

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division**

UNITED STATES, et al.,)	
)	
Plaintiffs,)	
v.)	No. 1:23-cv-00108-LMB-JFA
)	
GOOGLE LLC,)	
)	
Defendant.)	

**PLAINTIFFS’ POST-TRIAL PROPOSED FINDINGS OF FACT
AND CONCLUSIONS OF LAW**

I. Introduction

Over the course of three weeks, with testimony from dozens of witnesses, supported by hundreds of exhibits, the trial evidence proved what Plaintiffs alleged: Google is a monopolist illegally wielding control over the ad tech tools that make the free and open internet possible. Rather than compete on the merits by building better or lower-priced products for its customers, Google has used its dominance in three separate ad tech product markets to exert control over its customers, its competitors, and the very rules by which open-web display ads are bought and sold billions of times every day.

Google’s intent was clear from the start: “do to display what Google did to search.” PTX1814 at -746. After more than a decade of intentional, sustained, and mutually reinforcing conduct, Google has accomplished its objective. The trial evidence revealed that Google is more concerned with acquiring and preserving its trifecta of monopolies than serving its own publisher and advertiser customers or winning on the merits. The result is that, in the product markets at issue in this case, all roads lead to Google. It controls the dominant publisher ad server, the dominant advertiser ad network, and the dominant ad exchange in between, or as one Google

* Plaintiffs have redacted certain portions of the publicly viewable version of this document pursuant to the Court's prior orders on sealing of trial exhibits, *see, e.g.*, ECF No. 1147.

employee suggested, “the analogy would be if Goldman or Citibank owned the NYSE [New York Stock Exchange].” PTX0367 at -464.

Cognizant of the risks associated with its own internal plans to establish and maintain a monopoly over these and other products, and to minimize the prospect of future scrutiny as well as accountability, Google chose to train its employees about how to abuse the attorney-client privilege and destroy documents. By doing so, Google attempted to subvert the truth-finding functions of proceedings like this one. Those choices inform the credibility of the witnesses on Google’s payroll that through their testimony attempted to rewrite their own contemporaneous documents years after the fact.

Google’s conduct occurred in real, properly defined product markets that reflect the commercial realities of ad tech tools necessary to buy and sell open web display ads. Testimony from publishers, advertisers, and competitors alike established that open-web display advertising is a distinct form of digital advertising that is not reasonably interchangeable with other forms of advertising, and that the tools that facilitate programmatic open-web display ads belong in their own product markets. Google’s attempt to counter with—but not actually define—an amalgamated, two-sided market for digital display transactions did not even survive cross-examination after Google’s lead expert admitted that this purported market contained various products that are not reasonably interchangeable. But even if it had, Google’s own internal documents confirmed the validity of Plaintiffs’ product markets, as Google routinely tracks open web display advertising in separate categories from search advertising or social advertising. And Google’s own witnesses had to concede that an open-web publisher like the Wall Street Journal, the Staunton News Leader, or the Daily Mail cannot use a social media company’s ad tech tools—like TikTok’s—to sell display advertising inventory on the publisher’s own website. That

Google advocated against its own theory of market definition to another U.S. District Court, and secured dismissal of a complaint as a result, only underscores the lack of a legal and economic foundation to Google's arguments.

To protect and maintain its trifecta of ad tech monopolies, Google chose on more than one occasion to make its own products *worse*, and less in service of its customers' needs, so that it could avoid simple competition on the merits. Google used the acquisition of DoubleClick as part of its "three pillar" strategy to control ad tech products on the buy-side, sell-side, and in the middle, and the Admeld acquisition to "park" a worrisome competitor. Google confronted its customers with "all or nothing" propositions by tying Google Ads to AdX, and AdX to DFP. PTX0124 at -216. Indeed, a former Google employee noted that limiting Google Ads demand to AdX "compels publishers to work with" Google's products. Des. Tr. 108:18–109:03, 127:20–127:24 (Rowley (Google)). And through UPR, Google restricted its publisher customers' ability to do business with Google's competitors on more favorable terms. It is not surprising then that a publisher testified that publishers are "stuck" with Google's publisher ad server. Tr. Sept. 10 AM 10:16–13:2, 26:22–24, 51:19–52:3, 55:6–56:3 (Layser (News Corp)).

Google extended its tilting of the playing field to the mechanics of individual auctions for open-web display transactions, ensuring that Google's products got to jump to the head of the line (with First Look) or to get the last bite at the apple (with Last Look). And Google also exploited its Last Look advantage to gain scale and an informational upper hand over its competitors through Sell-Side Dynamic Revenue Share, though which Google could adjust its take rates to win the most desirable inventory (even when an advertiser using a rival ad exchange valued the ad more). Google's efforts to "dry out" header bidding through Project Poirot further illustrate Google's focus on exclusion rather than competition.

Google’s inability to call at trial a *single* live witness not on its payroll or in receipt of grant funds from Google—apart from a witness from the United States Census Bureau who does not use the ad tech tools at issue in this case—to support its general assertions of helping rather than harming its customers speaks volumes. Rather than meaningfully contradict Plaintiffs’ evidence of Google’s anticompetitive conduct or satisfy its burden to justify its conduct, Google proffered self-serving, post-hoc justifications for its conduct that were unsupported by the evidence—even its own documents—and insufficient under the law. For example, Google was unable to point to any “secret weapon” Google possesses when it comes to the prevention of spam, malware, or fraud, and even if it did, Google’s own documents show that Google’s actions were motivated by the desire to acquire and maintain its monopolies, not to maintain cybersecurity.

Google’s legal arguments fare no better than its factual assertions. Google’s contention that each part of its exclusionary campaign must be analyzed individually is foreclosed by Fourth Circuit and Supreme Court precedent. Google’s attempt to immunize anticompetitive conduct by labeling it a “refusal to deal” or “product design” likewise fails. None of Google’s conduct involves the kind of unilateral refusal to deal with rivals at issue in *Verizon Communications, Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398 (2004) (“*Trinko*”). Nor does it involve a product design choice.

Google is a monopolist in all three relevant markets, and it got to this point through anticompetitive conduct that violated the Sherman Act. On top of that, it tied two of its monopolized products together to further constrain its customers’ ability to make different choices away from Google. Google’s sustained, decade-long course of anticompetitive conduct is

inimical to a vibrant, open internet and is illegal. Plaintiffs therefore respectfully request that the Court find Google liable for its violations of the Sherman Act.

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PLAINTIFFS' PROPOSED FINDINGS OF FACT

II. Introduction and Legal Framework

A. Nature of the Action

1. The United States and 17 States brought this action under Section 4 of the Sherman Act and Section 16 of the Clayton Act respectively, 15 U.S.C. §§ 4, 26, to prevent and restrain Google's violations of Sections 1 and 2 of the Sherman Act, 15 U.S.C. §§ 1, 2. Plaintiffs seek to halt Google's anticompetitive scheme to maintain monopolies in three distinct digital advertising technology ("ad tech") markets, to unfetter and restore competition in each of these markets, and to prevent the recurrence of Google's illegal scheme in the future for the benefit of the consumers: the publishers and advertisers who rely on these markets.

B. The Parties

2. Plaintiffs are the United States and the states of Arizona, California, Colorado, Connecticut, Illinois, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, Tennessee, Virginia, Washington, and West Virginia.

3. Defendant Google LLC is a limited liability company organized and existing under the laws of the State of Delaware and is headquartered in Mountain View, California. Google is owned by Alphabet Inc., a publicly traded company incorporated and existing under the laws of the State of Delaware and headquartered in Mountain View, California. "The vast majority of Alphabet's revenues (nearly 80%) come from digital advertisements" *United States v. Google LLC*, No. 20-CV-3010, 2024 WL 3647498, at *6 (D.D.C. Aug. 5, 2024).

C. Third Parties

1. Publishers¹

4. *Buzzfeed*. BuzzFeed is an entertainment and news media publisher, which owns websites including The Huffington Post and Complex.com. Designated Deposition (“Des.”) Des. Tr. 78:24–79:05 (Blom (Buzzfeed)).²

5. *Gannett*. Gannett is a publishing company operating approximately 340 newspapers and their associated websites across the country, including national publications, such as USA Today, as well as local titles, such as the Detroit Free Press, Staunton Leader, and the Des Moines Register. Tr. Sept. 9 AM 49:10–50:1 (Wolfe (Gannett)).

6. *News Corp*. News Corp is a multinational publishing company that operates several major publications including the Wall Street Journal, New York Post, The Sun and The Times (UK), and The Australian. Tr. Sept. 10 AM 8:18–23 (Layser (News Corp)).

7. *The Daily Mail*. The Daily Mail is one of the largest English-language newspaper websites in the world. Tr. Sept. 18 AM 125:13–18 (Wheatland (Daily Mail)). It is headquartered in the United Kingdom with offices across the United States and Australia. Tr. Sept. 18 AM 125:9–12 (Wheatland (Daily Mail)).

8. *The New York Times*. The New York Times is an American newspaper and website. Tr. Sept. 26 PM 123:7–22 (Glogovsky (The New York Times)); DTX1824.

¹ Notice of Filing of the Parties’ Joint Glossary 7, ECF. No. 1309 (hereinafter “Joint Glossary”) (defining “Publisher”).

² Citations to the transcript of trial testimony, including depositions read into the record, use the following form: Tr. [Date] [AM/PM transcript] [page:line] [(witness (affiliation))]. Citations to designated deposition transcripts are used where the relevant portion does not appear in the trial transcript because the deposition was played via video or contained confidential information.

9. *The Walt Disney Company*. The Walt Disney Company is an American media and entertainment company that primarily offers consumers premium streaming video content. Tr. Sept. 17 PM 102:15–104:24, 129:25–130:5 (Helfand (Disney)) (“[T]he vast majority of our business is video[.]”). Disney reaches hundreds of millions of consumers across its platforms, including its streaming services. *Id.* at 131:12–19.

10. *Vox Media*. Vox Media is a digital media company which owns and operates 18 editorial brands. Tr. Sept. 27 AM 9:19–10:2 (Pauley (Vox)).

2. Publisher Ad Server Providers

11. *Equativ*. Equativ is an ad tech company headquartered in France, with offices in 18 countries including the United States. Equativ was founded in 2005 operating solely in the publisher ad server business, and since 2015 offers both a publisher ad server and a supply-side platform (“SSP”). Tr. Sept 13 PM 62:11–63:14 (Creput (Equativ)).

12. *Kevel*. Kevel is an ad tech company which primarily offers a publisher ad server product to publishers. Tr. Sept. 9 PM 116:19–23 (Avery (Kevel)). Kevel was founded as Adzerk in 2010 with a focus on display advertising. The company has since changed its business model to focus on native advertising. *Id.* at 117:11–13, 120:21–121:5, 127:23–128:4.

3. Ad Exchange Providers

13. *Index Exchange*. Index Exchange operates an ad exchange launched in 2011. Tr. Sept. 9 AM 106:25–107:3, 111:13–14 (Casale (Index Exchange)). It is based in Canada and the United States and maintains offices globally. *Id.* at 111:15–25.

14. *Kargo*. Kargo is an ad tech company offering an SSP that “transforms standard creative[s] and creates bespoke experiences for the largest advertisers as well as the best

publishers.” Tr. Sept 19 PM 38:23–39:1, 39:15–17 (Shaughnessy (Kargo)). Its customers include large publishers, digital first publishers, and broadcasters. *Id.* at 39:7–14.

15. *Magnite/Rubicon Project.* Magnite, formerly known as Rubicon Project, is an ad tech company offering an ad exchange product. Tr. Sept. 12 PM 160:1–13 (Kershaw (Magnite)). While Magnite has attempted to build other ad tech products, including a publisher ad server and a DSP, the vast majority of its revenue and transaction volume comes from its ad exchange product. *Id.* at 161:19–162:2, 162:13–25.

16. *OpenX.* OpenX is an ad tech company founded in the United Kingdom which primarily offers an ad exchange product to its customers. Tr. Sept. 17 PM 45:15–20 (Cadogan (OpenX)). From 2008 to 2018, OpenX also sold a publisher ad server product before discontinuing it. *Id.* at 46:4–8, 46:25–47:2.

17. *PubMatic.* PubMatic is an ad tech company offering an ad exchange product. PubMatic was founded in 2006 and focuses primarily on helping publishers generate more revenue from their ad inventory. DTX0117 at -425; Tr. Sept. 12 PM 56:22–57:23 (Goel (PubMatic)).

18. *Xandr/AppNexus/Microsoft.* Xandr, formerly known as AppNexus, is a subsidiary of the technology company Microsoft. AT&T acquired AppNexus in 2018 and rebranded it as Xandr before Microsoft acquired it in 2022. Tr. Sept. 20 PM 121:2–10, 136:10–12 (John (Microsoft)). Xandr offers a publisher ad server, ad exchange, and demand-side platform. *Id.* at 129:12–17.

4. Demand-Side Platform Providers

19. *The Trade Desk*. The Trade Desk is an ad tech company offering a demand-side platform product, a tool used by larger and more sophisticated advertisers to purchase open-web display advertising. Tr. Sept. 11 PM 87:21–22, 105:12–14 (Dederick (The Trade Desk)).

5. Advertiser Ad Network Providers

20. *Criteo*. Criteo is an ad tech company that offers an advertiser ad network with a focus on remarketing campaigns, i.e. allowing retailer advertisers to identify consumers that previously interacted with their companies and target digital advertising to those consumers. DTX0376 at -975; DTX1257; Tr. Sept. 11 AM 39:11–40:1 (Bender (Google)) (explaining remarketing), 84:15–85:8 (Criteo was “very competitive in their remarketing space”); Tr. Sept. 20 PM 143:7–9 (John (Microsoft)).

21. *Meta/Facebook*. Meta is a technology company which owns social media platforms including Facebook and Instagram. Meta offers an advertiser ad network called Facebook Audience Network (FAN). Tr. Sept 13 PM 98:5–17 (Boland (Meta)). Although FAN originally transacted in open-web display advertising, it stopped purchasing open-web display advertising in 2019. *Id.* at 100:2–19. Meta previously acquired but then shut-down a demand-side platform, an ad exchange, a supply-side platform, and a publisher ad server. DTX0758 at -969.

6. Other Companies

22. *Mediavine*. Mediavine is a company that works with smaller publishers, such as blogs to monetize their websites through advertising. Tr. Sept. 25 PM 160:21–23, 161:8–12 (Hochberger (Mediavine)). Mediavine does not offer its own commercial publisher ad server or

ad exchange. *Id.* at 163:12–13, 165:16–20. Instead, Mediavine uses Google’s publisher ad server, DFP, to service its publisher customers. *Id.* at 163:14–19.

7. Advertisers and Advertising Agencies

23. *Goodway Group.* Goodway Group is an advertising agency that provides services related to analytics, media planning, media buying, and strategic consulting. Tr. Sept. 10 AM 130:11–16 (Friedman (Goodway Group)). The agency primarily focuses on digital media. *Id.* at 129:9–19. Its clients include large global enterprises, local brands, and other ad agencies. *Id.* at 130:17–22.

24. *GroupM.* GroupM is an advertising agency that conducts media planning and purchases media on behalf of its clients. Tr. Sept. 17 PM 137:19–138:3 (Schiekofer (GroupM)). GroupM’s client base consists of large brands. *Id.* at 140:4–11.

25. *GSD&M.* GSD&M is an advertising agency that facilitates advertising campaigns and the purchase of media for its clients. Tr. Sept. 18 AM 194:14–23 (Bradbury (GSD&M)). GSD&M facilitated the purchase of open-web display advertising for the United States Air Force. Tr. Sept. 19 PM 6:11–20 (Bradbury (GSD&M)).

26. *OMD.* OMD is an advertising agency within the Omnicom Media Group. Tr. Sept. 13 PM 25:4–5, 49:3–6 (Lambert (OMD)). Its clients include major blue-chip brands and advertisers. *Id.* at 26:2–12.

27. *United States Census Bureau.* The United States Census Bureau is a federal agency with the objective of having all people living in the United States complete the decennial census. The Census Bureau deploys digital media campaigns in service of this objective. Tr. Sept. 23 PM 68:9–11 (Oliphant (Census)). The Census Bureau uses ad agency contractors to purchase digital media on its behalf. *Id.* at 69:9–11; Tr. Sept. 23 PM 122:3–18 (Hardie (Census)).

28. *Universal McCann (IPG)*. Universal McCann is an advertising agency owned by the holding company Interpublic Group (IPG). Tr. Sept. 9 PM 53:6–17 (Lowcock (IPG)). Universal McCann manages ad campaigns and buys various digital media for its clients, which include government entities, consumer product groups, retailers, automotive companies, and entertainment companies. *Id.* at 54:3–55:7.

29. *Zulily*. Zulily is an e-commerce company that sells retail products at discounted rates, and it markets to potential customers in part through digital advertising. Tr. Sept. 27 AM 23:4–11 (Bumpers (Zulily)).

III. Industry Background

A. Open-Web Display Advertising

30. A display ad is an image or text-based advertisement displayed on a website and viewed in an internet browser. Joint Glossary 6, ECF. No. 1309 (defining “Display advertising”); Tr. Sept. 9 AM 56:17–22 (Wolfe (Gannett)) (“[A]ny website that you go on, any of the boxes or rectangles that may be above or adjacent to, beside the content are traditionally referred to as display advertising.”); Tr. Sept. 17 PM 122:20–123:1 (Helfand (Disney)) (a display ad is “a static image on a page adjacent to content, as opposed to embedded in a piece of video content[.]”); Tr. Sept. 9 AM 113:1–8 (Casale (Index Exchange)) (“A display is an overarching category that typically refers to the banner ad. And so the banner ad is what you would typically see on a website. So imagine opening up the New York Times, and you'll see an ad maybe at the top of the page, inside of the content you might see a rectangle. Those are banner ads, and those are typically also considered display advertising as a generalized category.”).

31. Open-web display advertisements are display ads shown on the websites of open-web publishers and can be viewed on desktop or mobile devices. Tr. Sept. 9 PM 60:13–20 (Lowcock (IPG)) (“So

open web display advertising is a type of advertising that can appear effectively anywhere on the internet. It's used as a descriptor in contrast to something called 'walled gardens' [.]); Tr. Sept. 9 AM 56:17–60:23 (Wolfe (Gannett)) (highlighting examples of display ads in Plaintiffs' Demonstrative B); Tr. Sept. 19 PM 51:11–21 (Lee (Pls. Expert)) (open-web display advertising refers to “display banner ads shown to the websites of open-web publishers . . . in contrast to walled garden providers.”); Tr. Sept. 9 AM 113:1–115:25 (Casale (Index Exchange)) (answering that a display ad “typically refers to the banner ad . . . on a website” while differentiating it from social). Open-web publishers, in contrast to “walled-garden” publishers, are publishers that purchase third-party ad tech solutions, publisher ad server and advertiser exchange tools (i.e., ad tech products that these publishers do not themselves own) to sell their display advertising. Tr. Sept. 18 AM 136:12–24 (Wheatland (Daily Mail)); Tr. Sept. 9 PM 60:13–20 (Lowcock (IPG)) (“So a walled garden is best described as a constrained environment where you can only buy and place advertising on that platform in and of itself. That platform often controls both the tools with which you buy advertising.”); Tr. Sept 12 PM 70:25–72:23 (Goel (PubMatic)) (“‘Open web,’ to me, means the sector of the industry or ecosystem that is distinct from walled gardens where a publisher and advertiser in the open web can choose the technology systems, technology components that they want to use, both to interact with consumers and to deliver advertising.”); Des. Tr. 29:08–30:08 (O’Kelley (Xandr)) (explaining distinction between “open web” publishers versus “walled garden” or “closed platform” publishers like Facebook who use their own ad tech tools).

32. As described in more detail below, display ads and the ad tech tools used to buy, sell, and show them on the websites of open-web publishers are distinct from other forms of digital advertising—such as search ads, social media ads, and instream video ads—from the

perspective of website publishers and online advertisers. Tr. Sept. 9 AM 112:1–118:22 (Casale (Index Exchange)) (distinguishing the technological ecosystem underpinning the buying and selling of display ads to those of social media, mobile app, and in-stream video ads); Tr. Sept. 17 PM 138:7–140:23 (Schiekofer (GroupM)) (distinguishing display ads from other forms of digital advertising and discussing the complementary nature of digital advertising); Tr. Sept 10 AM 157:22–158:19 (Friedman (Goodway Group)); Tr. Sept 12 PM 70:25–71:9 (Goel (PubMatic)); Tr. Sept. 19 PM 15:16–16:10 (Cox (Google)) (Google’s buy-side “lead” for DRX distinguishing between instream and outstream video ads); PTX0764 at -251–54, -259–61 (identifying “Display Web,” “Display App,” “Search,” “Native Web,” “Native App,” and “Video Instream” as distinct categories of inventory that Google is tracking as part of a Business Focus Meeting); PTX0904 at -548–52; DTX0712 (Facebook presentation distinguishing between mobile, app, instream and outstream, mobile display, and desktop display).

33. Open-web publishers generate money by selling advertising space on their websites to advertisers who want to show their display ads to customers and thus advertise goods, services, or messages to website users. Tr. Sept. 18 AM 130:11–24 (Wheatland (Daily Mail)) (discussing importance of open-web display revenue); Tr. Sept. 9 AM 53:12–18 (Wolfe (Gannett)) (testifying that Gannett is able to offer free versus subscription-based access to newspapers on the internet and more generally remain in operation “[b]y selling advertising on the websites and properties.”). Open-web advertisers vary in size and include small businesses, large corporations, agencies of federal and state governments, charitable organizations, political candidates, public interest groups, religious and community organizations, and more. Tr. Sept. 10 AM 130:17–22 (Friedman (Goodway Group)) (Goodway’s open-web display advertisers includes “a variety of customers So everything from very, very large enterprises, global

enterprises, down to local or regional brands[.]”); Tr. Sept. 25 PM 73:22–23 (Stewart (Google)) (testifying that Google’s advertisers represent a wide range of advertisers from St. Jude to General Motors); Tr. Sept. 9 AM 54:3–55:7 (Lowcock (IPG)).

34. Some advertisers contract with ad agencies that have industry experience and expertise to buy advertisements on their behalf. Tr. Sept. 23 PM 71:12–17, 101:4–6 (Oliphant (Census Bureau)); Tr. Sept. 10 AM 130:17–22 (Friedman (Goodway Group)); Tr. Sept. 13 PM 26:2–12 (Lambert (OMD)); Tr. Sept. 9 PM 54:25–55:7 (Lowcock (IPG)).

35. A single display ad shown to a particular website user at a particular time is called an “impression.” Joint Glossary 6–7, ECF. No. 1309 (defining “Impression”); Tr. Sept. 9 AM 59:24–60:23 (Wolfe (Gannett)) (defining “impression” as unique views on each advertisement). A publisher’s “inventory” refers to the total number of impressions a publisher has available for sale to advertisers. Joint Glossary 5, ECF. No. 1309 (defining “inventory”); Tr. Sept. 9 AM 66:9–16 (Wolfe (Gannett)) (“Inventory, in our world, means those individual ad spaces that we’ve seen. They all have a mapping in the ad server that associates that discrete ad space on a per-platform basis to the inventory. So when we go to sell, we know specifically, you know, what inventory, what ad space we’re selecting to facilitate that sale.”).

36. Not all open-web ad impressions have the same economic value. Attributes of the website and the particular website user—such as the user’s demographics and her interests as revealed through previous websites visited—can make a given impression more valuable to a particular advertiser than that impression would be to other advertisers or than other impressions would be for that particular advertiser. PTX0904 at -543 (Google “Welcome to the Sell-Side world!” presentation: “Exchanges allow advertisers to bid for specific users (i.e. often employing cookies to provide additional user data). Advertisers can cherry pick the most valuable users and

publishers can earn more for more valuable inventory.”); PTX1674 at -040 (Equativ presentation discussing first-party data for targeting); PTX1503 at -598 (OpenX: “Our Next Steps: Build and bring to market the next wave of programmatic innovations . . . This will include exploring the application of more user data to drive transaction value.”); Tr. Sept. 10 PM 56:15–57:10 (Friedman (Goodway Group)) (describing retargeting ads and the value they provide by “showing an ad to a user who has already engaged with a brand in some meaningful way or another.”); Tr. Sept. 25 PM 125:25–126:11 (Borgia (Google)). For example, a vegan internet user browsing a blog about vegetarian recipes may give rise to an impression that is particularly valuable to a vegan restaurant advertiser. Tr. Sept. 16 PM 9:23–10:10 (Weintraub (Pls. Expert)). The ability to target more precise audiences distinguishes digital display ads from traditional TV or print ad placements, where the same ad is bought in advance and shown in an undifferentiated way to all viewers of a TV show or readers of a magazine. PTX0792 at -665 (Google presentation describing how digital ad “technology delivers greater precision in media buying than traditional advertising[,]” which is “[b]ought in advance, in bulk” and provides “less control over who sees your ad, where and when[.]”); Tr. Sept. 19 PM 76:21–77:11 (Lee (Pls. Expert)) (“[T]here’s significant value to be able to advertise on open-web publisher sites, target users across a wide range of websites.”).³ Data associated with the internet user’s online and offline behavior can be particularly valuable to advertisers looking to target particular types of users and to the ad tech tools used by those advertisers. Tr. Sept. 16 PM 8:25–9:22 (Weintraub (Pls.

³ At trial, Google’s primary economic expert on market definition issues did not include standard TV or print ads as part of the relevant market definition, for example. Tr. Sept. 26 AM 40:25–41:3 (Israel (Def. Expert)) (“[U]ltimately the business is, you know, digital display advertising where advertisers are trying to connect with users they find in some targeted way on a digital application or a website or something.”).

Expert)) (“And advertisers that wants to reach a user will find it more likely to find an impression that they value. So in that sense, the quality of the match—of a match between the buyer and the impression goes up.”).

37. All else equal, publishers want to find the advertisers willing to pay the highest prices for their impressions. Tr. Sept. 9 AM 130:14–19 (Casale (Index Exchange)) (“Publishers ultimately want to drive the highest cost they can for their media because that’s how they fund their content.”); Tr. Sept. 12 PM 84:16–85:4 (Goel (PubMatic)) (“I would say that, for publishers, the number one, two, and three priority is driving revenue or driving monetization for their ad inventory[.]”).

38. An ad tech industry has developed that offers various technology tools; some are used by open-web publishers to sell display advertising inventory (sometimes referred to as “sell-side” tools) and some are used by advertisers to buy open-web display advertising (sometimes referred to as “buy-side” tools). Joint Glossary 5, 8, ECF. No. 1309 (defining “Sell-side” and “Buy-side”).

39. Collectively, website publishers in the United States sell trillions of display ads on the open-web each year and billions of display ads every day. PTX0657 at -351 (2018 Google presentation estimating 7.2 trillion “addressable [] web” display advertisements globally); PTX0208 at -544 (third party exchanges represented more than 1 trillion monthly impressions as of 2014). These ads provide open-web publishers with over \$12 billion in advertising revenue annually, which allows those publishers to create and maintain their websites to the benefit of internet users. PTX0792 at -693.

40. The revenue that open-web publishers, particularly news publishers, generate through display advertising funds journalists, photographers, editors, and other professionals

who investigate and report stories to the public. Tr. Sept. 18 AM 151:1–20 (Wheatland (Daily Mail)) (Daily Mail is “a news publisher that produces content that we believe Americans find important, interesting, and the majority of our revenue is generated from display advertising, which run through Google’s systems. So, Google suppressing prices for publisher inventory means we cannot invest in journalism in the way we potentially otherwise would. You know, we see there are new verticals that we aim to move into, especially in the U.S. market. And actually fairly recently, we had – unfortunately had a round of layoffs across U.S. editorial. So it’s challenging to be a news publisher.”); Tr. Sept. 9 AM 53:12–18 (Wolfe (Gannett)) (testifying that Gannett is able to offer free access to newspapers on the internet “[b]y selling advertising on the websites and properties.”).

B. Advertising Sales Channels

41. Display ads can be sold via either “direct” or “indirect” transactions. Joint Glossary 6–7, ECF. No. 1309 (defining “Direct transactions” and “Indirect transactions”); PTX0792 at -667, -670 (Google presentation describing types of transactions).

42. *Direct transactions* are those in which an individual publisher negotiates in advance a deal with an individual advertiser to sell a particular volume of impressions on the publisher’s website. Joint Glossary, ECF. No. 1309 (defining “Direct transactions”); PTX0792 at -670 (direct sales are “[i]nventory bought at fixed prices directly from media owners”); PTX1031 at -527 (a direct deal “between publisher and advertiser or agency” involves “contracted quantities of impressions”); Des. Tr. 27:14–28:3 (Rowley (Google)) (“Direct” is “[a] publisher negotiating directly with advertisers or agencies to serve [advertisements] on their site.”). For example, a direct deal may give the advertiser the right—or option—to show its advertisement at the top of the publisher’s website for a set period of time or to a pre-determined

set of users. Tr. Sept. 9 AM 61:21–62:22 (Wolfe (Gannett)); Tr. Sept. 10 AM 33:3–34:5 (Layser (News Corp)); PTX0904 at -542.

43. Publishers cannot practicably sell their entire display ad inventory via pre-negotiated direct deals, however, because of the “labor, skills, and resources” required and because, as publisher witnesses testified, having “tested the market” publishers are “selling as much as they can directly.” Tr. Sept. 9 AM 63:10–64:2 (Wolfe (Gannett)) (explaining why it is not feasible for publishers to sell all of their advertising inventory via direct deals); Tr. Sept. 10 AM 34:25–36:9 (Layser (News Corp)) (discussing how publishers like News Corp cannot shift impressions from open auction to direct deals). Additionally, publishers cannot negotiate one-to-one agreements with every advertiser interested in showing an advertisement on the publisher’s website. Tr. Sept. 9 AM 63:10–64:2 (Wolfe (Gannett)); *see* Tr. Sept. 27 AM 64:2–10 (Wheatland (Daily Mail)). In addition, it is not possible for most publishers to sell all of their inventory directly, even if they could forecast with sufficient accuracy, because the volume of impressions for sale, the number of interested advertisers, and the relatively manual nature of the negotiations make that prohibitively costly and impractical. Tr. Sept. 19 PM 10:13–25 (Bradbury (GSD&M)) (agreeing that it would be more costly to do advertising across hundreds or thousands of websites via a direct deal: “there would be a cost [to] administering and executing that”); Tr. Sept. 9 AM 63:10–64:2 (Wolfe (Gannett)); Tr. Sept. 27 AM 63:9–23 (Wheatland (Daily Mail)) (“[W]e sell as much as we can via direct channels, but it’s typically—it’s difficult to sell via direct channels. The cost of doing business via direct sales is higher . . . you need a sales team, you need all of the support staff around that.”). Selling digital advertising only through pre-negotiated direct deals would leave a substantial amount of publisher inventory unsold. *See id.*; *see also* Tr. Sept. 10 AM 34:25–35–10 (Layser (News Corp)) (explaining why publishers cannot shift impressions from

open auctions to direct deals, and that programmatic selling is the method to sell inventory that was not sold through direct deals).

44. *Indirect transactions* are where a publisher sells any ad inventory that remains after accounting for all direct transactions; this is sometimes known as “remnant” inventory. Joint Glossary 7, ECF. No. 1309 (defining “Indirect transactions”); Tr. Sept. 12 PM 58:25–59:15 (Goel (PubMatic)) (discussing remnant inventory). Indirect transactions are those in which there is no direct relationship between the publisher and the advertiser. Tr. Sept. 9 AM 62:8–11 (Wolfe (Gannett)) (noting how direct deals require humans to interact with one another); Tr. Sept. 10 PM 74:6–22 (Lipkovitz (Google)) (testifying that direct deals require a relationship between advertiser and publisher, and that “programmatic was an attempt to sort of get it more efficient and sort of automated and . . . minimize the number of people needed to talk”).

45. Publishers typically sell their “remnant” inventory programmatically on an impression-by-impression basis via a real-time “open auction,” i.e., an auction open to a wide swath of advertisers rather than advertisers who have a pre-existing deal with the publisher. Joint Glossary 7, ECF. No. 1309 (defining “Open Auction Transaction”); Tr. Sept. 10 AM 6:15–24 (Layser (News Corp)) (“[R]emnant turned into programmatic . . . programmatic is the automated buying and selling of advertising.”); Tr. Sept. 18 PM 135:15–136:3 (Wheatland (Daily Mail)); Tr. Sept. 12 PM 59:3–8 (Goel (PubMatic)); Tr. Sept. 19 PM 54:13–22, 72:25–73:7 (Lee (Pls. Expert)) (“[A]d exchanges allow open-web publishers to auction off their remnant inventory to thousands of advertisers without having to form individual direct relationships with each and every one.”); PTX0792 at -689 (“open auction” happens “in real time” among “different types of buyers”).

46. Because display ads are generated alongside website content while a website loads, website publishers must quickly decide which display ads to show a particular user. For a single website publisher, such decisions have to be made in a fraction of a second, hundreds of thousands or millions of times per day. Tr. Sept. 12 PM 160:20–161:16 (Kershaw (Magnite)) (“We then—and when that inventory came to us, we’d call a bunch of buyers, run an auction. We had 250 milliseconds to do it; so you had to do it quite quickly, and we did it billions of times an hour.”); Tr. Sept. 9 AM 73:10–74:2 (Wolfe (Gannett)) (“So it is where an ad request is sent to an exchange, the exchange then represents—represents that same impression to the buy-side, and again, in that 800 milliseconds, an auction is occurring where a bid—a real-time bid is being placed and sent back to the ad server for evaluation.”); Tr. Sept. 12 PM 61:13–62:14 (Goel (PubMatic)) (“So all of this needs to happen very quickly as the consumer is looking at content or waiting for the content to load, so that is to say in a fraction of a second.”); Joint Glossary 8, ECF. No. 1309 (defining “Real-time bidding (RTB)”). During that time, advertisers, likewise, must decide which impressions to buy, using which advertisements, and at what price.

47. Programmatic advertising is the use of technology to automate and optimize, in real time, these publisher ad-selling (sell-side) and advertising ad-buying (buy-side, sometimes known as demand-side) processes. PTX0792 at -669 (“Programmatic advertising is the automation of buying and selling of digital advertising.”); Tr. Sept. 17 PM 120:8–13 (Helfand (Disney)) (programmatic is the “industry term for . . . automat[ing] the transaction of ad inventory using a request sent out over the web to a demand source, and that demand source sending an ad back and placing that into the ad inventory”); Tr. Sept. 10 PM 74:6–22 (Lipkowitz (Google)) (programmatic “automate[s]” advertising and “minimize[s] the number of people” needed to sell inventory and place ads).

48. Programmatic digital advertising is an innovation that pre-dates Google’s conduct at issue in this case and was pioneered by other companies. Tr. Sept. 12 PM 68:6–68:13, 69:22–25 (Goel (PubMatic)) (explaining PubMatic was “among the first, if not the first, to work on a specification with certain buyers” for real-time bidding and, along with others in the industry, were using real-time bidding at the time of the relaunch of AdX).

49. Because programmatic digital advertising obviates the need for individual negotiations between publishers and advertisers, it allows publishers to sell their ad inventory to a much wider universe of advertisers, and allows advertisers to buy ad inventory from a broader array of publishers. Tr. Sept. 23 PM 104:11–23 (Oliphant (Census)) (“Q. And to what extent could [C]ensus just do all site direct and not need to do programmatic display? A. It wouldn’t make sense. . . . We don’t have that time or that inclination to go website by website by website. It is not the best use of time. It’s not the best use of money. The use of programmatic for that effort is best.”); Tr. Sept. 19 PM 9:23–10:25 (Bradbury (GSD&M)) (“If the marketing objective is requiring a broad reach or exposure to a message, then scale becomes important. Therefore, programmatic is an attractive vehicle given its ability to reach many, many particular audience sets. A direct publisher, as you cited, can still be very beneficial, but it becomes a matter—typically, it comes at a lower scale.”); Tr. Sept. 9 AM 107:21–108:13 (Casale (Index Exchange)) (“Programmatic is the automation of digital media, and specifically the buying and selling of digital media.”).

C. Ad Tech Tools

50. As soon as website publishers began putting content on the internet, technology companies began to develop various kinds of software—sometimes called ad tech tools—to allow those publishers to generate revenue from their burgeoning digital presence to fund their

operations. The ad tech tools most relevant to this case include (i) publisher ad servers, (ii) advertiser ad networks, (iii) demand-side platforms (“DSPs”), and (iv) ad exchanges.

51. *Publisher Ad Servers.* For both direct and indirect transactions, open-web publishers use software called “publisher ad servers” to manage their sales of display ad inventory to advertisers. Joint Glossary 8, ECF. No. 1309 (defining “Publisher ad server”); Tr. Sept. 16 AM 22:12–14 (Mohan (Google)) (“By definition, publishers couldn’t really manage their display advertising without an ad server.”); Tr. Sept. 20 PM 78:4–25 (Sheffer (Google)) (“[T]he ad server is a mission-critical enterprise software tool that publishers use . . . to drive their direct sales efforts . . . [and] indirect monetization” of open-web inventory.); Tr. Sept. 9 AM 66:1–8 (Wolfe (Gannett)) (explaining that the publisher ad server is the “cornerstone technology that is used by publishers to manage their inventory” for both “direct sold campaigns” and “the programmatic environment”); Tr. Sept 19 PM 61:18–25 (Lee (Pls. Expert)) (describing one of the most important features of publisher ad servers: “to effectively manage both directly sold and indirectly sold open-web display advertisements”); Tr. Sept. 10 PM 75:24–76:7 (Lipkovitz (Google)).

52. The publisher ad server decides which ad to display for a given impression, then retrieves the ad from the advertiser and displays it to the website user, all in the short time it takes for the website’s content to load on the user’s web browser. Tr. Sept. 9 AM 68:16–69:25 (Wolfe (Gannett)) (explaining that the publisher ad server is “kind of the alpha and the omega in the equation,” “starts the process[,] and [is] ultimately the determining factor as to which ad gets displayed to the end user,” which happens “in less than 800 milliseconds” when a “user launches a web page”); Tr. Sept. 9 AM 121:1–16 (Casale (Index Exchange)) (describing the publisher ad server as making a “real-time decision . . . when a website is loading . . . typically in the blink of

an eye . . . as to what advertiser will buy that slot”); *see also* DTX1016 at -503 (“Today, Publishers use Ad Servers to control what inventory is sold directly vs. sold through Exchanges.”); Des. Tr. 77:10–14, 77:17–79:14 (O’Kelley (Xandr)) (explaining how the publisher ad server has “a huge advantage in deciding which ad to serve”).

53. A publisher ad server also tracks and produces reports to the publisher about the number of impressions sold, on what terms, and how often users are clicking on display ads, all of which helps the publisher understand how its website is generating ad revenue and can be better monetized. Tr. Sept. 13 PM 82:6–18 (Creput (Equativ)) (“The ad server manages all the complexity of digital advertising, the differences in format, in operating systems, in terms of devices which are constantly evolving.”); PTX1572 at -693 (Meta document describing [REDACTED]

[REDACTED]; Tr. Sept. 23 AM 30:9–31:9 (Korula (Google)) (describing “detailed reporting functionality” of Google’s publisher ad server, including “impressions,” and “clicks,” and “revenue”); Tr. Sept. 20 PM 78:4–25 (Sheffer (Google)) (explaining that the publisher ad server is a “mission-critical enterprise software tool” for running ad campaigns and “target[ing] those ads correctly to the types of users or the audiences that those advertiser agencies want”).

54. Since at least 2008, Google has offered a publisher ad server called “DoubleClick for Publishers” or “DFP.” Joint Glossary 6, ECF. No. 1309 (defining “DoubleClick for Publishers (‘DFP’)”); Tr. Sept. 11 AM 8:20–9:14 (Bender (Google)); Tr. Sept. 16 AM 27:24–28:7 (Mohan (Google)).

55. *Advertiser Ad Networks*. Advertiser ad networks provide ad buyers a simple tool for automating and optimizing the purchase of open-web display advertising. PTX0579 at -509 (describing Google’s advertiser ad network as a “turnkey media solution”); Tr. Sept. 10 AM 140:11–141:24, 145:9–19 (Friedman (Goodway)) (comparing the “less sophisticated tool” of advertiser ad networks to the “professional tool” of DSPs); Tr. Sept. 19 PM 99:6–14 (Lee (Pls. Expert)) (“[A]dvertiser ad networks provide a simplified user interface that is useful to smaller advertisers with less complex advertising needs.”); *see* PFOF Sec. VII.B.

56. Advertiser ad networks are distinct from other ad buying tools such as demand-side platforms or DSPs. Tr. Sept 13 PM 101:5–11 (Boland (Meta)) (advertiser ad networks are “a different beast than a standalone DSP”); Tr. Sept. 10 AM 140:7–141:19, 145:9–19 (Friedman (Goodway Group)); Tr. Sept. 11 PM 104:1–107:2 (Dederick (The Trade Desk)) (advertiser ad networks and DSPs are “not at all” the same because, among other things, an advertiser ad network will not have the same setup or pricing model as a DSP or utilize the same targeting data as a DSP); DTX1514 at -903 (industry “LUMAScape” distinguishing between “ad networks” and DSPs); *see also* PFOF Sec. VII.B.1. For example, advertiser ad networks are generally easier to use than DSPs, especially for a small advertiser that lacks technical expertise or ad targeting data or for an advertiser that desires a “hands-off” solution for buying display ads. PTX1031 at -484 (Google presentation describing its advertiser ad network as “[t]he advertiser tool for smaller advertisers”); PTX0579 at -509 (identifying the customer segment for Google’s advertiser ad network as “[t]ypically smaller and mid-sized marketers who . . . need[] a simple, low-touch solution with minimal customization”); Tr. Sept. 11 PM 104:25–105:20 (Dederick (The Trade Desk)) (advertising ad networks are “often much more sort of simple” and “often smaller advertisers buy from ad networks more than they would use demand-side platforms”); Tr. Sept.

12 PM 76:10–77:16 (Goel (PubMatic)) (“[S]maller advertisers will typically use an ad network” because “they’re looking really for ease of use.”). The user interfaces of advertiser ad networks are straightforward as compared to DSPs, allowing the advertiser to “[p]ut in a budget, put in very brief targeting criteria, and hit go.” Tr. Sept. 11 PM 104:1–105:20 (Dederick (The Trade Desk)); PTX0939 at -991 (describing Google Ads (“AdWords/GDN”) as “Easy to use” compared to “[h]ighly sophisticated” DV360 (“DBM”)); Tr. Sept. 11 AM 24:10–13, 40:2–41:2 (Bender (Google)). As such, advertiser ad networks, unlike DSPs, do not require management by a trading desk, agency, or in-house team of professionals. Tr. Sept. 25 PM 83:3–11 (Stewart (Google)) (agreeing that Google’s advertiser ad network does not require the type of management required by its DSP); DTX1514 at -947 (Google presentation comparing the management teams required for each advertiser buying tool).

57. There are other important differences between ad networks and DSPs. For example, advertisers buying display ads via an advertiser ad network typically pay only when an internet user *clicks* on the advertiser’s ad or takes some other action. DTX1514 at -947 (contrasting fee based on “pay per conversion” (e.g., clicks) for Google’s advertiser ad network and “% of media or CPM markup” for Google’s DSP). So, while an advertiser ad network typically bids on and pays publishers for each impression, it only charges its advertiser customer when a user *clicks* on an advertisement. PTX1096 at -610 (Google submission to the European Commission explaining that “[w]hen advertisers use Google Ads to buy display ads, Google Ads does not typically charge advertisers a per transaction fee, or a fixed revenue share. Instead, advertisers are typically charged when a user takes an action, such as clicking on an ad (referred to as a cost-per-click (CPC) basis”); Tr. Sept. 11 AM 24:14–24 (Bender (Google)); PTX 1385 (showing that the vast majority of Google Ads impressions were transacted on a cost-per-click

(CPC) or cost-per-action (CPA) basis); Tr. Sept. 9 AM 127:22–128:25 (Casale (Index Exchange)) (explaining that “an advertiser might use an ad network to buy clicks because buying impressions is complicated”); Tr. Sept 11 PM 102:20–103:13 (Dederick (The Trade Desk)) (explaining that advertiser ad networks are typically priced on “a fixed outcome like a click”); Tr. Sept. 19 PM 99:6–14 (Lee (Pls. Expert)) (“[A]dvertiser ad networks provide the ability to pay on a CPC or cost-per-click basis.”); Joint Glossary 5, ECF. No. 1309 (defining “Cost per click (CPC)”). By contrast, advertisers using DSPs bid directly on—and pay for—each display ad *impression* shown to an internet user. PTX1385 (demonstrating that DSPs overwhelmingly charge on a CPM basis); PTX1096 at -610 (explaining that Google’s DSP charges a fee based on a “tiered percentage of the customer’s ‘exchange spend’ . . . i.e. the aggregate cost of . . . media”); Tr. Sept. 19 PM 106:9–21 (Lee (Pls. Expert)) (describing data showing that advertisers primarily pay DSPs on a cost-per-impression basis versus paying cost-per-click for Google’s advertising ad network).

58. Google’s advertiser ad network is called Google Ads. Joint Glossary 6, ECF. No. 1309 (defining “Google Ads”). The pool of advertisers that utilizes Google Ads to purchase open-web display ads is often referred to as the “Google Display Network” or “GDN” in Google’s documents. PTX1096 at -609 (“The display advertising aspect of Google Ads/AdWords may also be referred to as ‘Google Display Network’ or ‘GDN.’”); Tr. Sept. 9 AM 129:1–6 (Casale (Index Exchange)) (“[T]he Google Display Network, which is now referred to as Google Ads is the largest ad network in the world.”). Millions of individual advertisers use Google Ads to buy open-web display ads. Tr. Sept. 19 PM 30:2–3 (Kim (Google)); PTX1231 (showing that over 4 million advertisers use only Google Ads to purchase open-web display advertising).

59. Google Ads provides advertisers access to advertising on “the more than two million publisher sites and apps on the Google Display Network,” reaching “90%+ of [the] internet population.” DTX0549 at -218, -293 (Google presentation “AdWords Display Overview”); Tr. Sept. 20 PM 84:9–13 (Sheffer (Google)) (Google has “2 million publishing partners worldwide”); *see* PFOF ¶ 93. To target ads and predict the likelihood that a user will click on an ad, Google Ads uses a mix of both contextual and user targeting data that it accumulates across its business. Tr. Sept. 13 AM 52:18–53:17 (LaSala (Google)) (Google Ads buys advertising using data available to Google, including contextual data, also used for Search); *cf.* Tr. Sept. 11 PM 99:11–22, 105:21–106:15 (Dederick (The Trade Desk)) (explaining how “Google sits on the most valuable data asset in the world. They have, like, 2 billion log-ins,” and how, for advertiser ad networks, targeting “data that is being applied is derived from the supply side.”).

60. *Demand-Side Platforms (“DSPs”)*. Demand-side platforms are typically used by large advertisers and ad agencies to purchase display ads programmatically. Joint Glossary 5, ECF. No. 1309 (defining “Demand-side Platforms”); Tr. Sept. 11 PM 104:25–105:14 (Dederick (The Trade Desk)) (DSPs are used by “larger advertisers or the Fortune 500 advertisers”); Tr. Sept. 12 PM 76:19–77:16 (Goel (PubMatic)) (“[L]arger advertisers will gravitate towards demand-side platforms.”). Demand-side platforms provide customizable tools for sophisticated advertisers and ad agencies that allow them to control where and how bids are submitted for display ad inventory. Tr. Sept. 10 AM 140:11–141:19 (Friedman (Goodway Group)) (describing DSPs as a “professional tool” with “significant flexibility” in controls); Tr. Sept. 11 PM 96:16–21, 104:25–105:11 (Dederick (The Trade Desk)) (DSPs are “a self-service buying tool” used by advertisers with “a robust marketing department” and “[ad] agency relationships”); Tr. Sept. 25

PM 83:19–25 (Stewart (Google)) (admitting that Google’s DSP provides “more control and customization” than Google’s advertiser ad network); DTX1514 at -952 (identifying “Enterprise Controls and Customization” as a key feature of Google’s DSP); PTX1031 at -483 (Google presentation defining a demand side platform). DSPs allow advertisers to use the advertiser’s own proprietary data to better target the audience they want to reach and refine their bidding strategy. Tr. Sept. 11 PM 105:21–106:8 (Dederick (The Trade Desk)) (explaining that “a demand-side platform is about leveraging buy-side interests and deploying buy-side data”); DTX1514 at -929 (highlighting DV360 enables advertisers to use “1st party data & 3rd party segments” to reach their audience); PTX1031 at -483 (DSPs let advertisers control who an ad reaches, when it is served, and from which advertiser budget). Some larger advertisers use both DSPs and advertiser ad networks because they offer complementary services to achieve an advertisers’ campaign objectives. DTX1514 at -950–953 (Google training deck section entitled “Google Ads and DV360: Better Together” highlighting reasons for advertisers to use both tools); Tr. Sept. 19 PM 104:11–16 (Lee (Pls. Expert)) (testifying that PTX1235 indicates “that DSPs and advertiser ad networks cater to different needs and different sets of customers even though there might be some customers who use both tools”).

61. Google’s DSP offering is called “Display and Video 360” or “DV360” and was previously known as “DoubleClick Bid Manager” or “DBM.” Joint Glossary 6, ECF. No. 1309 (defining “Display & Video 360 (‘DV360’)”); Tr. Sept. 12 AM 18:17-21 (Srinivasan (Google)); PTX1031 at -483.

62. *Ad Exchanges.* Publishers using a publisher ad server to sell ad inventory to advertisers using an advertiser ad network or DSP to buy advertising can connect through an ad exchange. Joint Glossary 5, ECF. No. 1309 (defining “Ad exchange”). Ad exchanges are

sometimes referred to as “supply-side platforms” or “SSPs.” Joint Glossary 8, ECF. No. 1309 (defining “SSP”); PTX1031 at -481 (the terms “SSP and [Ad] Exchange are . . . used interchangeably.”); Tr. Sept. 9 AM 67:8–18 (Wolfe (Gannett)) (“ad exchange” and “SSP” are “two terms [] used fairly synonymously”).

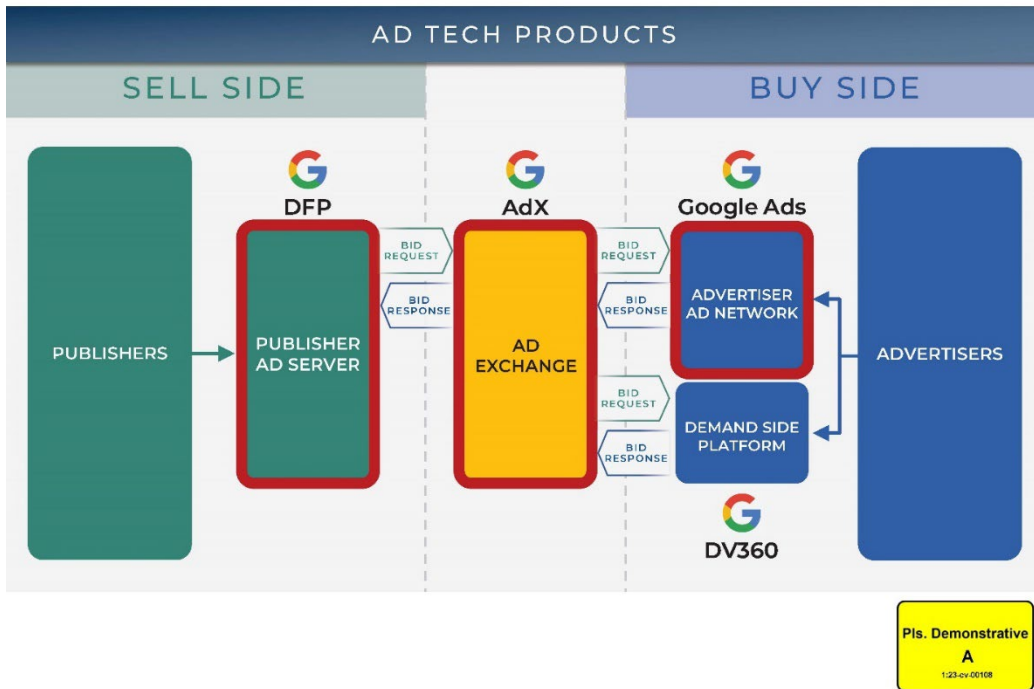
63. An ad exchange is software that runs auctions for an open-web publisher’s display ad inventory, i.e., each impression they want to sell. PTX1031 at -480 (exchanges are “an online, auction-driven marketplace, where ad impressions are sold and bought in real time”); Tr. Sept. 9 AM 67:8–18 (Wolfe (Gannett)) (“An ad exchange or an SSP is where a publisher will offer an impression or an ad call to be matched with a buyer” based on an “auction . . . for an advertiser to appear on a publisher’s website.”). Thus, ad exchanges are an important way for open-web publishers to connect indirectly to advertiser demand. *See* Tr. Sept. 9 AM 63:1–64:6 (Wolfe (Gannett)) (explaining that 60-75% of Gannett’s inventory is sold programmatically, mostly via ad exchange auctions); Tr. Sept. 19 PM 54:13–22 (Lee (Pls. Expert)) (\$24 billion was spent on “indirect programmatic auction open-web display ads”).

64. Google’s ad exchange is AdX. Joint Glossary 5, ECF. No. 1309 (defining “AdX”). Although Google has rebranded DFP and AdX under the combined name Google Ad Manager (GAM), DFP and AdX remain distinct products that serve distinct functions. Tr. Sept. 9 AM 66:19–67:3 (Wolfe (Gannett)) (“Google Ad Manager encompass multiple ad tech tools . . . what used to be called DFP DoubleClick for Publishers is the ad serving component, and the separate component is the Google ad exchange, also referred to as AdX.”). Google continued to identify its publisher ad server and ad exchange as separate products in its internal documents, as do other industry participants. *See, e.g.*, PTX0847 (Google diagram showing DFP separately from AdX). Google also prices the publisher ad server (DFP) and ad exchange (AdX) components of

GAM separately. PTX0847; PTX1392; PTX1242. Other ad exchanges include those offered by OpenX, PubMatic, Magnite, Xandr, and Index Exchange. Tr. Sept. 13 AM 5:16–6:4 (Kershaw (Magnite)); *see* PFOF Sec. VII.C.

D. Mechanics of Digital Display Advertising Auctions

65. Publishers and advertisers rely upon publisher ad servers, ad exchanges, demand-side platforms, and advertiser ad networks to buy and sell display advertising programmatically. Tr. Sept. 9 AM 66:1–8, 67:8–18 (Wolfe (Gannett)); Tr. Sept. 9 AM 109:22–110:25 (Casale (Index Exchange)); Tr. Sept. 11 PM 87:23–88:6 (Dederick (The Trade Desk)). As shown below, Google operates the dominant product within each of these markets. *See* PFOF Sec. VII.



66. In general, these ad tech tools work together in the following ways to allow open-web publishers to sell their impressions to advertisers interested in purchasing open-web display ads. When a user loads a website in an internet browser, that action generates an ad impression

that becomes available for sale. As the webpage is loading, the website's publisher ad server automatically requests a bid from one or more ad exchanges (a "bid request"). PTX1031 at -502; Tr. Sept. 9 AM 68:21–69:25 (Wolfe (Gannett)) (process initiated when "[a] user launches a web page"). The bid request contains information about the impression for sale including where the ad will appear on the website and any available data on the user who will be viewing the website, and any restrictions on the type of advertiser that can buy the impression (e.g., barring ads for certain types of products, or ads from specific companies). PTX1031 at -501 (describing Ad Exchange's collection of "signals from the request," such as "URL, what the page is about, User Agent, ad slot size, [and] cookie id," bid requests submitted to DSPs, and "filtering [bid responses] against publisher defined rules").

67. The ad exchange then sends its own bid request containing this information, potentially plus additional targeting-related information, to various advertiser buying tools or "demand sources" (e.g., advertiser ad networks and demand-side platforms). PTX1031 at -501–502.

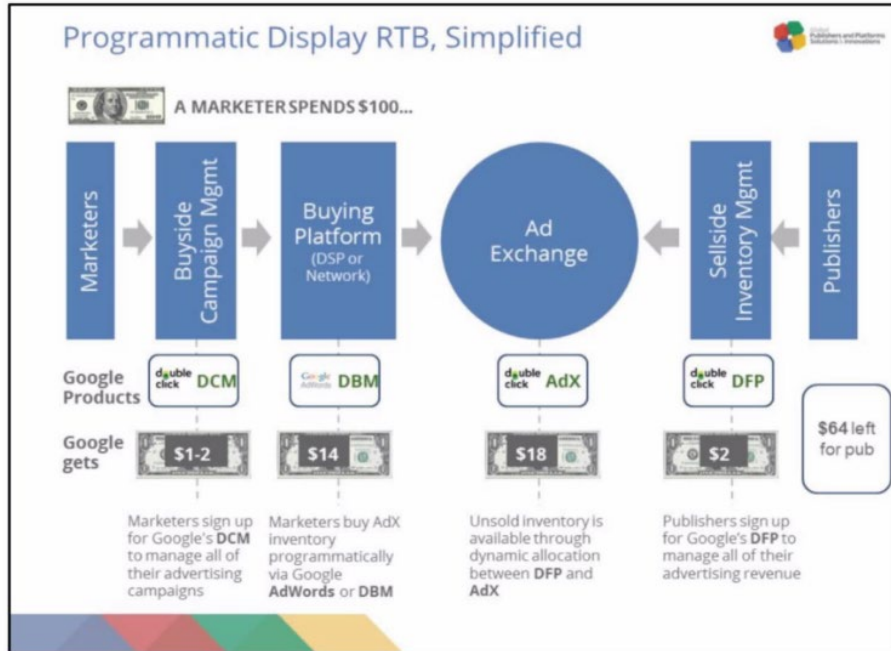
68. Each advertiser buying tool uses its own internal logic to identify which of its advertiser customers is willing to pay the most for the impression, and it returns that highest bid back to the ad exchange. PTX1031 at -480, -502.

69. The ad exchange evaluates the bids it receives to ensure they meet the publisher's eligibility criteria, runs an auction to select the highest eligible bidder, and sends the winning bid to the publisher ad server. Tr. Sept. 9 AM 68:16–69:16 (Wolfe (Gannett)) (describing publisher ad server's bid request to ad exchange, the ad exchange auction, and the winning bid passing back to the publisher ad server); PTX1031 at -502.

70. The publisher ad server compares the bids it receives from various exchanges against each other and selects which advertisement to serve for the impression being sold.⁴ Tr. Sept. 9 AM 121:1–122:1 (Casale (Index Exchange)); PTX1031 at -532; Joint Glossary 6–7, ECF 1309. The publisher ad server then loads that advertisement on the publisher’s website. Tr. Sept. 9 AM 120:12–25 (Casale (Index Exchange)) (“The ad server ultimately also is responsible for final decisioning and render of ad.”). If no eligible buyer is found for the impression, the ad space may simply go unfilled before the internet user navigates to another website; this generates no revenue for the publisher. *See* Tr. Sept. 17 PM 51:1–17 (Cadogan (OpenX)).

71. At each step in the process above, ad tech tools collect fees associated with using the ad tech tool, as shown in the Google-created diagram below. PTX0794 at -738 (Google presentation, “Programmatic Strategy Review”). In this illustration, Google keeps approximately \$36 of every \$100 of advertising transactions that go through each of Google’s ad tech tools. PTX0794 at -738.

⁴ Additionally, through a function known as Enhanced Dynamic Allocation, DFP compared prices of individual ad exchanges to a “temporary CPM” price assigned to directly sold ads, which accounted for whether the publisher was on track to deliver the number of impressions promised to the advertiser. PTX0401 at -787 (explaining that “What happens today” as “EDA ‘temporary CPM’”); *see also* PTX0884 at -249.



72. These fees often are based on a percentage of the price of the underlying advertisement and are referred to as a “revenue share” or “take rate” (i.e., part of the advertiser’s payment is taken by the ad tech tool and part is ultimately shared with the website publisher). PTX1031 at -514; Tr. Sept. 13 AM 59:23–60:1 (LaSala (Google)) (“I mean, I’m hesitating on the word ‘fee,’ because we just took the money off of -- like, there wasn't a negotiation or a stated rate. We just took 32 percent and then passed 68 percent through. That’s how I understood it.”); Tr. Sept. 9 AM 111:1–12 (Casale (Index Exchange)) (ad exchange “compensated on percentage of media basis, otherwise known as a take rate”). Fees are generally collected only if the advertiser’s bid wins; ad exchanges, advertiser ad networks, and DSPs do not receive compensation for submitting a bid that does not win the impression, even though they bear an associated cost. Tr. Sept. 9 AM 142:21–143:18 (Casale (Index Exchange)) (describing server costs for Index Exchange running auctions even when it does not ultimately render the ad); Tr.

Sept. 16 PM 17:15–18:10 (Weintraub (Pls. Expert)) (explaining “compute costs to be able to run the transaction . . . [b]ut the firm only makes money if it wins the impression”).

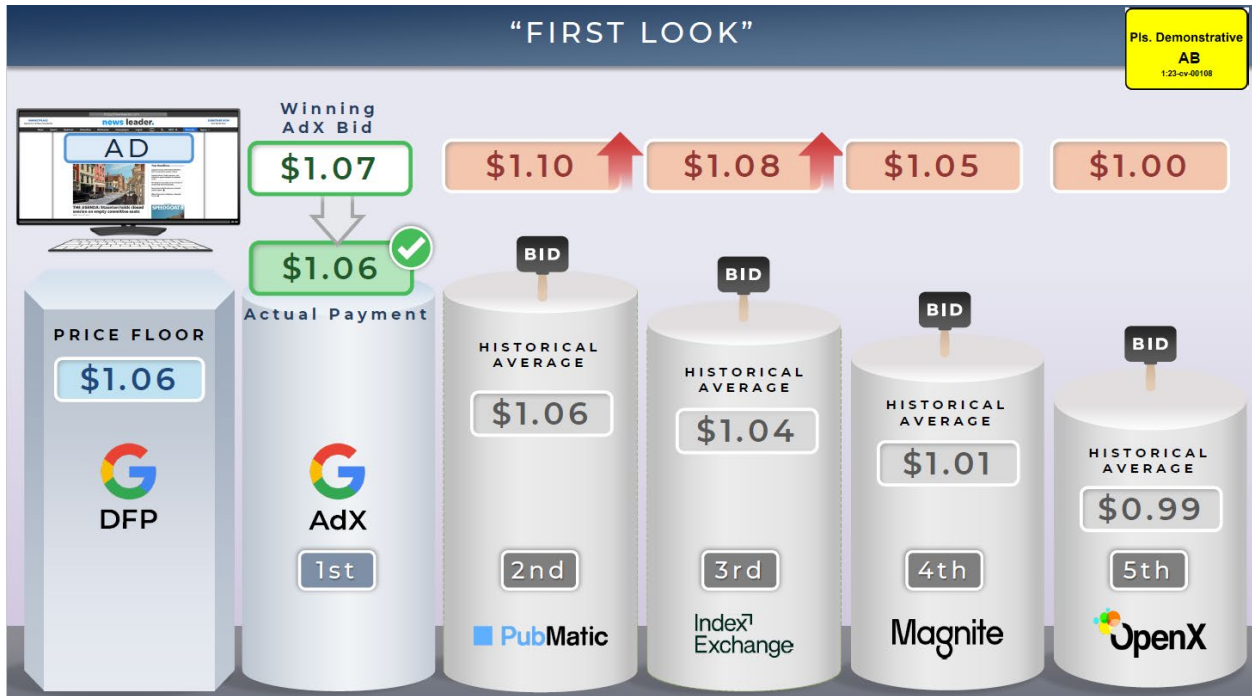
73. Historically, publishers used an ad server to sell impressions by requesting bids from ad exchanges one at a time—a process called a “waterfall.” Tr. Sept. 12 PM 60:19–62:8 (Goel (PubMatic)); Tr. Sept. 9 AM 148:12–149:12 (Casale (Index Exchange)); PTX1031 at -503 (“Waterfall is a traditional way of accessing demand from multiple ad sources (Networks, Exchanges, etc.) for one impression.”); Tr. Sept. 11 AM 99:24–101:2 (Ravi (Pls. Expert)) (explaining waterfall example); Joint Glossary 8, ECF. No. 1309 (defining “Waterfall”). As part of the waterfall process, the publisher ad server compares a publisher’s floor price, i.e., the minimum price that a publisher is willing to accept when selling an impression, to the price offered by each eligible ad exchange or ad network, one at a time. PTX1096 at -605 (If the first demand source “would not buy remnant inventory at or above the floor price set by the publisher for a particular ad unit or impression, the ad server would call the second [exchange] etc., until the impression was filled or could not be filled.”). If the price offered by an ad exchange matches or exceeds the publisher’s floor price, the waterfall process ends and the ad exchange willing to pay above the floor price wins the impression. Tr. Sept. 9 AM 148:12–149:12 (Casale (Index Exchange)) (“And if they were able to clear it, the transaction would end there.”). If not, the publisher ad server contacts the next ad exchange in the waterfall, repeating this process until the impression is sold or the ad server fails to find a buyer. Tr. Sept. 9 AM 148:12–150:24 (Casale (Index Exchange)) (“If they were not able to clear it, it would then go to the second chair, the second position, or the next platform in a waterfall, and they would be given the same opportunity.”); PTX1650 at -042 (The Trade Desk presentation diagramming “The Publisher Waterfall”).

74. Typically, publishers prioritized exchanges in the waterfall based on the average prices those exchanges had previously paid. PTX1677 at -694 (“Through historic analysis of average CPMs from each of these demand sources, a publisher then ranks each of them in a sequential hierarchy[.]”); *see also* Tr. Sept. 9 AM 149:13–150:3 (Casale (Index Exchange)) (explaining “the first positions [in the waterfall] would be a platform that was viewed as having a substantial amount of demand”). For example, it was common for publishers to order ad exchanges in the waterfall based on the historical average price (expressed in cents per mille or “CPM”) that a given exchange had offered for inventory offered. PTX1539 at -104 (Google employee email explaining that, prior to header bidding, “third-party networks competed on average price”); PTX0308 at -243 (Google email noting that “[p]ublishers have historically had to book an average CPM rate which would not allow Rubicon to compete effectively for higher-value impressions”); PTX0520 at -388 (Google document describing header bidding as a benefit to publishers and buyers by allowing “actual CPMs” to compete “in one flat auction” instead of “average CPM bid competition”); PTX1031 at -489 (defining “CPM”); Joint Glossary 5, ECF. No. 1309 (“Cost per mille (CPM)”). So, if an ad exchange historically paid a higher average price for impressions, it was given higher priority in the waterfall ahead of ad exchanges that historically paid a lower average price for impressions. Publishers could enter into the ad server line items, including those that could also have other triggering criteria assigned to them, such that they would become eligible to compete for particular types of impressions, e.g., impressions that appear on the front page of a website. Tr. Sept. 9 AM 120:12-121:16 (Casale (Index Exchange)) (explaining how “line items” function as part of the publisher ad server’s ability to serve as “something of an order book generally” and that the “order book function . . . is very important, it’s how direct sold ads are prioritized, it’s how they are paced” and that “when a

website is loading” the publisher ad server’s “decision is made by the ad server, and the ad server’s decision is made by everything that is effectively in its order book or its line items,” including, for example, for a banner on the top of the New York Times website, the decision “as to what advertiser will buy that slot”); Joint Glossary 7, ECF. No. 1309 (defining “Line Items”).

75. Waterfall bidding had serious limitations including that it was inefficient, opaque, and inflexible. PTX1540 at -574 (Meta presentation, “The ubiquitous DFP waterfall model is broken[:] Not maximizing revenue[:] Not really “real-time”[:] Linear[:] Non-transparent / Google-y[:] Cumbersome[.]”); PTX1650 at -043 (The Trade Desk presentation describing “The Publisher Waterfall” as “Inefficient[,] Inflexible [and an] Unfair advantage to Google”).

76. Because ad exchanges—besides AdX—were called one at a time, sequentially, an advertiser could “win” the impression by bidding above the floor even if another advertiser bidding through a lower-ranked exchange, which had not yet been called in the waterfall, would have been willing to pay more for the impression. Tr. Sept. 11 AM 100:16–101:2 (Ravi (Pls. Expert)) (explaining example of waterfall preventing an advertiser with higher bid from winning impression); PTX1540 at -574. This also would result in a poorer match between the publisher and the advertiser (e.g., the advertiser bidding through a lower-ranked exchange that was not called in the waterfall may have had a more relevant advertisement for the impression). Tr. Sept. 16 PM 24:2–15 (Weintraub (Pls. Expert)) (explaining that “match quality between advertisers and impressions gets reduced” when there is a “higher bid in the rival exchange that doesn’t win”). These inefficient results from the waterfall system are shown in the following demonstrative, which indicates in red how much each ad exchange hypothetically would have been willing to bid for the impression.



77. As explained in greater detail below, *infra* PFOF Sec. IV.B.1, Google engaged in conduct that allowed its ad exchange (AdX) to compete outside of the waterfall process by granting itself a “First Look” at the impressions before offering rival ad exchanges a chance to bid on an impression.

E. Header Bidding and Open Bidding

78. In response to Google’s conduct like First Look, and to allow other ad exchanges to have a chance to compete on a more level playing field, the industry eventually resorted to a technical solution (header bidding) that could work outside of Google’s system and potentially “threaten Google’s monopoly which ensured AdX always won the great majority of impressions.” PTX1710 at -407; Joint Glossary 6, ECF. No. 1309 (defining “Header bidding” and “Header bidding wrapper”); Tr. Sept. 9 AM 152:9–153:7 (Casale (Index Exchange)) (explaining header bidding as response to unfair “positional advantages” of the waterfall); PTX0284 at -290 (Google internal email questioning whether header bidding can lead to “a

decentralized exchange where there is no authoritarian intermediary in the form of the exchange operator that inhibited buyer participation[]”); Des. Tr. 138:16–19, 138:21–139:3, 139:5 (Lipkovitz (Google)) (agreeing that header bidding arose out of industry frustration with the waterfall method); PTX0587 at -794 (“Publishers felt locked-in by dynamic allocation in DFP, which only gave AdX ability to compete, so HB was born.”); Des. Tr. 111:07–111:09, 111:12–112:17, 112:19–114:02 (O’Kelley (Xandr)) (describing how industry participants had to “go in front of Google” to be able to compete against Google’s first look advantage; “I think all major industry participants really jumped into header bidding as the only way to compete with Google in the ad tech space. . . . [I]f DFP is the, you know, majority ad server for most of the industry, and if the ad server makes the final decision about which ad to serve, you have to find some way to influence that decision.”); PTX0284 at -290 (describing header bidding as “a decentralized exchange where there is no authoritarian intermediary in the form of the exchange operator that inhibited buyer participation”); PTX1710 at -407 (Facebook internal update explaining that “Header bidding benefits everyone but Google . . . [because it] threatens Google’s monopoly which ensured AdX always won the great majority of impressions, generating \$15.6 billion in annual gross revenue.”). Google responded in a variety of ways, including by introducing Open Bidding to preempt or co-opt publisher and advertiser participation in header bidding.

79. Header bidding was not a standalone commercial offering to replace an existing ad tech tool but instead a variety of middleware software code solutions that publishers and rival exchanges used to inject competition and avoid Google’s dominance by directly connecting with ad exchanges and ad networks to receive a bid (via the “header” of the webpage code), rather than rely exclusively on DFP to receive bids from third party exchanges. PTX1677; Tr. Sept. 12 PM 97:8–98:7 (Goel (PubMatic)) (“[H] eader bidding came into being as a technical approach to

allow parallel auctions where a publisher could flow the same ad impression into multiple ad exchanges, which would allow the publisher to bring demand in from non-Google ad exchange in addition to availing themselves of Google ad exchange demand.”).

80. Header bidding was a “hack” that allowed publishers to request real-time, per-impression bids from non-Google ad exchanges for their ad inventory. Header bidding accomplished this via a string of code in the header of the website with the instruction to call the non-Google exchange to obtain a bid before the publisher called DFP to request a bid from AdX. The highest header bidding bid, from non-Google exchanges and networks utilizing header bidding, would then be entered by the publisher into DFP as a line-item bid. Tr. Sept. 23 AM 34:23–35:16 (Korula (Google)) (explaining how header bidding bids are entered into DFP as price priority line items); PTX0507 at -218 (Google presentation describing header bidding as “a DFP hack”); Tr. Sept. 9 PM 136:12–19 (Avery (Kevel)) (header bidding is “a hack in the sense of it’s a clever solution . . . to get bids from other exchanges into the auction in DFP”); DTX0801 at -025 (Google strategy document noting that “[Header Bidding] does enable per impression, price-based competition.”).

81. Header bidding significantly increased publisher revenue by allowing, for the first time, non-Google ad exchanges to bid simultaneously against each other on each auction opportunity (e.g. “per-query”) rather than through the waterfall sequence in which Google’s AdX was placed first. *See, e.g.*, PTX0507 at -218 (“**per-query bids from exchanges dramatically increases yield**, so pubs [publishers] are clamouring for this functionality” (triple emphasis in original)); Tr. Sept. 9 AM 74:24–75:5 (Wolfe (Gannett)) (revenue increased 15-20% after header bidding launch); Tr. Sept. 10 AM 45:11–21 (Layser (News Corp)) (Layser implemented header bidding for approximately 25 publishers, leading to 20–50% more revenue); Tr. Sept. 18 AM

140:4–15 (Wheatland (Daily Mail)) (header bidding “increases publishers’ revenues considerably” anywhere from “50 to 100 percent increase”); PTX0587 at -794 (Google email recognizing “[header bidding] gives many publishers better yield, so it’s a no-brainer for a publisher to adopt it.”); Des. Tr. 119:10–119:11, 119:14–119:18, 119:20–121:01, 121:02–121:03, 121:06–122:01 (O’Kelley (Xandr)) (describing the difficulty of competing prior to header bidding and how header bidding increased publisher revenue); PTX0285 at -406. For that reason, publishers adopted header bidding even though, at least in early versions, it had some technical challenges, like the potential for increased latency in webpage loading speeds (although that could be managed by limiting the number of bidders participating in header bidding). Tr. Sept. 9 PM 22:19–24 (Casale (Index Exchange)) (“Google was attempting to position header bidding as something that was a hack and that was causing latency; but in the end, publishers still adopted it.”); PTX0507 at -218 (Header bidding “has gained rapid adoption despite shortcomings”); PTX1543 at -604 (Google email acknowledging “[i]ndustry does not seem to care about the latency impact”); Tr. Sept. 10 AM 84:18–85:1 (Layser (News Corp)) (agreeing that News Corp limited number of header bidding partners to manage latency concerns); Des. Tr. 131:8-25 (Blom (Buzzfeed)) (explaining BuzzFeed adopted header bidding despite certain downsides because “the positives outweigh the negatives, which, you know, having more competition is something we believe helps us and helps our advertising revenue . . . we view the competition and the even playing field that header bidding offers as a positive”); PTX 1533 at -604 (Google email acknowledging “[i]ndustry does not seem to care about the latency impact”).

82. Google perceived header bidding as an “existential threat” to its business. PTX0786 at -716; PTX0507 at -219 (Google presentation recognizing that “[i]f we do nothing, pubs will adopt header bidding en masse by EOY 2016”); Des. Tr. 131:05–131:06, 131:09–

133:13 (O’Kelley (Xandr)) (providing examples of ways in which Google fought back against industry efforts to promote header bidding, including by exerting its financial leverage over IAB, an industry organization that was considering advancing header bidding protocols). Google considered various ways in which to combat the threat of header bidding, including, for example, by lowering the take rate of its ad exchange. PTX0363 at -633, -640; PTX0401 (Google presentation “Jedi++ Header Bidding response and options” discussing the option to “[l]ower AdX rev share”); PTX0536 at -361; PTX0402 at -469 (“Effect in short term would be to move a lot of rev to AdX and put pressure on header bidding infrastructure[.]”); Tr. Sept. 17 AM 77:2–17 (Jayaram (Google)) (discussing PTX0402); PTX0520 at -390.

83. But instead of lowering its own fees to compete, Google developed Open Bidding. Google’s goal for Open Bidding was a “slightly better” version of header bidding (in particular by allowing limited head-to-head competition among ad exchanges), *see* PTX1543 at -604 (Google 2016 email noting that “[a] year ago we reviewed header bidding and decided to pursue Exchange Bidding (server-side) with a goal to be ‘slightly better’ than [header bidding]” and that “[header bidding] has continued to grow rapidly and is measurably impacting our revenues”); Tr. Sept. 19 AM 148:8–12 (Bellack (Google)) (agreeing that “the guidance we got” from Google’s leadership was “to only make Exchange Bidding slightly better than header bidding as opposed to much better”).

84. The intended outcome was to “move header bidding”—and rival ad exchanges—“to [Google’s] platform.” Tr. Sept. 19 PM 23:22–24:23 (Levitte (Google)) (explaining how Exchange Bidding “turn[ed] AdX’s competitors into customers,” where rival exchanges “would buy ad inventory using [E]xchange [B]idding and pay us for it”); *id.* at 21:2–23:10 (Levitte (Google)) (explaining how Google’s “[header bidding] alternative” is “more favorable to Google

. . . as defense against [the] long-term threat posed by [header bidding].”); PTX0438 at -480 (Google email describing as “the holy grail.....[sic]the impact of [Exchange Bidding] on the reduction of [header bidding]”).

85. By driving rival ad exchanges to bid via Open Bidding, rather than header bidding, Google hoped to mitigate the competitive pressure those rival ad exchanges could exert on AdX and DFP. Tr. Sept. 12 PM 10:19–12:9 (Kershaw (Magnite)) (comparing Exchange Bidding to header bidding and explaining how the former “made it harder for us to compete”). Importantly, Open Bidding preserves AdX’s advantages in the DFP auction. For example, Open Bidding handicaps non-Google ad exchanges’ ability to compete for transactions alongside Google’s ad exchange because Google deducts a 5% fee from the bids of non-Google ad exchange and prohibits a company that owns both an ad exchange and a DSP or advertiser ad network from submitting any bids originating from their own DSP or advertiser ad network. Tr. Sept. 9 AM 160:4–23 (Casale (Index Exchange)) (explaining how 5% fee charged to non-Google exchanges would be an advantage “if that same fee was not charged to AdX”); Des. Tr. 153:8–24, 154:1–2, 154:5–24, 155:3–6, 155:9–12 (O’Kelley (Xandr)) (explaining “Google had a rule that said if you participate in [O]pen [B]idding, you could not bring unique demand . . . —you could not be a DSP,” and that Google held an advantage from charging other exchanges a 5% fee); Tr. Sept. 13 AM 11:9–12:9 (Kershaw (Magnite)) (Exchange Bidding is “a 5 percent tax on everyone except for Google in an auction, which means we had to have higher bids by 5 percent just to compete.”).

86. Open Bidding also requires exchanges to share their bid data with Google, which Google can use to program its algorithms to provide an additional advantage to Google, and Google also inserts itself between its rival ad exchanges and their publisher customers by

insisting on exclusive control over the billing relationship with the publishers that sell inventory through Open Bidding. Tr. Sept. 13 AM 11:9–12:9 (Kershaw (Magnite)) (Exchange Bidding’s “information disequilibrium” allowed only Google to see all bids and thereby “bid more efficiently” than rivals); Tr. Sept. 19 PM 21:21–22:20, 24:9–25:19 (Levitte (Google)) (Exchange Bidding provided Google “bid data” it used for “optimizations,” and rival exchanges “would pay us . . . and then . . . we would remit to the publisher.”).

F. Importance of Scale

87. Because of the central role that different types of data play in each of the ad tech tools described above, scale is critical to an ad tech company’s ability to compete effectively for business. Tr. Sept. 11 PM 110:21–25 (Dederick (The Trade Desk)) (“One of the most important criteria that we’ll evaluate [in an ad exchange] is size and scale, which we often talk about in forms of queries per second. How many do they have? How many unique publisher relationships or how many publisher relationships do they have? So yes, scale is critical.”); Tr. Sept. 12 PM 103:2–10 (Goel (PubMatic)) (“I think scale is always something that any provider in our industry has to focus on, you know, continuously growing their scale, managing their scale, and making sure they have enough scale of ad impressions, of data, of advertiser bids in order to stay relevant.”); Tr. Sept. 16 PM 7:9–12 (Weintraub (Pls. Expert)) (“Scale plays a critical role in ad tech products[.]”).

88. Scale represents a significant barrier to entry and expansion as well as a key ingredient in the ability of an ad tech company to improve its products and better serve its customers. Tr. Sept. 9 AM 144:20–145:13 (Casale (Index Exchange)) (“[W]e’re in the business of scale, so there’s a significant infrastructure required to assume the scale of the exchange,

which is a significant investment, not just in compute in the servers, but also software and the engineering required to facilitate the platform.”).

89. Scale also is an important factor in a company’s ability to enter one or more ad tech markets. *See* Tr. Sept. 13 PM 113:7–115:6 (Boland (Meta)) (explaining how scale and network effects impede entry and expansion for ad tech tools); Tr. Sept. 19 PM 75:15–76:8 (Lee (Pls. Expert)). Certain aspects of scale affect advertisement match quality. Tr. Sept. 23 136:7–137:2 PM (John (Microsoft)) (scale is necessary for match quality); Tr. Sept. 13 PM 74:13–75:6 (Creput (Equativ)) (data scale increases match quality); Tr. Sept. 16 PM 9:15–10:10 (Weintraub (Pls. Expert)).

90. Transaction volume scale also informs decisions about whether ad tech firms decide to interoperate. Tr. Sept. 11 PM 113:3–13 (Dederick (The Trade Desk)) (“[T]here are multiple vectors that we would evaluate [to decide whether to integrate with an ad exchange]. Scale is among the most critical.”).

IV. Google Has Illegally Maintained Monopolies in Each Relevant Market⁵

91. Over the past 15 years, Google has engaged in a wide-ranging course of conduct designed to, and with the effect of, acquiring and maintaining monopoly positions in these markets. Google first established its dominant positions through acquisitions, acquiring the leading publisher ad server (DFP) and a nascent ad exchange (AdX), before tying those products to each other and to Google’s advertiser ad network (Google Ads). By conditioning effective

⁵ Pending before the Court is Plaintiffs’ Motion for Adverse Inference, ECF. No. 1115, seeking an adverse inference or other appropriate sanction for Google’s intentional deletion of chat evidence. If granted, such an adverse inference would provide additional support for Plaintiffs’ claims including with respect to anticompetitive effects, market definition, Google’s monopoly power, lack of procompetitive justifications, and intent to monopolize.

access to AdX and Google Ads on publisher customers' use of DFP and AdX, Google locked publishers into exclusively using Google's ad tech tools rather than those offered by competitors. Google then thwarted the ability of rivals to compete by impairing its customers' ability to partner with Google's rivals, diminishing those rivals' scale and decreasing their ability to effectively enter markets and compete. This conduct includes acquiring an important emerging competitor and eliminating one of the features of that competitor's platform that threatened Google's monopoly power; imposing anticompetitive auction rules for both its publisher and advertiser customers; and depriving rivals of the scale necessary to improve their products and attract customers.

A. Establishing Control Across the Ad Tech Stack

1. DoubleClick Acquisition

92. The DoubleClick acquisition was the first step in Google's course of conduct and set the stage for Google acquiring and maintaining monopolies in the relevant markets. Google first considered acquiring DoubleClick in 2007 and ultimately closed the deal in March 2008. PTX0015 at -990 (describing, in 2007, the "decision to enter the process to acquire DoubleClick"). At that time, Google was also trying to build its own publisher ad server, but DoubleClick's publisher ad server, DFP, was the dominant publisher ad server for open-web display advertising. PTX0015 at 6 (Google 2007 presentation recognizing at the time of the merger "DFP ha[d] 60% share of the publisher ad serving market"); PTX0014 at -246 (DoubleClick had "9 of Top 10 US, 8 of Top 10 European sites" and "35 of Top 50 web publishers"); Des. Tr. 69:11-69:18, 69:21-70:09, 72:20-73:01 (O'Kelley (Xandr)) (describing DoubleClick's "vast" share of the "non-portal" publisher ad server market. "[A]lmost every other

major publisher in the U.S., every major e-commerce publisher used DoubleClick” so DoubleClick had “huge market leverage[.]”).

93. Through the DoubleClick acquisition, Google was able to leverage its existing pool of captive Google Ads advertiser customers borne of its online search monopoly to begin to amass dominant positions in the tools used to transact open-web display advertising. *See* Tr. Sept. 11 PM 153:6–19, 154:8–11 (Dederick (The Trade Desk)) (describing the pool of Google’s search advertisers who also use Google Ads to purchase advertising on Google Search as the “greatest source of demand in the history of advertising” and observing “[t]his ecosystem would not exist without [Google’s] dominant position in search”); *id.* at 48:19–50:6 (“And so the initial implementation of Google’s publisher ad server said do you want the demand from millions of search advertisers and implement this? That foundational sort of connection is central to why that DFP publisher ad server is dominant today.”); Tr. Sept. 19 PM 99:18–100:2 (Lee (Pls. Expert)) (“a key part of Google Ads’ market power comes from the search advertisers us[ing] its [Google Ads] product” . . . It’s a large number of advertisers ranging from small to large businesses that [] are available to purchase display advertising through Google Ads.”); *United States v. Google LLC*, -- F. Supp. 3d --, 2024 WL 3647498, at *89–91 (D.D.C. Aug. 5, 2024) (“Google Has Monopoly Power” and “possesses a large and durable share in the [General Search] text ads market”); PTX0114 at -049 (“Ad Servers are sticky, and hard to replace.”); Des. Tr. 216:1–3 (Lipkovitz (Google)) (“Q. And would you agree that a publisher ad server is a sticky product? A. Yes.”); Tr. Sept. 16 AM 13:2–11 (Mohan (Google)) (discussing Google document: “Due to its position as the operating system for ad sales, switching costs are very high.”); DTX0404 at -134 (“The impact of switching from Google [DFP] to AppNexus as our adserver would take well

over a year across all [business units], and have an impact on their roadmaps (beyond ad serving)[.]”).

94. The acquisition allowed Google to further enhance the market power of the DoubleClick ad server over its pool of publisher customers by connecting those publisher customers to Google’s substantial advertiser base. Des. Tr. 72:13–72:116, 72:20–74:15, (O’Kelley (Xandr)) (describing how, after the DoubleClick acquisition, Google had two “fundamental advantages, by controlling the ad server and by having this massive source of unique demand, that made it extremely difficult for anyone else to compete with.”).

95. And it empowered Google to launch DoubleClick’s ad exchange from a nascent ad tech tool to *the* dominant ad exchange by making it the critical gateway linking Google’s captive publisher and advertiser customers. Des. Tr. 114:03–114:05, 114:08–114:11, 114:13, 114:17–116:08 (O’Kelley (Xandr)) (describing how DFP’s market dominance, and the steps it took to boost AdX’s competitiveness, enhanced AdX’s market power). In the words of one Google executive, “[f]undamentally the glue that seals DFP to GCN [Google Ads] is AdX[.]”. PTX0041 at -006. In doing so, the acquisition laid the foundation for much of Google’s anticompetitive conduct that followed.

96. After the DoubleClick acquisition, publishers had fewer ad server alternatives and faced heightened switching costs (that were already substantial) associated with changing to another publisher ad server, a move that DoubleClick’s former CEO characterized as “tak[ing] an act of God.” PTX1814 at -745; PTX0014 at -258 (“Due to [DFP’s] position as the operating system for ad sales, switching costs are very high[.]”); *see also* Tr. Sept. 9 AM 70:24–71:25 (Wolfe (Gannett)) (describing switching publisher ad servers as “an incredibly laborious lift” requiring “approximately a year” and “akin to, you know, changing the tires on the race car mid

race.”); Des. Tr. 74:17–74:19, 74:22–75:21, (O’Kelley (Xandr)) (explaining that Google’s publisher ad server after the DoubleClick acquisition “wasn’t the best ad server” but “every other ad server company either went out of business or was sold for scrap . . . They just destroyed all competition for that ad server . . . within a couple of years of that acquisition there were no viable competitors in the publisher ad server space.”).

97. As Google recognized, the “value of Google’s ad tech stack is less in each individual product, but in **the connections across all of them.**” PTX0551 at -048. In that vein, via Google’s subsequent conduct, the DoubleClick acquisition exacerbated scale and network effects, which protected Google’s position in the publisher ad server and advertiser ad network markets. Tr. Sept. 12 PM 7:21-8:4 (Kershaw (Magnite)) (“Search buyers was a unique asset that Google had that no other exchange could have because no one else had a search business. And what that allowed them to do was harness that mid-tier small business-type demand that no one else had the scale to get to.”). In a presentation outlining strategic considerations surrounding the acquisition, Google recognized that in the advertising network market “the winner will be the company with the largest pool of liquidity,” which would generate “[n]etwork effects.” PTX0014 at -278. In order to “build the largest pool of liquid inventory,” Google recognized that it needed to “[b]ecome the primary ad server to get a ‘first look.’” PTX0014 at -278.

98. As part of the same transaction, Google acquired DoubleClick’s “AdX,” then a nascent ad exchange.⁶ Google’s Statement of Undisputed Facts (“SUF”), ECF No. 570 ¶ 31; Tr.

⁶ Rather than innovate to build its own publisher ad server and ad exchange, Google entered these markets via acquisition, and in the case of the DoubleClick acquisition, by simply buying the dominant firm. Other market participants—not Google—were the source of innovations that led to the rise of real-time programmatic transactions for open-web display advertising. *See* Tr. Sept. 12 PM 68:6-68:13, 69:22-25 (Goel (PubMatic)) (explaining PubMatic was “among the first, if not the first, to work on a specification with certain buyers” for real-time bidding and along with others in the industry was using real-time bidding at the time of the relaunch of AdX).

Sept. 16 AM 14:21–15:4 (Mohan (Google)). Google did so because it recognized that over time the ad exchange—especially one buttressed by a dominant publisher ad server—could serve as a key tool used by publishers and advertisers that could also generate substantial revenues for Google. PTX0041 at -006 (“Fundamentally[,] the glue that seals DFP to G[D]N is AdX (that is why it is the second pillar of our three-pillared strategy)[.]”); PTX0032 at -916 (GDN would “monetize the inventory we aggregate via Ad Exchange”) (emphasis omitted). Prior to the DoubleClick acquisition, ad exchanges, including AdX, were not yet widely used by publishers. PTX0014 at -248 (showing prior to 2008 AdX had generated nearly \$800,000 in revenue total); DTX0037 at -642 (2009 email to Google employees announcing that “AdX ramped from nothing to over a \$30mm runrate in about 9 months”). Google recognized that acquiring the largest publisher ad server was foundational to over time achieving “the biggest and most liquid [ad] exchange,” from which it could later extract substantial revenues from publishers and advertisers. PTX1814 at -747. In fact, Google “[d]idn’t buy [DFP] for the revenue (& growth) – [Google] bought it for enabling the [Ad] Exchange” strategy and its plan to capture publisher inventory that had not been directly sold to advertisers. PTX0051 at -726; Tr. Sept. 16 AM 18:23–19:10 (Mohan (Google)); PTX0060 at -487 (“[G]etting backfill revenue through the combo of DFP and AdX was a fundamental component of our strategy (and one of the reasons why Google bought DCLK in the first place).”) (emphasis omitted).

99. The price that Google paid for DoubleClick reflected the value it believed it could derive from its long-term strategy to dominate multiple ad tech markets by taking advantage of the “the connections across all of them” and gluing together its products to “seal[] DFP to G[D]N [via] AdX.” Google internally valued DoubleClick as worth approximately \$1.5 to \$2.2 billion, but it ultimately offered to pay \$3.1 billion (overpaying by over \$1 billion) to secure the

acquisition over other technology companies. PTX0015 at 7 (“We value financial benefits at \$1.5–2.2B NPV”); PTX1507 at -414 (2014 Digiday article stating “Google was not always a power in display advertising, but that changed overnight when it purchased DoubleClick in April 2007 for \$3.1 billion.”); PTX0015 at -991 (March 2007 email to Google’s Board of Directors stating that “[a] Microsoft-owned DoubleClick represents a major competitive threat” to Google’s advertising technology).

100. Google recognized that control over the publisher ad server market made Google a critical gatekeeper in the sale of open-web display advertising. Even if Google’s rivals could build better ad tech products, with Google in control of the publisher ad server market, these rivals would always be at a disadvantage because Google could use the publisher ad server to dictate the rules under which publisher inventory is offered for sale, disfavoring publishers’ ability to partner with those rivals. PTX0041 at -005 (Google employee Neal Mohan noting that “[i]f we [Google] lose [publisher ad server] platform share, we can build the best [Google Ads] in the world but will still be at a severe risk of being disintermediated”);⁷ *see* Tr. Sept. 16 AM Tr. 21:1–22:14 (Mohan (Google)) (agreeing that acquiring a publisher ad server was essential to Google’s success in display advertising because “[b]y definition, publishers couldn’t really manage their display advertising without an ad server.”); PTX0551 at -048 (“Owning the ad

⁷ This outlook was prescient, as even Meta’s Facebook Audience Network, with its large advertiser base could not compete meaningfully for open-web display advertising transactions because Google sat between Meta “and the supply, the inventory, that [Facebook] wanted to get to” for ad impressions on open-web websites. Tr. Sept. 13 PM 99:4–16 (Boland (Meta)) (discussing PTX1709 at -933).

serving tag is the right strategy and AdX (and DBM & Adwords) benefits from the direct line of inventory provided by DFP via dynamic allocation.”).⁸

101. Accordingly, following the DoubleClick acquisition, Google sought to reinforce the costs of switching ad servers to “[p]rotect [DFP’s] position” as the dominant “operating system for publishers globally[,]” DTX0076 at -477, and to extend its market power by deploying a “three pillar[.]” strategy to enhance its dominance in each relevant market, including: (i) the publisher ad server “Platform to ACCESS the desired inventory,” (ii) the “Ad exchange to AGGREGATE that inventory that the platform piece gives” Google, and (iii) the “Google Content Network [Google Ads] to MONETIZE the inventory [Google] aggregate[s] via Ad Exchange.” PTX0032 at -916; Tr. Sept. 16 AM 21:1–22:14 (Mohan (Google)); PTX0051 at -726 (“Somebody will become the OS [operating system] for Display – we want it to be us[.]”); PTX0041 at -005 (March 2009 email from Neal Mohan stating that “the most strategic battle is about the publisher platform”).

102. While Google recognized the market power it could exert via this strategy, it also internally acknowledged that such a strategy was adverse to the interests of its publisher and advertiser customers. One executive involved in developing this strategy acknowledged this point years later: “The analogy would be if Goldman or Citibank owned the NYSE [New York

⁸ Google’s argument that Microsoft’s acquisition of Xandr (formerly AppNexus) is analogous to its acquisition of DoubleClick is unsupported by the evidence. Tr. Sept. 20 PM 136:1–9 (John (Microsoft)) (Microsoft’s acquisition of Xandr “was very small in specific markets for the sale side and also on programmatic,” and was “in no way comparable” to Google); *cf.* DTX0007 at -551 (Microsoft analysis on the potential acquisition of DoubleClick, noting the regardless of whether Google or some other party acquired DoubleClick, it would be “highly unlikely for Google to emerge from any scenario in second place or as ‘weak’ due to their dominance in AdSense, Search, built in advertiser base, and engineering capability”; instead, the “uncertainty [was] around the relative strength or weakness of the second player, and whether it is Yahoo or Microsoft,” and if Google acquired DoubleClick, “the second player will certainly be challenged to compete successfully”).

Stock Exchange].” PTX0367 at -464; *see also* PTX0059 at -077 (“[O]ne other very very important reason to keep adx out of the buy side team is that would be a HUGE conflict perception in the market.”); PTX0110 at -009 (“[W]e are artificially handicapping our buyside (GDN) to boost the attractiveness of our sellside [sic] (AdX).”

2. Google Conditioned Publishers’ Access to Google Ads on Use of AdX, and Conditioned Publishers’ Access to AdX on Use of DFP

103. To implement its strategy of forcing publishers to remain on DFP instead of switching to rival ad servers, Google imposed two key conditions or ties on publishers. First, Google required (and continues to require) publishers to use DFP if they wanted real-time bids from AdX. PTX1093 at -797 (AdX “does not directly bid into auctions run by third party ad servers. A publisher using a third party ad server would have to assign a static CPM price or serving priority to the AdX demand.”); PTX0555 at -115 (“AdX does not integrate with other ad servers as well as it does with DFP (no dynamic allocation), so AdX does not pass through real-time bids to these other ad servers (instead it passes through a ‘dumb’ flat CPM based on historical averages”); *see* Tr. Sept. 18 AM 127:8–20 (Wheatland (Daily Mail)) (explaining that publishers “can’t access Google AdX demand in real time through any other ad server” other than DFP); Tr. Sept. 17 PM 54:23–55:19 (Cadogan (OpenX)) (explaining that OpenX couldn’t compete effectively against DFP because “DFP was also linked to AdX,” which is “by far the largest ad exchange”); Tr. Sept. 19 PM 138:1–13 (Lee (Pls. Expert)) (“By restricting access to those real-time bids [from AdX] to other publisher ad servers, those publisher ad servers aren’t able to offer that to customers impairing their ability to compete for those customers.”); Tr. Sept. 16 PM 128:21–129:5 (Abrantes-Metz (Pls. Expert)).

104. Second, Google requires publishers to use AdX if they wanted to receive bids from Google Ads, a unique and substantial source of advertising demand that represents millions

of advertisers often buying distinct tranches of publisher inventory that otherwise would go unsold. Tr. Sept. 18 AM 11:20–12:1; 20:8–21 (Spencer (Google)) (acknowledging “that the exclusive relationship between Google Ads and AdX” “was a feature” of the products, and that Google’s demand was not available on third-party exchanges); PTX1393 (showing that AdX won around 6.5 billion auctions without competition on one day in 2023); Tr. Sept. 13 AM 7:21–9:21 (Kershaw (Magnite)) (identifying Google Ads demand as a “unique asset” because it contains “mid-tier small business-type demand that no one else had the scale to get to”); Des. Tr. 38:19–39:5 (Blom (Buzzfeed)) (explaining that AdX demand is “unique” because “[t]hey have a lot of small businesses that may be buying through AdX versus some of the other partners that we leverage maybe for larger ad budgets or larger spenders.”); Tr. Sept. 9 AM 129:22–130:22 (Casale (Index Exchange)) (explaining Google Ads is a “very steady source of demand” for publishers given the “very seasonal cyclical nature in the advertising business”); Des. Tr. 95:20–98:06 (O’Kelley (Xandr)) (describing Google Ads demand, which originated from Google’s search business, as “extremely different from most other sources of demand”). In over 60 percent of the auctions AdX wins—including many won by Google Ads, which bids nearly exclusively on AdX—AdX faces no competition, consistent with that source of advertising demand not being available anywhere else. Tr. Sept. 19 PM 88:2–89:7 (Lee (Pls. Expert)) (explaining that “AdX faces no competition for over 60 percent of the auctions it wins”).

105. As combined, these restrictions mean that if publishers want effective access to Google Ads, they need to use AdX, and if they want real-time bids from AdX, they need to use DFP. In practice this means that if a publisher wants to switch publisher ad servers, the publisher would not only need to incur the switching costs of changing publisher ad servers, but the publisher would also need to forgo revenue from the advertisers on AdX and Google Ads. This

has had the effect of making it difficult if not impossible for publishers to switch to rival publisher ad servers. Google itself recognized this dynamic, describing AdX as the “glue that seals DFP to [Google Ads].” PTX0041 at -006; PTX1717 at -647 (Daily Mail 2019 analysis of financial impact “if we pull AdX,” estimating a loss of between £219,000 and £355,000 (roughly \$284,000–\$461,000) per month); Tr. Sept. 18 AM 126:1–130:24 (Wheatland (Daily Mail)) (discussing Daily Mail analysis) (“[W]e would lose roughly 28 percent of our programmatic revenue if we switched off AdX[.]”); *see* Tr. Sept. 10 AM 11:11–12:2, 113:2–114:3 (Layser (News Corp)) (explaining that “there was a significant amount of unique demand [from Google Ads] that was specifically in AdX,” which is tied to DFP, so that the revenue “risk in switching” away from DFP was too high); Tr. Sept. 9 AM 75:22–77:13 (Wolfe (Gannett)) (explaining that Gannett could not switch to another publisher ad server from DFP because of “the revenue loss of not having direct access to the Google [A]d [E]xchange,” which includes Google Ads demand that cannot be obtained anywhere else but through DFP and AdX “from a real-time bidding perspective”); PTX0797 at -166 (“Strengths” of DFP include its “Access to unique demand”; “GDN / GMob [sic] demand is relatively unique”).

106. As explained below, these conditions have allowed Google to utilize its unique and sizeable advertising demand (via Google Ads) to coerce publishers to use Google’s sell-side products (Google’s DFP and AdX), giving rise to durable dominant positions in both the publisher ad server and ad exchange markets. PTX0041 at -006 (March 2009 email from Neal Mohan stating that “we need tight [D]FP - Adx / GCN [sic] bundles” as part of strategy to get “the most extensive platform footprint to give us access to inventory”); Tr. Sept. 16 PM 122:11–123:17 (Abrantes-Metz (Pls. Expert)) (explaining that “AdX is the only channel through which publishers can reach Google Ads in full” and that “publishers are essentially forced to use DFP”

because publishers must use DFP “to be able to compare AdX’s price to other alternatives”); Tr. Sept. 9 PM 122:25–124:15 (Avery (Kevel)) (explaining that Kevel was not able to convince publishers to switch from using DFP because AdX “is tied into DFP or GAM, and it brings a significant amount of money to publishers,” and that Kevel “had no way to replace that big chunk of revenue that the customer would be missing if they moved to Kevel from DFP.”); Tr. Sept. 9 AM 75:22–76:18 (Wolfe (Gannett)) (explaining that Gannett could not switch from DFP to another publisher ad server” because of “the revenue loss of not having direct access to the Google [A]d [E]xchange as a demand source”).

107. Google’s conduct thus guarantees that Google’s rivals in the publisher ad server and ad exchange markets are unable to compete effectively on the merits of their products to acquire enough publishers, advertisers, or transaction scale to their platforms to threaten Google. Tr. Sept. 17 PM 64:15–65:5 (Cadogan (OpenX)) (explaining that only getting “a sliver of [Google Ads] demand . . . made our job a lot harder” because “we’re competing against someone who has a lot more scale in terms of the ad dollars that are sitting behind that exchange”); Des. Tr. (Lipkovitz (Google)) 85:25–90:06 (explaining that it was a “competitive advantage” that only AdX offered access to non-remarketing Google Ads demand); *see* Tr. Sept. 16 PM 35:16–36:7 (Weintraub (Pls. Expert)) (noting a “decrease in rival exchanges’ share of impressions” of “25.4 percent driven by the Google Ads exclusivity”); Tr. Sept. 16 PM 129:6–14 (Abrantes-Metz (Pls. Expert)) (As a result of the restriction of Google Ads to AdX, “no other exchange . . . can access [Google Ads demand] in full even if they set their price to zero. . . . [B]ecause that’s a large and unique demand source[,] that affects their ability to grow and to compete, to gain skill, and become effective competitors.”).

108. The effects of these dual ties were no accident but rather the intended result of Google’s three-pillar strategy launched upon the DoubleClick acquisition. *See supra* PFOF Sec. IV.A.1; PTX0116 at -462 (“[I]t is too early to give AdX to non-[D]FP partners . . . This is an amazing time to ‘lock in’ impressions by offering [D]FP to publishers with full AdX dynamic allocation. AdX can serve as a tool to pull publishers onto [D]FP.”); PTX0041 at -005–006 (“[T]he most strategic battle is about the publisher platform I do think we need tight XFP AdX / G[D]N bundles”). The strategy was not intended to make any individual product offered by Google better for publisher or advertiser customers but rather to enhance Google’s market power in the ad exchange and publisher ad server markets. *See* Tr. Sept. 16 PM 128:21–129:5 (Abrantes-Metz (Pls. Expert)) (explaining that the restriction “of Google Ads to AdX amplifies the effect of the restriction of AdX and DFP because if the publisher values access to Google Ads, because it is a large and unique demand source, the publisher has to transact on AdX. But if the publisher wants to get the real-time price from AdX, then the publisher must use DFP.”). Google recognized the “value of Google’s ad tech stack is less in each individual product, but in **the connections across all of them.**” PTX0551 at -048.

a) Google Restricts Google Ads Demand to AdX

109. When Google relaunched the AdX ad exchange it acquired from DoubleClick in 2009, Google restricted advertisers using Google Ads “to buying only on AdX” and not through rival ad exchanges. Tr. Sept. 11 AM 25:20–26:2 (Bender (Google)) (agreeing that Google Ads initially only bid into AdX); Tr. Sept. 17 AM 9:5–25 (Jayaram (Google)) (agreeing that Google Ads advertisers could not purchase inventory offered by non-AdX ad exchanges in 2012); PTX0110 at -083; SUF ¶ 38 (“When Google re-launched AdX on its own infrastructure in 2009, Google Ads bid only into AdX.”). In the words of the Google employee who originally built the

AdX ad exchange, Google realized its “goal” to require publishers to choose “all or nothing – use AdX as your SSP [exchange] or don’t get access to our demand.” PTX0124 at -216; PTX0453 at -189 (“By completely turning off AdX, you are losing out on unique demand from our ad network (GDN) and higher yields from our DSP (DBM) [DV360].”) (emphasis omitted).

110. Google recognized the limitations on Google Ads bidding on third party exchanges were not in the interest of its Google Ads customers. Tr. Sept. 17 AM 21:3–16 (Jayaram (Google)) (acknowledging Google understood that Google Ads bidding on third party exchanges would benefit advertisers because they could participate in more auctions and increase the return on their “advertising objective”); PTX0183 at -717 (acknowledging Google Ads’ exclusivity on AdX “is purely a decision to hold back a set of advertisers (AW [Google Ads] customers) in order to promote [A]d[X].”). Google further understood that limiting Google Ads purchasing open-web display through AdX made Google Ads a lower quality product. PTX0110 at -009 (“[W]e appear to be running a buy-side-subsidizes sell-side [sic] model[;] we are artificially handicapping our buy-side (GDN) to boost our sell-side [sic] (AdX). Specifically, we have chosen to limit GDN buying only on AdX, an exclusivity that only makes AdX more attractive to sellers.”).

(1) Google’s Restriction of Important Google Ads Advertising Demand to AdX Distorted Competition

111. The restriction of Google Ads demand to AdX “compels publishers to work with” Google products, including AdX. Des. Tr. 108:18–109:03, 127:20–127: 24 (Rowley (Google)) (explaining that allowing Google Ads to bid on third party exchanges “would reduce one of the selling propositions for AdX and presumably would increase it for competitors”); PTX0453 at -188 (Google telling publisher that “by completely turning off AdX, you are losing out on unique demand from our ad network (GDN) and higher yields from our DSP [DV360]”)

(emphasis omitted); Des. Tr. 91:09–19:13, 91:16–91:20, 93:23–94:02, 94:05–95:18 (O’Kelley (Xandr)) (describing how Google’s “having a unique demand source on [its] exchange had a dramatic impact on the market” because it “made it very difficult to switch away” from Google’s products: “So if you think about switching from Rubicon to PubMatic, they may have slightly different technology, they might have slightly different features, different service, but the demand was all the same. And so there’s very low switching cost. With Google having a unique demand source, switching away from AdX or switching away from DFP would mean losing one of the largest demand sources, if not the largest demand source, and, therefore, would have significant monetization implications, or cost you a lot of money, or could, if you left.”); Des. Tr. 220:12–220:16, 222:04–222:17, 226:24–227:01, 227:03–227:04 (Lipkovitz (Google)) (explaining how access to unique Google Ads demands, including hundreds of thousands, if not millions, of search advertisers, was a “selling point” for AdX that led publishers to call AdX a “must call” exchange); *Id.* at 303:16–303:19, 303:21–303:24 (acknowledging awareness that publishers were afraid to forego using AdX because of the “meaningful impact” Google Ads demand provided to filling inventory volume; “it was basically filling any impression we would have bid for”); Tr. Sept. 16 PM 128:21–129:5 (Abrantes-Metz (Pls. Expert)) (“[I]f the publisher values access to Google Ads, because it is a large and unique demand source, the publisher has to transact on AdX.”).

112. Google’s strategy has proven effective as publishers remain keenly aware that the “only place you can get [full] Google Ads demand is through AdX.” Tr. Sept. 10 AM 62:11–18 (Layser (News Corp)); Tr. Sept. 17 PM 54:23–55:7, 64:5–19 (Cadogan (OpenX)) (explaining that “DFP was so powerful because DFP was also linked to AdX, . . . which is . . . by far the largest ad exchange, . . . which was then linked to Google Ads, which is the biggest pool of

advertising on the planet,” such that it “was not possible for us to compete”); Tr. Sept. 9 AM 76:9–77:7, 104:9–23 (Wolfe (Gannett)) (explaining Gannett cannot switch away from using AdX as one of its ad exchanges because of access to Google Ads demand that “monetiz[es] many of [Gannett’s] local properties” unavailable anywhere else); Tr. Sept. 13 PM 73:15–75:1 (Creput (Equativ)) (explaining that a publisher “cannot work . . . without AdX without losing a substantial amount of revenues” because “AdX has access to all Google Ads exclusively while other SSPs do not have access to Google Ads”).

113. Publishers’ inability to receive bids from Google Ads through rival ad exchanges limited publishers’ ability to choose ad exchanges other than AdX. Tr. Sept. 17 PM 64:15–65:5 (Cadogan (OpenX)) (explaining that only getting “a sliver of [Google Ads] demand . . . made our job a lot harder” because “we’re competing against someone who has a lot more scale in terms of the ad dollars that are sitting behind that exchange”); Tr. Sept. 19 PM 130:3–13 (Lee (Pls. Expert)); Tr. Sept. 16 PM 35:7–15 (Weintraub (Pls. Expert)). Restricting Google Ads demand to AdX ultimately means that publishers must make their inventory available for purchase on AdX, rendering AdX an important and relatively “thicker” ad exchange that attracts advertisers. PTX1031 at -500 (“Google Ad Manager is the only way to access Google Ad Exchange as a publisher[.]”); Tr. Sept. 16 PM 10:11–11:5 (Weintraub (Pls. Expert)); *see also* PFOF Sec. V.C.

114. The demand from Google Ads is “unique” because it generates revenue for publishers that they could not generate elsewhere. Tr. Sept. 19 PM 114:21–22 (Lee (Pls. Expert)) (quantitative analysis indicating that removing Google Ads advertising demand from auctions would decrease publishers’ revenue by approximately 14% on average). Therefore, if a publisher chose to forgo Google Ads advertising demand, that publisher would sacrifice a significant

amount of revenue. PTX1717 at -647 (Daily Mail 2019 analysis of financial impact “if we pull AdX,” estimating a loss of between £219,000 and £355,000 (roughly \$284,000–\$461,000) per month); Tr. Sept. 18 AM 126:1–130:24 (Wheatland (Daily Mail)) (discussing Daily Mail analysis) (“we would lose roughly 28 percent of our programmatic revenue if we switched off AdX.”).

115. The uniqueness of Google Ads derives both from the size and diversity of advertisers that use it and from the distinct way that advertisers purchase advertising through Google Ads. “[W]hat’s unique about Google Ads or the GDN demand source is the makeup of it, which . . . tends to be . . . many small and medium size businesses,” as well as “large marketers,” comprising an extremely “large number” of advertisers, “which makes it a very unique demand source.” Tr. Sept. 9 AM 129:22–130:22 (Casale (Index Exchange)); Tr. Sept. 10 AM 13:13–15 (Layser (News Corp)) (identifying Google Ads as the largest source of unique demand within programmatic display); Tr. Sept. 13 AM 7:21–9:21 (Kershaw (Magnite)) (identifying Google Ads demand as a “unique asset” because it contains “mid-tier small business-type demand that no one else had the scale to get to,” which Google obtains via its search ads business and is not feasible for competitors to obtain). Since there is “a very seasonal cyclical nature in the advertising business where there are high and low periods of demand,” the size and diversity of the advertisers using Google Ads makes a “very steady source of demand” for publishers. Tr. Sept. 9 AM 129:22–130:22 (Casale (Index Exchange)). The inclusion of many local advertisers on Google Ads also provides an invaluable monetization source for regional and local publishers. Tr. Sept. 76:21–7:7 (Wolfe (Gannett)).

116. Google Ads buys inventory and resells only the clicks to advertisers. This means that Google Ads uses data differently than other buy-side tools and buys differently than other

buy-side tools. Specifically, Google Ads most often bids on inventory based on the predicted click-through-rate (pCTR) of inventory rather than targeting a specific user. In this context, Google can use multiple sources of proprietary data, including contextual data, to bid on behalf of its advertisers. Tr. Sept. 13 AM 52:18–53:17 (LaSala (Google)) (conceding that Google Ads is unique because it purchases advertising differently from other buy-side tools, including using unique contextual data); Tr. Sept. 10 PM 96:20–97:9 (Lipkovitz (Google)) (agreeing that Google Ads provided differentiated demand because, unlike other buying tools, Google Ads does not “care . . . where you buy” inventory, but instead only analyzes the “availability of signals” to determine where to purchase).

117. Analysis of Google’s data further demonstrates that publishers rely on demand from Google Ads advertisers. In 2022, Google Ads alone purchased over 45 percent of worldwide indirect open-web display impressions, less than five percent of which went to third-party ad exchanges. PTX1389; Tr. Sept. 19 PM 129:13–22 (Lee (Pls. Expert)) (“[E]ven if one were to include other buying tools, including DSPs, Google Ads still has a very large share of all indirect open-web transactions worldwide here through all of these advertiser buying tools with a share of 45 percent and very little of that . . . is available or made available to third-party exchanges.”). Prof. Lee’s quantitative analysis of auction-level data from Google indicates that removing Google Ads advertising demand from auctions would decrease publishers’ programmatic revenue by approximately 14% on average. Tr. Sept. 19 PM 114:21–22 (Lee (Pls. Expert)); *see also* Tr. Sept. 10 AM 12:19–14:2 (Layser (News Corp)) (explaining that in its evaluation of switching from DFP to another ad server, News Corp determined that approximately 40 to 60 percent of its programmatic revenue came from AdX, and that 40 to 60 percent of its AdX revenue came from Google Ads).

118. Rival ad exchanges cannot compete effectively even if they offer better prices or higher quality prices because they cannot offer publishers access to Google Ads advertiser demand. This has diminished those rivals' scale and their ability to use that scale to further improve their products. *See* Tr. Sept. 10 AM 55:20–56:12 (Layser (News Corp)) (News Corp was “stuck” because it had to stay with DFP in order to access Google Ads demand; “if I didn’t have the reliance on Google Ads demand, we would be switching ad servers, but because I had this reliance, then we couldn’t.”); PTX1853 (Layser asking Google executive Rahul Srinivasan announcing 2019 launch of UPR “so, say I’m unhappy with [UPR] and I want to switch ad servers . . . I don’t want to give up AdWords or AdX demand and I want it compete kind of holistically with all the rest of my partners. Is there any plans for you to integrate with any of the server-to-server header bidding, or client-side header bidding partners?” Srinivasan responds: “I think that is also something we can explore, if, you know, there is a lot of reason for it.”); Tr. Sept. 16 PM 128:5–20, 129:6–14 (Abrantes-Metz (Pls. Expert)) (explaining that there is “no price that . . . an exchange competitor of AdX can offer to be able to access Google Ads” and that this negatively “affects their ability to grow and to compete, to gain s[cale], and become effective competitors”); Tr. Sept. 19 PM 132:4–10 (Lee (Pls. Expert)) (describing analysis that “an exchange that doesn’t [have] Google Ads bidding into it . . . it’s competitiveness would be adversely impacted”); *see also* Tr. Sept. 19 PM 130:14–20 (Lee (Pls. Expert)); Tr. Sept. 16 PM 35:7–36:7 (Weintraub (Pls. Expert)) (“AdX’s exclusivity reduces thickness on the buying side for rivals . . . and that reduction on thickness also implies a reduction in transaction volume”). For example, Tim Cadogan of OpenX testified that OpenX could not effectively compete with AdX because of AdX’s “access to Google Ads, which then and still now is by far the largest pool of advertising dollars on the web or in the world actually digitally or otherwise.” Tr. Sept. 17 PM

63:3–65:5 (Cadogan (OpenX)); *see also* Tr. Sept. 12 PM 84:6–15 (Goel (PubMatic)) (explaining the “challenge” of competing against AdX because it “has more demand flowing through its platform than anybody else”).

119. Publishers have been forced to use Google’s publisher ad server (DFP) and Google’s ad exchange (AdX) not because those were better products, but because Google used its dominance to “compel” publishers to use its publisher ad server and ad exchange and secure an unfair advantage over rivals. Des. Tr. 108:18–109:3 (Rowley (Google)) (testifying that Google Ads demand being available only on AdX “was a selling point” for AdX because “[w]hen demand can only be found through certain sources, it compels publishers to work with that product”); PTX1853 (publishers had to use DFP to access Google Ads demand); Des. Tr. 183:04–183:05, 183:08–183:21 (O’Kelley (Xandr)) (describing difficulty in competing against Google due to, among other things, “lack of access to [Google Ads] demand” and “tying of DFP to AdX without fair access to the ad server.”); Tr. Sept. 16 PM 128:21–129:5 (Abrantes-Metz (Pls. Expert)) (explaining how the restriction of Google Ads to AdX meant “the publisher has to transact on AdX”). As Stephanie Layser of News Corp explained to Google when objecting to the imposition of UPR (discussed below), “AdX is currently tied to DFP functionality leaving me forced into using the ad server should I want full access to AdWords, GDN and DV360 demand on a real-time basis.” Tr. Sept. 10 AM 55:6–56:3 (Layser (News Corp)) (explaining her comments at an April 2019 meeting with Google recorded in PTX1853).

120. Google’s conduct was motivated by a desire to protect DFP and AdX from competition, as shown by Google’s willingness to degrade Google Ads on the buy-side to lock in publishers to using DFP and AdX on the sell-side.

121. Google knew that having Google Ads bid into third-party ad exchanges would benefit Google Ads advertisers because they would be able to participate in additional advertising opportunities. Indeed, Google employees working on Google Ads advocated to expand Google Ads bidding to third-party ad exchanges because it would improve the quality of the Google Ads product. Des. Tr. 90:20–91:17 (Lipkovitz (Google)) (acknowledging that he personally supported extending Google Ads’ ability to purchase on third-party ad exchanges, but others at Google opposed it); Tr. Sept. 17 AM 21:3–16 (Jayaram (Google)); Tr. Sept. 18 AM 9:22–10:8 (Spencer (Google)) (agreeing that some Google employees advocated for unrestricted bidding by Google Ads across all ad exchanges); PTX0198 at -703 (“Speaking only from the perspective of [Google Ads], we want to buy into all auctions regardless of what the AdX margin is.”); PTX0066 at -528 (allowing Google Ads advertisers to bid on third-party exchanges would provide them with “access to additional inventory outside of the traditional AdSense and Ad Exchange publishers”).

122. However, there was an internal struggle at Google. Although Google’s buy-side team wanted Google Ads to bid on third-party exchanges, Google’s employees working on DFP and AdX concluded that those projects enjoyed the anticompetitive benefits from Google Ads’ exclusivity, which compelled publishers to use DFP and AdX. *See* PTX0198 at -703 (“[W]e do not like the idea of [Google Ads] being given a disadvantage compared to the other buyers in order to strengthen the publisher pitch (e.g. uphold the 20% margin [on AdX]).”). Thus, as early as 2010, Google employees recognized that it was “very very important . . . to keep adx out of the buy side team” because “that would be a HUGE conflict perception in the market.” PTX0059 at -077.

123. Ultimately, Google’s sell-side employees, working on DFP and AdX, “wore [] down” the buy-side and prevented Google Ads from buying on third-party exchanges. Des. Tr. 90:20–91:17 (Lipkovitz (Google)) (describing Google’s sell-side employees as “playing games” to prevent Google Ads from bidding on third-party exchanges). As Google acknowledged, that restriction is “artificially handicapping our buy-side [Google Ads] to boost the attractiveness of our sellside (AdX),” which “greatly weakens [Google Ads’] position in the market.” PTX0110 at -083.0009; PTX0066 at -528 (announcing in 2011 that Google Ads bidding on third-party ad exchanges would not launch yet because of “concerns about how this will affect other parts of our business, particularly AdX and AdSense”); Tr. Sept. 18 AM 12:2–7 (Spencer (Google)) (Google Ads restriction to AdX was “part of the value proposition associated with the exchange”).

124. Google was willing to sacrifice Google Ads’ performance to protect AdX from competition, which allowed Google to continue to use AdX to charge captive publishers supra-competitive fees. PTX0624 at -169 (“The AdX sell-side fee of 20% holds today not because there is 20% of value in comparing 2 bids to one another, but because it comes with unique demand via AdWords that is not available any other way. . . I think we are all in agreement that ‘exchange functionality’ is not worth 20% and value comes from sourcing demand.”); *see* PFOF Sec. V.A.

125. Google itself conducted an experiment to quantify what would happen if Google Ads were permitted to bid freely in the best interest of its advertiser customers. That 2011 experiment concluded that, if permitted, Google Ads advertisers would shift to buying on rival ad exchanges that could offer better terms than AdX, which in turn would cause publishers to shift to using those rival exchanges as well, such that “AdX will lose 20% to 30% of its publishers

due to sell side pressure.” DTX0085 at -539. Additionally, and for the same reasons, Google’s publisher ad server, “DFP will **lose 20%** of its publishers” to rival publisher ad servers if those publishers could use rival ad servers to connect with Google Ads advertiser demand, free of the disadvantage imposed by Google’s ties. *Id.*

126. Prof. Lee’s analysis of Google’s auction-level data further confirms that allowing Google Ads to transact freely with rival ad exchanges would have reduced the number of transactions won by AdX by approximately 40.2 percent, which “is consistent with other exchanges not having access to Google Ads . . . harming their competitiveness and ability to win impressions.” Tr. Sept. 19 PM 130:3–13 (Lee (Pls. Expert)); PTX1444. This result is consistent with a similar experiment performed in the ordinary course by Google in 2014, which predicted that removing Google Ads demand from auctions would reduce the number of transactions won by AdX by 51 percent. Tr. Sept. 19 PM 130:25–131:25, 132:1-15 (Lee (Pls. Expert)); PTX0324 at -608–09 (estimating via a simulation that without Google Ads’ bids, the number of impressions won daily on AdX would drop from 7.49 billion to 3.64 billion and 70 percent of the impressions previously won by Google Ads would receive no advertiser bids at all); *see also* Tr. Sept. 16 PM 35:16-36:7 (Weintraub (Pls. Expert)) (estimating a 25.4 percent reduction in rival ad exchanges’ share of impressions by Google Ads exclusively bidding on AdX).

127. Google restricted Google Ads to bidding almost exclusively on AdX, even though the technology for Google Ads to bid on rival exchanges already existed and was used by Google’s other advertiser buying tool, DV360, to bid widely across exchanges. PTX0132 at -787 (explaining Google Ads bidding on third-party exchanges would be enabled via “Xbid,” Google’s existing cross-exchange bidding tool already in use by DV360). With that technology, advertisers using DV360 chose to buy over half of their advertising on non-Google exchanges

through 2018, before Google implemented conduct (Project Poirot) that skewed the spend of DV360 advertisers away from rival ad exchanges. PTX1466 (reporting that even after 2018, approximately 30–40 percent of DV360 ad spend flowed through non-Google ad exchanges); *see also infra* at PFOF Sec. IV.B.4. But Google Ads advertisers did not have that choice. Google prevented them from bidding through Google Ads on non-Google ad exchanges, aware that that restriction would effectively lock publishers into using AdX and DFP, even if they would have preferred other ad tech providers. PTX0110 at -009 (“[W]e have chosen to limit GDN [Google Ads] to buying only on AdX, an exclusivity that makes AdX more attractive to sellers.”); Tr. Sept. 10 AM 55:6–56:3 (Layser (News Corp)) (explaining her frustration with being “stuck” with DFP and AdX in light of the ties); PTX1853 (noting publishers could not leave DFP because they would lose Google Ads demand).

(2) The Google Ads/AdX Tie Remains In Effect, Despite Google Allowing A Narrow Subset Of Google Ads Demand To Bid On Rival Exchanges

128. Over time, Google allowed a narrow subset of Google Ads demand to bid on third-party exchanges, but not in a manner that would allow publishers to choose freely whether they could use alternatives to AdX and DFP. Tr. Sept. 17 AM 33:23–34:9 (Jayaram (Google)) (As of August 2020, of the 18 million advertising campaigns eligible to bid on AdX, only 3 to 4 million campaigns were eligible to bid on third-party exchanges.); Tr. Sept. 16 PM 132:20–133:16 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 19 PM 133:16–134:3 (Lee (Pls. Expert)).

129. In 2011, Google became concerned that restricting Google Ads buyers to purchasing display advertising inventory only on AdX would put Google Ads at too much of a competitive disadvantage for remarketing campaigns, because rival advertiser ad networks “such as Criteo” were “focus[ing] on their inventory scale through cross exchange buying.” PTX0132

at -787 (“Competitors such as Criteo and Dapper are winning business against GDN as a result of” Google Ads bidding only on AdX.); PTX0066 at -528 (“[C]ompetitors [were] already offering a similar feature.”); Tr. Sept. 11 AM 85:1–8 (Bender (Google)) (acknowledging that Criteo was “very competitive in their remarketing space”); PTX0208 at -564 (indicating there was “Strong Advertiser Interest” in Google Ads bidding on additional ad exchanges). At the same time, Google recognized that allowing Google Ads advertisers to bid freely for inventory on rival exchanges would increase the risk that publishers would terminate their relationship with AdX and DFP by “compromis[ing] AdX’s competitive advantage [with respect to] its exclusivity to GDN [Google Ads] demand.” PTX0330 at -771; PTX0132 at -787 (“The main concern from AdSense and AdX is eliminating the U[nique] S[ales] P[roposition] that they are the only access point for dynamic AdWords [Google Ads] demand.”); PTX0333 at -486 (“Funnily enough, their question is about whether GDN [Google Ads] should go bigger on [cross]-exchange beyond [remarketing]. But if we do that, we need to wait for AdX to redefine its value prop in the absence of exclusive demand.”); Tr. Sept. 18 AM 122:8–12 (Abrantes-Metz (Pls. Expert)) (observing that Google “saw Google Ads as the competitive advantage for AdX, and if they let Google Ads be accessed in other ways, nobody would want to use AdX, and even their publisher ad server business would suffer”).

130. In response, Google started piloting a program known as AWBid (shorthand for “AdWords Cross Exchange Bidder”) in 2013, which officially launched in 2015. PTX0144 at -434; Tr. Sept. 17 AM 22:1–18 (Jayaram (Google)); Joint Glossary, ECF. No. 1309 (defining “AwBid”). AWBid only narrowly relaxed the complete restriction Google placed on Google Ads advertisers’ ability to bid for inventory on non-Google ad exchanges. Tr. Sept. 16 PM 132:20–133:5 (Abrantes-Metz (Pls. Expert)). “AwBid demand” was “capped at 10% of [Google Ads]

spend,” Google was “not obligated to bid on any inventory,” and “Google [could] not bid on [a] majority of available impressions from partner exchanges.” PTX0208 at -551.

131. AWBid was designed to counter the “perception that [the Google Ads] offering is not up to par with our competitors with regard to access to 3rd party exchanges.” PTX0144 at -434. Initially, AWBid was limited to a narrow category of advertising called “remarketing”—highly tailored advertisements that show the advertiser’s specific products to customers who had previously expressed interest in those products—because “[r]emarketing [was] where [Google Ads] face[d] the most competitive pressure.” PTX0791 at -218; Tr. Sept. 11 AM 38:20–40:1 (Bender (Google)); PTX0208 at -551 (AWBid was a “defensive priority for [Google’s] remarketing business,” rather than an attempt to move demand beyond AdX for the benefit of Google’s customers.); PTX0144 at -435.

132. Google also initially “contractually” required the ad exchanges participating in AWBid “to keep [AWBid] secret,” to prevent them from saying that “they have access to GDN [Google Ads]” because doing so would create “significant competitive pressure” on AdX. PTX0278 at -614. Google employees feared publisher and advertiser customers might try to shift more transactions to rival ad exchanges they preferred if these customers were more informed about the details of AwBid.

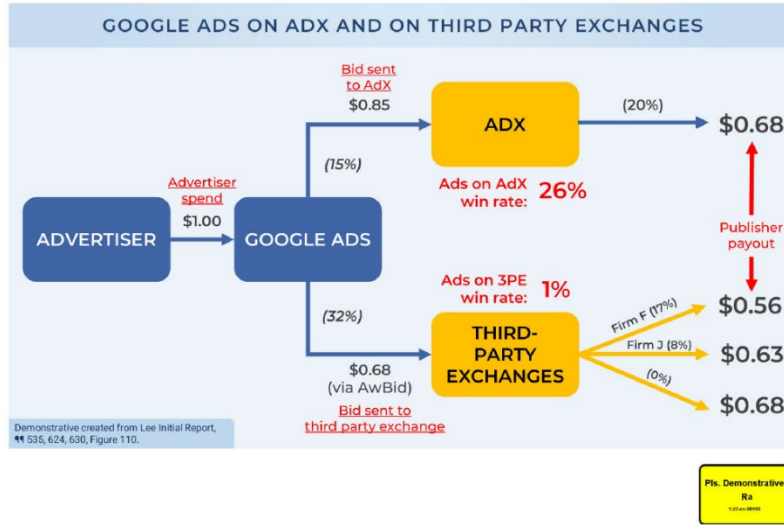
133. After Google launched AWBid for remarketing impressions, employees continued to discuss internally the benefits to AdX of keeping the scope of AwBid narrow and quiet. Google recognized that “[a]nnouncing AWBid for [remarketing] and announcing AWBid for all demand are two very different things from sell-side’s perspective” because “[i]f we announce [remarketing]-only AWBid, then we are still giving a competitive advantage to AdX – they’re still the only SSP/exchange that will get the entirety of GDN [Google Ads] demand. . . . On the

other hand, if we go with all-demand AWBid, that fully compromises AdX's competitive advantage w[ith] r[espect] t[o] GDN [Google Ads] demand access." PTX0333 at -491. Google employees understood that "if we didn't have sellside issues, we would make [Google Ads] [cross]-exchange beyond remarketing." PTX0333 at -489.

134. Although Google somewhat expanded the categories of advertising campaigns eligible for AWBid beyond remarketing (*e.g.*, certain interest category marketing ("ICM") campaigns), Google Ads customers are still limited to bidding for a small subset of advertising on non-Google ad exchanges, which means publishers still must use AdX in order to sell impressions to Google Ads. PTX0791 at -218 (indicating that, as of November 2019, AWBid was "launched for remarketing and icm verticals only"); Tr. Sept. 16 PM 133:6–16 (Abrantes-Metz (Pls. Expert)) ("[F]rom 2015, approximately only on average 3 percent of impressions transacted from Google Ads were placed outside of AdX."); Tr. Sept. 17 PM 64:15–65:5 (Cadogan (OpenX)) (noting that even though OpenX started getting "a sliver of the demand" from Google Ads, it was still "a lot harder" to compete against AdX).

135. In addition to allowing only a limited subset of Google Ads advertisers' campaigns to even participate in the AWBid program, Google took steps to systematically disadvantage any Google Ads bids submitted into rival exchanges. Contrary to the interests of Google's advertiser customers, Google added a 32 percent fee to any bids submitted by Google Ads advertisers on rival exchanges—more than twice the standard 15 percent fee Google Ads advertisers are charged for bidding on AdX. Tr. Sept. 17 AM 16:11–18 (Jayaram (Google)); Tr. Sept. 19 PM 134:16–137:9 (Lee (Pls. Expert)); PTX0624 at -169 ("AWBid puts pressure on this narrative, but is not as big a concern because even with AWBid, we can take our 32%."); Tr. Sept. 13 AM 56:19–57:16 (LaSala (Google)) (discussing PTX0624).

136. Later, when Google expanded AWBid to include a few other highly specialized campaign types, Google Ads initially applied a 50 percent fee—effectively a 50 percent reduction in the advertiser’s bid on rival exchanges—for those campaign types, before dropping the fee down to 32 percent. PTX0791 at -236 (requesting “approval to expand AWBid beyond [remarketing] at 50%” fee); Tr. Sept. 17 PM 15:12–21 (Jayaram (Google)) (noting that Google Ads’ initial revenue share for these impressions additional to remarketing was 50 percent, but later came down to 32 percent). Google charges this fee in addition to any fees charged by a competing exchange. Tr. Sept. 19 PM 135:7–137:1 (Lee (Pls. Expert)). By design, this makes the limited volume of bids submitted by Google Ads via AWBid less likely to win an impression—even if, but for this additional fee, the advertiser would pay less for the impression by buying it on the non-Google exchange. Tr. Sept. 19 PM 134:16–137:9 (Lee (Pls. Expert)). Indeed, in order to win, given AWBid’s take rate, a competing exchange would in some cases need to charge a zero percent take rate. Tr. Sept. 19 PM 135:7–137:1 (Lee (Pls. Expert)). This reality means that, as currently constituted, exchange competitors cannot expect to win meaningful volume of bids from the AWBid program. Tr. Sept. 19 PM 135:7–137:1 (Lee (Pls. Expert)). And the evidence shows they do not. Prof. Lee’s analysis of granular auction-level data shows that when Google Ads bid into a rival exchange, it only won the final auction about 1 percent of the time, whereas when Google Ads bid into AdX, it won the final auction about 26 percent of the time. Tr. Sept. 19 PM 134:16–135:2 (Lee (Pls. Expert)) (discussing Pls. Demonstrative R).



137. Because AWBid was limited to a narrow set of advertisements and because Google intentionally designed the program to disfavor any bids submitted on rival exchanges by charging over double the price, in practice the vast majority of Google Ads’ advertising demand in practice has remained exclusively available to AdX. Tr. Sept. 17 AM 33:23–34:9 (Jayaram (Google); PTX0278 at -613 (reporting in November 2015 that AWBid represented only 1.2% of total Google Ads spend). Between 2019 and 2022, “91 percent of [Google Ads] impressions [were] transacted through AdX.” Tr. Sept. 19 PM 133:2–9 (Lee (Pls. Expert)) (citing PTX1403); PTX1403 (comparing Google Ads to a competing advertiser ad network that bids across a variety of ad exchanges, including 54 percent on AdX). Since the introduction of AWBid, AWBid accounted for approximately 3 percent of Google Ads’ total open-web display impressions. Tr. Sept. 16 PM 133:6–16 (Abrantes-Metz (Pls. Expert)).

b) Google Restricts AdX Real-Time Bids To Publishers Using DFP.

138. As the second component of its strategy, Google blocked publishers using non-Google ad servers from accessing real-time bids from AdX (including AdX’s unique Google Ads advertiser demand). Tr. Sept. 13 PM 67:11–21 (Creput (Equativ)) (rival ad servers do not have access to Google Ads or AdX bids); Tr. Sep. 10 AM 11:17–12:18 (Layser (News Corp)). By

requiring publishers to use DFP to get effective access to real-time bids from AdX (a separate product), and by tying its must-have Google Ads demand (a third separate product) to using AdX, Google effectively has locked publishers into using AdX and DFP. *See* PTX1853 (showing publishers could not switch away from DFP even though they viewed the introduction of UPR as not in their best interests).

139. Google’s coercion of publishers to use DFP caused rival ad servers to go out of business and made it impossible for the few remaining ad servers to effectively compete. Des. Tr. 176:15–176:20, 176:23–177:09 (O’Kelley (Xandr)) (“[D]emonstrat[ing] to publishers that we had parity in demand to Google would have made it much more compelling for them to switch. And the idea that switching would cause them to lose a significant source of demand made it very difficult for us to convince publishers to make the switch.”); PTX0758 at -946 (James Avery of Kevel/Adzerk noting, in a 2019 email, “Almost every ad server has gone out of business because of this integration between AdX and Ad Manager, publishers may want to use another ad server but they would end up giving up a chunk of revenue from AdX. It turns out monopolies are pretty effective.”); Tr. Sept. 9 PM 145:4–20 (Avery (Kevel)) (stating that in 2010, Kevel launched a publisher ad server focusing on display advertising focusing on traditional publishers, but “we quickly realized it wasn’t a market we were going to be able to win in . . . [l]argely because of the tie to Google’s demand through [] AdX”).

(1) Google’s Restriction Of AdX Real-Time Bids To Publishers Using DFP Harms Competition.

140. By design, publishers that do not use Google’s DFP product cannot receive real-time bids from AdX (Google’s separate ad exchange product). If a publisher uses a non-Google ad server, AdX will only submit an ad for an impression in response to a bid request, but it will not disclose the price that it is offering to pay for that impression. *See* PTX0555 at -115 (“AdX

does not pass through real-time bids to [] other ad servers”); PTX1093 at -797 (AdX “does not directly bid into auctions run by third party ad servers”); Tr. Sept. 23 AM 45:14–17 (Korula (Google)) (AdX Direct does not return a real-time bid to any publisher ad server); Tr. Sept. 10 AM at 11:17–12:18, 17:25–18:16 (Layser (News Corp)); Tr. Sept. 27 AM 70:9–24 (Wheatland (Daily Mail)); Tr. Sept. 18 AM 127:8–20 (Wheatland (Daily Mail)). Instead, AdX only provides a “yes/no” answer indicating whether it wants to purchase the impression or not. *See, e.g.*, Tr. Sept. 18 AM 137:18–138:6 (Wheatland (Daily Mail)) (“When you want to access AdX demand through the AdX-direct tag, that tag will not give you the price back . . . Instead, you basically you have to give AdX last look because you have to have some pricing guidance within AdX”); Tr. Sept. 10 AM at 11:17–12:18, 17:25–18:16 (Layser (News Corp)); PTX0758 at -945 (“So [AdX direct] is essentially saying ‘yes or no,’ . . . ?”; “Yeah, exactly. It is binary, either it wins or doesn’t[.]”).

141. As a result, publishers must use DFP if they want to compare the price offered by AdX to a price offered by a competing ad exchange. *See, e.g.*, Tr. Sept. 27 AM 70:9–24 (Wheatland (Daily Mail)) (“[Y]ou get no price out of an AdX-direct tag, so you can’t put it into price competition with any other demand.”); PTX0758 at -945 (“[Y]ou can’t have [AdX direct] compete with other tags.”); Tr. Sept. 23 AM 139:8–17 (Korula (Google)) (“Q. Okay. So you are aware that for publishers that do not use DFP, it’s not as easy to compare real-time bids from AdX to real-time bids from other exchanges; correct? A. I think that’s right, yes.”); Tr. Sept. 18 AM 122:11–18 (Abrantes-Metz (Pls. Expert)). Because publishers that switch away from DFP to another publisher ad server cannot get basic price discovery from AdX (based on comparing real-time bids from AdX to real-time bids from other exchanges), publishers risk losing a significant

amount of revenue by using a non-Google ad server. *See, e.g.*, Tr. Sept. 10 AM 11:17–14:2 (Layser (News Corp)); Tr. Sept. 18 AM 127:8–128:11 (Wheatland (Daily Mail)).

142. This restriction essentially ties AdX and DFP together, expanding the tie between Google Ads and AdX discussed above. Stephanie Layser, from News Corp, testified that “AdX is tied to DFP” because “you can get real-time bids into DFP from AdX, but you can’t reverse it and do it in a different ad server.” Tr. Sept. 10 AM 21:18–23 (Layser (News Corp)); PTX0754 at -321 (“One of my biggest issues . . . is that AdX is currently tied to DFP functionality[.]”); *see also* Tr. Sept. 9 PM 123:5–124:15, 144:7–145:3 (Avery (Kevel)) (explaining that Kevel could not win business from Google’s DFP “[l]argely because of the tie to Google’s demand through [] AdX,” which is “tied into DFP,” and “brings a significant amount of money to publishers,” and that “the only way to get real-time demand and, really, bids from AdX is tied to DFP”); PTX0758 at -946 (“AdX is almost completely tied to DFP.”); Tr. Sept. 17 PM 105:25–106:6 (Cadogan (OpenX)) (explaining that “DFP was tied to AdX” and that “the only way a publisher could get access to real-time demand from AdX was using DFP,” which means that “as an ad serving competitor, one could, practically speaking, not effectively compete with that”).

143. If AdX and DFP were not tied together, “then publishers would be able to take the real-time price from AdX, and they would be able to use a different publisher ad server” than DFP. Tr. Sept. 10 AM 123:1–11 (Layser (News Corp)).

(2) Google’s Restriction of AdX Real-Time Bids to Publishers Using DFP Impairs Competition Among Publisher Ad Servers

144. The tie between AdX and DFP forced publishers to use AdX, even though they would have preferred to use other ad servers, because it leveraged AdX’s exclusive ability to get bids from Google Ads to control publisher choice in the ad server market, too.

145. Thus, for example, Ms. Layser evaluated whether News Corp could switch publisher ad servers and concluded that switching would create too great of a risk that News Corp would lose revenue from AdX and Google Ads. Tr. Sept. 10 AM 10:16–13:2 (Layser (News Corp)); *see also* DTX0404 at -134, -144 (switching away from DFP would “potentially have an eight figure impact on programmatic revenue”; “we would likely face a severe drop” in revenue from GDN). She concluded that switching away was not a realistic option; she was “stuck” with DFP, even though she concluded that Google’s implementation of certain policies, like UPR, degraded the quality of the product. Tr. Sept. 10 AM 10:16–13:2, 26:22–24, 51:19–52:3, 55:6–56:3 (Layser (News Corp)); *see also* PTX0754 at -321 (“AdX is currently tied to DFP functionality leaving me to be forced into using the adserver [sic] should I want full access to AdWords, GDN, and DV360 demand in a real-time pricing basis[, which] seems like a way that Google is forcing publishers onto their adserver [sic] and hindering . . . freedom to switch should the publisher community be unhappy with changes.”); Tr. Sept. 9 AM 75:22–76:18 (Wolfe (Gannett)) (Gannett turned down an offer to switch to a rival publisher ad server that charged less, because “even if that number were to be cut in half for us, it was not going to offset the revenue loss of not having direct access to the Google ad exchange as a demand source for our inventory.”). Even if AdX and Google Ads did not account for all of News Corp’s programmatic revenue, it represented a significant enough amount of their revenue to constrain News Corp’s ability to choose alternative ad servers in practice. “Every bit of money counts in publishing” in order “to hire journalists” and “make the best possible products,” given that “advertising is a massive revenue stream” and publishers have to “maximize it as well as [they] can.” Tr. Sept. 10 AM 114:7–115:4 (Layser (News Corp)) (testifying that AdX accounted for approximately 53

percent of News Corp’s programmatic revenue when News Corp was considering switching away from DFP, and that Google Ads accounted for 42 percent of the revenue from AdX).

146. Similarly, Daily Mail evaluated whether it could switch away from DFP and ultimately concluded that it would be too costly because of the revenue loss associated with the loss of the totally separate Google product, Google Ads. Tr. Sept. 18 AM 126:1–130:24, 138:7–11, 146:5–10, 147:1–12 (Wheatland (Daily Mail)); PTX1717 (Daily Mail evaluation of revenue loss). According to Matthew Wheatland from Daily Mail, “in another world, maybe we would like to choose which product we feel operates best,” but Daily Mail has no choice because “AdX demand is huge” and “valuable to publishers,” and “because of that requirement to access [AdX] demand, we need to purchase Google’s ad server.” Tr. Sept. 27 AM 76:4–17 (Wheatland (Daily Mail)); *see also* Tr. Sept. 9 PM 123:13–23 (Avery (Kevel)) (explaining that when Kevel tried to pitch publishers to switch away from DFP, publishers would ask, “How do you replace that revenue [from AdX]?”; Kevel did not “have an answer for that” because “[t]here’s not a way for us to replace that revenue”); Tr. Sept. 17 PM 54:23–55:19 (Cadogan (OpenX)) (explaining that “to work with the OpenX ad server would require [publishers] saying no to by far the largest source of advertising revenue that was available to them, which was the Google offering” via AdX, and “that’s a choice almost no publisher could make because they couldn’t go without that large source of revenue”); Tr. Sept. 13 PM 66:9–67:21 (Creput (Equativ)) (identifying one of the main reasons publishers never switched from DFP to Equativ to be “the fear of losing revenues, the fear not to have access to Google demand”).

147. Empirical analysis of auction data confirms publishers’ intuition that foregoing access to Google Ads demand via AdX would be too costly to be rational. Analysis shows that publisher payouts would decrease by 28% overall without AdX bids, while removing any other

exchange would only decrease publisher payouts by less than one percent. PTX1395; Tr. Sept. 19 PM 88:2–89:7 (Lee (Pls. Expert)).

148. The dual, interlocking ties among DFP, AdX, and Google Ads made it effectively impossible for other publisher ad servers to meaningfully compete with DFP. Some rival ad servers exited the market completely. OpenX, for example, tried to compete with DFP from approximately 2008 until 2018. Tr. Sept. 17 PM 47:1–5 (Cadogan (OpenX)). Despite “stack[ing] up reasonably well” compared to DFP’s features and “compet[ing] reasonably well” on price, competing with DFP was “very, very difficult,” mainly because publishers only got real-time bids from AdX if they used DFP, and only got bids from Google Ads through AdX, which meant that “to work with the OpenX ad server would require [the publisher to] say[] no to by far the largest source of advertising revenue” and “that’s a choice almost no publisher could make[.]” *Id.* at 47:6–52:12, 54:18–55:19; *see also* PTX1501 at -612. OpenX shut down its ad server in 2017/2018, primarily because of how the DFP/AdX tie had manipulated the competitive process. Tr. Sept. 17 PM 47:1–52:12, 54:18–55:19 (Cadogan (OpenX)).

149. Similarly, Kevel tried to compete with DFP because it identified “an opportunity for a kind of more modern publisher ad server,” and it therefore created an ad server that “could serve a lot faster than any of our competitors.” Tr. Sept. 9 PM 121:20–11 (Avery (Kevel)). Kevel, however, “quickly realized” that it wouldn’t be able to compete effectively against DFP, “[l]argely because of the tie to Google’s demand through . . . AdX.” *Id.* at 121:20–11, 122:25–124:15. This made Kevel “pivot away from targeting . . . traditional publishers” and focus instead on a different type of publisher—i.e., ecommerce sites focused on sponsored listing and native ads. *Id.* at 126:5–129:3.

150. The tie between DFP and AdX also made it incredibly difficult for the small number of other remaining ad servers to compete effectively. For example, Andrew Creput, the CEO of Equativ, testified that it was “practically impossible to engage in competition with Google on ad serving,” mainly because publishers using its ad server could not receive real-time bids from AdX (and thereby Google Ads), and because of the other costs involved in switching ad servers. Tr. Sept. 13 PM 68:16–69:3 (Creput (Equativ)). According to Mr. Creput, Equativ lost half of its publisher ad serving clients to DFP, with the “main reason” being that non-DFP publishers could not receive real-time bids from AdX. *Id.* at 63:15–65:25. Similarly, Equativ tried to win approximately 25 publishers away from DFP, but was unable to convince any to switch; for those publishers, “it was never about product features” or “level of service.” *Id.* at 66:9–67:21. Instead, publishers decided not to switch due to their inability to effectively access AdX outside of DFP and due to the other costs involved in changing ad servers. *Id.* at 66:9–67:21; *see also* Tr. Sept. 20 PM 156:11–158:11 (John (Xandr)) (explaining that “it’s very difficult” to compete with DFP for U.S. publishers, not because Google has the best product, but instead because DFP provides publishers with better access to Google demand).

(3) Google’s Restriction of AdX Real-Time Bids to Publishers Using DFP Reduces Innovation.

151. The tie between DFP and AdX, reinforced by the tie between AdX and Google Ads, has allowed Google to resist competitive pressure that otherwise would have led it to innovate on behalf of its customers and has reduced its competitors’ ability to innovate.

152. Google’s unilateral imposition of UPR is one telling example. As discussed more fully below, *see* PFOF Sec. IV.B.5, publishers viewed UPR as a reduction in product quality because it eliminated their ability to control an important aspect of their business, reduce their dependence on AdX, and pursue other business goals. *See, e.g.*, Tr. Sept. 10 AM 50:17–23

(Layser (News Corp)); Tr. Sept. 18 AM 146:5–10 (Wheatland (Daily Mail)). In theory, publishers could have responded to Google removing this important feature from DFP by switching to other ad servers, like Xandr, that, unlike DFP, gave publishers the choice to set price floors for AdX higher than other ad exchanges. *See* Tr. Sept. 10 AM 52:25–53:7 (Layser (News Corp)) (Xandr allowed publishers to set different floors for different exchanges); Tr. Sept. 20 PM 158:12–159:9 (John (Xandr)). But publishers could not do so in practice due to the DFP/AdX tie. *See* Tr. Sept. 10 AM 51:23–52:3, 53:8–10 (Layser (News Corp)) (“[T]hey were making a product feature that was not in my best interests, and . . . I wanted to switch ad servers, but the tying of DFP and AdX made it too much of a revenue risk . . . so I felt like they were holding us hostage.”); Tr. Sept. 18 AM 147:1–12 (Wheatland (Daily Mail)); PTX0754 at -321 (Layser: “AdX is currently tied to DFP functionality . . . seems like a way that Google is forcing publishers onto their adserver and hindering . . . freedom to switch should the publisher community be unhappy with changes.”).

153. Similarly, Ms. Layser testified that she wanted access to News Corp’s log-level data—meaning data about how News Corp’s own ad inventory was being sold, which would help News Corp understand what was happening in its auctions—but Google prevented News Corp from accessing this data. Tr. Sept. 10 AM 23:5–24:24 (Layser (News Corp)). Then, “after two years of begging,” Google told Ms. Layser that it would provide access to that data, but it then “broke the keys” that allowed News Corp to merge different parts of the data, making it unusable. *Id.* at 23:5–24:24. Google never fixed this issue. *Id.* at 25:5–6. This was an example of a Google publisher customer requesting product functionality that would help its business, but those requests “land[ed] on deaf ears.” *Id.* at 22:22–24:24; *see also id.* at 25:19–26:9 (“It’s impossible to negotiate with Google” with respect to requests like access to log-level data.); *see*

also PTX1854 at 35:1-13 (publisher raising concerns with Google for limiting deal reporting information for Open Bidding which “made it next to impossible for any [publisher] to figure out . . . how we’re going to increase yield with our other partners”). Xandr’s ad server would have allowed News Corp to get access to this data, but News Corp determined that it could not switch to Xandr to take advantage of that capability because it would lose access to Google’s unique demand. *Id.* at 25:7–18.

154. Another telling example was Google’s delay in embracing an auction system that allowed multiple exchanges to submit simultaneous real-time bids for an impression, which nearly all witnesses at trial recognized was better for publishers. Header bidding, an effort spearheaded by publishers and other exchanges, attempted to provide such functionality via a hack or workaround of DFP, and increased revenues for publishers as a result. Tr. Sept. 17 PM 65:18–66:5 (Cadogan (OpenX)) (describing how header bidding started driving more revenue for publishers in 2014); Tr. Sept. 11 AM 111:7–11 (Ravi (Pls. Expert)); Tr. Sept. 16 PM 86:7–15 (Weintraub (Pls. Expert)); *see* PFOF Sec. III.E. At least by 2015, Google employees recognized that “the modern publisher ad server needs to allow as many demand sources as the publisher wants to compete in real time for a given impression.” PTX0254 at -237. But Google did not launch its comparable header bidding product, Open Bidding, until 2018, years after header bidding had already been widely adopted. Tr. Sept. 23 AM 39:10–12 (Korula (Google)). Google had an incentive to slow-roll the development of allowing multi-exchange, real-time bidding because it benefited from the status quo. *See* PTX0234 at -236 (“We do not want to fully embrace header bidding as we are giving away a cheap form of dynamic allocation for free to all our competitors.”); *see also* PFOF Sec. IV.B.1, IV.B.3; Tr. Sept. 19 AM 147:16–148:12 (Bellack (Google)) (conceding that Google leadership initially only wanted to develop Open Bidding to

be “slightly better” than header bidding, rather than “the best possible technology,” and that as a result, and because of “[c]ontinued HB [header bidding] innovation,” Open Bidding “will be inferior to header bidding” at launch); PTX1543 at -604.

155. Publishers forced to use DFP are unable to use Google’s ad tech products to innovate within their own businesses. *See* Tr. Sept. 10 AM 18:17–20:12 (Layser (News Corp)) (DFP is not innovative; it is “a 25- to 30-year-old piece of technology” that is “slow and clunky”); *id.* at 18:17–20:12 (DFP limited News Corp’s ability to “innovate in the ways that we wanted” by preventing it from developing “personalized product experiences” using its paywall); *see also* Tr. Sept. 18 PM 149:15–25 (Wheatland (Daily Mail)). For example, rather than address Ms. Layser’s concerns about UPR and the tying of AdX to DFP, Google employees “called [Ms. Layser] emotional and unproductive.” Tr. Sept. 10 AM 57:20–58:3 (Layser (News Corp)). Google’s own employees recognized that publishers had “been viewing [Google] as a necessary evil, instead of a responsive, innovative partner.” PTX0254 at -238; Tr. Sept. 13 AM 102:11–103:4 (LaSala (Google)) (conceding that Google had become too large compared to its smaller competitors to innovate quickly).

156. The DFP/AdX tie also reduced competitors’ ability innovate. For example, OpenX’s ad server had some feature gaps compared to DFP, primarily because the DFP/AdX tie deprived OpenX of scale, which in turn deprived OpenX of the revenue needed to invest in developing product features. Tr. Sept. 17 PM 106:7–22 (Cadogan (OpenX)) (reason for feature gaps was inability to win publishers due to lack of access to demand); *see also id.* at 48:9–16, 50:4–52:6, 54:23–55:19 (the main reason it was difficult to win publishers and compete with DFP was the tie between AdX and DFP). Similarly, Kevel’s ad server offered more functionality than DFP and had “pushed ad serving a lot further forward,” but Kevel was unable to

successfully serve traditional publishers due to the tie between DFP and AdX. Tr. Sept. 9 PM 132:18–133:6, 138:11–23, 148:19–24 (Avery (Kevel)). Absent that tie, Kevel would have been “able to compete in this traditional kind of display market that [it] really can’t compete in today,” opening up “a whole new market for our business.” *Id.* at 141:15–142:12. Thus, although Kevel created a product that offered better functionality than DFP, customers could not benefit from that innovation because Google’s conduct prevents Kevel from serving those customers. *See also* Tr. Sept. 13 PM 71:19–72:18 (Creput (Equativ)) (explaining that the DFP/AdX tie “substantially limits the capacity to innovate”); Tr. Sept. 19 PM 40:3–17 (Shaughnessy (Kargo)) (Google’s position in the publisher ad server market has “slowed down our ability to bring some of research and development we’ve done over the years to advance the industry at the pace we would like”).

157. The unlevel playing field created by the tie between DFP and AdX has caused some publisher ad servers to exit the market completely. *See* Tr. Sept. 17 PM 54:15–55:19 (Cadogan (OpenX)); *see also* Tr. Sept. 9 PM 145:14–20 (Avery (Kevel)); PTX0758 at -946 (“Almost every ad server has gone out of business because of this integration between AdX and Ad Manager, publishers may want to use another ad server but they would end up giving up a chunk of revenue from AdX.”). Those firms are no longer available to publishers as alternatives to Google that can provide additional product variety or features to customers. *See* Tr. Sept. 19 PM 145:13–146:4 (Lee (Pls. Expert)).

158. Finally, Google also implemented a written policy that reinforces the anticompetitive effects of Google’s tying of AdX and DFP. Google’s “Partner Guidelines,” which are binding on all publishers that use Google’s publisher ad server, impose restrictions on the ability of publishers using other ad servers to place bids from AdX in competition with those of other exchanges. Specifically, the policy provides: “Once Partner [publisher] has made an ad call

for Google Monetization of a given impression, [the publisher] Partner is not permitted to pass that impression through any other system (including [the publisher's] own system) that dynamically or programmatically allocates ad calls based on actual or estimated real-time pricing information." PTX0971 at -771. As one Google executive explained, the policy "essentially is saying once you've called AdX, you can't take that impression and then pass it through any other system that tries to put the AdX bid in competition with other bids based on price." Tr. Sept. 23 AM 46:12-19, 54:5-10 (Korula (Google)); *see also* PTX0118 at -822-23 (explaining that the "existing contract" with publishers already says "that AdX can not be called from any 3rd party SSP and yield management system. And in consequence AdX Mobile can not be called from third party mobile ad server that incorporate these functionalities."); Tr. Sept. 13 AM 92:10-14 (LaSala (Google)) ("Q. And the restriction Mr. Spencer is talking about here [in PTX0118] refers to the restriction that AdX cannot be called by a publisher using a third-party ad server with yield management functionality; right? A. I think that's what it says."). This provision reinforces the problems caused by Google's tying of real-time bids from AdX to DFP by limiting publishers' ability to work with other ad servers. At a minimum, this provision requires publishers using other publisher ad servers to give AdX a Last Look because in practice they must call AdX last and provide it a price to beat. Tr. Sept. 16 PM 125:14-126:16 (Abrantes-Metz (Pls. Expert)).

(4) AdX Direct Does Not Mitigate the Effect of the AdX-DFP Tie.

159. The mechanism that Google offers to publishers using rival publisher ad servers to place inventory into AdX, known as AdX Direct, is not a reasonable alternative for publishers and therefore is not a way around the tie. AdX Direct "does not pass through real-time bids to these other ad servers (instead it passes through a 'dumb' flat CPM based on historical averages)." PTX0555 at -115; Tr. Sept. 10 AM 11:23-12:18 (Layser (News Corp)) (explaining

that when accessing AdX “inside of DFP, there is real-time pricing,” whereas “when you go outside of DFP, it’s either a yes or a no. You offer an ad to Google, and they either take it or they don’t”). As a result, when publishers use AdX Direct, AdX “does not let the publisher know what the price . . . it’s paying in time for the publisher to be able to make a comparison with other sources and even to give the publisher the opportunity to refuse to take that price.” Tr. Sept. 16 PM 124:5–25 (Abrantes-Metz (Pls. Expert)).

160. Thus, AdX Direct is “not an effective replacement” to accessing AdX via DFP. Tr. Sept. 27 AM 70:9–24 (Wheatland (Daily Mail)) (“Q. Based on your experience, is using the AdX-direct tag an economically viable substitute to accessing AdX through DFP? A. No, it’s not. There’s a number of issues with accessing AdX via AdX-direct tags.”); PTX0758 at -945 (Kevel email explaining that “[t]he problem with tags is that they are opaque, you don’t get the bid of the ad.”); PTX1854 at 67 (Stephanie Layser describing in Google meeting with publishers that “Google will give you tags, but it will not insert the price into another” ad server); Tr. Sept. 17 PM 50:4–51:20 (Cadogan (OpenX)) (“When you use an ad tag, that’s just a proxy. It’s a historic price . . . the price signal, if you like, that you’re receiving is of a completely different class. One is real-time and contemporary. The other is historic average. So they’re two very different animals... They were much less effective and much less compelling.”); Tr. Sept. 19 PM 139:3–11 (Lee (Pls. Expert)) (explaining that AdX Direct “is a way in which rival publisher ad servers can connect to AdX but not obtain real-time bids”); Tr. Sept. 16 PM 124:5–25 (Abrantes-Metz (Pls. Expert)) (noting that “less than 2 percent of all of AdX’s revenues came from third-party publishers using AdX through AdX Direct,” and it is therefore not an effective replacement).

161. The practical result of AdX Direct tag integrations is a simplified “yes or no” call and response system, where AdX either “wins” by bidding above the static floor price, PTX0758

at -945, or if AdX did not have a bid above the floor price, then “the impression would go unsold” and the publisher would lose out on revenue absent a “passback” to another ad exchange. Tr. Sept. 17 PM 51:1–17 (Cadogan (OpenX)). Under either scenario, AdX does not return an actual bid to the rival publisher ad server, and when AdX wins, the publisher “never actually find[s] out the price it won at.” PTX0758 at -945.

162. Market participants view AdX Direct tags as outdated and “very inefficient,” and “the only way to get real-time demand and, really, bids from AdX is tied to DFP.” Tr. Sept. 9 PM 144:7–145:1 (Avery (Kevel)); PTX0758 at -945 (explaining that the problem with AdX Direct “tags is that they are opaque, you don’t get the bid of the ad. You can set a floor price, but you can’t have it compete”). Submitting inventory to AdX via AdX Direct does not provide “any access on a real-time basis to the AdX ad exchange, which is really what publishers wanted because they wanted [] real-time competition for their inventory.” Tr. Sept. 17 PM 50:4–11 (Cadogan (OpenX)). This is because the “whole point of the [ad tech] industry is to be able to value an impression, which is a user’s attention at a moment in time, to be able to value that in real-time,” but “[w]hen you use an ad tag [like AdX Direct], that’s just a proxy. It’s a historic average price. So . . . the price signal . . . that you’re receiving is of a completely different class. One is real-time and contemporary. The other is historic average. So they’re two very different animals.” Tr. Sept. 17 PM 50:12–25 (Cadogan (OpenX)). Similarly, Google employees internally acknowledged that AdX Direct is merely a “concept for antitrust,” not a genuine effort to provide publishers with ad-server choice. PTX0933 at -183 (Nitish Korula, in response to engineer concerns that the PR message was that the product was poorly designed due to budget constraints). Google employees likewise noted that AdX Direct “disadvantaged” the connection between AdX and publishers using rival ad servers, compared to the full access to AdX afforded

to DFP publishers, PTX0555 at -115 (“AdX is disadvantaged in ‘AdX Direct’ relationships because AdX does not integrate with other ad servers as well as it does with DFP (no dynamic allocation), so AdX does not pass through real-time bids to these other ad servers[.]”).

163. The impracticality and unpopularity of using AdX Direct tags to connect to AdX from non-Google ad servers is borne out in Google’s data. The share of display advertising spending on AdX that flowed via AdX Direct to publishers using rival publisher ad servers and proprietary in-house publisher ad servers has declined from about 12% in 2015 to less than 1% in 2023. PTX1302; Des. Tr. 129:03-129:10 (Lipkovitz (Google)) (doubting that many publishers used AdX Direct or that a large number of impressions flowed through AdX Direct compared to those flowing through DFP), 129:20-130:06 (explaining “multiple reasons” why using AdX Direct was not “a good or equal alternative” to using AdX and DFP, including that Google would “bid more aggressively higher prices, more impression if DFP is the output server.”); Tr. Sept. 19 PM 140:19–141:5 (Lee (Pls. Expert)).⁹

⁹ At trial, Google’s witnesses asserted that, at least prior to the transition to the Unified First Price Auction (“UFPA”) in 2019, AdX did not technically send a real-time price to DFP. Tr. Sept. 26 PM 95:9-96:9 (Israel (Def. Expert)); Tr. Sept. 23 AM 45:14-20 (Korula (Google)). But it is clear that publishers using DFP can compare AdX’s real-time price to those of other ad exchanges, while publishers using other ad servers cannot. *See e.g.*, PTX0758 at -945 (“You can’t have it [AdX direct] compete”); *see generally* PFOF Sec. IV.A.2.b.1. (summarizing evidence). Mechanically, prior to the transition to the UFPA, DFP received a real-time price from other exchanges using header bidding and then passed that price as a floor to AdX, which would then compare its real-time price to the highest price from an exchange (or other demand source) participating in header bidding. *See* Tr. Sept. 11 AM 111:18-112:18 (Ravi (Pls. Expert)). Thus, as even Google executive Nitish Korula concedes, publishers using AdX can compare real-time prices to those from other exchanges. Tr. Sept. 23 AM 138:21-139:7 (Korula (Google)). Other publishers that used rival publisher ad servers could not effectively make the same comparison. *See* Tr. Sept. 23 AM 138:21–139:7 (Korula (Google)) (“Q. So you are aware that for publishers that do not use DFP, it’s not as easy to compare real-time bids from AdX to real-time bids from other exchanges; correct? A. I think that’s right, yes.”); *see also* PFOF Sec. IV.A.2.b.1. Whether the comparison technically happened, for DFP publishers, within DFP, AdX, or some combination of the two is irrelevant.

164. Publishers have evaluated and rejected as commercially unfeasible other potential means of obtaining AdX advertising demand while using a competing publisher ad server. For example, publishers can, in theory, use both DFP and a second publisher ad server in tandem. Tr. Sept. 13 PM 70:19–71:18 (Creput (Equativ)) (explaining “Google mediation,” which “forces the publisher to keep, to maintain two ad serving contracts, one, for example, with Equativ and the other with GAM, Google DFP”); Tr. Sept. 20 PM 151:7–152:5 (John (Microsoft)) (describing how Xandr’s mediation system accesses AdX demand). However, publishers have determined that this workaround is not practical because, among other drawbacks, operating two publisher ad servers increase costs and latency. Tr. Sept. 10 AM 15:16–17:3 (Layser (News Corp)) (explaining that operating two publisher ad servers would result in: (1) reconciliation issues with order management systems and financial and billing systems, (2) issues with forecasting, and (3) increased latency resulting in lost impressions and lost revenue); PTX0949 at -481–82 (Google employee chat asking, “How likely is the dual ad server setup to get real adoption” and observing such a setup introduces latency resulting in lost revenue for website publishers); Tr. Sept. 20 PM 151:7–152:22 (John (Microsoft)) (explaining that “operationally it’s expensive” to run two publisher ad servers and that publishers are “not getting all of the demand even through mediation; so it’s kind of a patch” and noting the loss of a Swiss customer who was using Xandr’s mediation system).

165. Moreover, such a dual publisher ad server system does not actually overcome the tie Google has created between its ad exchange and publisher ad server: the publisher must continue to use Google’s publisher ad server *in addition to* the rival publisher ad server of its choosing, as well as provide AdX with a Last Look advantage. Tr. Sept. 10 AM 14:14–25, 17:4–15 (Layser (News Corp)) (explaining that because “you wouldn’t be able to get the real-time

price [from AdX without DFP], you would have to feed in pricing from another system into Google’s system,” which provides AdX “the final choice on whether or not they wanted an impression”); PTX1674 at -022; Tr. Sept. 13 PM 70:19–71:18 (Creput (Equativ)) (describing the dual publisher ad server setup as “extremely imperfect” and that publishers still must maintain an ad serving contract with Google’s DFP and “guarantee” AdX Last Look); Tr. Sept. 20 PM 151:7–152:12 (John (Microsoft)) (Xandr’s “mediation” system to access AdX demand was “not ideal” because publishers “have to manage two accounts, and they have to pay both the fee to Xandr as well as to Google” and AdX is granted Last Look); Tr. Sept. 16 PM 125:3–13 (Abrantes-Metz (Pls. Expert)); *see* PFOF Sec. IV.B.3. (discussing Last Look).

B. Google Exploited Publishers’ Inability to Switch Away from DFP and AdX to Further Entrench AdX and Google Ads

166. Google seized on publishers’ inability to switch from DFP and AdX to give unfair advantages to AdX and Google Ads and to engage in other anticompetitive conduct that enhanced Google’s power over both publishers and advertisers. These anticompetitive acts took a variety of forms as Google sought to undercut the ways in which industry participants tried to evade Google’s monopoly power.

- First, Google configured the rules in DFP so that publishers using DFP had to give AdX, and only AdX, the right to bid first for publisher inventory, commonly referred to as a “First Look” advantage.
- Second, Google acquired Admeld, an innovative and disruptive competitor, only to then deprecate important functionality that threatened Google’s dominance in the ad server and exchange markets. Third, after header bidding arose, AdX’s First Look turned into a Last Look over rival ad exchanges’ bids: publishers using DFP who sold inventory through a header bidding auction still needed to transmit the impression

through DFP's rules, which gave AdX a right of last refusal, providing AdX a continued preference over other ad exchanges.

- Fourth, through Project Poirot, Google responded to the threat of increased competition posed by header bidding by manipulating the bids from DV360 to limit competition from exchanges participating in header bidding.
- Fifth, through UPR, Google removed publishers' ability to set higher price floors for AdX (and Google Ads), and this removal limited publishers' ability to shift transactions to other ad exchanges, which would better serve publishers' business interests, and insulated AdX (and Google Ads) from competitive pressure.

1. First Look: Google Forced DFP Publishers to Grant AdX a Right of First Refusal

167. Prior to the emergence of header bidding, Google set up DFP to give AdX—and only AdX—a “First Look” when bidding on ad inventory. In other words, DFP allowed AdX to submit real-time bids for impressions before other exchanges even had the chance to compete for the impression. This allowed AdX to win impressions even if other exchanges would have been willing to bid more in real time, and this in turn channeled transactions to AdX and away from rival exchanges, depriving those rivals of the revenues and scale that are needed to compete effectively.

a) First Look Rearranged the Waterfall to Artificially Advantage AdX Over Rival Ad Exchanges

168. As discussed in PFOF Sec. III.D. above, publisher ad servers historically sent bid requests to ad exchanges and other demand sources one at a time in a static “waterfall” sequence, typically based on their average historical performance, until it found an eligible buyer.

169. Through First Look, however, Google gave itself an advantage over the waterfall. Des. Tr. 106:01–106:21 (Lipkovitz (Google)) (explaining that having first look is a “valuable opportunity” that, among other things, “gives you an advantage in winning the transaction” including by allowing you to “train your models to react to these specific auctions.”). Rather than AdX competing with rival exchanges to be selected by publishers for a particular position in the waterfall to bid on impressions sold through DFP, Google set up a system under which DFP granted AdX a “First Look” ahead of all other ad exchanges and ad networks. Tr. Sept. 12 PM 99:14–22 (Goel (PubMatic)) (describing AdX’s First Look: “AdX gets the right to monetize the ad impression if they have a buyer regardless of the price . . . without the publisher being able to look at bids from other exchanges.”); Tr. Sept. 10 AM 40:25–41:3 (Layser (News Corp)) (Q: And as far as you are aware, was there any way within DFP to put another exchange ahead of AdX within the remnant waterfall? A: No.”); Des. Tr. 138:08–138:09, 138:11–38:14, 138:16 (Lipkovitz (Google)) (explaining that the waterfall system made it difficult for other exchanges to compete and made it difficult for new exchanges to enter the market); Tr. Sept. 16 PM 135:21–136:3 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 16 PM 21:23–22:4 (Weintraub (Pls. Expert)). Under this system, DFP would use the highest price from other eligible line items—typically associated with other exchanges or ad networks—and use that value as a price floor for AdX to bid against. Tr. Sept. 11 AM 104:6–105:13 (Ravi (Pls. Expert)); Tr. Sept. 10 AM 39:4–10, 40:4–17 (Layser (News Corp)); PTX0551 at -048. Importantly, these line items that set AdX’s price floor were based only on static bids—meaning they had to be set in advance and did not reflect any of the real-time information about the value of the specific impression. Tr. Sept. 11 AM 104:6–105:13 (Ravi (Pls. Expert)); PTX0551 at -048; PTX0373 at -092; PTX1539 at -105; Tr. Sept. 10 AM 39:4–10, 40:4–17 (Layser (News Corp)).

170. Based on this static price floor provided by DFP, AdX would then run a real-time auction, and if an AdX buyer submitted a real-time bid that was higher than the static floor, it would win the impression, and other exchanges (and ad networks) would not have the opportunity to bid. Tr. Sept. 12 AM 28:20–29:5 (Srinivasan (Google)) (explaining how prior to header bidding, Google would “allow the AdX bids to be floored by those static line items” corresponding to other ad exchanges); Tr. Sept. 10 AM 40:18–24 (Layser (News Corp)); Tr. Sept. 11 AM 99:24–101:2 (Ravi (Pls. Expert)); PTX1540 at -577. Because AdX could run a real-time auction and win if its bid was higher than a static floor, AdX benefited from real-time information about the value of the impression, but other exchanges could not. Tr. Sept. 12 PM 98:19–99:13 (Goel (PubMatic)) (Google allowed “AdX to submit a real-time bid into the publisher ad server . . . but no other exchange could do such a thing. And so the result is that [AdX] would perform better, all things being equal, than any other exchange.”). This meant that AdX had an edge, especially in winning impressions whose value was substantially higher than a static price floor. Tr. Sept. 11 AM 102:22–103:12 (Ravi (Pls. Expert)); Tr. Sept. 16 PM 137:3–12 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 10 AM 39:4–10 (Layser (News Corp)) (“AdX reads the line items. It sees the price in which the publisher puts inside the line items, and then Google can choose whether or not it wants to buy above that price. If it does not want to buy above that price, it would go to the exchanges.”).

171. Google executives recognized this advantage DFP conferred on AdX, noting, for example, that DFP had “made it difficult to compete on a level playing field with AdX” because “[p]ublishers historically had to book an average CPM rate which would not allow Rubicon [an exchange] to compete effectively for higher-value impressions.” PTX0308 at -243; *see also* PTX0551 at -048 (“Our buyers enjoy a competitive advantage from dynamic allocation because

they receive first look on inventory”; ending the “competitive first look advantage” would “most likely lead to AdX . . . losing access to the *highest-value* queries”) (emphasis in original); PTX1539 at -105 (“[H]istorically third-party exchanges cannot compete with AdX . . . on the similar footing.”); PTX0468 at -551 (prior to exchange bidding, the “‘price’ . . . would have to be set every day on a directional basis by the publisher and not reflect Rubicon’s ability to bid highly on a given impression. . . . By comparison, AdX always submits prices in real time.”); Des. Tr. 106:01–106:21 (Lipkovitz (Google)) (explaining that having first look is a “valuable opportunity” that, among other things, “gives you an advantage in winning the transaction” including by allowing you to “train your models to react to these specific auctions.”).

172. Other industry participants also recognized this advantage; for example, Facebook described First Look as “bias[in] their system against us” by “giv[ing] Google the opportunity to cherry pick the best supply.” PTX1536 at -405; *see also* PTX1710 at -497 (First Look was an “unfair advantage which granted only AdX full viewability of publishers’ entire inventory and the opportunity to cherry pick the impressions it wanted.”); Tr. Sept. 13 PM 103:25–104:12 (Boland (Facebook)) (explaining that Google’s ability to “cherry-pick the best supply” came from Google having “the opportunity to take the very first look at all the supply and then choose to remove an impression by buying that impression.”); *see also* PFOF ¶¶ 184-85.

173. By giving AdX an advantage over rivals in winning the highest value impressions, First Look created a series of “feedback loops” that built up over time to reinforce AdX’s competitive advantages. For example, giving AdX First Look for the highest-value inventory also distorted the incentives of advertisers to funnel more of their bids (especially their highest-value bids) to AdX; in turn this gave AdX an advantage on the publisher side of the market by making the ad exchange artificially more attractive to publishers because it was able to offer

more (and higher) bids for inventory. Tr. Sept. 12 PM 99:23–100:6 (Goel (PubMatic)); *cf.* Tr. Sept. 11 AM 104:16–24, 105:16–24 (Ravi (Pls. Expert)) (discussing a related feedback loop caused by the fact that “since AdX wins the more valuable impressions, the less valuable impressions go down to the waterfall, the historical prices go down as a consequence, thereby AdX gets a lower floor, it’s able to win even more”); Tr. Sept. 11 AM 141:3–21 (Ravi (Pls. Expert)) (discussing the advertiser/publisher/advertiser feedback loop in the context of Last Look). Google recognized these feedback effects of First Look, noting that if Google ended First Look, AdX would lose access both to “overall queries” and to “the *highest-value* queries,” which would create a “self-fulfilling prophecy” under which “less-valuable inventory [would] beget[] lower CPMs, publishers [would] react by decreasing inventory access, [and that would] beget[] even lower CPMs.” PTX0551 at -048 (emphasis in original).

174. First Look allowed AdX to win impressions away from other exchanges even if exchanges lower down in the waterfall had a higher bid. *See, e.g.*, PTX1539 at -105 (“Publishers lose every time the third-party exchange has higher payout than the average (say, remarketing high bids)”); Des. Tr. 111:8–12 (Lipkovitz (Google)) (“Q: You would agree though that giving another exchange the opportunity to bid [after] AdX has met the floor price would have potentially been good for publishers; correct? A: It would.”); Tr. Sept. 11 AM 96:15–19 (Ravi (Pls. Expert)) (“Q: And how would that affect publishers’ revenue? A: It would give them less revenue, because sometimes the highest valued bidder is not coming through AdX, and AdX might have bought that same impression for a lower floor price.”); Tr. Sept. 16 PM 137:13–23 (Abrantes-Metz (Pls. Expert)) (“there are instances where publishers could have gotten a better price from, say, for example, the second- or third-in-line exchange, and they would – if they could, they would have liked to place that other source at the top of the remnant waterfall, but

they were unable to do that.”); Tr. Sept. 12 PM 86:7–16 (Goel (PubMatic)) (“There may be another buyer that’s willing to pay more for the inventory, and the publisher would have no way of finding that out or discovering that or generating that revenue.”). As a result, First Look allowed AdX to win impressions not because it had a higher bid, lower take rate, or more attractive product—but instead because merely because DFP and AdX are both owned by Google, and Google chose to give its exchange an artificial advantage over rivals. Tr. Sept. 16 PM 136:21–137:2 (Abrantes-Metz (Pls. Expert)); Tr. Sept 16 PM 102:17–103:8 (Weintraub (Pls. Expert)). This decreased revenue for publishers and also harmed advertisers by preventing, in some cases, the advertiser with the highest willingness to pay from winning. *See* Tr. Sept. 12 PM at 86:7–2 (Goel (PubMatic)); Tr. Sept. 16 PM 22:5–23:11, 24:2–15 (Weintraub (Pls. Expert)) (“first look decreases publisher’s revenues relative to the head-to-head scenario” and “because there may be a higher bid in the rival exchange that doesn’t win because of first look priority, the match quality between advertisers and impressions gets reduced under first look”); Tr. Sept. 11 PM 100:17–101:2 (Ravi (Pls. Expert)) (First Look meant that “advertisers in those exchanges are willing to pay” but the publishers would “never even get to expose this impression to others down the line, and, therefore, that advertiser with the \$1.10 value or the exchange that hosts that advertiser don’t get to win that impression.”).

175. To some extent, these inefficiencies would apply in any waterfall-based system, but First Look made them worse. Absent First Look, publishers would have had the ability to experiment with different waterfall orderings and see which one would earn them the most revenue. Tr. Sept. 16 PM 137:13–23 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 10 AM 41:16–42:25 (Layser (News Corp)) (Layser was unaware of a way to put another exchange ahead of AdX; without that ability, if she did have that ability, she would have negotiated for lower take rates

with an exchange and put that exchange ahead of AdX). First look took that ability away, harming publishers.

176. To illustrate this problem, Prof. Abrantes Metz re-ran a simulation performed by Professor Milgrom that analyzed the effects of First Look. Under this analysis, Prof. Abrantes Metz showed that only eight percent of publishers would have chosen to put AdX in the first position, if they had the opportunity to put other exchanges ahead of AdX. Tr. Sept. 16 PM 138:5–139:1 (Abrantes-Metz (Pls. Expert)). That meant that the other 92 percent would have made more money if they had been able to put other exchanges ahead of AdX, showing how First Look enhanced the limitations and disadvantages of the waterfall-based system. Tr. Sept. 16 PM 138:5–139:1 (Abrantes-Metz (Pls. Expert)).

177. First Look also skewed the bidding process to increase the number of transactions won by AdX, and decrease the number won by competitors, enhancing AdX's scale advantage. Tr. Sept. 16 PM 22:5–23:3 (Weintraub (Pls. Expert)) (simulation showing 24.6 percent decrease in transaction volume on rival ad exchanges). This effect was significant. Prof. Weintraub estimates that Google and its closest rival ad exchange would be expected to win the same number of impressions in a "fair" auction where they bid head-to-head simultaneously, First Look skewed impressions towards AdX, allowing it to win almost twice as many impressions as its closest rival. Tr. Sept. 16 PM 21:17–23:13; 87:3–16 (Weintraub (Pls. Expert)); *see also* Tr. Sept. 11 AM 102:3–18 (Ravi (Pls. Expert)) (analysis of document showing that "because of first look, AdX got to win 53 percent – that's over half – of all the impressions that it got to see from DFP").

178. In addition, First Look created an informational advantage for AdX by allowing AdX to see information about every impression from DFP that came up for auction. Conversely,

it significantly decreased the information available to rivals. Under First Look, AdX won roughly half of the available impressions, meaning that AdX's rivals did not get a chance to bid on—or receive any information about—those impressions. *See* Tr. Sept. 11 AM 102:3–18 (Ravi (Pls. Expert)) (“AdX got to win 53 percent – that’s over half – of all the impressions that it got to see from DFP.”). And each competitor exchange only received information about a subset of that remaining half of impressions because only exchanges that were allowed to bid on the impression would obtain information, while others would not. This meant that each competitor exchange received far less information than AdX did. *See* Tr. Sept. 26 PM 155:20–157:7 (Farber (Meta)) (“Google as a singular company receives – no matter where they are in the waterfall, because they’re hosting the waterfall itself, get view of the entire auction. . . . They have access to more data. They have access to data first. And the concern is are they misusing the data. . . . If you were to misuse this data about what is the price that is required by the publisher, you could consistently win.”).

179. The additional transactional data that First Look afforded AdX was an advantage because such data allows ad exchanges to “train[] machine learning models” to improve their products to win more impressions. Tr. Sept. 9 AM 146:4–147:3 (Casale (Index Exchange)); Des. Tr. 106:01–106:21 (Lipkovitz (Google)) (explaining that having First Look is a “valuable opportunity” that, among other things, “gives you an advantage in winning the transaction” including by allowing you to “train your models to react to these specific auctions.”). First Look provided AdX with an informational advantage because it allowed “AdX [to] see[] the impressions that it won” and to “also see[] the 47 percent that it lost,” whereas “other exchanges don’t even get to see the impressions that AdX wins.” Tr. Sept. 11 AM 102:10–18 (Ravi (Pls. Expert)); Tr. Sept. 16 PM 21:23–22:4 (Weintraub (Pls. Expert)).

180. Moreover, publishers had limited or no practical ability to place other exchanges ahead of AdX. *See* PFOF Sec. IV.B.1.c. This meant that publishers could not create competition for the first position. Publishers could not, for example, offer other exchanges the first position in exchange for a lower take rate. Tr. Sept. 10 AM 41:16–42:25 (Layser (News Corp)) (Layser was unaware of a way to put another exchange ahead of AdX; without that ability, if she did have that ability, she would have negotiated for lower take rates with an exchange and put that exchange ahead of AdX). This reduced price competition in the exchange market. Tr. Sept. 16 PM 136:21–137:2 (Abrantes-Metz (Pls. Expert)) (“these exchanges are not able to compete at any price for that exclusive first look in the remnant waterfall. So they were harmed by the conduct, and the evidence shows that competition in the ad exchange market as a whole was harmed.”); *see also* Tr. Sept. 12 PM 87:3–6 (Goel (PubMatic)) (First Look “suppressed competition” in the “market for ad exchange tools for open web display”).

181. If publishers had had the ability to switch ad servers, they could have tried to avoid the harms caused by First Look by switching to another ad server, or by using the threat of switching away to pressure Google to get rid of First Look. *Cf.* Tr. Sept. 18 AM 117:12–118:2 (Abrantes-Metz (Pls. Expert)). But they could not do that, as discussed above, given the ties between DFP, AdX, and Google Ads. *See* PFOF Sec. IV.A.2.

182. As a Strategic Partner Lead at Google explained, Google’s ability to lock in publishers to its ad server enabled Google to “(a) have a relationship with all pubs (b) get to see all their inventory, even that which we don’t monetize (c) (almost) always give AdX demand access to their inventory (d) maybe even allow AdX First Look at every single impression.” PTX0254 at -238. “[A]ll of that is predicated on the fact that publishers need an ad server[.]” PTX0254 at -238; *see also* PTX0551 at -048 (“Owning the ad serving tag is the right

strategy . . . AdX . . . benefits from . . . dynamic allocation . . . Our buyers enjoy a competitive advantage from dynamic allocation because they receive first look . . . Launching AdX into a non-DFP server destroys this competitive first look advantage[.]”); PTX0443 at -008 (“Clearly it’s strategic for us to have the AdServer being the decision maker to ensure GDN and DBM has first look access[.]”); PTX0114 at -049 (“Dynamic allocation allows AdX to see all XFP impressions. We lo[]se this advantage behind other ad servers.”). Google’s control over the publisher ad server also enabled Google to block other ad exchanges from competing for this advantage, because allowing rival ad exchanges to provide real-time bids directly into DFP would “be going directly against our dynamic allocation value prop with adx.” PTX0036 at -305.

183. By contrast, in a more competitive market, “DFP would have served the interests of its publisher customers, and if the interest was to put somebody else first, that they would be able to put somebody else first.” Tr. Sept. 18 AM 117:12–118:12 (Abrantes-Metz (Pls. Expert)).

b) Google’s Claims That First Look Disadvantaged AdX Are Unsupported And Contradicted By The Evidence

184. Google, through its expert, Prof. Milgrom, claimed that First Look created a competitive disadvantage, rather than an advantage, for AdX. Tr. Sept. 24 AM 63:17–64:14 (Milgrom (Def. Expert)). This argument is unsupported by—and inconsistent with—the real-world evidence from market participants presented at trial. Google’s internal documents demonstrate that even Google’s executives recognized that First Look gave AdX a significant competitive advantage over rival ad exchanges:

- One Google employee cautioned against improving DFP in a way for publishers that would “destroy this competitive First Look advantage” for Google and “likely lead AdX” to “losing access to overall queries” and “the highest-value queries” if it had to compete against rivals for the first spot in the waterfall. PTX0551 at -046 (“From

- there, it becomes a self-fulfilling prophecy in that less-valuable inventory begets lower CPMs, publishers react by decreasing inventory access, which begets even lower CPMs.”);
- Another Google employee observed that because of First Look, rival ad exchanges like Rubicon were not “allow[ed] to compete effectively for higher-value impressions” because they were relegated to competing based on their static, “average CPM rate.” PTX0308 at -243 (“Rubicon is pitching Header Bidding to several of our partners because DRX has historically made it difficult for SSPs to compete on a level playing field with AdX. (Publishers have historically had to book an average CPM rate which would not allow for Rubicon to compete effectively for higher-value impressions.)”);
 - Another Google employee observed that First Look provided “an advantage to AdX” “b/c of the implementation inside the same [Google] ad server” over other ad exchanges because other exchanges had to compete based on “their average bid” while “AdX buyers get to compete with their real bid.” PTX0238 at -608;
 - Another employee acknowledged that AdX’s “‘unfair advantage’ comes from historically third-party exchanges cannot compete with AdX . . . on the similar footing,” which in particular is a significant disadvantage for remarketing impressions. PTX1539 at -105 (“Pre-Jedi [Open Bidding], we allow DFP publishers to put in only the ‘average payout’ on the DFP line item that represents the opportunity cost of the third-party exchange. Publishers lose every time the third-party exchange has higher payout than the average (say, remarketing high bids.)”);

- Google recognized, “Clearly it’s strategic for us to have the AdServer being the decision maker to ensure GDN and DBM has first look access.” PTX0443 at -008;
- Other employees observed that header bidding “was a response . . . [to] the fact that any kind of dynamic allocation with DFP ONLY worked with AdX and not any other exchange – the rest had to work on [average] prices.” PTX0373 at -092;
- And finally, Google employees observed that prior to Open Bidding, the line item price in DFP “would have to be set every day on a directional basis by the publisher and not reflect [a rival ad exchange’s] ability to bid highly on a given impression. . . . By comparison, AdX always submits prices in real time.” PTX0468 at -551.

185. Similarly, documents and testimony from a variety of other knowledgeable industry participants also observed that First Look gave AdX a competitive advantage, not a disadvantage:

- Meta observed that DFP gave Google “the opportunity to have the ‘first look’ which punishes us” and “gives Google the opportunity to cherry pick the best supply.” PTX1536 at -404; PTX1536 at -405;
- Meta also recognized: “Google’s dynamic allocation product cuts out other demand partners, who are further down the waterfall. Publishers say that they don’t like the fact that Google is effectively the only company to get a ‘first look,’ which is intuitively anti-competitive.” PTX1540 at -577;
- The Trade Desk understood that AdX had “preferential access to ad inventory before other ad servers,” giving it “a significant competitive advantage.” PTX1650 at -044;
- Meta documents spell out its understanding of the advantage that First Look gave to AdX prior to header bidding: “Header bidding benefits everyone but Google. It takes

away the unfair advantage which granted only AdX full viewability of publisher's entire inventory and the opportunity to cherry pick the impressions it wanted. Header bidding therefore threatens Google's monopoly which ensured AdX always won the great majority of impressions." PTX1710 at -407;

- Stephanie Layser of News Corp articulated AdX's First Look advantage as the ability to "typically pay as little as one penny above [the highest floor] and take the impression" while other exchanges do not get the chance to bid. Tr. Sept. 10 AM 40:14-24 (Layser (News Corp));
- John Dederick of The Trade Desk testified that before header bidding AdX would have the first ability to bid (after direct deals were evaluated) and others exchanges might "never ha[ve] the opportunity to see the impression." Tr. Sept. 11 PM 133:9-134:9 (Dederick (The Trade Desk)).
- Rajeev Goel of PubMatic testified that First Look "suppressed competition" among exchanges because "anybody without the first look capability would be unable" to monetize certain inventory. Tr. Sept. 12 PM 87:3-9 (Goel (PubMatic)); and
- Brian Boland of Facebook described First Look as "cherry picking." Tr. Sept. 13 PM 103:25-104:12 (Boland (Facebook)).¹⁰

¹⁰ Prof. Milgrom cites one model from a paper by Prof. Ravi to support his conclusion that the first exchange in the waterfall faces a competitive disadvantage, rather than an advantage. Tr. Sept. 24 AM 65:10-67:11 (Milgrom (Def. Expert)). However, as Prof. Milgrom notes, this model relies on the assumption that publishers set such a high reserve price for the first exchange that the first exchange is "unable to attract any customers." Tr. Sept. 24 AM 66:17-67:10 (Milgrom (Def. Expert)). There is no real-world evidence that this happened. In fact, to the contrary, during this time period, AdX was able to win roughly half of the transactions auctioned off by DFP, rather than none of them. *See* Tr. Sept. 11 AM 102:3-18 (Ravi (Pls. Expert)). In addition, as discussed above, any conclusion that AdX was disadvantaged, rather than advantaged, by First Look is inconsistent with the evidence presented at trial. *See* PFOF Sec. IV.B.1.

186. Additionally, the overall import of Prof. Milgrom’s opinions on First Look is limited. As he admitted, Prof. Milgrom did not express any opinion about whether First Look harmed competition. Tr. Sept. 24 PM 10:15-17 (Milgrom (Def. Expert)). And he expressed no opinion about whether harm from First Look would be larger or smaller than any benefits that could have resulted from it. Tr. Sept. 24 PM 10:18-21 (Milgrom (Def. Expert)).

c) Publishers’ Limited Ability To Create “Workarounds” To First Look Did Not Eliminate Its Anticompetitive Effects

187. Google claimed at trial that there were ways for publishers to call other exchanges (or networks) before calling AdX. Most notably, as a technical matter, publishers could put other exchanges in the “sponsorship” or “standard” line items in DFP, which were typically used for direct deals. Tr. Sept. 18 AM 141:2–19 (Wheatland (Daily Mail)); Tr. Sept. 11 AM 107:1–9 (Ravi (Pls. Expert)). But this approach faced significant limitations, which made it impractical and unattractive for publishers.

188. These line items were designed for direct deals, not programmatic advertising—for example, they have a fixed time period and fixed number of impressions, which is not ideal for programmatic advertising. Tr. Sept. 18 AM 141:2–24 (Wheatland (Daily Mail)). In addition, placing exchanges in the sponsorship or standard line item has the significant downside that it interferes with direct sales, which are valuable to publishers. Tr. Sept. 11 AM 107:1–9 (Ravi (Pls. Expert)); Tr. Sept. 18 AM 35:8–36:10 (Abrantes-Metz (Pls. Expert)). As a result, publishers rarely used this approach. Tr. Sept. 18 AM 141:2–19 (Wheatland (Daily Mail)) (“[Y]ou would

never be able to do that at any great scale.”); Tr. Sept. 18 AM 35:8–36:10 (Abrantes-Metz (Pls. Expert)) (in “reality . . . it was not widely used.”).¹¹

189. In addition, the evidence discussed above about the advantages to Google of First Looks suggests that publishers did not freely or commonly use “workarounds” to call other exchanges before calling AdX. *See* PFOF ¶¶ 184-85. On the contrary, that evidence shows that any “workarounds” to First Look were too difficult and/or too uncommon to eliminate the significant competitive advantages that First Look gave to AdX. *See* Tr. Sept. 13 AM 15:25–16:19, 20:3–16 (Kershaw (Magnite)) (responding to the separate argument that publishers could

¹¹ Google also questioned Prof. Ravi on a footnote of his report that noted that Google offered something called “configurable priority,” which allowed publishers to change the ordering of the waterfall. Tr. Sept 10 AM 29:2–30:25 (Ravi (Pls. Expert)). But Google presented no other evidence on configurable priority at trial—neither its fact witnesses nor its expert witnesses discussed it—and also did not mention it in its pre-trial proposed findings of fact and conclusions of law.

In addition, it is not clear that configurable priority allowed publishers to obtain real-time bids (as opposed to static bids or static value CPMs) from other exchanges before calling AdX. In fact, to the contrary, several fact witnesses testified that, to their knowledge, it was not possible to call other exchanges within the “remnant waterfall” prior to calling AdX (meaning that publishers could put exchanges in the standard or sponsorship line items but could not call other exchanges before AdX within the portion of the waterfall dedicated to exchanges and other indirect demand sources). *See* Tr. Sept. 10 AM, 39:4–10, 40:25–41:3 (Layser (News Corp.)); Tr. Sept. 18 AM 140:19–23 (Wheatland (Daily Mail)). That testimony suggests either that configurable priority did *not* allow publishers to obtain real-time bids from other exchanges before calling AdX—or that it was a feature that was not commonly used or understood. And Google has provided no other evidence that configurable priority was used commonly.

Finally, if configurable priority were an easy way for publishers to call other exchanges before AdX, then neither Google nor third parties would have perceived first look as creating an advantage for AdX. But the evidence shows that, to the contrary, Google and other industry participants did recognize that first look created important competitive advantages for AdX. *See* PFOF Sec. IV.B.1.b. Also, as described more fully above, First Look can have anticompetitive effects even if some workarounds existed. *See* PFOF Sec. IV.B.1.c.

use Prebid to run an auction without calling AdX at all: “I have the option to starve to death. . . . I think this is the equivalent. I think that in this case you could bypass the largest demand pool in the industry and just go at it alone on principle, but that's not advisable for a publisher because they -- you want to have as much demand as possible. So I don't think it was practical[.]”).

2. Admeld Acquisition: Google Extinguished A Potential Competitor And Deprecated A Key Feature Important To Publishers.

190. Google's 2011 acquisition of Admeld reduced competition, both in the exchange and publisher ad server markets. Tr. Sept. 18 AM 46:4–48:22 (Abrantes-Metz (Pls. Expert)).

191. Prior to the acquisition, Google identified Admeld as one of its three “key competitors” and described it as being the one that was the “largest concern.” PTX0088 at -597. Rather than continuing to compete with Admeld, or building its own competing yield management technology, which Google had planned to do, *see* PTX0112 at -985, Tr. Sept. 16 AM 105:6–25 (Mohan (Google)) (agreeing that, by 2011, he supported either buying or building a yield manager), Google acquired Admeld and ended its ability to competitively threaten Google.

192. Prior to the acquisition, Admeld posed a competitive threat to Google. Through its yield management functionality, Admeld gave publishers an alternative way to manage their indirect demand. Admeld was one of the three leading yield managers at the time, *see* PTX0085 at -717; PTX0088 at -597; Tr. Sept. 26 PM 26:19–25 (Israel (Def. Expert)), and Google concluded that Admeld had a stronger product offering and more traction with customers. *See* PTX0112 at -981, -986 (Admeld had a “stronger product offering” and “better publisher base”; Rubicon was “inferior” to both Admeld and PubMatic in “product and traction”); *see also* PTX0088 at -597 (Admeld is the “largest concern”); Des. Tr. 86:20–86:23, 87:03–87:23 (O'Kelley (Xandr)) (prior to the Admeld acquisition, Google “was struggling to win business

with AdX. It was very expensive. It was inflexible. It wasn't great at optimizing for yield"; after the acquisition, Google "got the skill set and the knowledge they needed to make the AdX value proposition more compelling. And they also took out a competitor that was, I think, pulling money away from them. I think part of what Admeld was doing was optimizing away from the Google platform.").

193. Admeld's yield management system allowed publishers to manage the decision as to which indirect demand source would win, based on Admeld's predicted pricing rather than the historical average pricing that was previously used in the waterfall. *See* PTX0056 at -792 (noting yield managers used "predictive algorithms to decide which ad network to serve"); PTX0046 at -096-97 (describing predictive pricing model). At the time, publishers could choose to use Admeld's yield management system to operationalize their indirect demand strategy, rather than DFP's dynamic allocation function, which included First Look. *See* PTX0056 at -780, -783, -789-790 ("Yield Managers . . . are 'owning the remnant tag' for a growing number of premium publishers, putting at risk our current and future control over the inventory supply"; they "pose a significant threat" to "AdX growth"); Tr. Sept. 16 AM 40:2-12 (Mohan (Google)) ("[P]ublishers were choosing to go with static yield management . . . as opposed to putting all of their indirect inventory into . . . Dynamic Allocation, which was represented by what Google AdX did."). This meant that Admeld provided an alternative that publishers could use to avoid the DFP system that stacked the deck in AdX's favor. *See, e.g.,* Tr. Sept. 18 AM 47:24-49:15 (Abrantes-Metz (Pls. Expert)); PTX0056 at -780, -789-790; PTX0088 at -597 ("YM break out ability to dynamically allocate from DFP."); PTX0046 at -095 ("PubMatic is moving to more of a real-time model across network bids, positioning themselves to be directly competitive with the Exchange[.]").

194. Google acknowledged that it “missed the YM [yield manager] threat – both on the AdX side as well as the DFP side,” creating a “gap in [Google’s] portfolio.” PTX0060 at -187; Tr. Sept. 16 AM 38:8–11 (Mohan (Google)). Consequently, Google viewed yield managers as a threat to its “own the tag” strategy, under which DFP would manage these decisions, not third parties. *See* PTX0056 at -788 (“YMs [like Admeld] now manage the decision as to which ad network should monetize remnant inventory for a publisher . . . As a result, Google’s platform strategy to “own the tag” in order to ensure optimal control over inventory for monetization (Adx and AdSense) is at risk.”); PTX0088 at -597 (“YM break our ability to dynamically allocate from DFP.”); PTX0056 at -776 (“This deck highlights some of the threats yield managers are posing . . . [t]he biggest concern comes down to who owns the tag on the page.”); Tr. Sept. 18 AM 47:24–48:22 (Abrantes-Metz (Pls. Expert)). Google described this competitive threat as “disintermediation”—something that it saw as a significant concern. *See* PTX0085 at -714 (“Yield managers are disintermediating our access to inventory, inhibiting our overall display strategy[.]”); PTX0056 at -780 (“Areas of concern . . . in the competitive landscape” include “[d]isintermediation by Yield Managers[.]”); Tr. Sept. 18 AM 49:5–15 (Abrantes-Metz (Pls. Expert)).

195. In addition, Admeld also offered nascent real-time bidding capabilities, which was bringing it into even closer competition with Google’s exchange, AdX. *See* PTX0112 at -977, -981 (describing Admeld’s RTB functionalities); PTX0085 at -732 (RTB was a “[k]ey [s]trength” of Admeld); Tr. Sept. 26 PM 100:4–8 (Israel (Def. Expert)) (“[G]iven that [Admeld] offered some real-time bidding, then broadly defined it was an ad tech competitor [to AdX].”).¹²

¹² At trial, Google focused on the fact that Admeld’s RTB revenue was small. *See, e.g.*, Tr. Sept. 18 AM 61:8–62:1 (Abrantes-Metz (Pls. Expert)). But according to Google documents, RTB-

Relatedly, Admeld also submitted real-time bids to publishers using other ad servers. *See, e.g.*, PTX0141 at -448 (describing Admeld feature that “pass[ed] real-time pricing” into “a non-DFP ad server” while noting that adopting this feature within AdX was “not currently planned[.]”). As discussed above, this was something that AdX did not do then, and does not do now, as providing real-time bids to other ad servers would have undermined the tie between DFP and AdX. *See* PFOF Sec. IV.A.2.

196. Google’s acquisition documents show that Google understood that its acquisition of Admeld would have anticompetitive effects. For example, in one presentation discussing Google’s plan to acquire Admeld, Google executives described as a “[s]trategic [r]ationale” the fact that the acquisition would “[r]educ[e] [the] risk of disintermediation,” i.e. that a rival ad tech provider would be involved in the chain of ad tech tools that facilitated a transaction. PTX0112 at -976; *see also id.* at -979. Google also identified this “[s]trategic [r]ationale,” among other reasons, as justification for paying a higher price for Admeld than would be justified by an estimated valuation based on calculations of Admeld’s revenues alone. *See* PTX0112 at -976, -984.

197. Similarly, another Google presentation evaluating whether Google should acquire a yield manager noted that “[t]heir technology is irrelevant to us” and “[t]heir customer set is already a very large overlap . . . so we aren’t buying customers,” before suggesting the real reason Google wanted to acquire a yield manager, by asking: “How does the competitive landscape change if we buy one?” PTX0085 at -726. And Google executives Neal Mohan and Jonathan Bellack also illustrated Google’s understanding of how the acquisition would affect

based revenue amounted to almost 40 percent of Admeld’s total revenue in 2010, and it was projected to almost quintuple by 2011. *See* PTX0112 at -982.

competition by describing it as Google “picking up the one with the most traction and parking it somewhere,” which would “let us solve the problems from a position of strength (market share, knowledgeable team members).” PTX0058 at -800.

198. After the acquisition, Google deprecated Admeld’s products and rebuilt some of Admeld’s features into AdX. Tr. Sept. 18 AM 47:3–12 (Abrantes-Metz (Pls. Expert)); PTX0141 at -442; DTX0126 at -566. But Google stopped Admeld’s practice of offering real-time bids to publishers using third party ad servers, PTX0159 at -002–04, even though deploying such a capability widely would have taken “[m]inimal effort,” because submitting real-time bids to publishers using other ad servers would have “[t]ake[n] away a key differentiator for DFP.” PTX0113 at -804; *see also* Tr. Sept. 18 AM 47:3-12 (Abrantes-Metz (Pls. Expert)). This meant, then, that Google effectively shut down one of the features that created a competitive threat for its own products.

199. At trial, Google focused on a document stating that Admeld’s server-side integration had “ongoing issues,” PTX0159 at -003; Tr. Sept. 16 AM 120:1–5 (Mohan (Google)), but this ignores the following sentence reflecting Google’s intent: “At this point *I’m more of a mindset of getting folks to flip to DFP to get them DA.*” PTX0159 at -003 (emphasis added). Taken as a whole, this contemporaneous document shows a Google-owned Admeld had a different incentive to serve publisher customers than an independent Admeld. When it was independent, Admeld had an incentive to build a new technology that would compete with DFP and AdX, even if that technology faced some challenges. When it was owned by Google, Admeld’s incentive to do so was dampened; it was in the combined company’s (Google’s) interest to *not* support a new competitive technology and instead “flip” Admeld’s prior customers to Google’s existing products.

3. Last Look: Publishers And Rival Ad Exchanges Created Header Bidding To Introduce More Competition—But Then Google’s Last Look Advantage Continued To Afford Google Unfair Advantages

200. In response to First Look and the other limitations inherent in the waterfall, publishers and non-Google ad exchanges created a workaround or hack of DFP, known as header bidding, so that other ad exchanges could better compete with Google via real-time bids. *See* PFOF Sec. III.E.1; *see, e.g.*, PTX0587 at -794 (“Publishers felt locked-in by dynamic allocation in DFP, which only gave AdX ability to compete, so HB [header bidding] was born.”); Tr. Sept. 9 PM 136:12–19 (Avery (Kevel)) (“But [header bidding is] a hack in the sense of it’s a clever solution that they figured out how to get bids from other exchanges into the auction in DFP.”). Header bidding “dramatically increase[d]” publisher revenue by increasing real-time, head-to-head competition among ad exchanges. PTX0507 at -218 (“**per-query bids from exchanges dramatically increases yield**, so pubs [publishers] are clamouring for this functionality”). And while header bidding brought benefits to both publishers and advertisers by facilitating real-time competition from multiple ad exchanges, Google resisted this innovation: “We do not want to fully embrace header bidding as . . . [t]his would have a large distorting effect on our rate card as one of the largest advantages to AdX is real time competition.” PTX0234 at -236.

201. Header bidding mitigated some of the effects of First Look, but, through the operation of Google’s dynamic allocation, AdX’s First Look advantage became a Last Look advantage. Tr. Sept. 12 PM 101:1–12 (Goel (PubMatic)) (explaining that with header bidding, “Last Look is [AdX’s] ability to look at all the other bids that are coming in for publisher’s inventory”); Tr. Sept. 11 AM 112:2–8 (Ravi (Pls. Expert)) (explaining that “that first position, that first look advantage, now became a last look because you’re now seeing it after all of the

other header bidders have finished bidding[.]”); PTX0502 at -890 (Google product marketing manager explaining that header bidders’ highest bid provides the floor price in AdX).

202. When a publisher using DFP sent impressions outside of Google’s ad tech tools to a header-bidding auction (in which Google declined to participate), the publisher still needed to decide whether to show the winning ad on its website and to mechanically serve that ad; this meant the publisher needed to send the winning header bidding bid into their publisher ad server. DFP. Tr. Sept. 11 AM 112:19–113:12 (Ravi (Pls.’ Expert)). At that point, DFP allowed AdX alone a last chance to bid on the impression—hence, a Last Look. This came after all other exchanges had already bid and after DFP allowed AdX alone to see the highest header bidding bid and to incorporate that bid into the AdX auction as a price floor. PTX0342; Tr. Sept. 16 PM 24:26–25:1 (Weintraub (Pls. Expert)) (Last Look was a “feature implemented by Google in which rivals run their auction, the header bid auction. They will send the clearing price of that auction to DFP, Google’s AdServer, that will act as a floor for the AdX auction. And the AdX auction will run after having access, after having visibility over the clearing price. So that’s why it’s called the last look advantage. Now, AdX is going last and has the advantage of having visibility over the clearing price of rivals.”).

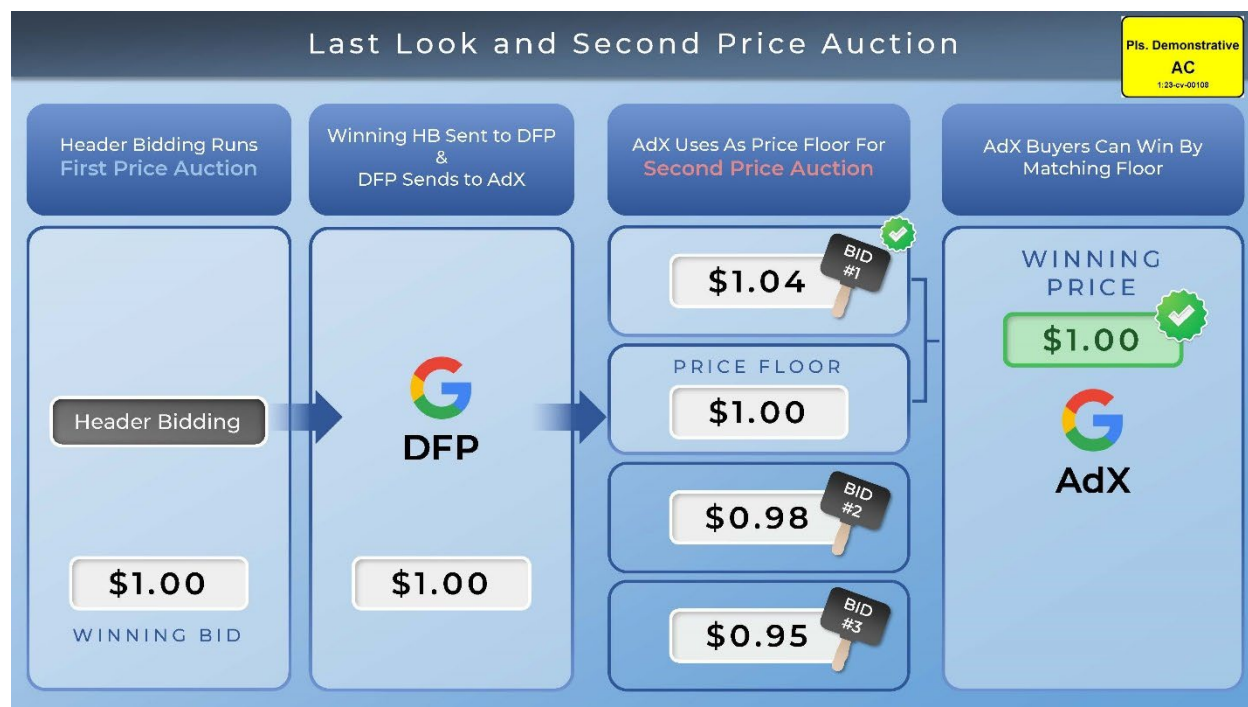
203. In other words, Last Look allowed AdX—and no other ad exchange—to see the highest bid from a rival ad exchange and then adjust its bid in response. It thus was akin to Google conducting a sealed auction for all other market participants and then allowing Google to see the results of that sealed auction and adjust accordingly. *See* Des. Tr. 123:6–123:21, 123:22–125:11, 125:13–126:19 (O’Kelley (Xandr)) (describing ways in which Last Look favored AdX and gave it unfair competitive advantages because “AdX could see everybody else’s bids” and then decide “to bid a little bit higher or not,” whereas everyone else did not “know what anyone

else is going to bid”); Des. Tr. 163:03-163:05, 163:07-163:25 (Lipkovitz (Google)) (explaining competitive advantage that Last Look gave to Google by being able to bid at the end); Tr. Sept. 18 AM 37:7–38:1 (Abrantes-Metz (Pls. Expert)) (“AdX and only AdX is able to . . . open the envelope for the winning bid, know what the winning bid is, and be able . . . to bid after everybody else.”).

204. Mechanically, Last Look created this advantage for AdX in two ways. The first stems from AdX running a second price auction during this time period (though, as discussed below, AdX did not run a “clean” second price auction). Tr. Sept. 11 AM 112:19–113:12 (Ravi (Pls. Expert)). In a second price auction, the buyer with the highest bid wins, but pays the amount of the second-highest bid or the price floor, whichever is higher. Joint Glossary, ECF. No. 1309 (defining “Second-price auction”); Tr. Sept. 11 AM 95:5–8 (Ravi (Pls. Expert)). Importantly, through Last Look, DFP took the highest bid from header bidding and submitted it to AdX as a floor. Tr. Sept. 11 AM 112:19–113:12 (Ravi (Pls.’ Expert)). As shown in Pls. Demonstrative AC below, in situations where AdX only had one buyer above the floor, AdX would win at a price equal the price floor set by the header bidding bid. Tr. Sept. 11 AM 112:19–113:12 (Ravi (Pls. Expert)). No other ad exchange could obtain an advantage comparable to Last Look, except to a limited extent as discussed below with respect to Open Bidding. Tr. Sept. 24 AM 142:22–143:2 (Milgrom (Def. Expert)); Tr. Sept. 18 AM 37:7–38:1 (Abrantes-Metz (Pls. Expert)).

205. Google executives acknowledged that this created a competitive advantage for AdX, noting that “AdX has an advantage where its closing price can depend on [a] bid from another exchange.” PTX0528 at -448; *see also* PTX0815 at -391 (describing a situation in which AdX automatically wins at the same price as the highest bid from header bidding due to the

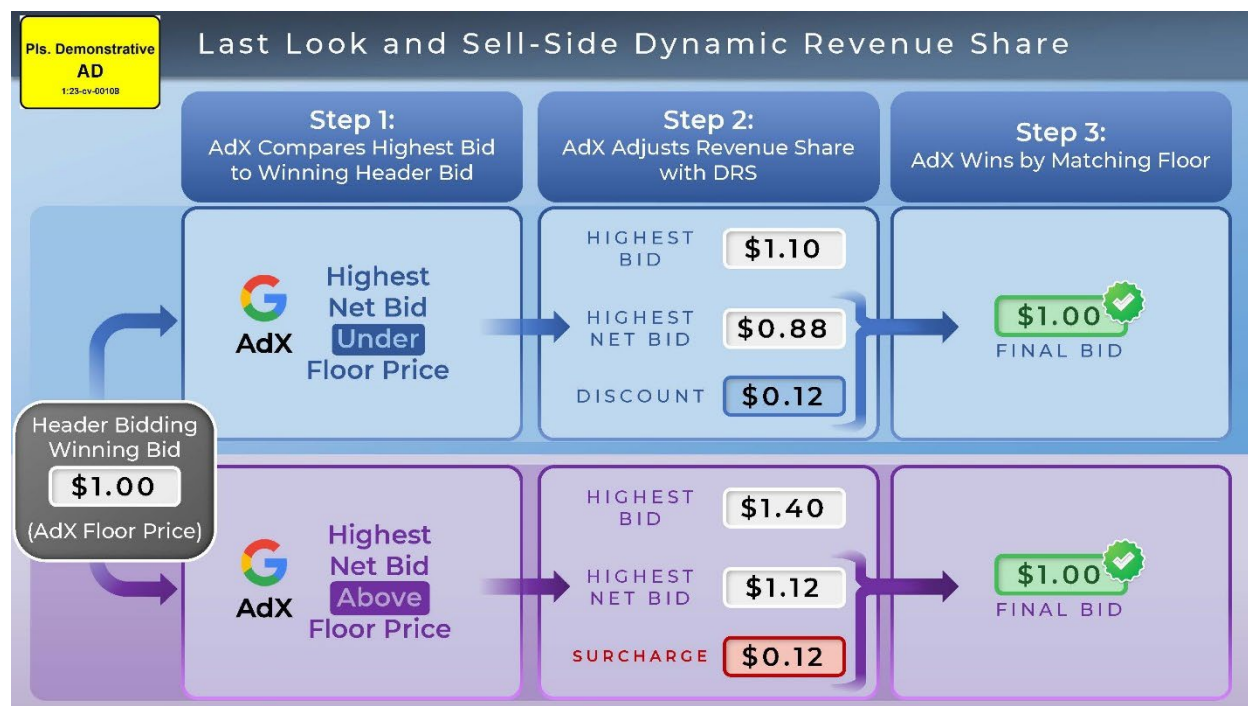
interaction of last look and its second-price auction and adding: “this dynamic provides a significant advantage”).



206. The second advantage resulted from the interaction of Last Look and sell-side dynamic revenue share (“sell-side DRS”). Tr. Sept. 11, AM 113:13–17 (Ravi (Pls.’ Expert)). Sell-side DRS was a Google system allowing AdX to vary its take rate on an impression-by-impression basis. Tr. Sept. 11 AM 114:5–20, 115:7–12 (Ravi (Pls. Expert)); Des. Tr. 163:09-163:11, 163:14, 163:17-165:11 (O’Kelley (Xandr)) (“The advantage that Google had against us was that, because they could see all the bids, they could adjust the rev share at the end. So we could have taken a lower rev share, but we were just guessing at what the clearing price would be.”); Tr. Sept. 11 AM 114:5–20, 115:7–116:16 (Ravi (Pls. Expert)). In other words, sell-side DRS allowed AdX to charge, for example, a 15% take rate for one impression, and a 25% take rate for another impression, with the goal of maintaining AdX’s average 20% take rate. Tr. Sept. 11 AM 114:8-20, 115:7-12 (Ravi (Pls. Expert)). Google used sell-side DRS to lower its take rate

for more valuable impressions, for which competition with other exchanges was more pronounced, and correspondingly increase its take rate for less valuable impressions for which there was little or no competition from other exchanges.

207. Sell-side DRS, when combined with Last Look, allowed AdX to see the highest other bid from header bidding and then adjust its take rate so that AdX would win at a price equal to the highest other bid. Tr. Sept. 11 AM 114:21–115:6 (Ravi (Pls. Expert)).



That meant, for example, as shown in the picture above, AdX, knowing that the price to beat for a particular impression is \$1, could either provide a \$0.12 discount off its normal revenue share to win if its net bid would otherwise only be \$0.88, or conversely add a \$0.12 surcharge if it had an advertiser with a high enough bid to allow Google to take the added revenue share and still beat the \$1.00 header bidder price floor. In either case, AdX wins. Tr. Sept. 11 AM 115:13–116:16 (Ravi (Pls. Expert)) (describing Demonstrative AD shown above).

208. This too created a competitive advantage for AdX—and one that no other exchange had (again, with the partial exception discussed below in relation to Open Bidding). Google understood this competitive advantage as well. For example, a Google engineer, Martin Pál, who worked on sell-side DRS, described “dynamic revshare” as being “just yet another way for AdX to exploit the last look advantage,” noting that “AdX gets to pay high and win whenever AppNexus [an ad exchange] is present with a high CPM, and can pay low when AppNexus bids low. AppNexus in contrast can’t reliably save money on queries where AdX bids low, because it doesn’t know AdX bids.” PTX0542 at -335.

209. Accordingly, both Google and other knowledgeable industry participants recognized that Last Look created a competitive advantage for AdX—and a competitive disadvantage for other exchanges. For example, Google itself has described Last Look as a “significant advantage.” PTX0815 at -391; *see also* PTX0429 at -757 (describing Last Look as “an advantage where [AdX’s] closing price can depend on bid from another exchange”); PTX0816 at -161 (Last Look gave AdX a “significant informational advantage”); Tr. Sept. 23 AM 152:8–18 (Korula (Google)) (agreeing that Last Look was a source of informational advantage for AdX); PTX0542 at -335 (“[D]ynamic revshare is just yet another way for AdX to exploit the last look advantage.”).

210. Similarly, third parties have also described Last Look as “significantly disadvantaging other competitors.” PTX1709 at -934–35 (Facebook document explaining that “last look” was “killing alternatives for open markets”); *see also* Des. Tr. 123:22–128:8 (O’Kelley (Xandr)) (Last Look provided AdX an “incredibly powerful bit of information” and “bias[ed] th[e] decisioning process towards AdX”); Tr. Sept. 9 AM 162:16–163:13 (Casale (Index Exchange)) (Last Look would “be an incredibly privileged opportunity” for an ad

exchange); Tr. Sept. 13 PM 116:13–117:21, 118:12–19, 124:4–16 (Boland (Facebook)) (First Look and Last Look allowed Google to win the highest quality impressions and leave lower quality impressions for competitors; it also gave AdX an informational advantage); Tr. Sept. 12 PM 101:8–12, 101:24–102:15 (Goel (PubMatic)) (“[A]ny party with last look will win more auctions, and that creates a dependency from an advertiser and a publisher perspective or perceived dependency on that technology platform.”).

211. Last Look also had important negative consequences for both publishers and advertisers. First, as with First Look, Last Look allowed AdX to win even if AdX did not have the advertiser willing to pay the most for the impression, harming the process through which publishers were matched with the advertisers who valued the impression the highest. *See* Tr. Sept. 11 AM 121:9–16 (Ravi (Pls. Expert)). Second, as discussed more fully below, PFOF Sec. IV.B.3.b, Last Look likely reduced publisher revenue relative to an auction where all bidders competed simultaneously without any one having an unfair advantage.

212. Last Look negatively impacted competition in the exchange market in at least three ways. First, for the reasons described above, Last Look created an artificial competitive advantage for AdX—and a corresponding disadvantage for other exchanges—enhancing AdX’s market power. PFOF Sec. V.C. Importantly, Last Look also allowed AdX to win transactions, not because it competed and won on the merits (as would be the case, for example, if AdX won by having the best product, lowering its take rate, or simply having the highest bid), but instead because it gave Google this artificial competitive advantage.

213. Second, Last Look also limited price competition among exchanges. Tr. Sept. 18 AM 39:4–14, 40:2–13 (Abrantes-Metz (Pls. Expert)). Last Look reduced the incentive and ability of other exchanges to compete on price, since even if they lowered the price, AdX always

retained the ability to bid later and match the price and win the transaction. Tr. Sept. 18 AM 39:4–14, 40:2–13 (Abrantes-Metz (Pls. Expert)). Relatedly, at least one Google employee recognized that Last Look reduced Google’s incentive to lower its own take rate by asking, when Google was considering giving up Last Look: “If we are giving away last look . . . [l]et’s say [another ad exchange] decides to start a price war and decreases its OA [Open Auction] cut to 10%, what would [b]e our levers to not to have to follow it?” PTX0438 at -478.

214. Third, Last Look reduced the scale of rival exchanges. The significance of this effect is supported in part by Google’s own documents. Google itself calculated that Last Look allowed AdX to win a significant number of transactions and recognized that it also reduced the number of transactions won by ad exchanges competing through header bidding. DTX0768 at -934 (“Last-look allows us to win queries that account for 7.8% of Adx revenue”); PTX0819 at -318 (“Giving up ‘last look’ over . . . header bidding . . . results in an 8% decrease in AdX revenue . . . and 7.6% decrease in impressions.”); PTX1631 at -868 (noting that after removal of Last Look, “Header bidding [is] filling more queries”; “HB lift can be attributed to ‘Last Look’ removal”); *see also* Tr. Sept. 12 AM 144:12–23 (Srinivasan (Google)) (removing Last Look made other ad exchanges bidding through header bidding “more competitive with AdX demand” and “resulted in AdX losing more impressions”); Tr. Sept. 12 PM 101:24–102:15 (Goel (PubMatic)) (Last Look gave AdX a “significant advantage[.]” with respect to scale by allowing AdX to win more transactions). Relying in part on similar Google calculations, Professor Weintraub also estimated that Last Look reduced rival exchanges’ scale by 14.75%, when

measured by impressions, or 8.72%, when measured by revenues. PTX1326; *see* PFOF Sec. V.C.¹³

215. In a competitive market, Google likely would not have been able to give AdX a Last Look advantage. As Prof. Abrantes-Metz explained, “[O]ne possibility for what competition would have looked like with respect to Last Look would have been to ask AdX to provide . . . its own bid without having the knowledge of everybody else’s bids.” Tr. Sept. 18 AM 39:15–40:1 (Abrantes-Metz (Pls. Expert)). Alternatively, Google would have “allow[ed] for DFP to allow its publisher customer[s] to choose which exchange [] they want to give a last look to. And if the publisher had had that choice, competition for that last look position would have naturally happened and it would not have given this exclusive privilege to AdX.” Tr. Sept. 18 AM 39:15–40:1 (Abrantes-Metz (Pls. Expert)).

216. Google ultimately removed AdX’s Last Look advantage in stages. In 2017, Google removed Last Look over rival exchanges that participated in its Open Bidding product (previously known as Exchange Bidding and discussed further below), a competitor to header bidding. Tr. Sept. 23 AM 125:20–126:18 (Korula (Google)) (acknowledging that AdX’s Last Look was removed for Open Bidding ad exchanges in 2017, but that AdX still had a Last Look over header bidding ad exchanges after that). Recognizing the value of AdX’s Last Look advantage, Google offered to share that advantage over header bidding with ad exchanges willing to join Google’s Open Bidding program. Des. Tr. 164:23–165:15 (Lipkovitz (Google))

¹³ This analysis is based on estimates conducted after Google had already removed Last Look over Open Bidding, meaning that in some respects it understates the competitive impact of Last Look. Tr. Sept. 23 AM 125:23–126:18 (Korula (Google)) (Google removed Last Look over Open Bidding ad exchanges in approximately 2017, but retained Last Look over header bidding exchanges at that time); PTX1035 at -355 (the Google experiment Prof. Weintraub’s relied upon for his quantitative analysis of Last Look was run between June and September of 2019).

(explaining how Google gave up Last Look as Exchange Bidding was launched). With this change, both AdX and certain participating rival ad exchanges were able to use the Last Look advantage to increase their chances of winning transactions via Open Bidding rather than header bidding, diminishing the scale of transactions flowing through header bidding.

217. Importantly, however, giving up Last Look over Open Bidding did not end AdX's advantage over header bidding, which was significant given that Open Bidding was significantly smaller than header bidding. *See* DTX2085 (showing more than 75% of publishers adopting header bidding, even after the launch of Open Bidding). Relatedly, Open Bidding came with other significant disadvantages for other ad exchanges, including that they were charged a separate 5% fee, or a fee equal to one quarter that of AdX's take rate. *See* Tr. Sept. 12 PM 104:2–105:6 (Goel (PubMatic)) (explaining that Open Bidding charges PubMatic's ad exchange a fee “in the 5 to 10 percent range”); Tr. Sept. 19 AM 145:18–25 (Bellack (Google)) (agreeing that Google charged 5% take rate ad exchanges participating in Open Bidding). That amounted to a significant disadvantage that ensured that other ad exchanges would not compete on a level playing field against AdX through Open Bidding, even after the removal of AdX's Last Look. *See* Tr. Sept. 13 AM 11:9–12:9 (Kershaw (Magnite)) (“To participate in Google's [Open Bidding], they charged 5 percent to the participants. So you had a 5 percent discount on whatever you bid. If you bid \$1, they would actually bid 95 cents into the auction. Google didn't charge itself this 5 percent. So think about it as a 5 percent tax on everyone except for Google in an auction, which means we had to have higher bids by 5 percent just to compete.”); Tr. Sept. 12 PM 104:2–105:6 (Goel (PubMatic)) (the Open Bidding fee “disadvantages our bid, which means we win less”); Des. Tr. 155:03–157:16 (O’Kelley (Xandr)). In addition, third-party exchanges were also disadvantaged by the fact that they could not bring their own unique demand when

participating in Open Bidding. Des. Tr. 153:08–155:01 (O’Kelley (Xandr)). Finally, Open Bidding was not launched until 2018—meaning that Google’s Last Look advantage remained in full force for all ad exchanges for around four years after the popularization of header bidding. Tr. Sept. 23 AM 39:10–12 (Korula (Google)); Tr. Sept. 17 PM 65:18–66:5 (Cadogan (OpenX)) (explaining that header bidding began “around 2014”); Tr. Sept. 11 AM 111:7–11 (Ravi (Pls. Expert)) (observing that header bidding began in 2014-15).

218. Google’s removal of Last Look over Open Bidding allowed it to leverage Last Look over header bidding to cause publishers to switch to its own Open Bidding product. As Google employees recognized, giving up Last Look over Open Bidding but not header bidding would create a “pretty big incentive to switch” from header bidding, which Google did not control, to Open Bidding, a Google product. PTX0438 at -479.

219. Google finally gave up Last Look over header bidding in 2019, but only as part of a package of several changes that included new anticompetitive conduct, Unified Pricing Rules, described in more detail above. *See* PFOF Sec. IV.B.3. At the time, Google employees acknowledged Last Look had created an uneven competitive playing field for ad exchanges. *See, e.g.*, PTX0816 at -161 (describing Last Look as a “significant informational advantage” and adding that “competition concerns will cause us to give” it up); Tr. Sept. 23 AM 152:3–153:3 (Korula (Google)) (explaining PTX0816 at -161). In addition, as discussed at PFOF Sec. V.C. Last Look, by directly restricting competing exchanges’ scale in 2019 and earlier, continued to have a significant effect on the market in future years due to the operation of network effects and the importance of scale for optimization, investment, and product improvement.

a) *Professor Milgrom's Analysis of Last Look is Inconsistent with Market Realities*

220. Prof. Milgrom argues that Last Look gave AdX only a conditional and tenuous competitive advantage—or even that it put AdX at a disadvantage. *See, e.g.*, Tr. Sept. 24 AM 139:9–13, 139:19–140:6 (Milgrom (Def. Expert)) (testifying that Last Look does not create an inherent advantage for AdX). Professor Milgrom's theoretical contention that Last Look provided only an uncertain advantage to Google is undermined by the factual record.

221. Prof. Milgrom's general conclusion is inconsistent with the many Google and third-party documents—and testimony from knowledgeable industry participants—that describe Last Look as giving AdX a competitive advantage, not a disadvantage. *See, e.g.*, PTX0815 at -391 (Last Look provides a “significant advantage”); PTX0429 at -757 (describing AdX's Last Look as “an advantage where its closing price can depend on bid from another exchange[.]”); PTX0816 at -161 (Last Look gave AdX a “significant informational advantage”); Tr. Sept. 23 AM 152:8–18 (Korula (Google)) (conceding that Last Look gave AdX an informational advantage); PTX0542 at -335 (“[D]ynamic revshare is just yet another way for AdX to exploit the last look advantage”); PTX1709 at -934 (“The way that Google operates Ad[X] significantly disadvantages other competitors. AdX gets last look . . . This means that although we now have access . . . our ability to compete fairly for it is handicapped.”); Des. Tr. 123:6–128:8 (O'Kelley (Xandr)) (Last Look was an “incredibly powerful bit of information” and “bias[ed] th[e] decisioning process towards AdX”); Tr. Sept. 13 PM 116:13–117:21, 118:12–19, 124:4–16 (Boland (Facebook)) (First Look and Last Look allowed Google to win the highest quality impressions and leave lower quality impressions for competitors; it also gave AdX an informational advantage); Tr. Sept. 12 PM 101:24–102:15 (Goel (PubMatic)) (Last Look gave

AdX a “significant advantage[.]” with respect to scale); *see* PFOF Sec. IV.B.3. Relatedly, as discussed more fully above, Google’s documents also calculate that Last Look allowed it to win a significant number of impressions that it would not otherwise have won, a fact that also undermines Prof. Milgrom’s conclusion that Last Look did not really advantage AdX. *See id.*

222. Prof. Milgrom’s theory relies, in part, on the argument that publishers could put AdX at a disadvantage by “boosting” or “inflating” the price (or, more accurately, the value CPM), associated with a bid from header bidding. Tr. Sept. 24 AM 139:19–140:6 (Milgrom (Def. Expert)). This would mean, for example, that if DFP received a \$1 bid from the Xandr ad exchange, the publisher would actually report to DFP that the Xandr bid was worth \$1.08. According to Prof. Milgrom, this means that a publisher could (for example) effectively take a \$1 bid from AppNexus and tell AdX that it would win only if AdX could offer \$1.08 or higher. Tr. Sept. 24 AM 79:22–80:14 (Milgrom (Def. Expert)).

223. Prof. Milgrom did not provide evidence analyzing how common bid inflation is in practice. When asked, Prof. Milgrom cited only one document from July 2018 that indicated that Google had heard “anecdotally” that publishers inflated bids. Tr. Sept. 24 AM 86:8–87:14 (Milgrom (Def. Expert)) (citing DTX0578); DTX0578 at -506 (“We’ve *anecdotally heard from some publishers* that they inflate the value CPM of remnant line items[.]”) (emphasis added). But Prof. Milgrom did not quantitatively analyze how often publishers inflated bids. Tr. Sept. 24 AM 140:24–141:2 (Milgrom (Def. Expert)) (“I don’t have any data about that”). Nor did he interview publishers about whether they inflated bids, *id.* at 141:11–13, or review any deposition testimony from publishers (or anyone else) about bid inflation, *id.* at 141:18–22.

224. Prof. Milgrom also did not analyze whether bid inflation has downsides—nor did he review evidence from publishers on this issue. Tr. Sept. 24 AM 141:8–10, 141:14–22

(Milgrom (Def. Expert)) (did not analyze whether bid inflation had downsides; did not interview publishers about whether there were downsides to bid inflation; did not review deposition testimony about whether bid inflation has downsides). Yet Prof. Milgrom admits that Last Look created a competitive disadvantage for other ad exchanges in the absence of bid inflation (and in the absence of AdX floors that are higher than the header bidding bid, as discussed below). Tr. Sept. 24 AM 140:18–23 (Milgrom (Def. Expert)) (“Q. So let’s set aside floors and set aside bid inflation. If you set aside those two things, last look creates a competitive disadvantage for exchanges bidding through header bidding; correct? A. In that case, it would create a competitive disadvantage, yes.”).

225. By contrast, knowledgeable industry participants testified at trial that bid inflation was *not* common—and that it had important downsides. For example, Stephanie Layser, who has worked or consulted for approximately 75-80 publishers, testified that the publishers she worked for never inflated bids, because bid inflation would create operational difficulties with respect to reporting and analytics. *See* Tr. Sept. 10 AM 120:3–23 (Layser (News Corp)). Similarly, Matthew Wheatland testified that Daily Mail did not inflate bids because bid inflation was “quite [] technically difficult” and because it would interfere with the reporting provided by DFP, since bid inflation would make the information input into the ad server about header bidder pricing inaccurate. Tr. Sept. 18 PM 148:3–25 (Wheatland (Daily Mail)); *see also* Tr. Sept. 11 PM 47:8–20, 74:16–75:1, 76:10–12 (Ravi (Pls. Expert)) (bid inflation was “not very prevalent”).

226. Prof. Milgrom also testified that publishers could avoid Last Look by deciding not to call AdX.¹⁴ Tr. Sept. 24 AM 74:18–25 (Milgrom (Def. Expert)). This, too, is inconsistent with

¹⁴ To the extent that Prof. Milgrom intended to make a broader argument that publishers could turn off Last Look—or, in other words, call AdX but not allow AdX to receive information about

market realities. Neither Google nor Prof. Milgrom have cited any evidence from publishers suggesting that publishers' theoretical ability to turn AdX off allowed them to avoid the downsides associated with Last Look.¹⁵ In fact, to the contrary, several industry participants who testified at trial explained that turning AdX off would not be a reasonable strategy, since publishers were dependent on the substantial revenue they obtained from AdX. For example, Tom Kershaw, from Magnite, agreed that publishers technically could turn AdX off, but described that as being like the "option to starve to death," because it would amount to "bypassing the largest demand pool in the industry," which is "not advisable for a publisher." Tr. Sept. 13 AM 20:3–21:2 (Kershaw (Magnite)); *see also* Tr. Sept. 10 AM 120:24–121:12 (Layser (News Corp)) (publishers could turn AdX off, "but you would lose a lot of money"); Tr. Sept. 18 AM 130:11–24, 134:6–16 (Wheatland (Daily Mail)) (Daily Mail would lose 28% of its programmatic revenue if it turned off AdX; this led Daily Mail to work with AdX even though AdX's take rate was typically double the take rate of other exchanges).

227. In addition, AdX's high market share undermines the argument that publishers commonly turned AdX off. *See* Tr. Sept. 24 PM 23:3–7 (Milgrom (Def. Expert)) ("The higher its market share, the less possible that it is that it's turned off frequently."). As discussed more fully below, AdX's market share (based on impressions) is approximately 54-65% in a worldwide market, and 46-56% in the U.S. market. *See* PFOF Sec. VII.C.2; PTX1258 (worldwide); PTX1259 (U.S.). Thus, for at least the roughly half of the transactions that AdX won, the

the highest other bid from header bidding—that was not possible (prior to the elimination of Last Look in 2019). Tr. Sept. 27 AM, 69:24–70:8 (Wheatland (Daily Mail)) ("[I]t wasn't possible to switch off last look."); Tr. Sept. 23 AM 129:7–17 (Korula (Google)) ("Q. Right. And so another way of saying that is publishers could not turn off last look; correct? A. That's correct.").

¹⁵ In fact, Prof. Milgrom did not study how often publishers turned AdX off. Tr. Sept. 24 PM 22:23–25 (Milgrom (Def. Expert)).

publisher obviously did not turn AdX off. But, of course, AdX did not win 100% of the time that it bid. Neither Google nor its experts have tried to run the necessary calculations, but the fact that Google wins roughly half of the time and also loses a significant number of bids suggests that publishers likely did not turn AdX off for a large fraction of transactions.

228. Prof. Milgrom also argues that publishers could use higher floors on AdX to eliminate the advantage posed by Last Look. Tr. Sept. 24 AM 139:19–140:6 (Milgrom (Def. Expert)). But this argument ignores the fact that higher floors create a cost for publishers: if the publisher sets the floor too high, it risks losing a bid from AdX that might have given it more revenue. Tr. Sept. 23 AM 91:10–24 (Korula (Google)) (explaining “the risk of setting the reserve price [floor price] too high, of the auction not clearing at all, which means the publisher gets paid zero”). For that reason, while publishers likely did use higher floors to push AdX to work harder, the evidence also does not show that this practice eliminated the advantage created by Last Look. In fact, to the contrary, as discussed above, the ordinary course documents created by both Google and its competitors show that Last Look did give AdX an artificial competitive advantage, and the Google documents calculating that last look allowed AdX to win a significant number of transactions that it otherwise would not have won. *See* PFOF Sec. IV.B.3.¹⁶

¹⁶ Prof. Milgrom also noted that, where AdX had two bids above the floor, the winning price would be based on the bid from the second highest bid, not the floor set by header bidding. *Cf.* Tr. Sept. 24 PM 26:1–10 (Milgrom (Def. Expert)). This does mean that, in some cases, Last Look does not allow AdX to win at a price equal to the highest other bid. *See* Tr. Sept. 11 AM 112:19–113:12 (Ravi (Pls. Expert)). But Prof. Milgrom did not quantify how often this happens. Tr. Sept. 24 AM 77:2–19 (Milgrom (Def. Expert)). Prof. Lee did calculate that, where AdX wins, there is no bid from a competing ad exchange approximately two-thirds of the time, a fact that suggests that a large number of auctions do not have multiple bidders, though of course this is analyzing a slightly different question. Tr. Sept. 24 AM 86:3–25 (Lee (Pls. Expert)) (describing PTX1393)). And any argument that this phenomenon eliminated the advantage created by Last Look would, again, be inconsistent with the documents and testimony that describe Last Look as creating an advantage for AdX, and with the Google documents calculating that Last Look

229. Finally, Prof. Milgrom was careful to say that he did *not* take a position on whether Last Look harmed competition. Tr. Sept. 24 AM 153:11–22 (Milgrom (Def. Expert)). Prof. Milgrom agreed that Last Look *did* give AdX a competitive advantage in at least two ways (with some caveats). First, he agreed that Last Look gave AdX an advantage because, in situations where it had only one bid above the floor, Last Look allowed AdX to automatically win at the same price as the price of the highest other bid (an advantage that no other exchange had). *Id.* at 144:8–23. Second, he agreed that AdX got an advantage from the fact that the combination of Last Look and sell-side DRS allowed AdX—and no other exchange—to see the highest other bid and then adjust its take rate afterwards to win at a price exactly equal to that of the highest other bid. *Id.* at 144:24–145:24. But, despite agreeing that Last Look gave a competitive advantage to AdX (and a disadvantage to other ad exchanges) in those circumstances, Prof. Milgrom also claimed that he did not do a full analysis of the effect of Last Look on competition—and that he is not offering an opinion about whether any harm to competition from Last Look is larger or smaller than the benefits that could result from Last Look. *Id.* at 153:11–22. For that reason, Prof. Milgrom’s analysis of Last Look is of limited utility.

b) Last Look Did Not Increase Publishers’ Revenue

230. Prof. Milgrom also testified that Last Look allowed publishers to make more money, *see id.* at 79:18–80:14, but the evidence adduced at trial is inconsistent with that position.

231. First, absent bid inflation, Last Look meant only that AdX would win at a price that was a penny higher than the highest other bid. This means that any revenue gains from Last

allowed AdX to win a significant number of transactions that it otherwise would not have won. *See* PFOF Sec. IV.B.3.

Look would be, at best, marginal. *See* Tr. Sept. 10 AM 47:24–15 (Layser (News Corp)) (News Corp ran an analysis of Last Look in the UK; AdX “typically pa[id] one and two pence above what all the header bidding line items would respond,” so “there was not a lot of incremental revenue value” from Last Look); Tr. Sept. 11 PM 70:16–71:3, 76:7–9 (Ravi (Pls. Expert)) (absent bid inflation, Last Look “just shift[s] the winner from a header bidder to an AdX bidder” with “no . . . benefit to the publisher”).

232. Prof. Milgrom relies primarily on the claim that publishers could “boost” or “inflate” the price (or, more accurately, the value CPM) associated with a bid from header bidding. Tr. Sept. 24 AM 79:18–80:24 (Milgrom (Def. Expert)). This would mean, for example, that if DFP received a \$1 bid from Xandr’s ad exchange, the publisher would actually report to DFP that the Xandr bid was worth \$1.08. According to Prof. Milgrom, this means that a publisher could (for example) effectively take a \$1 bid from Xandr and tell AdX that it would win only if AdX could offer \$1.08 or higher. *Id.* at 79:22–80:14 (Milgrom (Def. Expert)).

233. However, as discussed more fully above, neither Prof. Milgrom nor Google provide any rigorous analysis of how common bid inflation was or of whether it had downsides. *See* PFOF ¶¶ 223-24. And Prof. Milgrom’s analysis is also undermined by the testimony, discussed above, that bid inflation was *not* common and *did* have downsides. *See* PFOF ¶225. This means that using bid inflation to increase revenue is not as common or feasible as Prof. Milgrom assumes.

234. In addition, there is a countervailing effect that means that Last Look actually *reduces* the money that publishers receive from AdX, when used with or without bid inflation. Absent Last Look, AdX and its buyers would not know the highest other bid and would have to submit a bid that, in their estimation, gives them a reasonable chance of winning. Tr. Sept. 12 PM

101:8–23 (Goel (PubMatic)) (“It’s hard to imagine any scenario where last look would be good for publishers. Typically, a bidder . . . would submit the highest bid that they felt comfortable paying in order to win inventory. So a last look . . . would afford a party with the last look with the opportunity to just bid 1 cent more, which would clearly harm publishers.”); Tr. Sept. 11 AM 120:22–121:8 (Ravi (Pls. Expert)) (Last Look reduces publisher revenue because it “takes the auction pressure off of AdX because it is given the very highest price it has to beat from the other header bidders[.]”); *cf.* Tr. Sept. 11 PM 76:13–77:8 (Ravi (Pls. Expert)) (a unified first price auction, which is what likely would result once Google moves away from Last Look, would provide more revenue to publishers). That would cause AdX and its buyers to, in some cases, bid more than one cent higher than the highest other bid from header bidding—or more than one cent higher than the inflated bid—which would increase revenue for publishers. Tr. Sept. 18 AM 38:2–20 (Abrantes-Metz (Pls. Expert)) (explaining that without Last Look, “chances are that often AdX would have provided significantly higher than that bid [from header bidding], if it had been bidding without having the advantage of seeing the competitor’s price. But because AdX could see the competitor’s price, AdX could then reduce its bid and pay just the minimum price it had to pay to win the transaction”). In other words, without the ability to know the highest other bid, AdX and its buyers would have had to make an educated guess about how much they need to bid to win the impression—and in some cases, that would lead to AdX and its buyers bidding higher than they would in a world with Last Look. Perhaps in part for this reason, internally, Google acknowledged that “last look . . . only benefits us.” PTX0534 at -305.

235. Relatedly, the record evidence shows that publishers *opposed*, rather than supported, Last Look, which is inconsistent with it being in publishers’ best financial interest. *See* PTX0444 at -651 (“[B]oth publishers and exchanges have very strongly complained about

the fairness of [last look].”); PTX0452 at -808 (“Last look considered not fair by exchanges and publishers.”); PTX0882 at -720 (“[O]ne of the biggest things we gave up was last look. This was one of the biggest push backs from publishers[.]”); Tr. Sept. 12 AM 66:17–20 (Srinivasan (Google)) (“I have heard some publishers characterize [Last Look] as an unfair advantage.”).

4. Project Poirot: Google Skewed DV360 Spend Away from Rival Ad Exchanges to AdX.

236. By 2017, Google had become concerned that header bidding would increase the competitive threat posed by other exchanges, as it allowed them to submit real-time bids, whereas prior to header bidding, they could only bid if AdX, which bid first, did not have a bid above the floor. *See* PFOF Sec. IV.B.1 (describing First Look); PTX0284 at -290 (“[W]ith header bidding we’re finally entering a world of true, multi-sourced RTB with all ‘buyer participation’[.]”); PTX0786 at -716 (describing header bidding as an “existential threat”). Google also was concerned that increased competition in the ad exchange market would threaten its monopoly power in the publisher ad server market, too; if a publisher could cobble together a larger enough set of demand from exchanges other than AdX, that might increase publishers’ ability to switch away from DFP despite the potential revenue loss from DFP. *See, e.g.*, PTX0611 at -801 (“HB technology makes third party yield solutions more attractive, undermining the value of DRX as a must-call platform.”). Despite the rise of header bidding, DFP’s monopoly power remains unabated today, in part because of Google’s conduct. *See* PFOF Sec. VII.A.

237. Google’s sell-side global strategy lead (as with others at Google) identified Google’s response to header bidding as a 2017 priority: “Need to fight off the existential threat posed by Header Bidding[.]” PTX0433 at -601 (calling for an “all hands on deck approach”); Tr. Sept. 13 AM 97:15–21 (LaSala (Google)) (acknowledging that the response to header bidding called for in PTX0433 included both sell-side and buy-side employees at Google).

238. Google responded to the threat of increased competition by innovative rival ad exchanges by launching “multiple initiatives in DBM [DV360] to combat the effects of header bidding, such as first price auction protection [Project Poirot] (all HB is by definition first price).” PTX0588 at -821. Project Poirot was the result of a series of meetings where Google considered a range of options to stunt the growth of transactions on rival ad exchanges in the face of increasing header bidding adoption. *See e.g.*, PTX1545 at -142 (Google experimental results estimating impact of DV360 no longer buying impression on non-Google ad exchanges for publishers that adopted header bidding); PTX0421 at -227 (under “Meeting notes . . . Instead of stop bidding on HB queries, we could bid lower. . . [W]e should think about this[.]”). Google initially proposed to “dry out HB [] SSP” by having DV360 no longer buy impressions available on both a non-Google ad exchange (via header bidding) and AdX, regardless of the price at which the impression was available on the rival ad exchange. PTX0426 at -741; Tr. Sept. 17 AM 58:11–59:1 (Jayaram (Google)) (discussing PTX0402). Google realized initial proposals—such as no longer bidding outside of AdX on impressions offered by header bidding publishers—would not be technically feasible to implement. Tr. Sept. 17 AM 79:10–80:3, 81:17–82:5 (Jayaram (Google)) (discussing PTX1545 at -142, which notes cutting off that supply results in reduced revenues).

239. Accordingly, Google devised a strategy, named Project Poirot, under which DV360 engaged in “bid shading”—lowering its bids—on all impressions offered for sale by exchanges engaged in header bidding. Tr. Sept. 17 AM 84:10–86:13 (Jayaram (Google)) (discussing PTX0545 and affirming that Poirot was intended to lower bids on non-second price exchanges, resulting in more DV360 spend going to AdX and away from other exchanges.) DV360 did not, however, bid shade into AdX. Tr. Sept. 17 PM 30:12–14 (Jayaram (Google)); Tr.

Sept. 11 AM 126:5–7 (Ravi (Pls. Expert)); Tr. Sept. 24 PM 13:18–21 (Milgrom (Def. Expert)).

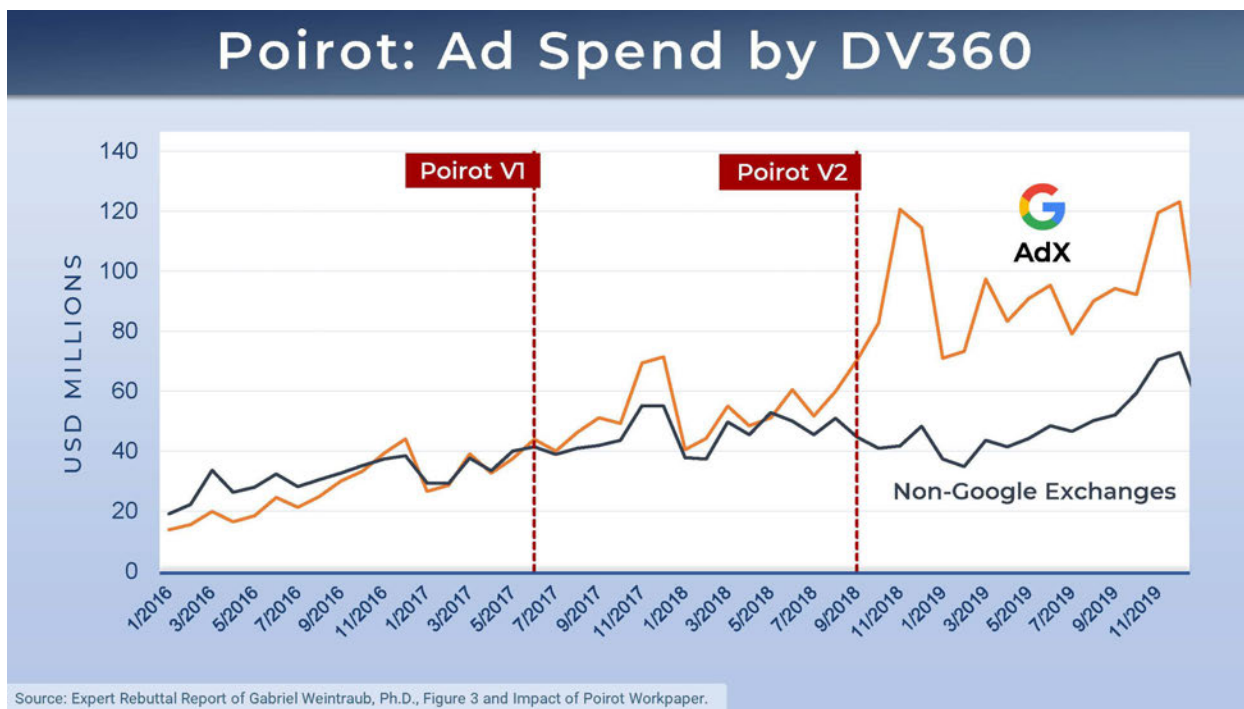
The practical effect was to shift spending away from other exchanges and onto AdX on a relative basis.

240. Google has claimed that Project Poirot was designed to increase advertiser surplus because bid shading into exchanges running a first price auction is an optimal bidding strategy. *See* Tr. Sept. 24 AM 110:3–111:1 (Milgrom (Def. Expert)). But by the time of Project Poirot, AdX had moved away from being a pure second-price auction in important ways, and therefore, DV360 should have shaded its bids into AdX as well. *See* PFOF Sec. VI.E; *see also* Tr. Sept. 11 AM 127:4–128:24 (Ravi (Pls. Expert)); PTX0317 at -549 (Google email recognizing “our auction acts as a modified 2nd price auction [because] [t]hings like RPO [Reserve Price Optimization], Dynamic Rev Share . . . all have the impact of optimizing the 2nd price [auction] in someway.”); Tr. Sept. 24 PM 14:5–15:19 (Milgrom (Def. Expert)) (buyers did have an incentive to bid shade on AdX, for a few reasons, including RPO).

241. The effects of Poirot on non-Google ad exchanges were significant and intended. Google employees understood that Poirot “generate[d] margins by shifting inventory to AdX.” PTX0734 at -596; Tr. Sept. 17 AM 96:10–12 (Jayaram (Google)) (admitting he knew an outcome of Poirot was to shift inventory to AdX); PTX0587 at -794 (“Poirot has actually been quite effective, resulting in DBM spending 7% more on AdX and reducing spend on most other exchanges.”).

242. Poirot resulted in a reduction in the proportion of DV360 spending that went through most major non-Google ad exchanges, which meant that, like Google’s other conduct, Project Poirot limited rival exchanges’ ability to compete by reducing their scale. *See, e.g.*, PTX0545 at -115 (just one month after fully launching Poirot, Google estimated it had increased

DV360 spend on AdX by around nine percent and decreased DV360 spend on “non-AdX” exchanges by around 10 percent, with no change in DV360 spend overall); Tr. Sept. 17 AM 84:15–85:7 (Jayaram (Google)) (discussing PTX0545). This effect became particularly pronounced after the launch of Project Poirot version 2 in 2018, when Google increased the amount of bid shading to as much as 90 percent, rather than the 40 percent in version 1. PTX0860 at -682 (“Summary of proposed changes...Lower the floor on bid shaving from 0.6 to 0.1.”). While prior to Poirot, about half (or more) of all DV360 spending flowed through non-Google ad exchanges, after Poirot the gap between spend on AdX and spend on non-Google ad exchanges grew dramatically. *See* Tr. Sept. 16 PM 32:18–33:5 (Weintraub (Pls. Expert)) (discussing Demonstrative N, slide 18, shown below).



243. Google calculated that Poirot version 2 would reduce spending significantly for major exchanges: under Google’s analysis, Appnexus would see a 31 percent reduction, Index Exchange a 26.5 percent reduction, and OpenX a 42 percent reduction. PTX0860 at -683–84.

This effect mirrored calculations by third parties; for example, OpenX calculated that DV360's spending on OpenX declined by 40 percent, year-over-year, in November 2018, shortly after version 2 went into effect. *See* PTX1600 at -011 ("I don't need to belabor the significance of this for us.").¹⁷

244. Project Poirot had additional significant real-world effects on competing exchanges. OpenX had to lay off 200 people, or about 45% of its staff. Tr. Sept. 17 PM 66:15–22 (Cadogan (OpenX)).¹⁸ This affected OpenX's ability to compete going forward, because with fewer people, it was "less able to build product and to compete in terms of product technology innovation," and because it sustained a reputational hit that affected its ability to win new clients. Tr. Sept. 17 PM 67:11–25 (Cadogan (OpenX)). According to Tim Cadogan, CEO of OpenX, the reduction in spending from DV360 "damaged us very severely." Tr. Sept. 17 PM 66:15–22 (Cadogan (OpenX)).

¹⁷ At trial, Google cross-examined Mr. Cadogan with a document showing that DV360's revenue declined by only \$3M. Tr. Sept 17 PM 70:23–71:14 Cadogan (OpenX)). But this document was prepared in September 2018 and analyzed DV360's spending for the summer of 2018, Tr. Sept 17 PM 71:15–71:22 Cadogan (OpenX)), meaning that it analyzed the period prior to the launch of Poirot version 2 and prior to when OpenX noticed the largest drop (which was in November 2018), *see* PTX1600 at -011; Tr. Sept 17 PM 101:14–103:3 (Cadogan (OpenX)).

Similarly, Mr. Cadogan was cross-examined about a document showing that DV360's spending increased, year-over-year, between 2017 and 2018, Tr. Sept 17 PM 72:24–73:9 Cadogan (OpenX)), but a year-over-year comparison for the entire year would obscure the drop that occurred in November 2018. In addition, even a flat year-over-year comparison would not account for the fact that DV360's spending declined relative to OpenX's expectations built into its business plan, Tr. Sept. 17 PM 73:7–25 (Cadogan (OpenX)), or that OpenX would not be able to keep pace with a growing market.

¹⁸ Tim Cadogan, from OpenX, also acknowledged that other factors affected the need to lay off employees, though the reduction in spending from DV360 was the "biggest" factor. Tr. Sept 17 PM 66:15–67:10 (Cadogan (OpenX)).

245. Google provided only limited information to industry participants about Project Poirot. For example, when OpenX asked Google about the reasons why DV360 reduced its spending, OpenX “never got really anything of an answer.” Tr. Sept. 17 PM 68:4–10 (Cadogan (OpenX)).

5. UPR: Publishers Introduced Competitive Pressure through Price Floors – But Google Forcibly Removed Publishers’ Ability to Use Different Floors to Shift Transactions Away from AdX

246. Prior to the Unified Pricing Rules (UPR), publishers using DFP had the ability to separately set price floors for different ad exchanges or advertiser buying tools (advertiser ad networks or DSPs). *See, e.g.*, PTX0611 at -802; PTX0748 at -626. Publishers often set higher floors for AdX. *See, e.g.*, PTX0611 at -792 (“floors tend to be higher for AdX bids”); PTX0609 at -146 (“Pubs set higher floors for AdX” for a number of reasons); PTX0698 at -021 (“[T]here is a lot of traffic on which the floor DBM is subject to through AdXs is higher than the floor” for third-party exchanges); Tr. Sept. 10 Sept. 10 AM 49:16–19 (Layser (News Corp)) (“[W]e typically set higher floors for AdX”). Google employees, including those that ultimately developed and implemented UPR, were aware publishers did so for a variety of reasons.

247. First, many publishers set higher floors for AdX to reduce their dependence on Google and to increase competitive pressure for AdX. In other words, some publishers used their ability to set higher floors on AdX to shift transactions away from AdX to rivals in order to “reduce[] dependence on Google as a whole.” PTX0611 at -802; *see also* Tr. Sept. 10 AM 50:4-9 (Layser (News Corp)) (setting higher floors for AdX “decreased our reliance on Google”); PTX0609 at -146 (Google employee recognizing that publishers sometimes set higher price floors for AdX because they have “some perceived benefit from wanting revenue diversity” and publishers have been “willing to tolerate some revenue loss in exchange for reduced dependence

on both [Google Ads/DV360] and Google . . . as a whole.”); PTX0715 at -430 (similar); *cf.* PTX0469 at -512 (Publishers “are also rationale [sic] when they decide to diversify their source of revenues. It help[s] them to keep Google at bay and put pressure on us [Google] (similar to any industry).”).

248. Other publishers varied price floors across different demand sources to put competitive pressure on AdX and Google Ads—an attempt to push back against Google’s conduct discussed above—and to maximize the overall value of their inventory. *See, e.g.*, PTX0609 (publishers set higher floors for AdX because the “want[ed] AdX to ‘work harder’”); Tr. Sept. 10 AM 49:16–24 (Layser (News Corp)) (News Corp set a higher floor for AdX to increase its revenue from AdX/Google Ads and prevent Google Ads from lowering its bids).

249. In addition, some publishers set higher floors on AdX to prevent AdX from showing less-desirable ads. PTX0609 at -146 (“Pubs set higher floors for AdX . . . because . . . publishers have the perception that undesirable ads on AdX . . . is correlated with low CPMs, and setting higher floors will ‘protect’ them”); PTX0611 at -802 (similar); PTX0715 at -429-001 (similar); PTX0534 at -306; *see also* Tr. Sept. 10 AM 49:25–50:3, 119:13–21 (Layser (News Corp)) (setting higher floors on AdX and Google Ads resulted in better quality ads; that was one of the reasons News Corp set higher floors for Google Ads); Tr. Sept. 26 PM 143:25–144:24 (Glogovsky (New York Times)). As one Google employee wrote, “[e]ach [exchange], including AdX, has controls/rules/floors that [a] publisher can set and these rules are important to them for a variety of reasons -- an example is a publisher not trusting a particular buyer very much, so they only want higher quality (higher priced) demand from them where others they [sic] will take whatever.” PTX0534 at -306.

250. Open Bidding provided Google with unprecedented access to data on impression-by-impression bidding behavior of rival ad exchanges. *See* PTX0534 at –305. Google capitalized on the intelligence provided by Open Bidding to identify how publishers were flooring AdX differently from Open Bidding and header bidding exchanges in order to push more transactions through those rival ad exchanges. PTX0534 at –305 (“We suspected higher ADX floors is what was happening both for HB and for Jedi, but without the Jedi [Open Bidding] data we didn’t have a way to conclusively prove it.”). Notwithstanding Google’s understanding of the value of differential price floors to publishers, Google set out to degrade its own publisher ad server product to control how publishers could set price floors.

251. In 2019, Google imposed so-called Uniform Pricing Rules (“UPR”) to control how publishers could interact with rival exchanges and advertiser ad networks by setting different price floors for each. These rules, imposed by fiat at the request of the “Adx team,” acted like an anti-steering clause on all of Google’s DFP customers. PTX0762 at -291 (“Adx team want[s] to use this migration as an opportunity to significantly limit the ability of publishers to set floor prices per buyers (which is a good goal to have).”).

252. Once UPR went into effect, it prevented publishers from setting a higher floor for AdX than for other exchanges. *See, e.g.*, Tr. Sept 10 AM 60:3–6 (Layser (News Corp)); Tr. Sept. 18 AM 149:1–8 (Wheatland (Daily Mail)); Tr. Sept. 23 AM 157:8–158:20 (Korula (Google)). UPR also stopped publishers from setting a higher floor for Google Ads than for other networks or DSPs. Tr. Sept. 10 AM 119:9–120:2 (Layser (News Corp)). UPR did not, however, stop publishers from setting higher floors for third party exchanges than for AdX. *See* Tr. Sept 10 AM 60:7–9 (Layser (News Corp)); Tr. Sept. 18 AM 149:1–8 (Wheatland (Daily Mail)); Tr. Sept. 23 AM 157:8–158:20 (Korula (Google)). In other words, UPR prevented the kind of differential

floors that benefited Google’s competitors, but not the kind of differential floors that benefited Google.

253. While Google took this ability away from publishers, other ad servers did not follow suit. Kevel and Xandr, for example, continued to allow publishers to set different floors for different exchanges. *See* Tr. Sept. 20 PM 158:12–159:9 (John (Microsoft)) (Xandr allowed publishers to set different floors for different exchanges); Tr. Sept. 9 PM 135:15–136:9 (Avery (Kevel)) (same, Kevel).

254. Publishers concluded that UPR was not in their best interest. For example, Stephanie Layser, from News Corp, testified that UPR was not in News Corp’s best interest because it “took control out of our hands.” Tr. Sept 10 AM 50:17–23 (Layser (News Corp)). Similarly, Matthew Wheatland, from Daily Mail, testified that UPR “stopped our ability to set floors as we would like, and . . . [optimize inventory]” and that it increased the percentage of Daily Mail’s impressions that AdX won without increasing Daily Mail’s revenue. Tr. Sept. 18 AM 143:23–146:10, 150:16–19 (Wheatland (Daily Mail)); *see also* PTX1633 at -123 (“AdX is monetising roughly 3x the amount of our inventory post UPR, but we don’t see much change in revenue); Tr. Sept. 26 PM 143:25–144:24 (Glogovsky (New York Times)) (publishers should have the ability to set different floors for different exchanges).

255. After UPR was announced, several publishers expressed opposition, stating, among other things, that UPR would take control away from publishers, PTX1854 at 25:1–6 (“[T]he problem with this seems to be . . . the control sits on Google’s plate rather than . . . within publishers[.]”), PTX0751 at -120 (similar), and that it would interfere with publishers’ ability to steer transactions to other ad exchanges in exchange for a lower take rate, PTX1854 at 55:1–6 (“[I]n order to get a concession on rev shares, maybe we have to give

something up, and priority is one of those concessions.”), PTX0751 at -121. *See also* Tr. Sept 10 AM 50:24–51:5 (Layser (News Corp)) (“I told [Google] that I believe that they were doing UPR in the best interests of Google and not in the best interests of their publishers.”). Google employees responsible for implementing UPR heard these concerns and at times acknowledged them, but Google never responded or altered its behavior in response.

256. In a competitive market, publishers could have responded to UPR by either switching to another ad server or by using the threat of switching to incentivize Google to provide a product that better served their interests. *See* Tr. Sept. 18 AM 42:12–43:7 (Abrantes-Metz (Pls. Expert)). But publishers could not do so, because, as described above, the ties between DFP, AdX, and Google Ads meant that switching was impractical. *See* Tr. Sept. 10 AM 51:19–52:7, 53:8–10, 55:6–56:19, 109:23–110:6 (Layser (News Corp)) (“I was frustrated that I had to use [Google’s] ad server in order to get access to AdX demand” because “they were making product decisions that were not in the best interests of my business, and I felt stuck.”); PTX0754 at -321 (“AdX is currently tied to DFP . . . seems like a way that Google is forcing publishers onto their adserver and hindering . . . freedom to switch should the publisher community be unhappy with changes.”); Tr. Sept. 18 AM 147:1–12, 150:20–25 (Wheatland (Daily Mail)) (Daily Mail had “[v]ery little” ability to switch away from DFP in response to UPR).

257. UPR harmed competition. *See* Tr. Sept. 12 AM 20:16–20 (Srinivasan (Google)); Tr. Sept. 18 AM 41:20–42:11, 43:8–17 (Abrantes-Metz (Pls. Expert)). UPR increased spending on AdX at the expense of rival ad exchanges and prevented publishers from transacting with rival advertiser ad networks that publishers might have preferred. *See* PTX0819 at -318 (“The effect [of UPR] is estimated at a 6.4% increase in value of open auction + private auction

impressions won by AdX and a 32.6% increase in impressions . . . This also has a negative effect on external exchange spend[.]”); DTX0768 at -933; *see also* PTX0698 at -021 (predicting “ there would be some spend shift from 3PE . . . to AdX” due to UPR); Tr. Sept. 12 AM 58:4–6, 98:6–9 (Srinivasan (Google)) (“Q. You knew that spend was a natural consequence of moving and imposing Unified Pricing Rules; right? A. Some spend shift, yes.”); Tr. Sept. 18 AM. 143:23–146:10, 150:16–19 (Wheatland (Daily Mail)); PTX1633 at -123–38. UPR also limited publishers’ incentive and ability to enter into agreements with Google’s rivals at lower prices in order to maximize their revenue overall. *See* Tr. Sept. 18 AM 43:18–44:10 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 11 AM 131:8–132:1 (Ravi (Pls. Expert)). And, at least for one publisher, Daily Mail, average prices (i.e., CPMs) for open-web display ads decreased after UPR, resulting in lower publisher revenue per impression. PTX1633 at -123–38. That meant that, for Daily Mail, AdX won more impressions but paid roughly the same amount in total for them. PTX1633 at -123–38 (“AdX is monetising roughly 3x the amount of our inventory post UPR, but we don’t see much change in revenue. So most of this is coming from low CPM inventory after the floors were taken out.”). UPR also shifted more transactions to AdX, at the expense of publishers and advertisers who had to pay Google’s supracompetitive ad exchange fees. Tr. Sept. 16 PM 29:9-31:15 (Weintraub (Pls. Expert)); Tr. Sept. 18 PM 15:11–17:11, 23:3–24:1 (Simcoe (Pls. Expert)).

258. Relatedly, UPR reduced the scale of rival exchanges. Prof. Weintraub estimated that UPR had the effect of depriving rival exchanges of 367 billion impressions and \$221 million in gross advertising spend annually, approximately 7.95% of rivals’ scale as measured by impressions based on his substitution from rivals methodology. Tr. Sept. 16 PM 29:18–25, 31:8–15 (Weintraub (Pls. Expert)) (also identifying as a conservative lower-bound alternative estimates using June 2023 auction data); PTX1331; PTX1035 at -360. Others in the industry

arrived at similar estimates. PTX1621 at -158 (PubMatic estimating UPR impact of -6 percent to -7 percent). By depriving rival ad exchanges and advertiser ad networks of additional scale, Google impeded their ability to effectively compete for publishers, customers, and transaction volume, and denied them the ability to further improve their products in response to customer demand. *See* Tr. Sept. 18 AM 43:8–17 (Abrantes-Metz (Pls. Expert)).

259. Although Google transitioned DFP and AdX to a Unified First Price Auction (UFPA) at the same time Google implemented UPR, the change in DFP and AdX auction format did not require that Google also remove publishers' ability to set a higher floor for AdX. Google's contemporaneous business communications make clear the true purpose and intent behind the bundled changes: providing additional pretextual "justification" to address the "backlash among publisher[s]" that Google experienced when launching UPR. PTX0763 at 165–66 (Google employee asking for the real "motivation behind removing publisher controls . . . Couldn't we just make the changes to [UFPA] without removing the controls?" and later observing "that the primary objective of these changes is to help the buy-side," i.e. Google's advertiser buying tools including Google Ads.). For example, Google executive Nitish Korula wrote that UPR would involve "taking away some functionality that publishers have today. We could likely sell it to them as part of this broader change . . . , but if we offer it [the ability to set different floors for different exchanges] in a first-price world, I think it would be very hard for us to take it away later: It would be viewed as a pure loss of functionality that we're doing for our own (perceived 'nefarious/self-serving' reasons)" PTX0699 at -260. Similarly, another Google executive recognized that "[d]oing this [UPR] by itself makes it look extremely self-serving." PTX0762 at -290; *see also* Tr. Sept 12 AM 58:11–20 (Srinivasan (Google)) (Google thought "some publishers might be upset" about UPR; this was one "factor that informed the

reason to bundle those changes together”); PTX0715 at -429-001 (the introduction of the UFPA “may be the best opportunity we have” to impose UPR; “wouldn’t it be more effective in getting to our end goal, rather than relying on pubs to voluntarily give up this functionality, esp if they start using it widely in a 1P world?”); PTX0715 at -429-003 (“[W]e would have a very hard time introducing the unified floors without coupling it with the first price move. Publishers would not understand why we took it away”); PTX0750 at -481 (Google has “Bundl[ed] things that should not be bundled.”).

a) Google’s Theoretical Analysis of UPR is Inconsistent with Market Realities

260. Google’s auction theory expert, Prof. Milgrom, argued that publishers could still steer transactions away from AdX even after UPR. This theory relies primarily on the idea that publishers could “boost” or “inflate” the price (or, more accurately, the value CPM) associated with a bid from header bidding. This would mean, for example, that if DFP received a \$1 bid from AppNexus, the publisher would actually report to DFP that the AppNexus bid was worth \$1.20. According to Prof. Milgrom, this would allow publishers to steer away from AdX even after UPR. *See* Tr. Sept. 24 AM 132:7–133:3 (Milgrom (Def. Expert)).

261. This theory is undermined by the fact that neither Google nor Prof. Milgrom provided rigorous evidence that publishers commonly used bid inflation—and by the evidence that bid inflation involved significant downsides. *See* PFOF ¶¶ 223-25. These downsides meant that using bid inflation to steer away from AdX, while theoretically possible, was not practical enough to prevent the anticompetitive effects associated with UPR.

262. Similarly, Prof. Milgrom’s argument that publishers can steer away from AdX after UPR by turning AdX off, Tr. Sept. 24 AM 132:7–133:3 (Milgrom (Def. Expert)), also ignores the real-world evidence that publishers were too reliant on AdX to realistically turn it off.

See PFOF ¶ 226. This option, too, while theoretically possible, was not sufficient to prevent UPR's anticompetitive effects.

263. In addition, Prof. Milgrom's theoretical arguments are inconsistent with the voluminous real-world evidence showing how UPR actually affected the markets in practice. See PFOF ¶ 257. If Prof. Milgrom's theories were correct, then UPR would not have affected publishers, and UPR would not have caused share to shift from competitors to AdX. But the record shows otherwise: It did affect publishers. *Id.* And it did shift share to AdX. *Id.* This evidence shows that Prof. Milgrom's theories do not match the reality of how UPR actually worked.

264. Finally, even Prof. Milgrom seems to have acknowledged that UPR might have harmed competition, despite his theoretical arguments for why publishers had alternative methods to steer. First, Professor Milgrom acknowledged that UPR is analogous to "most favored nations" clauses, or "MFNs"; MFNs restrict customers' ability to set prices, and UPR similarly restricts publishers' ability to set different floors for different exchanges. Tr. Sept. 24 PM 21:16–22:4 (Milgrom (Def. Expert)). Second, Prof. Milgrom agreed that, when a firm with market power adopts an MFN, that can reduce competition. Tr. Sept. 24 PM 22:5–12 (Milgrom (Def. Expert)). And third, he also admitted that UPR removed a tool that publishers could use to steer away from AdX; that it is good for publishers to be able to switch away from their suppliers if they want to; and that this ability for customers to switch away encourages both competition and innovation. Tr. Sept. 24 PM 23:8–17 (Milgrom (Dep. Expert)). The upshot of these admissions is that UPR could adversely affect competition.

b) Floors Remain Relevant in a First Price Auction

265. Notwithstanding some testimony by a Google employee to the contrary, *see* Tr. Sept. 12 AM 113:20–115:9, 115:11–116:8 (Srinivasan (Google)), the trial record shows that price floors are still relevant and valuable to open-web publishers in a first-price auction, like the one that AdX formally became in late 2019. Joint Glossary, ECF. No. 1309 (defining “First-price auction”). In both a second-price auction and a first-price auction, publishers could set a higher floor for AdX for a variety of reasons, including to reduce their dependence on AdX, limit low quality ads from AdX, and fulfill volume discount agreements. *See* PTX0715 at -429-001 (publishers saw benefits from setting differential floors to “reduce perceived dependency on Google”; that would “still be [a] valid reason[] for pubs to push back on the removal of this functionality [per exchange floors]” even after a “move to a 1 P auction”); Tr. Sept. 12 AM 64:7-65:3 (Srinivasan (Google)) (confirming that publishers’ concerns “could still be valid” with a shift to a first-price auction); Tr. Sept. 24 PM 24:14-24:23 (Milgrom (Def. Expert)). The evidence also contradicts Prof. Milgrom’s argument that setting a higher floor for AdX in a first-price auction cannot influence the bids that AdX advertisers submit. *See* Tr. Sept. 24 AM 131:12-132:1 (Milgrom (Def. Expert)). Advertisers buying on AdX can respond to the floor price even in a first-price auction. PTX0715 at -429-001 (“[W]ouldn’t . . . the short-term benefits that pubs see from the remaining buyers who continue responding to floors in a 1P auction, still be [a] valid reason[] for pubs to push back on the removal of this functionality.”).

266. Moreover, to the extent that Google thought that differential floors were less relevant in a first-price auction than a second-price auction, Google could have simply tried to persuade publishers to do so (as Xandr appears to have done) rather than eliminate existing publisher choice. *See* PTX0715 at -429-002 (“Assuming that some pubs love this feature and

look at it as an ‘empowering knob’ and will hate us if we take it away from them then why do we need to hurt their feeling[s]. Let them see it themselves, we give them this feature initially and watch how they learn to put the same floor for everyone (We will educate them to expedite the process.)”); Des. Tr. 194:22-196:7, 198:5-199:7 (Lipkovitz (Google)) (“I don’t think you win trust of customers by telling them what they cannot do after you’re unable to convince them why it’s worse for them in the ecosystem in the long run”); Tr. Sept. 18 AM 42:12–43:7 (Abrantes-Metz (Pls. Expert)). This does not justify removing publishers’ ability to set a higher floor for AdX, as UPR did.

V. Anticompetitive Effects of Google’s Conduct

267. Google’s course of conduct has harmed competition in the publisher ad server, ad exchange, and advertiser ad network markets, and is direct evidence of Google’s monopoly power in each relevant market. Tr. Sept. 19 PM 45:13–46:16 (Lee (Pls. Expert)); Tr. Sept. 16 PM 115:22–116:5 (Abrantes-Metz (Pls. Expert)); *see* PFOF Sec. VII. Google has impaired the ability of publishers and advertisers to choose the ad tech tools they would prefer to use and diminished the number and quality of viable options available to them, including the ability to effectively multihome across those tools. Google has done so not simply by succeeding on the merits or by creating the best or most innovative products, but rather because it engaged in anticompetitive conduct. Tr. Sept. 20 PM 158:5–11 (John (Microsoft)); Tr. Sept. 13 PM 70:1–18 (Creput (Equativ)); Tr. Sept. 16 PM 118:6–13 (Abrantes-Metz (Pls. Expert)).

A. Google’s Conduct Allows It to Charge Supracompetitive Prices.

268. Google’s conduct has enabled it to charge publishers and advertisers supracompetitive prices for AdX, even accounting for any potential differences in quality

between exchanges. Tr. Sept. 19 PM 81:20–82:9; 82:22–83:9; 83:14–84:16 (Lee (Pls. Expert)); Tr. Sept. 18 PM 7:13–8:14 (Simcoe (Pls. Expert)).

269. Google has internally recognized for years that the 20% average fee it charges publishers and advertisers on all open auction transactions via AdX is not justified by the value of the service provided, but a result of the anticompetitive conduct described above, including Google’s restriction on Google Ads’ advertisers’ ability to bid on inventory outside of AdX. Tr. Sept. 13 AM 43:4–17 (LaSala (Google)) (“Q. Okay. And those discount requests were out of the thousands of publishers that used the AdX ad exchange? A. Yes. Q. But ultimately, Google did not discount the AdX fee often; right? A. Not often. Q. Discounts were rare? A. Yes. Q. And overall, that meant there was minimal discounting to AdX’s fee? A. Yes. Q. Instead, in your experience, the AdX 20 percent take rate seemed to hold? A. Yes.”); PTX0624 at -169 (“The AdX sell-side fee of 20% holds today not because there is 20% of value in comparing 2 bids to one another, but because it comes with unique demand via AdWords that is not available any other way. . . I think we are all in agreement that ‘exchange functionality’ is not worth 20% and value comes from sourcing demand.”); PTX0719 at 463-003–05 (“[W]e can only retain 20% rev share given AdX mostly brings unique demand in [Google Ads] . . . I’m still convinced that is the only reason we can sustain 20%.”) (noting competing exchanges charge only 8.5% and 12% and AdX “shouldn’t be double the price.”); PTX0639 at -965 (“If [Google Ads] bought liberally through all [competing exchanges], I think the [AdX] 20% would crater. What I am suggesting is that ‘comparing two bids and running an auction’ is proven to not be worth 20%[.]”); PTX0759 at -751 (“Everyone in this room would point to unique Google Display Ad demand as one of the justifications for why we can charge 20% in the market for OA [Open Auction] transactions.”); PTX0578 at -402 (“Getting away w/ 20% b/c [Google Ads] demand still exclusive.”); PTX0719

at -463 (LaSala: “My summary POV is that a sell-side rev share should probably top out at 10% for OA (comparing 2 bids with layers of protection.”); PTX0618 at -896 (“For all programmatic i.e. transaction including AdX and [Open Bidding] – sellside charges for taking on risk of being a clearing house so whatever 2% to 10% whatever we think the market can bear but ideally closer to 2%...Unless we bring the demand changing the pipes to be programmatic does not create enough value to be closer to 10 IMHO[.]”); PTX0712 at -647 (“DRX’s 20% rate is problematic for DBM and AdX buyers as well, because as discussed, it is significantly higher than the competition.”); PTX0612 at -035 (LaSala: “Said more precisely, I don't think there is 20% of value in comparing two bids...adx is not providing additional liquidity to the market, it is simply running the auction. The value of our platform is not in adx it is in other parts...so we need to up our [targeting data] game and focus on winning this game, vs continuing to extract irrationally high rent from the adX...One might ask why the market continues to bear 20%. It may be because of adwords bringing liquidity from a long-tail...”); PTX0612 at -035 (Bellack: “AdX buyers at 20% is not long term defensible.”); PTX0864 at -223 (“It is questionable that 20% for OA is reasonable long term. Pubs accept it because it brings demand (Google Ads). If Google Ads bought everywhere else, I think we’d see pubs move to other SSPs for OA and we’d lose the 20%.”); PTX0198 at -703 (“As you know there are significant concerns over how we can maintain our 20% revenue share for the auction...Speaking only from the perspective of AdWords, we want to buy into all auctions regardless of what the AdX margin is. More importantly, we do not like the idea of AdWords being given a disadvantage compared to the other buyers in order to strengthen the publisher pitch (e.g. uphold the 20% margin).”); PTX0737 at -160 (“20% margin is not sustainable in my opinion. I argued for many years that it is not justifiable to charge more for a simpler service which is sellside (just sort bids and declare the

winner) and charge less for more expensive margin which is buy-side.”); PTX0611 at -795 (Google considered changing “web pricing to improve AdX attractiveness” to be “in line with competition”).

270. Market participants also recognized that AdX charges higher fees than its rivals. Des. Tr. 88:01–88:17 (O’Kelley (Xandr)) (characterizing AdX’s 20% fee as “dramatically higher than competitors” with the “market” rate at the time of the Admeld acquisition being “around 15% for most participants.”).

271. Google felt no need to compete on the merits to justify pricing with customer value and to explain the difference between its price and those of rival ad exchanges. Google’s publisher-facing team supported increasing fees even further despite advice to “be competitive in our pricing . . . not abuse market power, and [] build better new products with better economics rather than changing the pricing of existing products wherever possible.” PTX0631 at -418.

272. Notwithstanding the market forces that would have driven prices down in a competitive market—as predicted by Google’s own employees—Google’s conduct has allowed it to persistently charge materially higher fees in the ad exchange market. Tr. Sept. 19 PM 142:14–19 (Lee (Pls. Expert)); Tr. Sept. 18 PM 7:17–21; 27:23–28:5 (Simcoe (Pls. Expert)). Prof. Simcoe employed two complementary quantitative methods to estimate what AdX’s take rate would be for the period January 2019 through March 2023 without Google’s anticompetitive conduct (the “but-for take rate”). Tr. Sept. 18 PM 56:19–23 (Simcoe (Pls. Expert)). First, Prof. Simcoe used an “event study” regression analysis around Google’s implementation of UPR to estimate the take rate in a competitive market for ad exchanges absent Google’s tying and UPR conducts. *Id.* at 12:7–17:11 (Simcoe (Pls. Expert)). This method accounts for potential differences in quality across exchanges through “fixed effects” accounted for in the regression.

Id. at 20:25–21:23 (Simcoe (Pls. Expert)). Second, Prof. Simcoe used a “comparables” method that compares AdX’s take rate to the weighted average of other exchanges. *Id.* at 32:16–20 (Simcoe (Pls. Expert)). Both approaches predict that absent Google’s anticompetitive conduct, AdX would charge approximately 19-27% less than it does, with Google’s but-for take rate estimated to be at most 16.6%. *Id.* at 7:17–21; 27:23–28:2. This estimated overcharge is likely conservative, as evidenced by the internal Google business records discussed above predicting a lower ad exchange fee in a competitive market. *See* PFOF ¶ 269; Tr. Sept. 18 PM 16:23–17:11; 31:12–20 (Simcoe (Pls. Expert)). While Google’s expert criticized certain aspects of Prof. Simcoe’s methodology, Google’s expert admitted that she did not reach a conclusion about whether there is an AdX overcharge. Tr. Sept. 25 AM 51:7–10 (Chevalier (Def. Expert)). Furthermore, all but a few of Google’s expert’s adjustments to Prof. Simcoe’s comparables methodology still show an overcharge on AdX. *Id.* at 55:8–57:24; 57:25–58:18; 58:23–59:4 (“Q: So if you take all of the large exchanges, their average take rate over this period is 15.6 percent? A: Yes.”).

273. This overcharge was effectively paid by both publishers and advertisers. Prof. Simcoe used quantitative methods to estimate the share of the overcharge that was borne by advertisers and the share borne by publishers. Tr. Sept. 18 PM 33:11–19 (Simcoe (Pls. Expert)). Under the tax incidence model employed by Prof. Simcoe, advertisers would bear between 20% and 30% of the overcharge; publishers would bear the majority of the overcharge. *Id.* at 7:17-21, 27:23-28:5. While Google’s expert critiqued the precise percentages Prof. Simcoe allocated to publishers and advertisers in his overcharge model, she conceded that a portion of any overcharge would be borne by both publishers and advertisers. Tr. Sept. 25 AM 100:2–6 (Chevalier (Def. Expert)) (“Q. And you think there was a sharing between advertisers and

publishers for any AdX overcharge, if there is an AdX overcharge; correct? A. So there would be a sharing of—there’s a sharing of any overcharge in the full stack.”)

274. Google’s conduct not only allowed Google to charge supracompetitive fees for its AdX ad exchange, but also to funnel more transactions through Google’s ad exchange on which these fees were assessed. Google employees recognized that “[e]veryone in this room would point to unique Google Display Ad demand as one of the justifications for why we can charge 20% in the market for O[pen]A[uction] transactions.” PTX0759 at -751.

275. Furthermore, Google Ads limiting its bids to AdX, and in turn AdX limiting effective real-time bids to publishers using DFP, meant that publishers were forced to use DFP in order to access demand. DFP in turn forced more transactions to flow to AdX, which was able to charge its own supracompetitive prices on a larger base of transactions. Tr. Sept. 19 PM 81:20–82:9; 82:22–83:9 (Lee (Pls. Expert)); Tr. Sept. 18 PM 7:13–8:14 (Simcoe (Pls. Expert)). Market participants also testified that the few alternative publisher ad servers that remained on the market charged lower fees than DFP. Des. Tr. 32:25–33:13 (Blom (Buzzfeed)) (testifying that the Smart publisher ad server (later renamed Equativ) was “cheaper than Google”).

276. The trial evidence offered by Google regarding profitability is not inconsistent with Google charging supracompetitive prices or having monopoly power in the relevant markets. *See* PFOF Sec. V.A. As explained by Google’s financial witness, Google’s accounting system aggregated different products and types of advertising both inside and outside the relevant markets, Google’s profit and loss reports “evolved” over time and were at times “not particularly accurate,” Google’s profitability calculations were impacted by an “accounting determination” Google itself made of how to treat revenue it passed through to publishers, and even when the profit and loss reports did not report profitability there were not discussion of

shutting down any products due to lack of profitability. Tr. Sept. 26 AM 10:1–12, 13:9–13, 16:11–24, 21:2–9, 23:6–10, 29:23–31:8 (Mok (Google)). Instead, Google’s financial reports indicate Google’s display advertising business was profitable each year from at least 2018 through August 2023, including earning over \$1.2 billion in profits in 2019, and Google Ad Manager (including DFP and AdX) on its own was profitable each year from 2020 through August 2023 (the only years Google produced financial reports specifically for Google Ad Manager). *Id.* at 21:10–15, 21:18–24, 22:24–23:2; *see also* DTX1165 at -503 (Google’s display business experienced 167% year-over-year profitability growth in 2021); PTX0939 at -006 (proposal for “DVAA profitability and value creation in 2019+” including “[i]ncrease net revenues” and focus on “pricing”); *id.* at -009 (proposed goal for “Web” display advertising business of “Drive significant operating profit”); Tr. Sept. 26 AM 24:17–25:19, 26:16–27:12, 27:23–28:6 (Mok (Google)).

277. With respect to the imposition of UPR, Plaintiffs’ expert explained that “in a competitive world where DFP would have faced more competition, if it had imposed such a restriction [UPR] that was undesirable to its customers, customers would have gone somewhere else to an alternative. They didn’t, because those alternatives were really not there.” Tr. Sept. 18 AM 42:12–43:7 (Abrantes-Metz (Pls. Expert)). Using an event study and regression, Plaintiffs’ expert, Prof. Simcoe, did independent quantitative analysis that controlled for factors such as exchange quality and other relevant factors to demonstrate that Google’s AdX average fee of 19.8% was an overcharge relative to the 15.7% to 16.6% fee that would have been charged in a but-for world without certain anticompetitive conduct. Tr. Sept. 18 PM 11:8–15, 17:6–18:2, 20:2–22:10, 27:23–28:5 (Simcoe (Pls. Expert)). Underscoring the reliability, validity, and robustness of his event study estimate, Prof. Simcoe’s second analysis, a comparable analysis,

which found that the weighted average take rates of comparable exchanges was between 15.6% and 16.2%. Tr. Sept. 18 PM 28:15–29:21, 32:16–20 (Simcoe (Pls. Expert)).

B. Google’s Conduct Degraded the Quality of Its Products

278. Certain of Google’s anticompetitive conduct directly reduced the quality of its products for its customers.

279. For example, UPR removed from the DFP publisher ad server a feature valued by Google’s publisher customers—granular, differential price floors—making DFP a lower quality publisher ad server post-implementation. Even in the face of UPR, publishers could not switch ad servers because they were locked into DFP by these limitations. PTX0751 at -122 (Google reminded publishers who were unhappy with UPR and “want to change ad servers” that “AdWords finds it more advantageous to buy more on AdX,” validating publishers’ concerns that switching away from DFP meant losing AdX access and thus access to AdWords buyers); *see also* PFOF Sec. VII.A.2.

280. Likewise, Google’s imposition of an exclusive First Look for its AdX ad exchange reduced publisher revenues, as compared to a publisher ad server that did not require publishers to provide exclusive First Look access to AdX. *See* PFOF Sec. IV.B.1; Tr. Sept. 16 PM 24:2–11 (Weintraub (Pls. Expert)). Additionally, conduct such as First Look and Last Look resulted in poorer match quality, leading to less efficient and lower-value matches between publishers and advertisers, notwithstanding the importance of match quality to the overall quality of ad tech products. Tr. Sept. 16 PM 24:2–15, 27:15–23 (Weintraub (Pls. Expert)).

281. In addition to degrading its products, by diminishing the competitive pressure Google would otherwise have felt, Google’s conduct impaired innovation both by Google and Google’s customers. For example, publishers continue to use DFP even though it “is a 25- to 30-

year-old piece of technology” that is “slow and clunky.” Tr. Sept. 10 AM 21:2–23 (Layser (News Corp)); Des. Tr. 125:24–127:14 (Lipkovitz (Google)) (characterizing the publisher ad server team at Google as “lazy and slow” and even “intellectually dishonest.”). Publishers do not use DFP because it is innovative but “because AdX is tied to DFP.” Tr. Sept. 10 AM 21:2–23 (Layser (News Corp)). DFP’s lack of certain functionality in fact “stifled any sort of innovation that [publishers] could have had” and meant that publishers “couldn’t continue to innovate in ways that [they] wanted.” Tr. Sept. 10 AM 18:17–19:12 (Layser (News Corp)). Publishers did not like many of the “product features that [Google] shoved down [their] throats over the course of time that [they] were using DFP.” Tr. Sept. AM 124:1–12 (Layser (News Corp)). Google’s own employee conceded that there has been little innovation with respect to Google Ads in the last two years. Tr. Sept. 23 PM 54:22–55:17 (Stefaniu (Google)).

282. Similarly, AdX’s move to a Unified First Price Auction, which Google claims to be an “innovation” to “a simpler and more consistent auction,” came later than it would have had the market been competitive. Tr. Sept. 12 AM 50:18–21, 113:20–115:9 (Srinivasan (Google)) (agreeing that many ad exchanges had moved to a first price auction before Google, and that “AdX was one of the few SSPs that were still operating in a second price world” before UFPA). The same is true of Open Bidding, *see* PFOF Sec. III.E, which only allowed for head-to-head real-time competition among non-Google ad exchanges (with a number of restrictions) years after other much smaller exchanges had developed similar header bidding technology.

C. Google’s Conduct Has Prevented Ad Tech Rivals From Gaining The Scale Needed To Compete Effectively.

283. Google’s anticompetitive conduct substantially reduced the scale of rival ad exchanges and publisher ad servers, not by winning scale away from rivals on the merits of Google’s products but by imposing the restrictions, restraints, and other anticompetitive conducts

outlined above. Tr. Sept. 18 AM 36:11–21, 40:2–13, 43:8–17 (Abrantes-Metz (Pls. Expert)). In addition to directly preventing rivals from effectively competing for hundreds of billions of individual transactions, Google’s conduct had a long-run self-reinforcing effect by depriving rivals of the ability to use data, revenue, and better publisher-advertiser matches to grow their business, experiment to create a better product, and attract additional publisher and advertiser customers. *See* Tr. Sept. 13 PM 114:2–21 (LaSala (Google)) (“[I]t was a reinforcing cycle.”). This deprivation of scale made Google’s rivals less able to compete effectively for publisher and advertiser customers, to bring more innovative products to market, and to identify high-quality matches between publishers and advertisers. Tr. Sept. 16 PM 36:8–38:15 (Weintraub (Pls. Expert)); *cf.* Tr. Sept. 12 PM 102:16–23 (Goel (PubMatic)) (“Scale begets data. Data begets performance. And performance, in turn, begets more scale. So there’s a virtual cycle that one can establish and that one needs to establish in order to cement publisher and advertiser relationships.”). Scale is important to ad tech companies. *See* PFOF Sec. III.F; V.C. There are four key benefits to an ad tech company with greater scale: (1) stronger indirect network effects, (2) more data for developing and training algorithms, (3) more data for experimentation, and (4) improved cost efficiencies. Tr. Sept. 16 PM 10:11–11:14, 13:2–13 (Weintraub (Pls. Expert)). These benefits of scale create a flywheel effect (or what Google and industry participants refer to as a “virtuous cycle”) through which a firm with greater scale today can grow even more tomorrow, and, conversely, a firm that loses scale today will find it increasingly difficult to catch up to a larger rival tomorrow and in some cases may ultimately exit the market. Tr. Sept. 9 AM 135:17–136:21, 146:4–147:3 (Casale (Index Exchange)) (discussing the importance of data scale to the ability of an exchange to optimize to benefit its customers, and explaining how more transaction volume allows Index Exchange to better train its machine-learning algorithms, which

better optimizes and wins more impressions, and ultimately be allocated more demand by DSPs, resulting in more transaction volume); Tr. Sept. 12 PM 102:16–23 (Goel (PubMatic)) (“I think to be relevant, scale is important. Scale begets data. Data begets performance. And performance, in turn, begets more scale. So there's a virtu[ous] cycle that one can establish and that one needs to establish in order to cement publisher and advertiser relationships.”); Tr. Sept. 10 PM 94:12–16 (Lipkovitz (Google)) (describing a “virtual cycle”); DTX0173 at -180 (Google document depicting “The Virtuous Cycle” and noting Google’s ad tech “monetization platform is the foundation for adoption of many other products” in part through “data culled from opted-in pub[lishers]”). As Tim Cadogan of OpenX explained, this latter “vicious cycle” ultimately led OpenX to exit the publisher ad server market entirely:

“Primarily, it’s a vicious cycle. . . . But because we’ve not been able to win more publishers, we were not able to generate as much revenue. Therefore, we couldn’t reinvest as much of that revenue in developers to build the functions that we knew would be competitive. So [] it’s kind of a vicious cycle because we were unable to win the publishers because we didn't have the demand access. We couldn’t get on to a virtuous cycle, which is ultimately what led us to decide to close the business, because it was uneconomic for us.”

Tr. Sept. 17 PM 106:12–22 (Cadogan (OpenX)).

284. Scale encompasses both “thickness” (the number of publishers and advertisers using an ad tech product) and transaction scale or traffic (the volume of queries seen and transactions completed). Tr. Sept. 11 AM 134:17–135:7 (Ravi (Pls. Expert)); Tr. Sept. 16 PM 7:23–8:4 (Weintraub (Pls. Expert)).

285. When more advertisers and more diverse advertisers use an ad exchange (i.e., making the advertiser-side of the exchange “thicker”), the exchange becomes more attractive to publishers, and vice-versa. Tr. Sept. 10 PM 94:12–16 (Lipkovitz (Google)) (“And you get into this sort of virtual cycle thing where, if you find a way to make it more attractive to buyers, now

you're competitive towards buyers. You will then use that to go to tell sellers you should sell here because I have more buyers."); Tr. Sept. 11 AM 142:8–15 (Ravi (Pls. Expert)); Tr. Sept. 16 PM 10:11–11:5 (Weintraub (Pls. Expert)). This concept is commonly called "indirect network effects." Tr. Sept. 16 PM 10:11–11:5 (Weintraub (Pls. Expert)); Tr. Sept. 19 PM 75:3–14 (Lee (Pls. Expert)). Thicker ad exchanges increase the likelihood that a publisher will find a high-quality match—or a match at all—with an advertiser. Tr. Sept. 16 PM 9:3–22 (Weintraub (Pls. Expert)).

286. Seeing and winning more impressions enables ad tech products to utilize more data to improve the quality of their algorithms in real time, effectively improving the quality of their products. Tr. Sept. 20 PM 161:2–3 (John (Microsoft)) ("[T]he more the publisher wins, the [more] algorithm[s] learn and get optimized."); Tr. Sept. 11 AM 135:2–7 (Ravi (Pls. Expert)) ("[S]cale provides [ad tech firms] with data that is the fodder for optimization, which, in turn, is the way in which the different quality features of these products are implemented."). For example, companies operating publisher ad servers or ad exchanges can use bidding and transactional data to create more accurate algorithms that help their publisher customers determine how to optimally set reserve prices for different demand sources. PTX1021 at -920 (Google is "able to segment inventory more granularly than publishers do today, do the modeling, experimentation, and analysis necessary to . . . automatically update floor prices as market conditions change. We also have access to much more data than a single publisher does[.]"). As John Dederick of the Trade Desk explained, "data is currency in many aspects of our industry." Tr. Sept. 11 PM 111:12–16 (Dederick (The Trade Desk)) ("But, significantly, if there are other aspects of a connected stack that associate more data with those same users, same publishers, or same opportunities, you begin to create an incredible data advantage.").

287. Industry participants testified to the value of transaction data scale in creating and calibrating algorithms. For example, Andrew Casale of Index Exchange explained how ad exchanges are constantly facing an “optimization problem” and rely upon data to train machine learning models that maximize the limited volume of queries that Index Exchange gets from DSPs. Tr. Sept. 9 AM 146:4–147:3 (Casale (Index Exchange)). Additionally, Prof. Ravi explained how transaction volume allows a firm like Google to engage in conduct like Sell-Side Dynamic Revenue Sharing without losing volume, because Google is able to balance the lower revenue share it gets from some transactions against the higher revenue share it gets from other transactions; firms with less scale are less capable of deploying such a program. Tr. Sept. 11 AM 136:20–137:13, 138:21–139:8 (explaining how Google was able to double its profit from its Sell-Side Dynamic Revenue Sharing when it scaled up the program, and explaining that “truthful” dynamic revenue share was only profitable when run by Google at scale).

288. Ad tech products also rely on machine learning and artificial intelligence to improve these algorithms. *See, e.g.*, Tr. Sept. 9 PM 146:4–147:17 (Casale (Index Exchange)) (“Every time we clear a transaction, that trains machine learning models, or ML models at Index, that helps us do a better and better and better job of making the most of whatever allocation the DSP gave us.”); Tr. Sept. 11 PM 95:18–96:7 (Dederick (Trade Desk)) (“By we’re also having to build a lot of technology to constantly assess the marketplace and add a level of artificial intelligence to, you know, automate because there’s just so much metadata that we’re assessing all of the time to help figure out what an advertiser should bid.”); Tr. Sept. 11 AM 138:7–139:8 (Ravi (Pls. Expert)) (testifying that Google’s Truthful DRS feature “relies even more on scale because of this prediction or machine learning element” which “requires even more data”); Tr. Sept. 12 PM 137:9–19 (Goel (PubMatic)) (testifying that “massive data” and “sophisticated

machine-learning algorithms” lead to “increase[d] publisher revenue” and increased “advertiser return on investment”); Tr. Sept. 13 PM 75:7–20 (Creput (Equativ)) (“[Google’s auction data] allows for a dynamization, which is done through machine learning, in order to position itself at the best price and potentially reduce the fee in order to win the bid.”); Tr. Sept. 20 PM 160:13–161:8 (John (Xandr)) (explaining that operating an exchange requires “sophisticated algorithms” and that gaining “wins” “feeds” algorithm and “improves” it, thereby allowing it to “monetize better”); Tr. Sept. 23 AM 48:13–49:15 (Korula (Google)) (listing “machine learning systems” which operate “intelligently” as innovations by Google’s display ads business); Tr. Sept. 23 PM 32:8–12 (Stefaniu (Google)) (testifying that Google uses “[s]ophisticated machine-learning capabilities” to provide better targeting for advertisers); Tr. Sept. 24 PM 49:15–50:6 (Bjorke (Google)) (explaining that Google uses “automatic detection through computer[] algorithms and machine learning” to combat invalid traffic); Tr. Sept. 25 PM 110:12–23 (Borgia (Google)) (“[Google] use[s] that information to train our machine learning so that we can enforce [policies] [at] scale.”); *id.* at 112:20–113:4 (“[W]e need to use extensive machine learning because there aren’t enough people that we could hire in the world to review all of these ads [for brand safety] manually.”).

289. Ad tech companies conduct experiments to update their products and test new features; seeing and winning more impressions enables ad tech products and other participants in the ecosystem to run experiments faster, perform more experiments over a given period of time, and ultimately launch more product features. Tr. Sept. 16 PM 13:14–16:7 (Weintraub (Pls. Expert)); Tr. Sept. 9 AM 139:1–5 (Casale (Index Exchange)) (noting that Index Exchange “experiments with everything all the time”).

290. Ad tech tools achieve substantial cost efficiencies as they grow larger. Tr. Sept. 16 PM 17:15–18:10 (Weintraub (Pls. Expert)). These efficiencies include cost economies of scale, such as spreading costs over more sales. For example, ad exchanges incur substantial costs for processing all the transactions that they observe, and an ad exchange that wins more often can spread these processing costs over more transactions, generating cost savings that can be used to lower prices or invest in R&D. Tr. Sept. 16 PM 18:3–6 (Weintraub (Pls. Expert)); Tr. Sept. 9 AM 141:18–143:18 (Casale (Index Exchange)) (describing infrastructure and operating costs incurred on each transaction opportunity that are covered by the revenue earned on the “half a percentage” of transactions won by Index Exchange); Tr. Sept. 16 PM 17:23–18:6 (Weintraub (Pls. Expert)). While scale in terms of the volume of opportunities an ad exchange can see is important for attracting publishers and advertisers, ad exchanges do not “directly benefit from that scale unless [they] clear or win the transaction.” Tr. Sept. 9 PM 48:1–14 (Casale (Index Exchange)); *see* Tr. Sept. 13 PM 79:5–21 (Creput (Equativ)) (“[I]f Equativ would have been able to increase its growth on the ad server in addition to growth on the SSP, Equativ could have invested much more and quicker both in technology and service to its clients and in its international expansion.”).

291. Scale effects for ad tech firms are global. Ad tech firms often operate in many countries and benefit from indirect network effects, data scale, and cost economies of scale across multiple countries. PTX0904 at -553; PTX0657 at -351; Tr. Sept. 19 PM 126:20–23 (Lee (Pls. Expert)) (“[C]ustomers interact across country boundaries, supplier competition is global, and the scope of Google’s conduct is global as well. It’s not restricted to any one country.”).

292. Smaller firms benefit more from increases in scale—and are harmed more by decreases in scale—than larger firms from the same change in scale due to the concept of

decreasing returns. Smaller competitors can use increases in scale to achieve substantially greater improvements in product quality to customers, as compared to the value of that incremental scale to a larger incumbent firm, like Google. Tr. Sept. 16 PM 38:1–15 (Weintraub (Pls. Expert)).

293. As explained in the sections above, Google’s ordinary course documents estimate the impact of several aspects of Google’s conduct on the scale of AdX and, in turn, their substantial effects in the marketplace. DTX0768 at -934 (“Last-look allows us to win queries that account for 7.8% of Adx revenue.”); PTX0819 at -318 (“Giving up ‘last look’ . . . results in an 8% decrease in AdX revenue . . . and 7.6% decrease in impressions”; “The effect [of UPR] is estimated at a 6.4% increase in value of open auction + private auction impressions won by AdX and a 32.6% increase in impressions.”); PTX0860 at -683–84 (showing that Poirot Version 2.0 reduced DV360’s spending on Appnexus (Xandr) by 31.4%, on Casale Media (Index Exchange) by 26.5%, on Rubicon (Magnite) by 22.3%, on OpenX by 42.0%, and on PubMatic by 26.4%); DTX0774 at -038–040 (Rubicon (Magnite) observes following the introduction of UPR that its win rate declined significantly resulting in revenue losses of \$100,000 per day).

294. Prof. Weintraub conducted his own analysis, based on Google experiment data and auction-level data, to estimate the impact of Google’s conduct on the ability of rivals to gain scale. He also explained how the short-run effects of Google’s conduct are amplified over time by virtue of various feedback loops that operate within ad tech markets, such that the overall impact of Google’s conduct on rivals’ ability to compete effectively is even greater over time and when Google’s conduct is considered as a whole. Tr. Sept. 16 PM 36:24–38:15, 39:5–14 (Weintraub (Pls. Expert)).

295. In particular, Prof. Weintraub estimated the likely impact on rivals’ scale caused by Google’s conditioning of access to Google Ads demand on publishers’ use of AdX, Google’s

conditioning of AdX's real-time bids on publisher's use of DFP, First Look, Last Look, SSDRS, Project Poirot, and Unified Pricing Rules. Tr. Sept. 16 PM 21:11–22 (Weintraub (Pls. Expert)). These estimates were conservative because they examined short-run effects of single pieces of conduct, and to the extent they relied on auction-level data, were based on recent data that likely was impacted by Google's conduct as a whole. *Id.* at 92:2–17.

296. Google's tie of nearly all of Google Ads' demand to AdX substantially reduced rival exchanges' scale. As one benchmark to approximate the magnitude of this effect, Prof. Weintraub estimated that if Google Ads had instead bid into rival ad exchanges at the rate that DV360 did between 2017 and 2023, rival ad exchanges would have won 6.88 trillion more impressions, which amounts to an estimated decrease in rival exchanges' scale of 25.4%. Tr. Sept. 16 PM 35:16–36:6, 61:15–62:17 (Weintraub (Pls. Expert)).

297. Google's exclusive provision of a First Look to AdX also caused AdX to win a large share of impressions that otherwise would have been won by rival ad exchanges with higher valuations of the impression had those auctions occurred on a level playing field. PTX0551 at -048 (Google employee acknowledging that “[l]aunching AdX into a non-DFP server destroys this competitive first look advantage and would most likely lead to AdX (1) losing access to overall queries, and (2) losing access to the *highest-value* queries. From there, it becomes a self-fulfilling prophecy in that less-valuable inventory begets lower CPMs, publishers react by decreasing inventory access, which begets even lower CPMs.”). Prof. Weintraub's simulation model estimated that First Look decreased rivals' share of impressions by 24.6% versus head-to-head competition. Tr. Sept. 16 PM 21:23–23:3 (Weintraub (Pls. Expert)).

298. Prof. Weintraub quantitatively estimated the effects of Google's conduct on rival ad exchanges by combining results from Google experiments with historical data collected from

Google and third parties. Tr. Sept. 16 PM 19:10–20:5 (Weintraub (Pls. Expert)). Prof. Weintraub estimated that annually UPR likely reduced rival ad exchanges' impression scale by 367 billion impressions, or 7.95%, and reduced rival exchanges' revenue scale by \$221 million, or 2.75%. PTX1331; *see also* PTX1332 (providing alternative lower-bound estimate using auction-level data approach).

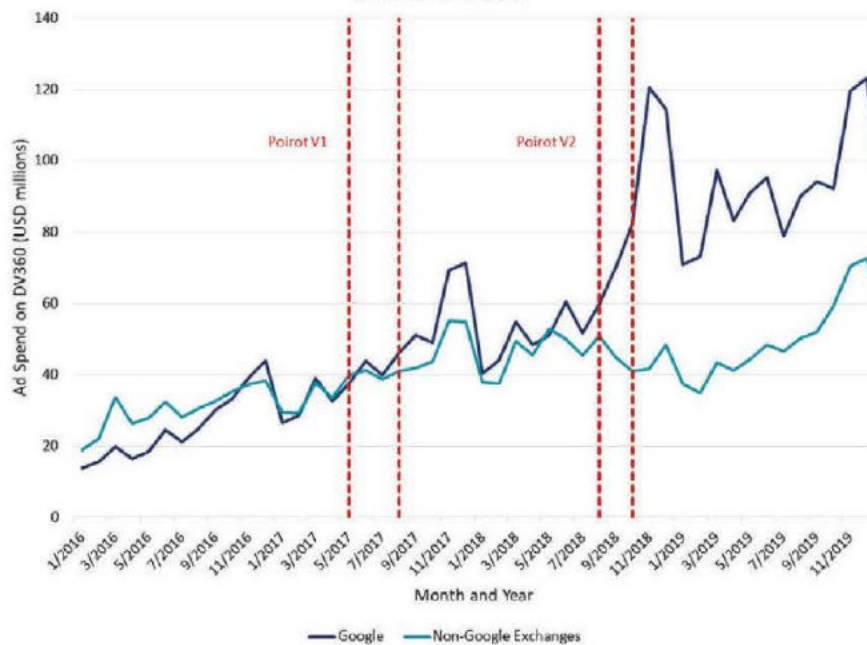
299. Prof. Weintraub estimated that Last Look, while in effect, likely reduced annually rival ad exchanges' impression scale by approximately 14.25% and reduced rival exchanges' revenues by approximately 8.72%. PTX1326. Prior to Google's elimination of AdX's Last Look over Open Bidding participants in early 2017, there was likely an additional negative impact of Last Look on rival exchanges. *Cf.* PTX0452 at -808 (indicating that giving up Last Look over Google's Open Bidding would provide an incentive for rival ad exchanges and publishers to switch from header bidding to Open Bidding).

300. Prof. Weintraub estimated that SSDRS annually likely reduced rival ad exchanges' impression scale by 81.7 billion, or 2.39%, and reduced rival exchanges' revenues by \$161.6 million, or 2.74%, a portion of which stems from its effect as an extension of Last Look. PTX1328; *see also* PTX1329 (using alternative auction-level data approach). To put the amount in context, in 2019, two smaller ad exchanges, made approximately \$170 million in revenue combined, meaning that SSDRS restricted the available market for competitors by almost two whole competitors. Tr. Sept. 16 PM 28:21–29:3 (Weintraub (Pls. Expert)).

301. With respect to Project Poirot, Prof. Weintraub identified experiments conducted by Google itself that directly estimated the impact of Poirot on rival ad exchanges. Tr. Sept. 16 PM 31:16–32:9 (Weintraub (Pls. Expert)). Those experiments showed that the initial version of Poirot, while in effect, reduced rival exchanges' impression scale by 1.26% and reduced rival

exchanges’ revenue scale by 4.1% annually, and that a second version of Poirot introduced in 2018 reduced rival exchanges’ impression scale by an additional 1.76% and reduced rival exchanges’ revenue scale by an additional 4.45% annually. Tr. Sept. PM 32:1–33:5 (Weintraub (Pls. Expert)) (referring to Demonstrative N at 18). Prof. Weintraub’s analysis indicated that DV360 ad spend on non-Google ad exchanges diverged significantly from DV360’s spend on AdX after the introduction of version 2 of Poirot. PTX1466. Furthermore, Project Poirot caused AdX to gain share.

FIGURE 3: THE TRENDS IN AD SPEND ON DV360 FOR GOOGLE AND NON-GOOGLE EXCHANGES USING DR. ISRAEL’S DATA SHOW DIVERGENCE IN GROWTH AFTER SEPTEMBER 2018



Sources: Israel Table 18, GOOG-AT-MDL-DATA-000488278 to -508815 (DV360 RFP 243 data). See Impact of Poirot Workpaper.

Notes:

[1] Following Dr. Israel’s methodology:

- The data is limited to U.S. web display ad spend via open auction.
- Exchanges with at least \$1 million DV360 spending in May 2017 (before Poirot) are shown in the table.
- Google includes AdX, AdSense, and AdMob.

[2] Poirot V1 launched in July 2017.

PTX1466.

302. These estimates of effects on rivals from quantitative analysis conducted by Prof. Weintraub are consistent in magnitude with estimates of effects on Google’s products and on

rivals relied upon by Google in the ordinary course for Last Look, SSDRS, Poirot, UPR, as well as the testimony of market participants at trial. To put these effects in context, the impact of a single aspect of Google's conduct, Last Look, was nearly equivalent to the average growth rate of non-Google ad exchanges. Tr. Sept. 16 PM 25:2–25 (Weintraub (Pls. Expert)). That means that but for the conduct, non-Google ad exchanges could have grown twice as fast. In absolute terms, Google's conduct corresponds to hundreds of billions of impressions and hundreds of millions of dollars of lost revenues for non-Google exchanges annually. *See* Tr. Sept. 16 PM 36:8–23 (Weintraub (Pls. Expert)).

303. Moreover, these annualized estimates that rely on short-term experimental results likely understate the long-term effects of Google's conduct on rivals. Because Google's conduct persisted for several years and was mutually-reinforcing, it is likely that the magnitude of the effects persisted and increased over time by virtue of indirect network effects and a self-reinforcing data feedback loop. Tr. Sept. 16 PM 36:8–38:15 (Weintraub (Pls. Expert)). This is true even for conduct that may have ended. *See* Tr. Sept. 16 PM 36:8–38:15, 39:6–14 (Weintraub (Pls. Expert)); Tr. Sept. 17 PM 105:25–106:22 (Cadogan (OpenX)) (describing Google's conduct as generating "a vicious cycle"); Tr. Sept. 11 AM 141:3–21 (Ravi (Pls. Expert)) (explaining that for Google's conduct that ended in the past, the resulting "reduction of scale" reduces "the thickness of these [rival ad] exchanges, so they would continue to impact how these exchanges are able to evolve and grow up until now"); Tr. Sept. 18 AM 100:5–10 (Abrantes-Metz (Pls. Expert)) (explaining that "the effects of first and last look exclusively to AdX would have extended beyond their termination"); Tr. Sept. 19 PM 146:5–16 (Lee (Pls. Expert)) (for Google's conduct that has ended, "due to the durability of network effects and scale effects and the exit of competitors, the impact of all of Google's conduct still persists").

304. Prof. Weintraub also estimated the effects from Google’s conduct on its ad exchange rivals using data sampled from actual DFP auctions in June 2023. *See* Tr. Sept. 16 PM 30:8–31:7 (Weintraub (Pls. Expert)). This data showed that in June 2023, AdX won an impression against a competitive rival ad exchange at least 14 percent of the time in terms of impression and at least 19 percent in terms of ad spend. Tr. Sept. 16 PM 30:8–31:7, 96:15–98:3 (Weintraub (Pls. Expert)). This estimate of rivals’ presence was conservative because it was not always clear in the data which entries were rivals (only clear rivals were counted), and the transactions measured occurred years after the conduct began. Tr. Sept. 16 PM 96:15-97:15 (Weintraub (Pls. Expert)). Professor Weintraub used this methodology to estimate a very conservative lower bound of the effects of Last Look, Sell-side DRS, and UPR, equivalent to 14% by impressions and 19% by revenue of the estimates provided above, which were based on the substitution-from-rivals method. Tr. Sept. 16 PM 97:16–98:13 (Weintraub (Pls. Expert)). Even using this alternative methodology to estimate a lower bound of the effects of Google’s conduct, Professor Weintraub still observed an effect of each conduct on the ability of rivals to compete. PTX1335; PTX1336. For Last Look, in particular, Prof. Weintraub testified the likely effect of Google’s conduct was much closer to his substitution-from-rivals-based calculation because “last look is really about moving impressions from rivals to AdX,” consistent with the substitution assumption underlying Prof. Weintraub’s estimates. Tr. Sept. 16 PM 27:7-14 (Weintraub (Pls. Expert)).

305. Because rival exchanges had less scale due to Google’s conduct, they were less able to compete effectively with AdX. Rivals had less revenue available to invest in improving their products and developing new features. Tr. Sept. 17 PM 106:11–22 (Cadogan (OpenX)) (explaining that Google’s conduct meant they had “not been able to win more publishers” and

were therefore “not able to generate as much revenue. Therefore, [they] couldn’t reinvest as much of that revenue in developers to build the functions that [they] knew would be competitive[,]” which was “a vicious cycle” that they could not get out of); Tr. Sept. 13 PM 79:5–80:20 (Creput (Equativ)) (explaining that if Equativ had had enough scale, it “could have invested much more and quicker both in technology and service to its clients” but that it was not able to achieve that scale because of “Google’s anticompetitive behavior”). Rival ad exchanges were not able to utilize as much data as they could have otherwise to improve the quality of their algorithms. Tr. Sept. 9 AM 135:17–137:21, 146:4–147:3 (Casale (Index Exchange)) (explaining that of the 250 billion impressions Index Exchange sees every day, it is only able to obtain more information about the impression if it “clears” or wins, which is “half a percentage” of that amount; “Every time we clear a transaction, that trains machine learning models... that helps us do a better and better and better job making the most of whatever allocation the DSP gave to us.”); Tr. Sept 12 PM 169:13–171:1 (Kershaw (Magnite)) (explaining that header bidding allowed Magnite to participate in many more auctions, and that by having the opportunity to participate and “lose a lot,” “you can understand what prices are too low and you can start to raise your bids and find the optimal level”); Tr. Sept. 13 PM 78:13–79:21 (Creput (Equativ)). Rival exchanges were not able to run as many experiments to improve the products as they would have been able to otherwise. Tr. Sept. 16 PM 14:7–15:12 (Weintraub (Pls. Expert)). Rival publisher ad servers likewise recognized that Google’s tying of AdX to DFP “weakens competition,” and therefore “substantially limits the capacity to innovate” in the industry. Tr. Sept. 13 PM 71:19–72:8 (Creput (Equativ)).

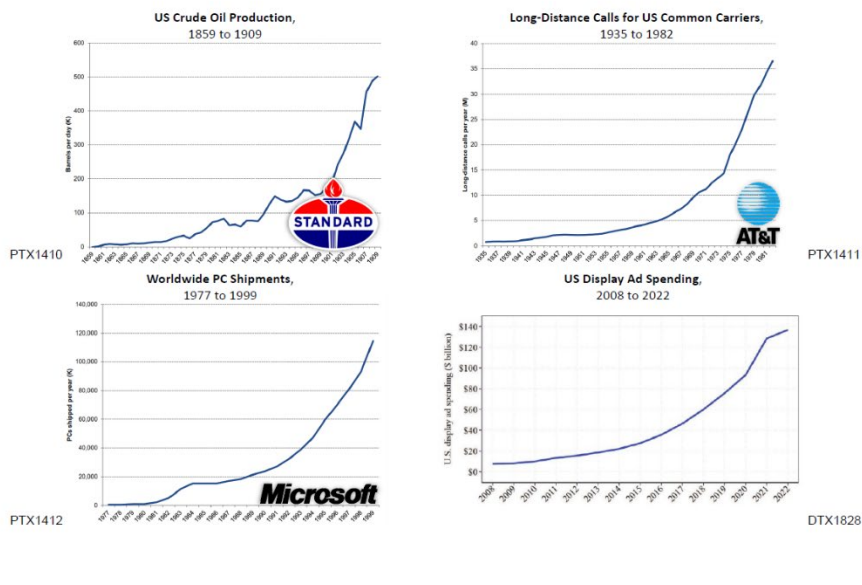
306. Rival ad exchanges struggled to attract new publisher customers and transaction volume. *See* Tr. Sept. 9 AM 143:19–145:1 (Casale (Index Exchange)) (explaining the

“significant network effects and costs” “to attract both demand and supply” that required “years and years and years and years” to establish); *cf.* Tr. Sept. 12 PM 101:24–102:23 (Goel (PubMatic)) (explaining how Last Look deprived PubMatic of scale, which “one needs to establish in order to cement publisher and advertiser relationships”). With diminished ability to lower prices, improve quality, and innovate, rival exchanges were less able to exert competitive pressure on Google to lower AdX’s prices, improve its quality, or innovate. Tr. Sept. 19 PM 145:13–146:4 (Lee (Pls. Expert)) (explaining that “Google’s conduct reduced the benefits that i[t]s rivals could expect to gain from innovation”); Tr. Sept. 16 PM 129:6–14, 132:3–19, 136:21–137:12 (Abrantes-Metz (Pls. Expert)) (explaining how the tie of Google Ads demand to AdX and First Look deprived ad exchanges of scale and ability to compete on price); Tr. Sept. 18 AM 39:4–14, 43:8–17 (Abrantes-Metz (Pls. Expert)) (explaining how Last Look and UPR deprived ad exchanges of scale and ability to compete on price).

307. Certain Google conduct, like UPR, directly prohibited publishers and ad exchanges from altering this scale gap. UPR prevented publishers from dealing with ad exchanges or advertiser ad networks (other than Google) on preferential terms, which meant publishers could not steer additional scale to those rival ad tech firms. Tr. Sept. 18 AM 43:8–44:10 (Abrantes-Metz (Pls. Expert)). These firms could have used the additional scale to further improve their products to the benefit of publisher and advertiser customers and increase the intensity of competition with Google’s dominant ad tech products. *See* Tr. Sept. 16 PM 15:17–16:7 (Weintraub (Pls. Expert)) (discussing how scale could have allowed rivals to innovate faster to compete).

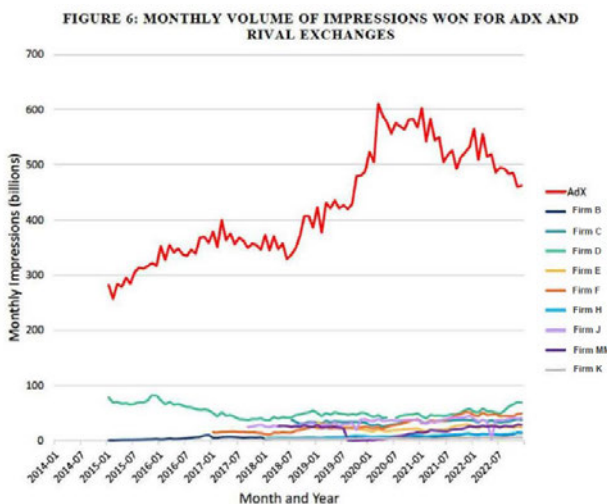
308. The growth in the scale of these markets overall—or commensurate growth within each ad tech firm in these markets—does not diminish the impact of Google’s conduct on

rivals’ scale or the ability of Google’s rivals to effectively compete. As acknowledged by Google’s economic expert, anticompetitive conduct can harm competition during a period in which overall industry output has expanded, which is evidenced by contemporaneous industry expansion alongside anticompetitive conduct by Standard Oil around the turn of the 20th century, by AT&T in the 1960s and 1970s, and by Microsoft in the 1990s. Tr. Sept. 26 PM 79:10–22 (Israel (Def. Expert)) (discussing Pls. Demonstrative AG reproduced below); Tr. Sept. 19 AM 106:17–107:2 (Simcoe (Pls. Expert)). Indeed, as a matter of economics, output can still increase even during the course of anticompetitive acts. Tr. Sept. 19 AM 106:17–107:2 (Simcoe (Pls. Expert)) (“You could have someone sign an exclusive contract with a customer that has anticompetitive effects but brings a new customer into the market. Or, I mean, more generally, we’ve just seen markets expand in spite of anticompetitive conduct over the course of history. Right. There’s been the railroads. You know, when Standard Oil was a monopoly, the oil market still expanded.”)

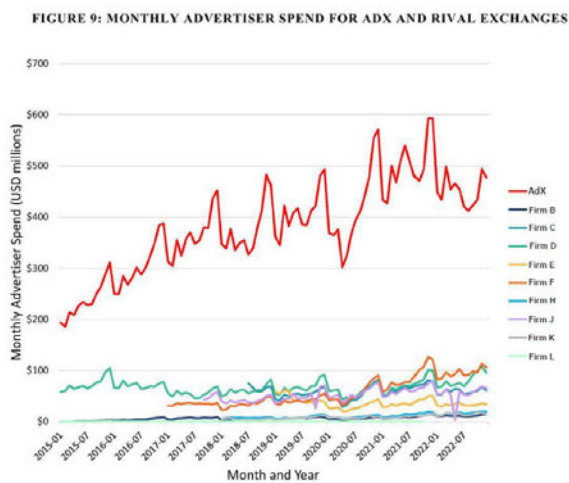


309. And what matters for purposes of ad tech companies’ ability to compete effectively with Google in the relevant markets is not whether they have some minimum amount

of scale but rather their scale relative to Google. Tr. Sept. 16 PM 52:18–23 (Weintraub (Pls. Expert)). Over the period of Google’s conduct, Google’s AdX ad exchange grew and maintained an enormous scale advantage over rivals both in terms of volume impressions and ad spend, as shown in the figures below.



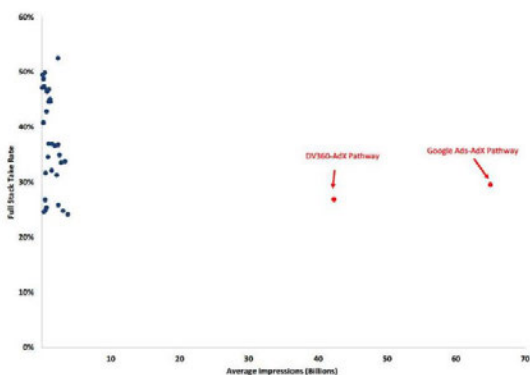
PTX1314A



PTX1317A

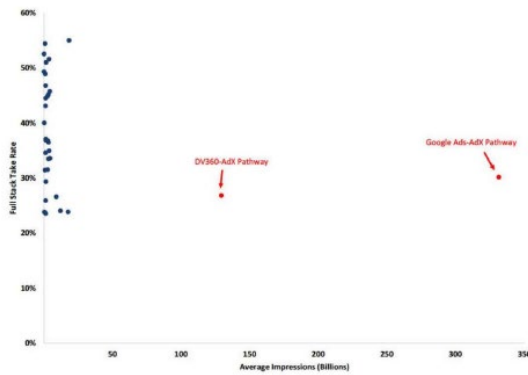
Comparing the relative size of various pathways yields similar results. The scale of 30+ transactions through “pathways” of buying tools to ad exchanges that involve at least one third party product pathway pale in comparison to the scale of transactions through the DV360-AdX pathway and the Google Ads-AdX pathway: no pathway involving a third party has more than about 5 billion monthly impressions in the U.S., whereas DV360-AdX is over 40 billion and Google Ads-AdX is over 65 billion. PTX1362. Worldwide comparisons are even more stark. PTX1373.

FIGURE 1: GOOGLE'S "PATHWAYS" ARE OUTLIERS



PTX1362

FIGURE 12: PROF. CHEVALIER'S FULL-STACK TAKE RATE VS. AVERAGE MONTHLY IMPRESSIONS BY PATHWAY, WORLDWIDE IMPRESSIONS



PTX1373

D. Google's Conduct Impedes Customer Choice

310. Google's course of conduct has deprived publishers and advertisers of meaningful choice in a variety of ways. For example, the tie of Google Ads to AdX forces Google Ads advertisers to bid for inventory almost exclusively on AdX rather than where they might find the best inventory at the best price. *See supra* PFOF Sec. IV.A.2.a. In addition, the ties between Google Ads, AdX, and DFP force publishers to choose DFP (and AdX) even when they think another ad server would serve their needs better. *See* PFOF Sec. IV.A.2.a.2. First Look forced publishers to give AdX a preferential first look at their impressions, rather than the ad exchange publishers might otherwise prefer. *See supra* PFOF Sec. IV.B.1. Similarly, Last Look forced publishers to give AdX an advantageous last look at their impressions, knowing the price offered by non-Google ad exchanges. *See supra* PFOF Sec. IV.B.3. And UPR forces publishers to forgo the ability to use higher floors to shift transactions away from AdX. *See* PFOF IV.B.5.

311. Google's conduct has limited customer choice in other ways, as well. Its anticompetitive conduct has caused some firms to exit the market completely—for example, the ties between DFP, AdX, and Google Ads have caused rival publisher ad servers to exit or reposition so that they compete less directly with DFP. *See* PFOF Sec. IV.A.2. In addition,

Google’s conduct has deterred entry and expansion by rival advertiser ad networks, and has deprived rival ad exchanges of the scale necessary to innovate more efficiently and quickly. *See* PFOF Sec. V.C. By removing some firms from the market completely (and limiting the ability of others to innovate and compete effectively), Google’s conduct takes away customer choice, too, as it prevents customers from having access to options that they might have preferred. *See, e.g.*, PFOF ¶ 148 (explaining how the DFP/AdX tie forced OpenX to exit the market, even though it was more flexible than DFP, and caused Kevel to reposition, even though Kevel’s ad server was more innovative).

E. Google’s Conduct Harms the Open Web.

312. As a result of Google’s conduct, and as explained in more detail above, Google extracted extraordinary fees at the expense of the website publishers who make the open internet vibrant and valuable. This includes newspapers, popular websites, and thousands of other content creators.

313. As publishers generate less money from selling their advertising inventory, publishers are pushed to put more ads on their websites, to put more content behind costly paywalls, reduce their spending on journalism, or to cease business altogether. Tr. Sept. 18 AM 151:1–14 (Wheatland (Daily Mail)) (“So Google suppressing prices for publisher inventory lowers publisher revenue, which, in turn, means that we cannot invest in journalism in the way that we potentially otherwise could. . . . And actually fairly recently, we had – unfortunately had a round of layoffs across U.S. editorial. So it’s challenging to be a news publisher.”); Tr. Sept. 10 AM 13:22–14:2 (Layser (News Corp)) (explaining that switching from DFP and losing AdX demand would result in less revenue, which means “[l]ess journalists, less innovation, less money towards all of our products and services”); Tr. Sept. 9 AM 55:1–16 (Wolfe (Gannett))

(describing employee decline from 33,000 to 11,000 resulting from “[r]eduction in ad revenue and subscription revenue”); Tr. Sept. 18 AM 56:18–57:4 (Abrantes-Metz (Pls. Expert)) (explaining that Google’s conduct resulted in publishers “getting less money for each of the impressions” meaning that they “monetized less than they otherwise would have”). That makes the open internet worse for everyone—except Google.

VI. Google’s Pro-Competitive Justifications Lack Factual Support And Do Not Outweigh Harms In Relevant Markets

314. Below, Plaintiffs address why certain purported justifications raised by Google’s experts or in its prior filings are unsubstantiated, insufficient, or inapposite for purposes of assessing whether Google’s conduct was anticompetitive.

315. When analyzing potential pro-competitive justifications for a conduct or a merger, economists analyze whether the benefit (1) is conduct-specific meaning that the potential justification must actually be a result of the conduct; (2) enhances total welfare in the relevant product market; and (3) is supported by evidence. *See* Tr. Sept. 18 AM 51:14–52:11 (Abrantes-Metz (Pls. Expert)); Tr. Sept 19 PM 128:3-18 (Lee (Pls. Expert)).

A. Google’s Justifications for Restricting Google Ads to AdX Are Invalid and Inconsistent With the Record

1. Safety, Security, and Malware

316. To the extent Google claims its restriction of access to Google Ads advertising demand to its AdX ad exchange is based on safety, security, or malware concerns, Google’s documents demonstrate that the real reason for this restriction was to preserve the attractiveness of AdX for publishers, *See* PFOF Sec. IV.A.2. In any event, Google can and already has mitigated those risks in the context of AWBid and through Google’s DV360 advertisers bidding widely across those same exchanges. PTX0199 at -240–41; PTX0835 at -867.

317. Both in 2014 and 2018, Google found that the “Inventory Quality” of rival exchanges met “AdX policy ratings and compares to [its own] AdSense Longtail,” and that “Click Spam is at acceptable levels in most exchanges” and “comparable to AdX”. PTX0199 at -240–41; PTX0835 at -867; Tr. Sept. 17 PM 24:1–20, 25:11–20 (Jayaram (Google)). Likewise, other major advertiser buying tools bid on inventory across a variety of exchanges and in doing so were still able to meet their customers’ interest in ensuring inventory quality. Tr. Sept. 11 PM 114:22–115:10 (Dederick (The Trade Desk)) (explaining how “a host of companies” that work with ad exchanges “typically vet their inventory for different forms of invalid or low-quality traffic” and noting The Trade Desk “effectively eliminated invalid traffic” from inventory purchased by The Trade Desk); Tr. Sept. 10 AM 46:13–47:13 (Layser (News Corp)); Tr. Sept. 10 AM 153:23–154:16 (Friedman (Goodway Group)); Tr. Sept. 9 AM 157:1–9 (Casale (Index Exchange)). Thus, because inventory quality and spam were concerns industry-wide, industry participants worked together to set industry standards to protect all ad tech participants. For example, industry participants notified each other if they spotted concerns that the others were missing, including catching spam from Google’s inventory that Google itself missed. Tr. Sept. 24 AM 83:3–15, 90:7–21 (Bjorke (Google)). But Google chose instead to restrict its advertiser customers to buying virtually exclusively on Google’s ad exchange rather than allowing its advertiser customers to make that choice for themselves based on the merits of Google’s publisher inventory and spam and malware protections.

318. Nor is there evidence that Google’s AdX or its Open Bidding product are better at preventing cybersecurity issues than other exchanges or header bidding. Tr. Sept. 9 AM 157:1–9 (Casale (Index Exchange)) (“I completely disagree with header bidding being more risky [regarding malware or ad fraud]... It’s the same equivalence. Whether we were rendering an ad

in the waterfall or whether we were rendering an ad through header bidding, we were rendering an ad on the publisher's website. They're fundamentally equivalent once the ad server renders the ad."); Tr. Sept. 27 AM 74:5–75:1 (Wheatland (Daily Mail)) ("Q. And can you describe more of the types of ads you're talking about where AdX is worse? A. You know, these would be like misleading ads that are asking the user to, you know, sign up to some financial product, for instance. Yeah. Typically those kinds of ads we find anecdotally as well where we see them on the site. They're more often to be from Google, from my experience. Plus, we see it in the data from our third-party scanning software."); Tr. Sept. 10 AM 46:13–47:13 (Layser (News Corp)) (explaining how News Corp used third parties to manage issues related to malware and spam and testifying about observations that Google's AdX was not better at preventing fraud or malware or spam than any other exchange); Tr. Sept. 10 AM 153:23–154:16 (Friedman (Goodway)) (there is "not a meaningful" difference between AdX and other major exchanges with respect to quality, fraud, or brand safety); Tr. Sept. 11 PM 114:22–115:10 (Dederick (The Trade Desk)); Tr. Sept. 24 PM 100:12–24 (Bjorke (Google)) (acknowledging OpenX "regularly scans creatives for malware"); Tr. Sept. 19 AM 13:2–9 (Simcoe (Pls. Expert)) (explaining he did not see evidence that there were substantial differences between AdX and other exchanges with respect to malware, fraud, and spam detection).

2. "Interoperability" – Innovation and Cost

319. Google expert Dr. Israel also claimed that allowing Google Ads's advertisers to choose whether to buy on AdX or other platforms would reduce Google's ability to innovate. Tr. Sept. 26 PM 4:6-5:20 (Israel (Def. Expert)). Dr. Israel has not, however, provided specific information substantiating this claim—for example, he has not identified specific innovations that Google introduced because of the restriction of Google Ads to AdX or other conduct

challenged by Plaintiffs. Additionally, this argument is counterintuitive because increased competition and customer choice is generally recognized as promoting innovation; there is less incentive to innovate when a company's customers have no meaningful choice to switch to other providers.

320. Similarly, Google suggested at trial that undoing the restriction of Google Ads to AdX would be unnecessarily costly. But, through AWBid, Google Ads already bids into third-party exchanges—though it has artificially limited this buying in a variety of ways, including by limiting it only to certain targeting types. *See* PFOF Sec. IV.A.2.a.2. That means that the work necessary to connect Google Ads to third-party exchanges has already been undertaken.

321. In addition, the argument that bidding on third-party exchanges would be unnecessarily costly is undermined by the fact that most other buy-side tools, as well as Google's DV360 itself, also buy on a wide variety of different exchanges. Tr. Sept. 11 AM 26:3–6 (Bender (Google)). In fact, rival ad exchanges receive Google Ads' bids via AWBid through the same "single integration or API with Google" as the bids received through AdX, further undermining the idea that expanding Google Ads's bidding would be unnecessarily costly. Tr. Sept. 12 PM 79:7–80:1 (Goel (PubMatic)); Tr. Sept. 9 PM 10:9–25 (Casale (Index Exchange)) (explaining that "GDN [Google Ads demand] also routes through the same pipe" as DV360).

322. Finally, the debate within Google about whether Google should launch AWBid—and whether it should be restricted to remarketing impressions—also undermines the argument that undoing the restriction of Google Ads to AdX would be unnecessarily costly. During that debate, Google's buy-side team wanted to expand Google Ads's buying on third-party exchanges, but Google's sell-side team pushed back, not primarily because of cost concerns, but because an expansive AWBid would undo its artificial competitive advantages. For example,

according to 2012 analysis by a team of Google buy-side employees, “we are artificially handicapping our buy-side (GDN) to boost the attractiveness of our sell-side (AdX). Specifically, we have chosen to limit GDN to buying only on AdX, an exclusivity that makes AdX more attractive to sellers” but that “competitively disadvantage[d]” GDN. PTX0110 at -083.0009. This team’s solution was to “[g]o multi-exchange, do what’s best for our advertisers without worrying about how it might hurt our exchange business.” PTX0110 at -083.0010. And when it analyzed the necessary “Investment,” it concluded: “AWBid eng. BD work mostly done. Mostly a strategic decision.” PTX0110 at -083.0010; *see also* PTX0333 at -489 (“[I]f we didn’t have sell-side issues, we would make gdn x-exchange [cross-exchange, i.e. across non-Google ad exchanges] beyond remarketing”); Tr. Sept. 11 AM 36:2–5 (Bender (Google)) (“Q. You were also a proponent or advocate of the advertising ad network – of the advertising ad network buying on third-party exchanges, right? A. That’s true.”). Google’s sell-side resisted this and similar arguments not primarily by claiming that the cost was excessive, but instead by arguing that an expansive AWBid would reduce AdX’s competitive advantages over other exchanges. *See, e.g.*, PTX0333 at -491 (“We’ve considered the option of doing it [AWBid] for all demand and decided against it (with Bellack/sell-side guys). Announcing AWBid for RMKT and announcing AWBid for all demand are two very different things from sell-side’s perspective. . . .if we go with all-demand AWBid, that fully compromises AdX’s competitive advantage w.r.t its exclusivity to GDN demand.”); PTX0132 at -787 (“The main concern from AdSense and AdX is eliminating the USP [unique sales proposition] that they are the only access point for dynamic AdWords demand. . . . if publishers can get the same AdWords RTB demand from any yield management/exchange partner, we expect many publishers would terminate their AdX relationship in favor of their preferred alternate vendor.”)

B. Google’s Purported Justifications for the AdX-to-DFP Tie Are Inconsistent With Market Realities

1. Spam, Fraud, and Quality

323. At times, Google has seemingly argued that its tying of real-time bids from AdX to DFP and other conduct is justified by the need to prevent spam, fraud, malware, or other quality-related issues. *See* Tr. Sept. 16 AM 120:1–121:6 (Mohan (Google)). But the evidence submitted at trial undercuts this claim, for several reasons.

324. First, as discussed more fully above, Google’s buy-side, which acted on behalf of the advertisers that would be injured if undoing the ties were to lead to more spam or fraud, actively argued that Google Ads should bid on third-party exchanges (or, relatedly, that DBM directly bid into header bidding). *See* PFOF Sec. IV.A.2.a.1; Tr. Sept. 11 AM 36:2–5 (Bender (Google)) (“Q. You were also a proponent or advocate of the advertising ad network – of the advertising ad network buying on third-party exchanges; right? A. That’s true.”); *see also, e.g.*, PTX0333 at -489 (“[I]f we didn’t have sellside issues, we would make gdn x-exchange beyond remarketing”); PTX0183 at -717 (“We could easily enable cross exchange in AW [Google Ads] for selected advertisers (and make sure it is spam protected.)”); PTX0520 (DBM should bid into header bidding); PTX0110 at -0084.0010 (Google should “[g]o multi-exchange, do what’s best for our advertisers without worrying about how it might hurt our exchange business.”). Non-Google exchanges did submit real-time bids to non-DFP ad servers, but Google’s buy-side seems to have concluded that any additional risk of spam, fraud, or other issues from doing so was manageable.

325. Second, while a senior Google executive suggested Google is uniquely positioned to fight spam, fraud, and related issues, because only it has a position on both the sell-side (i.e., DFP) and buy-side (i.e., Google Ads/DV360), Tr. Sept. 16 AM 132:14–133:13 (Mohan

(Google)), contrary evidence indicates that AdX was no better at addressing these issues than other exchanges (even though those exchanges are not associated with major buy-side tools or large publisher ad servers). *See* Tr. Sept. 10 AM 46:13–47:10 (Layser (Daily Mail)) (“Q. Based on what you observed when you were implementing header bidding and working with these publishers, was Google better than the other ones, any other exchanges, at preventing fraud or malware or spam? A. No[.]”); Tr. Sept. 27 AM 73:23–75:5 (Wheatland (Daily Mail)) (Daily Mail typically sees ad quality issues “more often . . . from Google”); Tr. Sept. 10 AM 153:23–154:16 (Friedman (Goodway Group)) ((there is “not a meaningful” difference between AdX and other major exchanges with respect to quality, fraud, or brand safety). That is in part because some buyers rely not on Google, but on independent third-party vendors or their own efforts to address these issues. Tr. Sept. 10 PM 4:14-5:13 (Friedman (Goodway Group)); Tr. Sept. 11 AM 114:19-115:13 (Dederick (The Trade Desk)); Tr. Sept. 9 PM 78:17-79:1 (Lowcock (IPG)) (noting firms that offer tools addressing brand safety and security issues).

326. Third, while AdX does not provide real time prices to other ad servers, AdX still submits bids to other publisher ad servers; the only difference is that AdX does not tell non-DFP publishers the price it is submitting at the time of the auction. *See* PFOF Sec. IV.A.2.b.1. That restriction interferes with publishers’ ability to effectively run auctions and reduces the amount of revenue publishers receive from AdX, *see* PFOF Sec. IV.A.2.b.2, but publishers still obtain ads from AdX despite this restriction. Google has provided no explanation for why submitting proposed ads, but doing so in a way that interferes with publishers’ ability to run an auction, is an effective means to combat fraud or spam. And that is because, as discussed above, Google’s true incentive for not submitting real-time bids to non-DFP publishers is that this limits competition for DFP. *See, e.g.*, PTX0114 at -049 (“This is an amazing time to ‘lock in’ impressions by

offering XFP to publishers with full AdX dynamic allocation. AdX can serve as a tool to pull publishers onto XFP. By allowing third parties to integrate with AdX . . . we are giving away this advantage.”); PTX0113 at -804 (Google could open up dynamic allocation to publishers using other ad servers with “[m]inimal effort” but that would “[t]ake[] away a key differentiator for DFP”).

327. Finally, Google also has provided no explanation for how any supposed need to fight fraud, spam, or other quality issues justifies removing choices from publishers and advertisers. If real-time bidding from AdX were to somehow result in increased spam, fraud, malware, or similar problems for publishers or advertisers, Google could have allowed publishers and advertisers to evaluate this issue themselves and decide whether publishers should accept, or advertisers should submit, real-time bids from AdX into non-DFP publishers. But Google provided no such choice.

2. “Interoperability” – Innovation and Cost

328. Google’s expert Dr. Israel also claims that undoing the tie between AdX and DFP would undermine Google’s incentives to innovate. Tr. Sept. 26 PM 6:9-18 (Israel (Def. Expert)). And Google employees have also, at times, claimed that undoing the tie would be too costly. *See* Tr. Sept. 23 AM 175:17-20 (Korula (Google)). The factual record does not support either of these claims.

a) Cost

329. Virtually every major exchange (other than Google) submits real-time bids to publishers using ad servers that they do not own. Tr. Sept. 13 AM 30:22–31:1 (Kershaw (Magnite)) (noting that “pretty much everybody” in the industry provides bids to Prebid’s header bidding solution); Tr. Sept. 26 PM 60:7–10 (Israel (Def. Expert)) (conceding that “many” ad

exchanges participate in the header bidding auction); *see also* Tr. Sept. 23 AM 180:18–181:3 (Korula (Google)) (many other exchanges submit real-time bids to DFP; those exchanges developed that capability many years ago); Tr. Sept. 17 PM 53:8-25 (Cadogan (OpenX)) (OpenX’s exchange provides real-time bids to publishers using other ad servers).

330. Several industry participants testified at trial that it was not particularly costly or difficult to develop this capability, particularly in recent years. For example, Rajeev Goel, from PubMatic, testified that PubMatic could build an API allowing PubMatic to submit real-time bids to DFP as early as 2009, but that Google refused to allow PubMatic to do so, even though it would have been “low to moderate” in terms of difficulty and require about three to six months’ worth of work. Tr. Sept. 12 PM 90:18–93:7, 100:13–18 (Goel (PubMatic)). Similarly, James Avery, from Kevel, testified that it took “one or two engineers” approximately “two to four weeks” for Kevel’s ad server to integrate with new exchange partners. Tr. Sept. 9 PM 141:9-14 (Avery (Kevel)). And Tim Cadogan, from OpenX, testified that, once header bidding was set up, it was “automatic” and “beyond easy” for OpenX’s ad exchange to provide real-time bids to a header bidding auction set up by a publisher. Tr. Sept. 17 PM 53:8–54:14 (Cadogan (OpenX)) (noting that OpenX could not “work directly with Google” to provide its real-time bids to DFP); *see also* Tr. Sept. 9 AM 114:23–115:9 (Casale (Index Exchange) (describing widely-accepted standards used to integrate between ad tech products)).

331. Google’s own documents confirm that submitting real-time bids to non-DFP publishers would not be particularly difficult or time-consuming. Admeld developed this capability prior to the Google acquisition—meaning that it had already developed the ability to submit real-time bids to non-DFP publishers more than twelve years ago—though Google chose to deprecate it after the merger. *See* PFOF Sec. IV.B.2. In addition, when Google was considering

whether to integrate this capability after the merger (nearly 10 years ago), it concluded that responding to bid requests from publishers using non-Google ad servers with real-time bids would require “minimal effort.” PTX0113 at -803–04 (noting that funding this and other efforts would help grow AdX’s business by 2014).

332. In addition, Project Yavin is a capability that Google developed to allow Google Ads and DV360 to submit real-time bids to a small number of publishers that use in-house ad servers (presumably because submitting real-time bids to publishers using other ad servers would pose more of a competitive threat to DFP). Tr. Sept. 23 AM 142:24–144:2 (Korula (Google)); PTX0555 at -115 (“Demand Product”—i.e., Project Yavin—would initially only be “offered to a small subset of publishers that are building their own proprietary ad servers” and would include the ability “to pass through real-time bids”); Tr. Sept. 17 AM 131:22-132:12 (Jayaram (Google)) (“Ad Connector”—i.e., Yavin—allowed two publishers who ran their own ad servers to connect to Google Ads), Tr. Sept. 17 PM 26:12-25 (Jayaram (Google)); PTX0882 at -719 (describing Yavin and noting: “*Limitation: only available for in-house ad servers*”). Extending Project Yavin would at least partially unwind the ties, although its real-time bids account for only a portion of AdX demand. Tr. Sept. 23 AM 143:13-23 (Korula (Google)). Google has not shown that it would be unnecessarily costly or difficult to offer Project Yavin to other publishers.

333. AWBid also at least partially unwinds the ties, as it increases the availability of Google Ads on third party exchanges and allows publishers to obtain real-time Google Ads bids from their preferred exchange, regardless of the publisher ad server they choose to use. While doing so would not fully restore competition, it would offset some of the effects of the ties. As discussed above, Google has not shown that it would be particularly costly or difficult to extend AWBid. *See* PFOF Sec. IV.A.2.a.2.

b) Innovation

334. Dr. Israel has not substantiated his claim that the DFP/AdX tie reduces innovation. He has not, for example, provided specific examples of innovations enabled by the DFP/AdX tie. In addition, Dr. Israel's claim is undercut by the evidence that the DFP/AdX tie actually *reduces* innovation, rather than enhancing it. *See* PFOF Sec. IV.A.2.b.¹⁹

C. Google's Claims Concerning Dynamic Allocation Are Irrelevant to First Look

335. Rather than address First Look specifically, Google claims that Dynamic Allocation increased publishers' revenues. Such claims are irrelevant because "Dynamic Allocation" refers to a broader set of auction systems within DFP and AdX, not First Look specifically. Plaintiffs do not claim that all aspects of dynamic allocation were anticompetitive. Tr. Sept. 18 AM 53:3–54:12 (Abrantes-Metz (Pls. Expert)) (explaining that "Dynamic Allocation," as Google's experts use it, refers to the addition of AdX as a new demand source and the "process that allows AdX to provide real-time bids," but that "none of those are the conduct [she] opine[s] is anticompetitive").

¹⁹ At times, Google expert Mark Israel testified about generalized, purported benefits from integration, i.e., benefits arising from Google's ownership of multiple ad tech products. These arguments are not relevant to whether, e.g., the tie of AdX to DFP is anticompetitive. In addition, Dr. Israel presented no evidence that integration led to pro-competitive efficiencies. He did not perform any independent analysis to specify or quantify any lowered prices, elimination of double marginalization, increased amounts of investments, or other efficiencies attributable to integration. For example, he does not cite to any evidence that quantifies the specific amount publishers, advertisers, consumers, or other market participants benefitted from Google owning both DFP and AdX, or from Google owning DFP, AdX, and Google Ads.

Dr. Israel testified about a figure purporting to show that Google has increased its investment in its ad tech business over time. DTX1881; Tr. Sept. 26 AM 162:11-163:5. But Dr. Israel has not analyzed how Google's investments in its ad tech business might have varied absent integration.

336. For example, in his discussion of First Look, Google's expert relies on a Google whitepaper for the proposition that "Dynamic Allocation" in 2010 resulted in a "price rise" of "136 percent." Tr. Sept. 24 AM 58:14–59:14 (Milgrom (Def. Expert)) (citing DTX0117 at -415). First, rather than First Look, "Dynamic Allocation" in the whitepaper refers to the ability of AdX's "winning bid" to "compete[] in real-time with other directly booked third parties." DTX0117 at -414. Second, the "CPM lift of 136%" compared the addition of AdX as a new demand source against not having AdX at all. *Id.* Both of these are irrelevant to First Look, namely DFP exclusively calling AdX first for remnant inventory.

337. Similarly, in his discussion of First Look, Google's expert relies on a later Google whitepaper for the proposition that the second version of AdX resulted in a "188 percent" increase in revenue. Tr. Sept. 24 AM 60:8–62:5 (Milgrom (Def. Expert)) (citing DTX0080 at -322). As Google's expert acknowledged, however, this increase was due to Google "recod[ing AdX] to allow live bids, real-time bids" and "there's a higher number that is associated with the lift with real-time bids." Tr. Sept. 24 AM 60:8–15 (Milgrom (Def. Expert)). In other words, Google's expert concedes that the increase to publisher revenues was due to AdX's shift from bidding using static bids to real-time bids, and not DFP's granting AdX exclusive First Look.

338. More to the point is an analysis by Professor Abrantes-Metz. She reviewed simulations by Prof. Milgrom to analyze what choices would best maximize publisher revenue if they were free to put another exchange ahead of AdX. Tr. Sept. 16 PM 137:24-139:1 (Abrantes-Metz (Pls. Expert)). She concluded that publishers would best maximize revenue by calling AdX first only 8% of the time; 92% of the time, they would be better off putting another exchange first. Tr. Sept. 16 PM 137:24-139:1 (Abrantes-Metz (Pls. Expert)). This shows that First Look, by

limiting publishers' ability to call other exchanges before AdX, actually reduced publisher revenue rather than increasing it. Tr. Sept. 16 PM 137:24-139:1 (Abrantes-Metz (Pls. Expert)).²⁰

D. First Look and Last Look Did Not Benefit Advertisers

339. Google suggested at trial that First Look benefited advertisers buying on AdX. But “the advertiser willing to pay the highest price may not get [an impression] as a result of first look.” Tr. Sept. 11 PM 71:18–23 (Ravi (Pls. Expert)). In other words, the fact that First Look benefited one specific AdX advertiser, by allowing that advertiser to win, does not benefit advertisers overall, because the AdX buyer’s victory comes at the expense of other advertisers who may have been willing to pay more but “would have never had the opportunity to see the impression.” Tr. Sept. 11 PM 132:3–13, 133:9–134:9 (Dederick (The Trade Desk)) (explaining that DFP gives “AdX access to an impression before other SSPs” and that header bidding provided advertisers with “Access to all impressions . . . at the same time in a more liquid market with significantly more price discovery” compared to a waterfall with AdX being granted exclusive First Look); PTX1650 at -044, -052 (presentation from The Trade Desk indicating that DFP provided AdX “preferential access to ad inventory before other SSPs” and that header bidding counteracted AdX’s First Look, providing more advertisers with access to “higher quality programmatic inventory”).

340. In addition, as discussed more fully above, First Look insulated AdX from competition, enhanced its market power, and limited the ability and incentive for other exchanges to compete on price. *See generally supra* at PFOF Sec. IV.B.1: *see also* Tr. Sept. 10

²⁰ Similarly, to the extent Google claims, with respect to First Look, that Dynamic Allocation was an improvement over the then-existing waterfall mechanism of selling impressions, such claims are also irrelevant to the extent they refer to the addition of AdX as a real-time demand source and not merely DFP’s policy of exclusively calling AdX first. *See* Tr. Sept. 24 AM 40:23–41:9 (Milgrom (Def. Expert)); Tr. Sept. 18 AM 53:3–54:12 (Abrantes-Metz (Pls. Expert)).

AM 42:13–21 (Layser (News Corp)) (First Look stopped her from negotiating a lower take rate with other exchanges in return for putting them first within the waterfall; Tr. Sept. 16 PM 135:15–137:2 (Abrantes-Metz (Pls. Expert)) (First Look eliminated competition for the first position). This, too, harmed advertisers and publishers, for a variety of reasons, including by increasing the price that they would have paid in a more competitive market. Tr. Sept. 18 AM 55:12–56:2 (Abrantes-Metz (Pls. Expert)) (higher take rates harm both advertisers and publishers).

341. For similar reasons, while Last Look allowed AdX advertisers to win impressions they otherwise would not have won, it did not benefit advertisers overall because competition was impeded. Here too, the fact that Last Look benefited an AdX advertiser by allowing it to win a transaction that it otherwise would not have won does not help advertisers overall, since the AdX buyer’s win comes at the expense of other advertisers who may have been willing to pay more. Tr. Sept. 11 AM 121:9-16 Ravi (Pls. Expert)). In addition, as discussed more fully above, Last Look limits competition among exchanges, for a variety of reasons, including by reducing rivals’ scale and dampening price competition. *See* PFOF Sec. IV.B.3.; Tr. Sept. 18 AM 39:4–14 (Abrantes-Metz (Pls. Expert)); PTX0438 at -478 (Google employee asking, in the context of “giving away last look,” “Let[‘s] say that this other SSP decides to start a price war and decreases its OA [open auction] cut to 10%, what would [b]e our levers to not have to follow it?”). This too led to, among other things, higher take rates, which harmed both advertisers and publishers.

E. Project Poirot Did Not Meet Its Purported Procompetitive Objectives Because It Did Not Apply to AdX.

342. Google contends Project Poirot was procompetitive because it benefited advertisers by bid-shading on non-Google ad exchanges that had shifted away from a pure second-price auction format. *See* Tr. Sept. 24 AM 111:2-112:9 (Milgrom (Def. Expert)). But by this logic, Google should have also bid-shaded on AdX, because it also did not run a clean second-price auction, meaning that bid-shading on AdX also would have benefited advertisers. Tr. Sept. 11 AM 124:25–127:3 (Ravi (Pls. Expert)).

343. In a first-price auction, where the bidder with the highest bid wins and pays the price equal to their own bid, bidders have an economic incentive to bid shade or bid strictly below their valuation. Tr. Sept. 11 AM 121:22–122:18 (Ravi (Pls. Expert)). The optimal level of shading depends on the bidder’s estimates or guesses about what others might bid: the bidder should reduce its bid more if it expects lower bids from others. Tr. Sept. 11 AM 122:9–18 (Ravi (Pls. Expert)).

344. In a pure second-price auction, where the bidder with the highest bid wins but pays the price that equals the bid submitted by the *second-highest* bidder, bidders do not gain from bid shading because, from each bidder’s perspective, its bid does not affect the price it actually pays; rather, the final price is determined by the bid of another bidder (the one who submitted the second-highest bid), a price over which each bidder has no control. Tr. Sept. 11 AM 124:25–125:22 (Ravi (Pls. Expert)).

345. As Google employees understood, Google itself had introduced auction design changes that meant that AdX was not a true second-price auction, and that gave buyers an incentive to bid shade. Tr. Sept. 13 AM 118:15–22 (LaSala (Google)) (acknowledging that by

March 2016, AdX acted like “a modified second-price auction”); PTX0317 at -549 (noting “the reality that our auction acts as a modified 2nd price auction”); DTX0308 at -716 (explaining features introduced in 2015 that “move[d] Google away from a 2nd price auction.”). For example, “[t]hings like RPO [Reserve Price Optimization], Dynamic Rev Share ... all have the impact of optimizing the 2nd price [auction] in some way.” PTX0317 at -549. Most notably, by allowing a buyer’s past bids to result in increased floors for future auctions, RPO meant that buyers had an incentive to bid-shade on AdX, and from that perspective, AdX was not running a clean second-price auction. Tr. Sept. 11 AM 127:4–128:17 (Ravi (Pls. Expert)); Tr. Sept. 13 AM 118:15–22 (LaSala (Google)); *see also* Tr. Sept. 24 PM 14:5-15:19 (Milgrom (Def. Expert)) (“RPO did create a reason to shade bids.”). Thus, there was a potential surplus that advertisers could have gained if Google’s DV360 bid shaded on AdX. Tr. Sept. 11 AM 126:13–128:17 (Ravi (Pls. Expert)). Nonetheless, Google did not shade DV360’s bids into AdX as it did on rival ad exchanges until 2019. Tr. Sept. 11 AM 126:5–12 (Ravi (Pls. Expert)).

F. Google’s Acquisition of Admeld Did Not Result in Any Pro-Competitive Efficiencies

346. When evaluating potential pro-competitive justifications of a merger, economists analyze whether a claimed benefit is “specific to the conduct,” meaning, in the context of a merger, that the potential justification “would not have existed absent the” merger, and whether the claimed benefit also enhances total welfare in the relevant product market. *See* Tr. Sept. 18 AM 51:14–52:11 (Abrantes-Metz (Pls. Expert)).

347. None of Google’s experts argued at trial that the Admeld acquisition generated any pro-competitive efficiencies. And Google has not put forward other evidence of any merger-specific benefits. In its pre-trial PFOF, Google asserted the acquisition allowed Google to offer

yield management features to its publisher customers more quickly than would have been the case had Google not acquired Admeld and instead built its own yield management solution. Google Pre-trial PFOF, ECF No. 1177 at 207.

348. At trial, Google did not explain why the acquisition was necessary to provide the purported benefits to publishers or why Google lacked the capability to develop yield management capabilities itself. Instead, the record shows that prior to the merger, Google's publisher customers could, and frequently did, use both Google's ad tech tools and yield managers (such as Admeld). *See* PTX0112 at -978 (“60% of DFP customers also use a Yield Manager”); PTX-0085 at -716 (“60%+ of paying DFP publishers are using a third party yield manager or a competitive exchange”; “A growing percentage of AFC+AdX publishers are working with yield managers, too.”); Tr. Sept. 18 AM 54:13–55:11 (Abrantes-Metz (Pls. Expert)). The merger did not give these publishers access to technology that was previously unavailable: both before and after the merger they could use Admeld's yield management technology together with Google's products. Therefore, any purported benefits of the merger to Google's publisher customers were not specific to the merger. Tr. Sept. 18 AM 54:13-54:11 (Abrantes-Metz (Pls. Expert)).

349. Google did not offer evidence—in the form of any rigorous or detailed analysis—of what benefits, if any, actually resulted from Google owning both a yield manager and other ad tech tools. And any such argument would be difficult given that Google determined that Admeld's technology was “irrelevant to us,” and ultimately shut down Admeld's real-time bidding technology that was valued by publishers and a threat to Google. PTX0085 at -726 (“Their technology is irrelevant to us[.]”); Tr. Sept. 18 AM 47:3–12 (Abrantes-Metz (Pls. Expert)); PTX0112 at -980 (short-term integration plan was to operate Admeld's products

independently; long-term plan was to rebuild some of Admeld’s functionality on the “Google stack,” to which Google would “migrate customers”); Tr. Sept. 16 AM 110:3–23, 111:12–20 (Mohan (Google)) (discussing PTX0112 and short-term/long-term integration plans); DTX0126 at -566 (Google was launching a new platform built on AdX and was “planning to discontinue Admeld later in 2013”); PTX0141 at -442, -445 (Google was in the process of “mov[ing] Admeld publishers from the Admeld platform to the AdX platform, and . . . downsizing and eventually turning off the Admeld platform”; which is “a process that began with the Google acquisition of Admeld”; “not every existing feature within Admeld will be developed in AdX”).

350. Finally, even if there were some technical benefit to Google owning both a yield manager and its other ad tech tools, Google could have obtained those benefits through other means—i.e., building yield management capabilities. Tr. Sept. 18 AM 54:13-54:11 (Abrantes-Metz (Pls. Expert)). That is, in fact, what Google had planned to do prior to the acquisition. *See, e.g.*, PTX0112 at -985; Tr. Sept. 16 AM 105:6–25 (Mohan (Google)) (agreeing that, by 2011, he supported either buying or building a yield manager). This also shows that any potential justifications are not specific to the merger.

G. UPR Did Not Result in Any Valid Pro-Competitive Benefits

1. Price Fishing

351. At trial, Prof. Milgrom suggested that the reason publishers set different floors for the same impression when sold through multiple exchanges was to “fish” for the highest price an advertiser was willing to pay across ad exchanges. *See* Tr. Sept. 24 AM 126:6–14 (Milgrom (Def. Expert)). If DSPs did not realize that they were bidding on the same impressions being offered through different exchanges, differential floors could cause the DSP to win the impression at a higher price than might otherwise have been the case. As a preliminary matter, three conditions

must exist for Prof. Milgrom's hypothetical to play out: 1) a publisher offers the same impression to AdX and a rival ad exchange but sets a higher price floor for AdX, 2) a DSP is unaware it is bidding on the same impression on AdX and a rival ad exchange, and 3) that DSP decides to bid at or above the floor on both exchanges. If all these conditions are met, and there are no higher bids on either ad exchange, the DSP might win the impression and pay the higher AdX floor price. By contrast, if both exchanges had the same lower price floor, the DSP might have won the impression at the lower price floor. *See id.* at 126:6–127:14.

352. But the factual record does not demonstrate that UPR is an effective or necessary measure for addressing the potential problems associated with price fishing. First, UPR does not stop “price fishing.” UPR only prevents publishers from giving AdX a *higher* floor than other exchanges; it does nothing to prevent publishers from giving AdX a *lower* floor than other exchanges. *See* Tr. Sept. 10 AM 60:7–14 (Layser (News Corp)); Tr. Sept. 18 PM 149:1–8, 182:3–10 (Wheatland (Daily Mail)); Tr. Sept. 18 AM 118:13–119:8 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 24 PM 19:15–20:10 (Milgrom (Def. Expert)). In other words, if a publisher wants to price fish, even after UPR, all that it has to do is set a lower unified price floor in DFP (which would apply to AdX) and a higher price floor within the software for other ad exchanges. Tr. Sept. 18 AM 118:13–119:8 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 24 PM 20:2–10 (Milgrom (Def. Expert)). Relatedly, Prof. Milgrom did not provide any quantitative analysis of how effective UPR was at reducing price fishing in practice if at all. Tr. Sept. 24 PM 20:11–21:5 (Milgrom (Def. Expert)).²¹

²¹ Prof. Milgrom seems to have argued that he could not have analyzed how common price fishing was before or after UPR, because price fishing only occurs in a first price auction. Tr. Sept. 24 PM 18:14–20, 20:11–21:5 (Milgrom (Def. Expert)). But this argument does not make sense, logically; most other exchanges had already transitioned to a first price auction prior to

353. Additionally, neither Prof. Milgrom nor Google offered evidence that Google lacked less-restrictive ways of limiting the problems associated with price fishing. Tr. Sept. 24 PM 18:8–10 (Milgrom (Def. Expert)). Google, for example, already had a project called “Project Elmo,” under which Google used cookies to address a related phenomenon known as “multi-calling” (i.e., where exchanges sent multiple bid requests for a single impression). Tr. Sept. 24 PM 18:11–13 (Milgrom (Def. Expert)); DTX0615 at -646-650. But Google made no attempt to analyze the effectiveness of Project Elmo at limiting any potential problems associated with price fishing. Tr. Sept. 24 PM 18:8–13, 18:21–23 (Milgrom (Def. Expert)).

354. Finally, even if (contrary to the evidence at trial), Google could establish that UPR limited price fishing, UPR would not have increased overall economic surplus. Tr. Sept. 18 AM 119:9–18 (Abrantes-Metz (Pls. Expert)). When economists examine potential pro-competitive justifications, they evaluate whether pro-competitive justifications increase economic welfare for industry participants—which roughly equates to increasing the size of the pie, as opposed to simply transferring money from one set of industry participants to another. Tr. Sept. 18 AM 51:15–52:11 (Abrantes-Metz (Pls. Expert)). “Price fishing” merely results in causing advertisers to pay a price that is closer to their willingness to pay—in other words, it

UPR, and header bidding itself amounted to a unified first price auction, PTX0520 at -389; PTX0588 at -821, meaning that price fishing, if it were a significant issue, could have existed both before and after UPR and thus is something Prof. Milgrom could have analyzed. PTX0705 at -086, -093, [REDACTED]

[REDACTED] PTX0520 at -389 (showing that header bidding amounted to a unified first price auction). In addition, this argument does not explain why Prof. Milgrom did not analyze how common the related problem of self-competition was, as self-competition is an analogous concept that applies to second price auctions—meaning that this issue would have arisen within DFP and AdX prior to UPR. *See* Tr. Sept. 24 PM 17:23-18:7 Milgrom (Def. Expert)) (agreeing that self-competition is a “related concept that applies in a second-price auction” and that he didn’t quantify how often it occurred prior to the UFPA).

shifts money from advertisers to publishers. Limiting price fishing, then, would simply shift money back from publishers to advertisers. It would not increase economic surplus. Tr. Sept. 18 AM 119:9–18 (Abrantes-Metz (Pls. Expert)).

2. Output

355. At least one Google executive claimed that UPR increased economic output. Tr. Sept. 12 AM 121:3–7 (Srinivasan (Google)) (asserting that prior to UPR publishers were not maximizing revenue). Google did not even attempt to evaluate this claim with any rigor, however. Google did not, for example, conduct any economic studies analyzing whether UPR led to increased output.

356. UPR's effect on output is, at best, ambiguous. UPR did lead to a decrease in AdX's price floors, which would increase the number of transactions cleared by AdX. PTX0819 at -318 -321 (UPR "lowers floors on AdX," causing AdX to win 32.6% more impressions, or 6.4% by value). But many of these transactions would have cleared on other exchanges absent UPR, *see* PFOF Sec. IV.B.5, and these impressions would not be associated with an output increase. In addition, UPR caused an increase to the floors faced by other exchanges, which would decrease the number of transactions cleared on those exchanges and potentially decrease output. PTX0819 at -318 ("[UPR] also has a negative effect on external exchange spend, since remnant / header bidding / Open Bidding demand previously had no floors applied."); Tr. Sept. 10 AM 119:22–120:2 (Layser (News Corp)) ("Q. What impact did UPR have on News Corp's ability to set a higher floor for Google Ads as compared to other DSPs or other networks? A. So you couldn't set a higher floor for AdX, but you could go into a competing SSP, and you could set higher floors in their system"). Economic analysis could have attempted to untangle these opposing effects, but Google attempted no such work.

357. In addition, even if UPR caused more transactions to clear on AdX, and even if those transactions would not have been sold by other exchanges, it is not clear that this amounts to an output increase. As discussed above, there is significant evidence that publishers purposefully used higher price floors for AdX to pursue a variety of legitimate business goals, like, for example, limiting low quality ads or facilitating volume discount agreements. *See* PFOF Sec. IV.B.5.b. Limiting publishers' ability to pursue those goals does not necessarily lead to an output increase. An increase in low quality ads from AdX might, for example, cause users to switch to other publications, which would potentially cause an output decrease.

358. Finally, neither Google nor any of its experts have explained why a potential increase in output would justify forcibly removing publishers' ability to floor AdX higher, as UPR did. If flooring AdX higher led to lower output, as Google claims, then Google could have attempted to address that problem by *persuading* publishers to give AdX a price floor equal to other exchanges, rather than *forcing* publishers to give AdX an equal floor. *See* Tr. Sept. 18 AM 42:12–43:7, 118:17–119:8 (Abrantes-Metz (Pls. Expert)) (describing Xandr's recommendation, but not requirement, of equal floors as one alternative that an economist would expect to see in a competitive market); Des. Tr. 195:12-196:7 (Lipkovitz (Google)) (explaining his view of UPR) (“[A]s a free speech guy, my answer -- people say something you don't like, you say more things. You don't tell them not to do something. So I don't know how to justify it[.]”). And, in fact, another ad server, Xandr, *recommended* that publishers set equal floors for different exchanges, while still giving them the freedom to set different floors, if publishers chose that option. *See* Tr. Sept. 18 AM 42:12–43:7 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 20 PM 158:12–159:9 (John (Xandr)). Neither Professor Milgrom nor Google have explained why Google could not have done the same thing.

3. Simplicity and Bidder Errors

359. Google elicited testimony that UPR led to greater simplicity and a reduction in bidder errors. Tr. Sept. 12 AM 113:20–115:9 (Srinivasan (Google)) (“[UPR] moved us to a simpler and more consistent auction.”); *see also* Tr. Sept. 11 PM 19:7–11 (Ravi (Pls. Expert)) (being questioned on cross-examination whether “consistent price floors . . . minimize[] bidder error”). But this goal, too, would not justify forcibly removing publishers’ ability to set different price floors. If simplicity was a goal, Google could have given publishers the option to set a consistent floor across all exchanges and (like Xandr) tried to persuade publishers to do so. *See* Tr. Sept. 18 AM 42:12–43:7 (Abrantes-Metz (Pls. Expert)); Tr. Sept. 20 PM 158:12–159:9 (John (Xandr)). But that is not what Google did.

360. In addition, Google has provided limited or no evidence from third-party advertisers or buying tools (e.g., DSPs or ad networks) stating either that (a) differential price floors were creating too many bidding errors or (b) that UPR helped address this problem. Presumably, if this were a significant issue, Google could have found testimony from industry participants helping it establish these claims. But it did not.

VII. Google Has Monopoly Power in the Markets for Publisher Ad Servers, Ad Exchanges, and Advertiser Ad Networks²²

361. Google has monopoly power in each of the three relevant markets: publisher ad servers, ad exchanges, and advertiser ad networks for open-web display advertising. These products perform distinct, important functions for publishers seeking to monetize ad inventory on their websites and advertisers looking to reach internet users on those websites. Google’s

²² Google has not affirmatively proposed any alternative relevant product markets it believes the Court should adopt. Rather, Google has limited its advocacy to criticizing the boundaries of Plaintiffs’ proposed markets. Tr. Sept. 26 AM 42:17–20 (Israel (Def. Expert)) (Dr. Israel admitting that he did not define the “exact edges of” a “single two-sided market”).

monopoly power in each market is mutually reinforcing across these adjacent markets, such that its power in each market is even stronger than it would be if Google had substantial power in that market alone. *See, e.g.*, PTX0551 at -048 (Google recognized, the “value of Google’s ad tech stack is less in each individual product, but in the connections across all of them.”); Tr. Sept. 13 PM 66:9–67:21 (Creput (Equativ)) (discussing the effects of Google’s power in the ad exchange and ad server markets being used to exclude publisher ad server competitors); Tr. Sept. 13 AM 19:14–20:16 (Kershaw (Magnite)) (describing the necessity of having AdX demand for a publisher and how that increased the attractiveness of using DFP); Tr. Sept. 10 AM 11:11–13:15 (Layser (News Corp)) (describing how Google Ads’ unique demand to AdX made it too risky for News Corp to change to a non-Google publisher ad network).

A. Google Has Monopoly Power in the Market for Publisher Ad Servers For Open-Web Display Advertising.

362. Publisher ad servers for open-web display advertising constitute a distinct product market based on the economic realities of the market, and based on direct and indirect evidence, Google has monopoly power in that market.

1. Publisher Ad Servers for Open-Web Display Advertising Is a Relevant Market.

363. Google and its competitors recognize the distinctiveness of publisher ad servers that support the sale of open-web display advertising. For example, Google itself recognized “addressable” “display web” advertising in an overview of its display advertising business. PTX0946 at -807 (Google document estimating 85% share in “display web” ad serving); *see also* PTX0847 at -261 (Google diagram of the display ads landscape, identifying “Publisher Ad Server” as a distinct product with distinct competitors); PTX0015 at -990 (“Google’s Rationale

for Acquiring DoubleClick: [] Own DoubleClick’s customer footprint to accelerate time to market for our own . . . publisher ad serving products”).

364. Facebook acknowledged Google’s “monopolistic power,” which it uses “to manipulate the market [in] its favor and disadvantage competition,” while in the same breath recognizing “ad serving” as a distinct market. PTX1709 at -937 (Facebook document discussing “the ad-serving market” for website publishers). Microsoft likewise observes competition in a distinct “ad server market.” Tr. Sept. 20 PM 130:22–131:21 (John (Microsoft)) (discussing competition in “the ad server market” for publishers).

365. A publisher ad server is a necessary tool for open-web publishers seeking to generate revenue by selling open-web display ad inventory. Tr. Sept. 16 AM 22:5–14 (Mohan (Google)) (“By definition, publishers couldn’t really manage their display advertising without an ad server.”); Tr. Sept. 9 AM 119:9–17 (Casale (Index Exchange)) (“A publisher ad server is . . . a platform that publishers use to effectively run their ads businesses.”). Publisher ad servers perform a critical function for open-web publishers for which no reasonable substitutes are available. Tr. Sept. 20 PM 78:4–25 (Sheffer (Google)) (“the ad server is a mission-critical enterprise software tool that publishers use” which can “drive their direct sales efforts” and the “indirect monetization” of open-web inventory); Tr. Sept. 9 AM 119:9–120:25 (Casale (Index Exchange)) (Publisher ad servers “act as a central fixture for the publisher” “that allow publishers to run their [ad] businesses” and “have certain features and functionality that allow them to do that” including the “final decisioning and render of ad.”); Tr. Sept. 19 PM 61:18–63:3, 64:4–65:20 (Lee (Pls. Expert)).

366. *Advertiser substitution.* Because publisher ad servers are used by website publishers—not the advertisers who buy ad inventory on those websites—the extent of

advertiser substitution between various forms of digital advertising is irrelevant for the purposes of defining a market for this publisher tool. Tr. Sept. 19 PM 59:16–60:3, 62:1–15, 64:4–65:3, 72:1–17 (Lee (Pls. Expert)) (“An open-web publisher, regardless [of] if they have other forms of content, still [has] valuable web impressions they [] want to monetize . . . And that’s why an open-web publisher ad server is still important to them.”); *see also id.* 62:20–63:3 (it is not unusual for a product in a relevant antitrust market to also perform functions outside of that product market); Tr. Sept. 27 AM 59:20–60:3 (Wheatland (Daily Mail)) (“If advertisers can change where they run their ad spend, that doesn’t help the publisher, per se. We have an open web product, and we make the majority of our revenue from display ads on open web, and we can’t shift those open web adverts to some other medium, so it doesn’t help us.”).

367. *Other types of ad tech tools are not reasonable substitutes.* Publisher ad servers are software products that serve a distinct role in allowing website publishers to manage, sell, and track their ad inventory. Tr. Sept. 18 AM 131:18–132:6 (Wheatland (Daily Mail)) (publisher ad servers “deal with inventory management, the hierarchy of the inventory, inventory forecasting . . . [and] reporting tools”); Tr. Sept. 9 AM 125:2–21 (Casale (Index Exchange)) (publisher ad servers are “responsible for handling the scale of [publisher] media . . . whether it was a small publisher or a potentially very large publisher with billions or tens of billions of impressions.”); Tr. Sept. 9 PM 118:21–24 (Avery (Kevel)) (“a publisher ad server is the technology that a publisher uses to control which ads are going to be shown on a website”). Website publishers use publisher ad servers to select which advertisement fills each ad slot on their webpage in real-time to maximize display ad revenue and meet other commercial goals. DTX1487 at -849 (a publisher ad server “offers complete digital ad management and superior yield optimization to help publishers improve ad performance and profitability”).

368. Publisher ad servers work by allowing a publisher to set rules and goals that determine which advertisement will be shown to each internet user. Tr. Sept. 9 AM 66:9–16 (Wolfe (Gannett)) (“mapping in the [publisher] ad server” ties together ad space on the website to ad inventory sold via the publisher ad server “[s]o when we go to sell, we know specifically [] what inventory, what ad space we’re selecting to facilitate that sale” to an advertiser); Tr. Sept. 9 AM 120:12–25 (Casale (Index Exchange)) (“The [publisher] ad server ultimately also is responsible for final decisioning and render[ing] of [an] ad . . . on [a] website[.]”).

369. Among other functions, publisher ad servers allow a website publisher to create rules that determine whether to show an advertisement based upon a pre-existing direct deal with an advertiser or whether to auction off the impression via an indirect demand channel, such as an ad exchange. Tr. Sept. 9 AM 66:1–8 (Wolfe (Gannett)) (publisher ad servers “manage the implementation and delivery of [publishers’] direct sold campaigns. It participates in facilitating part of the programmatic environment.”); Tr. Sept. 20 PM 78:4–25 (Sheffer (Google)) (“the ad server is a mission-critical enterprise software tool that publishers use . . . to drive their direct sales efforts” and for “indirect monetization”); Sept. 19 PM 61:18–25 (Lee (Pls. Expert)) (“one of the most important [features] is a publisher ad server’s ability to effectively manage both directly sold and indirectly sold open-web display advertisements for publishers.”).

370. No other type of ad tech tool reasonably allows publishers to configure such rules. Tr. Sept. 10 AM 29:8–30:10 (Layser (News Corp)) (“content recommendation” tools like “Taboola” are not “a full-featured [publisher] ad server” because “[y]ou wouldn’t be able to put your direct ad campaigns in it and use it like you would use DFP or AppNexus.”); Tr. Sept. 16 AM 92:24–93:14 (Mohan (Google)) (Google’s AdSense product does not support direct-sold advertising); Tr. Sept. 18 PM 131:18–132:6 (Wheatland (Daily Mail)) (header bidding wrappers

like Prebid do not support direct-sold advertising); Tr. Sept. 13 AM 17:8-18:10 (Kershaw (Magnite)) (“I am not aware personally -- and I was a chairman of Prebid -- of any of the websites that we dealt with daily that were running their ads” via Prebid header bidding technology without a publisher ad server).

371. Publisher ad servers also allow a publisher to compare these pre-existing direct deals to bids received from various ad exchanges. Tr. Sept. 9 AM 67:8–18 (Wolfe (Gannett)) (publisher ad servers send “an ad call” to an ad exchange “to be matched with a buyer” via an auction); Des. Tr. 109:04–10 (O’Kelley (Xandr)) (indirect ads “run[] through the ad exchange” programmatically); *id.* 72:13–74:15 (“the ad server” can “do a more dynamic yield management process” where it “auction[s] guaranteed campaigns, the campaigns that the publisher sold itself, against all of the program[m]atic” bids); Tr. Sept. 9 AM 68:16–69:16 (Wolfe (Gannett)) (publisher ad servers will “evaluate the publisher’s direct sold campaigns [and], at the same time, it will fire off a bid request to the ad exchange whereby the auction will occur . . . Those will respond with a bid from the auction[.] The price that the advertiser is willing to pay for that impression will then be pushed back . . . ultimately into the ad server. So the ad server, [] kind of the alpha and the omega in the equation . . . [is] ultimately the determining factor as to which ad gets displayed to the end user.”).

372. Publisher ad servers also uniquely track ad performance and monetization, as well as collect and utilize targeting information. PTX1572 at -693 [REDACTED]
[REDACTED]
[REDACTED]. In doing so, the publisher ad server tracks data across transactions that may occur on various ad exchanges. Tr. Sept. 13 PM 73:25–74:12 (Creput (Equativ)) (Google’s publisher ad server “has access to all the auction

data from the [exchanges] . . . but the [exchanges] don't have access to this data.”); *see also* Tr. Sept. 9 PM 49:5–17 (Casale (Index Exchange)) (the “ad server [] has the vast majority of the transactions that [exchanges] participate” in). No other ad tech tool is positioned to perform this function.

373. *Industry participants and observers routinely recognize publisher ad servers as a distinct product.* Google's own documents distinguish between publisher ad servers and other ad tech products such as ad exchanges and advertiser ad networks, noting different competitors for each. PTX0847 at -261 (diagram of the display ads landscape, grouping “Publisher Ad Server” as a distinct product that includes DFP, OpenX, and FreeWheel); PTX0993 at -310 (in diagram of ad tech ecosystem, Google draws a separate category for “Ad Servers” on the publisher side, with DFP, OpenX, and Adzerk (Kevel) in the same box). Other industry players do as well. *E.g.*, PTX0580 at -802 (evaluating a deal to work with Google and measuring DFP's market share and Google's market share in web advertising separately from app and video).

374. Non-parties including publishers and other ad tech companies likewise recognize publisher ad servers as a distinct product providing a distinct service as compared to other ad tech tools. DTX0376 at -940 (“Header bidding **does not replace the ad server**: the creative is served in the usual way through the ad server, using server **line items** and server **tags** on the page.”) (emphasis in original); Tr. Sept.9 AM 66:2–16 (Wolfe (Gannett)) (publisher ad servers are a “cornerstone technology”); Tr. Sept. 9AM 66:23–67:3 (Wolfe (Gannett)) (publisher ad servers are businesses separate from ad exchanges); Tr. Sept. 10 AM 30:20–22 (Layser (News Corp)) (publisher ad servers are products distinct from ad exchanges); Tr. Sept.18 PM 131:18–132:6 (Wheatland (Daily Mail)) (publisher ad servers are products distinct from header bidding wrappers); Tr. Sept. 13 PM 62:22–61:1 (Creput (Equativ)) (publisher ad servers are a “business”

distinct from SSPs); DTX1487 at -851 (AppNexus document) (publisher ad servers and SSPs offer distinct functions and features).

375. Google’s own expert, Dr. Mark Israel, admitted that publisher ad servers are “components” in the ad tech stack that “serve different purposes” from other components, such as buy-side tools and ad exchanges. Tr. Sept. 26 PM 45:9–19 (Israel (Def. Expert)) (DV360 is not a substitute for DFP); Tr. Sept. 26 PM 136:20–137:10 (Israel (Def. Expert)) (“DFP publishers us[e] multiple exchanges . . . [with]in DFP” to access demand sources). Dr. Israel also admitted that publisher ad servers like DFP are products separate and distinct from ad tech tools offered by social media companies. Tr. Sept. 26 PM 47:18–48:3 (Israel (Def. Expert)) (agreeing that publishers cannot use Facebook or TikTok to sell display ad inventory on their websites).

376. *Prices.* The differences in the services offered by a publisher ad server and other types of ad tech tools are also reflected in the fees they charge. Publisher ad servers, including the one offered by Google, typically charge publishers a flat fee each time they sell an impression. Tr. Sept. 26 AM 120:20–121:3 (Israel (Def. Expert)) (“The DFP prices would be charged basically per thousand impressions.”). By contrast, ad exchanges and tools that advertisers use to buy display advertising charge based on a percentage of the price advertisers pay for an impression. PTX0188 at -963 (Chart listing all of Google’s ad tech products and pricing: “Price is eCPM in \$¢ for . . . DFP, % of media for . . . AdX”); PTX0549 at -076. Ad server fees are also much lower than fees charged by ad exchanges, such that publisher ad servers and ad exchanges are quite differentiated. Tr. Sept. 26 AM 121:10–16, 132:22–25 (Israel (Def. Expert)) (DFP “take rates” when converted from dollar figures equal “1.7 percent to 1.3 percent,” whereas “for an auction run on AdX” take rates are 20%).

377. *In-house ad servers are not a viable alternative.* In-house ad servers are not reasonable alternatives to third-party options except for very, very few publishers due to the cost and technological complexity of building and maintaining a publisher ad server. Tr. Sept. 9 AM 73:1–8 (Wolfe (Gannett)) (describing building an in-house publisher ad server as “incredibly sophisticated and incredibly complex” and “not something that Gannett has the technical resources to build, nor is it frankly a part of Gannett’s core competencies to build”); Tr. Sept. 18 AM 132:7–17 (Wheatland (Daily Mail)) (“Our specialism is producing content and journalism. We don’t specialize in producing sort of enterprise-level software. So I think [creating an in-house publisher ad server is] not really possible.”); Tr. Sept. 10 AM 28:23–25 (Layser (News Corp)); Tr. Sept. 26 PM 141:15–142:5 (Glogovsky (New York Times)) (describing disadvantage of an in-house publisher as server as “the operational support and infrastructure in capital resources required to maintain that and to evolve with the industry exchanges”); *see also* Tr. Sept. 19 PM 65:4–20 (Lee (Pls. Expert)) (very few publishers can and have successfully built an in-house ad server – it is costly and removes a publisher’s ability to maximize revenue via real-time bidding on Google’s publisher ad server DFP).

378. Other market participants confirmed the technical complexity of building a publisher ad server. Tr. Sept. 9 AM 125:2–25 (Casale (Index Exchange)) (testifying that building an in-house ad server “would be very complex and expensive . . . you would need to be a technology company or technology-minded company, because a publisher ad server is a platform with a lot of software engineering behind it”); Tr. Sept. 13 PM 82:6–19, 91:8–15 (Creput (Equativ)) (testifying that creating an in-house publisher ad server “requires an extremely major investment” because it is “the part of ad technology which is the most strategic and the part which is most complex in terms of its maintenance”); *cf.* Tr. Sept. 13 PM 115:7–20, 129:14–21

(Boland (Facebook)) (Facebook determined that “it would be unfeasible to build the market-comparable set of features for what Google had established” and “feared [they] would not be able to get access to” Google’s own demand). Even Google internally has recognized that in-house ad servers have increasingly become a less feasible option for major publishers. PTX0174 at -633 (“Increasingly complex landscape means that in-house / independent ad servers will find it more difficult to keep pace with the market[.]”).

379. Very few website publishers are successfully using an in-house ad server for display advertising today. Disney operates an in-house publisher ad server that supports video and app ads, but not display ads. Tr. Sept. 17 PM 122:3–12 (Helfand (Disney)). It required substantial time and investment for Disney to build and maintain its in-house video publisher ad server. Des. Tr. 113:12–114:17, 121:1–16 (Helfand (Disney)) [REDACTED]

[REDACTED] Few, if any, publishers have the scale and focus on video content of Disney to justify this investment. Tr. Sept. 17 PM 130:17–20, 131:10–19 (Helfand (Disney)).

380. The New York Times used an in-house publisher ad server for a time but switched to DFP for display ad serving in 2015 in order to “improve other personnel operations” and gain “the capability of utilizing Google’s programmatic demand,” i.e., access Google Ads demand tied to AdX and DFP, among other reasons. Tr. Sept. 26 PM 140:13–141:14 (Glogovsky (New York Times)). The New York Times’ Mr. Glogovsky testified that he was unaware of any other publishers using an in-house publisher ad server for display advertising and would not recommend that New York Times start using an in-house publisher ad server for display advertising today. *Id.* 142:6–13.

381. Even if a publisher were willing to expend the resources to create its own publisher ad server in-house, that ad server necessarily would lack effective access to real-time bids from Google's AdX ad exchange and the important, unique Google Ads advertising demand available nearly exclusively on AdX. Tr. Sept. 18 AM 132:7–13 (Wheatland (Daily Mail)) (“We don’t specialize in producing sort of enterprise-level software. So I think not really possible. And even if we did, we still wouldn’t get access to AdX demand, so it wouldn’t be worthwhile.”); Tr. Sept. 27 AM 67:21–22, 68:4–13 (Wheatland (Daily Mail)); PTX1031 at -500 (“Google Ad Manager is the only way to access Google Ad Exchange as a publisher”). None of the publisher witnesses who testified at trial currently use an in-house publisher ad server for display advertising. Tr. Sept. 9 AM 66:17–19 (Wolfe (Gannett)); Tr. Sept. 10 AM 10:3–5 (Layser (News Corp)); Tr. Sept. 17 PM 133:11–13 (Helfand (Disney)); Tr. Sept. 18 AM 125:19–22 (Wheatland (Daily Mail)); Tr. Sept. 26 PM 140:10–12 (Glogovsky (New York Times)). It therefore is not a reasonable substitute to Google’s publisher ad server for most publisher customers; the handful of in-house publisher ad servers that Google’s expert identified at trial are all ‘owned and operated’ ecommerce and social-media platforms not available to third-party publishers, as they have been for some time. *See* Tr. Sept. 26 AM 66:2-22, 128:11–22 (Israel (Def’s Expert)); Tr. Sept. 26 PM 118:511–119:15 (Israel (Def’s Expert)); DTX1872 at 1 (based on data from [REDACTED] [REDACTED]).

382. Likewise, while publisher-facing ad networks can potentially serve the needs of some small publishers, by making ad inventory available for sale to a defined group of advertisers within the network, it is not a reasonable alternative for most publishers, particularly those that make use of direct deals with advertisers. Tr. Sept. 27 AM 58:4–6 (Wheatland (Daily Mail)); Tr. Sept. 18 PM 202:18–203:16 (Pappu (Google)) (explaining that Google’s AdSense

product was for “smaller publishers” and “was a much more simple product with very few controls because it was meant for very simple kind of publisher-use cases” while “DFP was the product that [Google] built for large publishers”); PTX0088 at -603 (describing Google’s strategy for “Large pubs” as “XFP [DFP] + AdX yield mgmt” in contrast to “double down on AdSense” for “Smaller pubs”); Tr. Sept. 20 PM 110:23–25 (Sheffer (Google)) (“Q. And AdSense for Content doesn’t have functionality to manage direct deals, correct? A. That is correct, yes.”). Most sizeable publishers seek to sell open web display ads via a wide range of channels, such as through multiple ad exchanges and through both direct and indirect sales channels. Publisher-facing ad networks do not allow publishers to utilize all of these various channels to sell advertising. Tr. Sept. 10 AM 29:8–30:10 (Layser (News Corp)) (explaining why ad network Taboola is “a specific use case” and “not a full-featured ad server where you would be able to manage all of your ad inventory”); Tr. Sept. 17 PM 61:6–18 (Cadogan (OpenX)).

383. For that same reason, loading ads directly through header bidding is not a reasonable alternative for most publishers, who need a publisher ad server to allocate impressions between direct deals and indirect sales (even indirect sales through header bidding). Tr. Sept. 13 AM 6:19–7:9 (Kershaw (Magnite)) (explaining that it was “not technically possible” for a publisher to use a header bidding wrapper instead of DFP because of the need to allocate inventory to “direct sold” deals); Tr. Sept. 13 AM 15:25–16:19, 17:17–23, 19:4–13, 20:3–16 (Kershaw (Magnite)) (“[T]here’s no way for any scaled publisher to operate just with Prebid”); Tr. Sept. 18 AM 131:18–132:6 (Wheatland (Daily Mail)) (“There’s a lot of functionality that we require[] from an ad server, and, for instance, Prebid wouldn’t allow us to serve our direct sold campaigns. . . .”); Tr. Sept. 27 AM 68:15–69:23 (Wheatland (Daily Mail)); Tr. Sept. 13 AM 96:6–15 (LaSala (Google)) (discussing how even with header bidding “I think

you still need an ad server.”); Tr. Sept. 20 PM 78:4-24 (Sheffer (Google)) (“So the ad server is a mission-critical enterprise software tool that publishers use primarily and, most importantly, to drive their direct sales efforts.”); DTX0376 at -940 (“Header bidding **does not replace the ad server . . .**”); Tr. Sept. 20 PM 36:20-37:1 (Lee (Pls. Expert)) (“Q. Why not? Why couldn’t a DFP publisher just use header bidding wrappers or Amazon or other ad exchanges and forgo DFP altogether? A. This goes to one of the important features of a publisher ad server, its ability to manage both directly sold and indirectly sold open-web display ads. And those other products don’t offer all of those features.”).

384. *Publisher ad servers that facilitate the sale of other forms of advertising are not reasonable substitutes.* Publisher ad servers used to transact open-web display advertising—the type of advertising relevant to this case—are technologically distinct from tools used to transact other forms of digital advertising, as recognized in the industry and in Google’s own documents.

385. All publisher ad servers that are made available to website publishers to sell display advertising on their websites fall within the relevant market. Tr. Sept. 19 PM 45:13–23, 54:23–55:4 (Lee (Pls. Expert)). By contrast, publisher ad servers that do not transact display ads (i.e., publisher ad servers that transact *only* video and social ads) are not substitutes for a publisher looking to sell display ads and therefore fall outside the relevant market. Likewise, proprietary ad tech tools (such as those used exclusively to sell advertisements on social media websites or on a single web property—so-called “walled gardens”) cannot be used by a website publisher (e.g., the New York Times) looking to sell a display ad on its own website, and therefore are not reasonable substitutes to publisher ad servers that transact open-web display

ads.²³ Tr. Sept. 10 AM 32:10-33:2 (Layser (News Corp)); Tr. Sept. 18 AM 131:3-16 (Wheatland (Daily Mail)); Tr. Sept. 17 PM 18:22-25 (Jayaram (Google)) (“Q. You understand that Facebook doesn’t offer a third-party publisher ad server to websites like The Wall Street Journal, correct? A. Yes.”); PTX0657 at -350 (Facebook, Amazon are not “addressable” for Google’s sellside display business); Tr. Sept. 20 PM 153:25–154:13 (John (Microsoft)) (testifying that Facebook, Apple, and Amazon are not competitors to Xandr’s publisher ad server business); Tr. Sept. 20 PM 153:25–154:19 (Facebook, Apple and Amazon do not compete with Google’s or Xandr’s publisher ad server business); Tr. Sept. 9 AM 114:7-115:25 (Casale (Index Exchange)) (explaining that “social media platforms are what we called walled gardens, which is they’re effectively walled off” but companies like ours “can’t actually participate in social media opportunities”); Tr. Sept. 10 AM 157:22-158:19 (Friedman (Goodway Group)); Tr. Sept. 17 PM 57:2-13 (Cadogan (OpenX)); Tr. Sept. 19 PM 62:1–19 (Lee (Pls. Expert)).

386. While a website publisher may *also* sell ad inventory on an app, a social media site, or a streaming video service—if they operate one or more of these services—a website publisher also has a desire to sell display ad inventory available on its website. Tr. Sept. 9 AM 64:15-19 (Wolfe (Gannett)); Tr. Sept. 18 AM 133:4-14 (Wheatland (Daily Mail)); Tr. Sept. 27 AM 59:20-60:3 (Wheatland (Daily Mail)). To sell this display ad inventory—potentially in addition to these other forms of ad inventory—website publishers must use a publisher ad server capable of selling open-web display advertising. Tr. Sept. 9 AM 66:1-67:7, 103:15–19 (Wolfe (Gannett)); Tr. Sept. 10 AM 29:20–30:10, 31:1–12, 31:20–32:2 (Layser (News Corp)); Tr. Sept.

²³ To the extent a publisher ad server transacts both open-web display advertising as well as other forms of advertising (e.g., app advertising), the product falls within the relevant market to the extent it transacts open-web display ads. Tr. Sept. 9 PM 62:20–63:3, 63:16–64:3 (Lee (Pls. Expert)).

18 AM 133:4–14 (Wheatland (Daily Mail)); Tr. Sept. 27 AM 65:6–66:22 (Wheatland (Daily Mail)); PTX0657 at -350; Tr. Sept. 17 PM 132:7–133:13 (Helfand (Disney)) (explaining Disney uses Google’s publisher ad server for open-web display ads while it uses another ad server for ads shown within its premium video content). This is true even though other types of ads (such as premium video ads) might earn a publisher more money: a publisher operating both a website and a premium video website would seek to monetize both using the appropriate ad tech tools for each. *See* Tr. Sept. 19 PM 64:14–65:3 (Lee (Pls. Expert)).

387. Industry participants regularly distinguish between ad tech tools based on the type of ad they are technically capable of transacting. For example, industry participants, including Google, recognize there are different technologies and competitors for publisher ad servers that transact open-web display ads versus those that transact mobile app ads or instream video ads. PTX0953 at -532 (“Web, App, Instream Video, and Search. These tranches of inventory have different industry and competitive dynamics, different types of partners with different business models and different technology challenges.”); PTX0590 at -751 (Google document discussing Open Bidding pricing: “As we launch Apps and Video, the dynamics are different” than web); PTX0581 at -992 [REDACTED] PTX0764 at -251–54, -259–61; PTX1031 at -485.

388. App publishers—unlike open-web publishers—generally use ad tech tools specifically designed to sell in-app advertisements (known as SDKs), rather than tools that primarily are used to sell open-web display advertising. Tr. Sept. 9 AM 103:3–19 (Wolfe (Gannett)); Tr. Sept. 10 AM 31:18–32:7 (Layser (News Corp)); DTX0376 at -943 (“In an App environment, the SSP’s software development kit (SDK) is embedded in the app publisher’s code to allow the SSP and its SDK to do the majority of the work, instead of the publisher’s ad

server.”). Notably, Google offers a separate ad tech product, AdMob, for app publishers seeking to sell ads within their mobile apps. DTX0076 at -474 (discussing “AdMob acquisition”); DTX0939 at -009 (distinguishing between “Web” as an “Established, at scale business[.]” and “Apps” as an “Emerging” business).

389. Likewise, publisher ad servers that allow publishers to sell instream video ads offer distinct technology that is not a substitute for the technology used to sell display ads. Tr. Sept. 17 PM 122:9–16, 123:12–14, 131:24–132:3, 133:11–13 (Helfand (Disney)) (explaining that Disney’s in-house ad server only sells instream video, that Disney uses Google’s DFP publisher ad server to sell display ads, and that Disney’s in-house ad server could serve display ads only if Disney further “invested in developing the capability”); Tr. Sept. 10 AM 31:1–17 (Layser (News Corp)); PTX1835 at -172; DTX1207 at -500 (distinguishing between “Desktop/Mobile Web” and “Connected TV” and “DMVPDS/MVPDS [i.e., technologies for delivering video content]”); PTX0051 at -726 (“Why is Video different?”); DTX1151 at -286–87; Tr. Sept. 19 PM 16:4–10 (Cox (Google)) (distinguishing between instream and outstream video: “[i]nstream video is within the stream of a show or a piece of content whereas outstream is a video ad running in what is normally a static placement.”).

390. There is little evidence that any publishers were able to substitute away from Google’s DFP publisher ad server to either an in-house ad server or to an ad server focused on other types of advertising. Professor Lee’s analysis of data produced by Google “indicates that from 2018 to 2022, of the top hundred publishers who use DFP, only one stopped using DFP during that time period.” Tr. Sept. 19 PM 68:21–70:1 (Lee (Pls. Expert)).

391. *Sensitivity to price changes.* A hypothetical monopolist of publisher ad servers that transact open-web display advertisements would likely be able to profitably exercise

monopoly power either through an increase in price or a degradation in quality. Tr. Sept. 19 PM 55:10–57:8, 60:4–61:5, 61:14–17 (Lee (Pls. Expert)). Because of the lack of close alternatives available to open-web publishers, a hypothetical monopolist would be able to raise prices without the risk of significant substitution that would render the price increase unprofitable. Tr. Sept. 19 PM 61:18–66:6, 67:12–17 (Lee (Pls. Expert)).

392. Additionally, here, there is direct evidence that Google has degraded its product in various ways, such as by removing the ability of publishers to implement different price floors for different sources of advertising demand (Unified Pricing Rules), without meaningful substitution away from Google’s publisher ad server. Tr. Sept. 19 PM 66:7–67:11 (Lee (Pls. Expert)); *see* PFOF Sec. IV.B.5.

393. Moreover, quantitative analyses in Google’s business planning documents indicate that Google could profitably impose a price increase for its publisher ad server without a significant number of publishers switching away to alternative products to defeat such a price increase. PTX0611 at -798 (estimating a \$40–\$50 million increase in overall revenue by raising DFP prices by around 20%). Therefore, under the hypothetical monopolist test routinely employed by economists, publisher ad servers for open-web display advertising are a relevant product market for antitrust purposes. *See* Tr. Sept. 19 PM 60:4–67:17 (Lee (Pls. Expert)).

2. Google Has Monopoly Power in the Market for Publisher Ad Servers Capable of Transacting Open-Web Display Ads.

a) Direct Evidence of Google’s Market Power in the Publisher Ad Server Market.

394. As described above and in greater detail below, as a result of Google’s anticompetitive conduct, publishers cannot—and do not—switch to the few available publisher ad server alternatives within the publisher ad server market to any meaningful degree. *See* PFOF

Sec. IV.A.1 (discussing high switching costs); Des. Tr. 216:01–216:13 (Lipkovitz (Google)) (explaining how a publisher ad server is a “sticky” product from which it is difficult to switch, particularly for large publishers), 303:02–303:15 (unable to recall a publisher switching from DFP to another ad server and assuming that was “very rare”; inability to switch is part of what lead to header bidding), 305:14–305:20 (explaining that it is difficult to switch publisher ad servers because “it’s a lot of work” and “there aren’t many competitors.”). Google can therefore engage in conduct that harms publishers, e.g., reducing product quality, without facing a competitive response by publishers, e.g., switching, which would otherwise constrain Google’s conduct. *See* PFOF Sec. IV.B.5 (discussing Google’s implementation of UPR and lack of publisher switching post-UPR); IV.A.2 (discussing the double ties).

395. In practice, publishers using DFP do not switch to rival publisher ad servers for a variety of reasons. *See* PFOF Sec. IV.A.2. As a result, publishers must accept adverse changes to Google’s publisher ad server, like UPR, because they have no meaningful alternatives. Tr. Sept. 10 AM 109:23–110:4 (Layser (News Corp)) (“when product [changes] happen in DFP, [publishers] just take them. You have to take them.”); Tr. Sept. 9 AM 70:20–23 (Wolfe (Gannett)) (there are no realistic alternatives to DFP for Gannett for selling display ads on its websites). Publishers described this market reality in a meeting where Google announced how via UPR Google was removing an existing feature that allowed publishers to set different price floors for different sources of advertising demand: “there’s really no recourse for us” given that this was “a product that you’ve already built” therefore publishers had to continue to use it without any real way to “enforce [Google] to change.” PTX1854 at 25:1–11, 36:5–37:20, 44:1–14, 52:11–16; PTX1853 (recording of the meeting); *see also* Tr. Sept. 10 AM 50:21–23 (Layser (News Corp)) (“UPR “took [pricing] control out of our hands. . . So it made it so that we could no longer

choose how to best monetize our inventory.”). Although publishers complained, Google maintained the change, and publishers remained on Google’s publisher ad server. Tr. Sept. 10 AM 51:24–55:3 (Layser (News Corp)); PTX0882 at -717 (Google noted that, post-UPR, News Corp would not “move off of DFP”).

396. When Google estimated the impact of UPR, it did not account for whether a significant number of publishers would switch away from its publisher ad servers in response, largely because there were almost no publisher ad servers in the market left for publishers to switch to. PTX1035 at -360. Notably, publishers did not switch even though some of the few remaining ad servers allowed them to set different price floors for different sources of advertising demand. Tr. Sept. 10 AM 52:25–53:7 (Layser (News Corp)) (News Corp did not switch to Xandr after Google implemented UPR, even though Xandr let publishers set different price floors by exchange); Tr. Sept. 9 PM 135:19–136:2 (Avery (Kevel)).

397. Google itself was aware that it could impose a significant price increase on DFP publisher customers given its market position. PTX0712 at -648 (2018 Google strategy document noting that “the market will bear” a 10-20% price increase for DFP). It has been able to hold prices relatively steady (while degrading DFP’s quality) since 2014. *See* PTX1392 (graphing DFP fees while controlling for changes in publisher composition). In addition to Google’s power to raise DFP prices, Google also had and used its dominant position in publisher ad servers to direct more transactions through its other, relatively higher margin ad tech products, including the AdX ad exchange, while also collecting valuable transaction data at scale. PTX0528 at -448 (“AdX has an advantage where its closing price can depend on bid from another exchange,” which are only visible in DFP); PTX0238 at -611 (Google wanted to “make

sure we get ALL the queries passing through us at some point. . . *And what we get is ... well, the data.*”) (emphasis added).

398. Google’s conduct has reduced the quality of options that customers had to transact open-web display advertising and reduced the efficiency of transactions for that same type of advertising. Tr. Sept. 19 PM 142:2–23 (Lee (Pls. Expert)). Google has also, for example, failed to provide features, such as access to log-level data, that were very important to its publisher customers and that in a competitive market publisher ad servers would otherwise provide. Tr. Sept. 10 AM 22:22–24:24 (Layser (News Corp)).

399. Industry participants recognize DFP as the dominant product in the publisher ad server market. E.g., Tr. Sept. 9 PM 150:4–11 (Avery (Kevel)) (DFP is dominant in the publisher ad server market); Tr. Sept. 10 AM 21:9–23 (Layser (News Corp)) (DFP is the dominant publisher ad server); Tr. Sept 12 PM 49:5–24 (Dederick (The Trade Desk)); Tr. Sept. 12 PM 168:3–6 (Kershaw (Magnite)); Tr. Sept. 13 PM 103:4–17 (Boland (Meta)); Tr. Sept. 19 PM 39:18–20 (Shaughnessy (Kargo)); Des. Tr. 112:23–113:04 (O’Kelley (Xandr)) (describing DFP as the “majority ad server for most of the industry.”); Des. Tr. Lipkovitz (Google) 213:18–213:25, 214:07–214:09, 214:11–214:19, 214:21–215:04, 215:16–215:21 (estimating DFP market share for open-web display in the “three quarter range” and acknowledging he was not aware of DFP’s competitors in that market or any new entrants to that market); *see also*, e.g., PTX0758 at -946 (Kevel document explaining Google’s ad serving monopoly in 2019); PTX1709 at -934 [REDACTED]).

b) *Google's High Market Shares Provide Indirect Evidence of Google's Substantial and Sustained Market Power in the Publisher Ad Server Market.*

400. In 2022, Google had a 91% market share of the worldwide publisher ad server market for open-web display advertising and an 87% share of the United States market, as measured by the number of impressions served. PTX1278; PTX1236; PTX1277. The remaining 2022 worldwide shares (9%) and U.S. shares (13%) are split among five much smaller rivals. PTX1278.

401. Prof. Lee's share calculations are supported by Google's own documents. PTX0604 at -314 (90% market share in 2018); PTX0946 at -807 (estimating 85% market share in 2020); PTX0468 at -551 ("DFP has near 100% market penetration as an *ad server*") (emphasis in original); PTX0767 at -775 (84% market share in global web display in 2018); PTX0254 at -238 ("we are the defacto, preferred ad server of choice for 90% of publishers.").

402. Google's high market share of open-web display publisher ad serving has been durable. Since acquiring DoubleClick's publisher ad server, Google's share in the market has risen from approximately 60% to over 90% globally. PTX0015 at -6 (Google estimated that DoubleClick had "60% share" of publishers by 2008); PTX0051 at -726 (estimating 75% share in 2010). By 2014, [REDACTED] PTX0581 at -986. And by 2020, Google executives were musing that they might be "willing" to "give up" market share "in the short term," as it would "demonstrat[e] to regulators that ... we [Google] [a]re not a monopoly." PTX0949 at -481.

403. Google's durable monopoly power in publisher ad serving was also recognized by peer technology companies, such as Meta, whose Facebook Audience Network team observed in

2017 that “Google’s market share [for DFP] is expected to grow[.] Ad serving is not going away . . . Google has monopolistic power, and it uses its power to manipulate the market[.]” PTX1709 at -933.

c) There Are Substantial Barriers to Entry and Expansion in the Publisher Ad Server Market.

404. Google’s durable market share is protected by significant barriers to entry and expansion in this market. First, building and maintaining a new publisher ad server takes significant time and resources, which must be offset by a high volume of transactions at scale to cover those fixed costs. [REDACTED]

[REDACTED]

[REDACTED] PTX1572 at -699–700 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] PTX0581 at -977, -983 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]”); Tr. Sept. 19 PM 68:25–70:1 (Lee (Pls. Expert)); Tr. Sept. 20 PM 23:18–25:4 (Lee (Pls. Expert)).

405. Second, building a new ad server also requires substantial investments in developing and maintaining publisher relationships. PTX0581 at -983 (Meta observing, [REDACTED])

[REDACTED]

[REDACTED]; Tr. Sept. 19 PM 68:25–70:1 (Lee (Pls. Expert)).

406. Third, there are high switching costs for publishers looking to move from one publisher ad server to another. Most publishers use a single publisher ad server for web display advertising. Tr. Sept. 17 PM 133:2–10 (Helfand (Disney)) (explaining that Disney typically uses a single ad server for each web property); Tr. Sept. 18 AM 138:20–139:23 (Wheatland (Daily Mail)). To gain share, rival ad servers would have to convince publishers to switch or “migrate” ad servers.

407. Switching costs are high because of the ad server’s role as “the cornerstone technology for serving ads on pages.” Tr. Sept. 9 AM 66:1–8 (Wolfe (Gannett)); *see also* Tr. Sept. 20 PM 78:4–25 (Sheffer (Google)) (describing the publisher ad server as “a mission-critical enterprise software tool”). According to David Rosenblatt, the former CEO of DoubleClick and later a Google executive, “Nothing has such high switching costs [as publisher ad servers]. If there’s a better network or exchange, you can just switch to it. Switching platforms is a nightmare. Takes an act of God to do it.” PTX1814 at -745; *see also* Tr. Sept. 9 AM 70:24–71:25 (Wolfe (Gannett)) (describing switching publisher ad servers as “an incredibly laborious lift” requiring “approximately a year” and “akin to, you know, changing the tires on the race car mid race”); PTX0114 at -049 (“Ad Servers are sticky, and hard to replace.”); Des. Tr. 44:7–9 (Lipkovitz (Google)) (“Q. And would you agree that a publisher ad server is a sticky product? A. Yes.”); Tr. Sept. 10 AM 27:11–28:20, 108:2–20 (Layser (News Corp)); Tr. Sept. 13 AM 89:3–7 (LaSala (Google)); Tr. Sept. 16 AM 13:2–11 (Mohan (Google)) (discussing Google document:

“Due to its position as the operating system for ad sales, switching costs are very high.”); PTX1572 at -694 (getting publishers to switch away from DFP would be a challenge because

PTX0014 at -258 (explaining that “switching costs are very high” for publisher ad servers); DTX0404 at -134 (“The impact of switching from Google to AppNexus as our adserver would take well over a year across all [business units], and have an impact on their roadmaps (beyond ad serving.)”); Tr. Sept. 19 PM 68:25–70:1 (Lee (Pls. Expert)).

408. Publisher ad servers are integrated with other publisher systems, increasing the work related to switching. Tr. Sept. 9 AM 71:9–25 (Wolfe (Gannett)) (explaining that switching requires “making further adjustments in integration to upstream technologies, customer relationship management tools, order management tools, as well as downstream financial and reporting tools”); Tr. Sept. 10 AM 28:9–13 (Layser (News Corp)). In addition, it is hard to find personnel who are familiar with publisher ad servers other than Google’s DFP. Tr. Sept. 10 AM 27:11–28:3, 28:14–20, 108:2–8 (Layser (News Corp)) (“There are legions of people who have only ever used DFP in their life.”).

409. Migration can also be challenging due to Google’s conduct, as discussed above, wherein Google has made real-time Google Ads demand effectively accessible only to publishers that use Google’s ad exchange, AdX, and their publisher ad server, DFP. Because publishers can only access valuable Google advertiser demand on a real-time basis through DFP and AdX, if a publisher were to switch away from DFP they would lose access to AdX demand, thus likely leaving behind a significant amount of revenues. Tr. Sept. 10 AM 11:11–12:10, 20:20–21:1, 31:22–32:2 (Layser (News Corp)); Tr. Sept. 18 AM 127:10–20, 128:5–11, 132:7–13, 150:4–12 (Wheatland (Daily Mail)); Tr. Sept. 19 PM 41:21–42:1 (Shaughnessy (Kargo)); Tr. Sept. 27 AM

67:21–68:13, 69:20–23, 76:4–17 (Wheatland (Daily Mail)); Tr. Sept. 19 PM 68:25–70:1 (Lee (Pls. Expert)).

410. The publisher ad server market has seen no significant entry in recent years. Rather, rival publisher ad servers have remained on the fringes of the market or exited the market entirely. Kevel, one of the few publisher ad servers left in the market, has shifted focus to other types of advertising because it could not keep—let alone attract—many publisher customers without access to the demand in Google’s AdX. Tr. Sept. 10 PM 120:21–121:12, 123:5–127:2, 127:17–128:4 (Avery (Kevel)); PTX0758 at -945 (“People who are doing banner ads are so tied to GAM it’s not even funny. When OpenX and AdTech shutdown [their publisher ad servers] [Kevel] got some good customers, but they weren’t general display . . . If you want to play the header bidding, ad exchange game you pretty much need [Google’s publisher ad server]. We even tell customers that.”).

411. OpenX had operated a publisher ad server but exited the market because OpenX’s customers could not effectively access Google Ads demand. Tr. Sept. 17 PM 46:25–48:16 (Cadogan (OpenX)). Even technology giants like Meta have been unable to gain scale to compete with Google’s publisher ad server. Meta once had a limited publisher ad server offering, but ultimately determined it could not expand considering barriers to entry in the publisher ad server market. Tr. Sept. 13 PM 100:20–24, 128:21–129:21 (Boland (Meta)); PTX1709 at -934

[REDACTED]

[REDACTED]

[REDACTED] Instead, Meta opted to shut down its publisher ad server and exit the market. Tr. Sept. 13 PM 100:20–24 (Boland (Meta)).

B. Google Has Monopoly Power in the Market for Advertiser Ad Networks for Open-Web Display Advertising.

412. Advertiser ad networks that transact open-web display advertisements constitute a relevant product market, and Google has monopoly power within that market. *See* PCOL Sec. IV.

1. Advertiser Ad Networks for Open-web Display Advertising is a Relevant Market.

413. Advertiser ad networks are simple buying tools used by advertisers—especially but not exclusively smaller advertisers—to purchase open-web display advertising. PTX1235; Tr. Sept. 19 PM 99:10–12 (Lee (Pls. Expert)). For many advertisers, they are the only ad tech tool reasonably available to purchase open-web display ads. *See* PTX1231 (showing that over 4 million advertisers use *only* Google Ads to purchase open-web display advertising). For others, they represent a distinct ad buying tool (as compared to demand-side platforms) that sells advertisers ad *clicks* rather than simply ad *impressions*. Tr. Sept. 11 AM 24:14–24 (Bender (Google)); Tr. Sept. 19 PM 105:11–106:21 (Lee (Pls. Expert)); PTX1385. While advertisers may also use other ad buying tools to purchase different forms of advertising, those tools do not transact open-web display ads and are complements to the services offered by advertiser ad networks for open-web display ads. *Id.* 106:23–107:16.

414. *Other types of ad tech tools are not reasonable substitutes.* Advertiser ad networks are easy-to-use, “turnkey” buying tools that automate the ad purchasing process and require less engagement and expertise than other ad buying tools, such as demand-side platforms. PTX0579 at -509 (referring to GDN as the “[m]ost effective starting point for display and as a **turnkey media solution**” relative to DV360’s “Target Use Case” of “Marketers who need platform-driven features for **more customization across multiple inventory sources**”) (emphasis in original); DTX 1508 at -876 (describing Google Ads as “an advertising self-service

platform by Google for businesses wanting to have search, display & video campaigns on Google and its advertising network” and DV360 as “Google’s programmatic solution that offers consolidation, advanced controls and the ability to buy directly from publishers programmatically” and “Google’s customizable, enterprise-grade solution for advertisers.”); PTX0939 at -991 (describing Google Ads (“AdWords/GDN”) as “Easy to use” compared to “[h]ighly sophisticated” DV360 (“DBM”); Tr. Sept. 11 AM 24:10–13, 40:5–41:2 (Bender (Google)).

415. As a result, advertiser ad networks are particularly important for smaller, less sophisticated advertisers, who are not able to effectively utilize complex buying tools such as demand-side platforms and might have modest advertising budgets. PTX0579 at -509 (characterizing GDN’s customer base as “[t]ypically smaller and mid-sized marketers who are able to satisfy their display needs with a simple, low-touch solution with minimal customization”); Tr. Sept. 10 AM 141:20–24 (Friedman (Goodway Group)) (“Q. What types of advertisers in your experience might want to use an advertiser ad network instead of a DSP? A. The only – to put it bluntly, it’s usually those that can’t afford the minimums or their budgets are too small to get the benefit of the advanced and additional controls.”); Tr. Sept. 12 PM 76:2 – 77:16 (Goel (PubMatic)) (“Typically, larger advertisers will gravitate towards demand-side platforms. So advertisers that are spending significant amounts of money, tens to hundreds of millions of dollars a year; whereas smaller advertisers will typically use an ad network” “[b]ecause there are differences in the technology and the sophistication of users behind that technology.”).

416. An additional aspect of advertiser ad networks that is distinct from demand-side platforms and other ad tech tools is their pricing model. Advertiser ad networks typically charge

advertisers for the number of clicks by an internet user on the advertiser's ad (cost-per-click (CPC) pricing). PTX1096 at -610 ("When advertisers use Google Ads to buy display ads, Google Ads does not typically charge advertisers a per transaction fee, or a fixed revenue share. Instead, advertisers are typically charged when a user takes an action, such as clicking on an ad (referred to as a cost-per-click (CPC) basis)."); Tr. Sept. 11 AM 24:14–24 (Bender (Google)) ("the majority way [Google Ads] advertisers chose to bid was on a cost-per-click basis, and so then they would pay only if their advertisement received a click"). This differs from impression-based (e.g., CPM) pricing that assesses fees for each ad impression rendered on a publisher's website regardless of whether the internet user clicks on the ad. Tr. Sept. 19 PM 105:23–106:8 (Lee (Pls. Expert)) (explaining the difference between CPM and CPC pricing and why advertisers may prefer one pricing structure to the other); Tr. Sept. 9 AM 127:22–128:25 (Casale (Index Exchange)) ("[A]n advertiser might use an ad network to buy clicks because buying impressions is complicated. So if an advertiser just wants to drive clicks to their website, they might use an ad network to do that."). Publisher ad servers, ad exchanges, and demand-side platforms typically charge based on a CPM pricing model. PTX1385 (demonstrating that DSPs overwhelmingly charge on a CPM basis); Tr. Sept. 26 AM 149:17–22 (Israel (Def. Expert)) ("[A]ctual bids that go into AdX are on a CPM basis[.]"); Tr. Sept. 9 AM 72:9–72:19 (Wolfe (Gannett)) (noting publisher ad servers' fees are CPM-based).

417. Because advertisers are charged only for clicks rather than for each ad impression purchased, Google generally does not disclose to advertisers many details on how Google carried out their advertising campaigns. Google generally does not disclose the bids it submitted on advertisers' behalf (or how they were calculated) or the fees retained by Google for any particular ad or click. Tr. Sept. 10 PM 63:20–25 (Friedman (Goodway Group)) ("Ad networks

typically don't have disclosed . . . take rates"); Tr. Sept. 11 PM 102:24–103:13 (Dederick (The Trade Desk)) (explaining that “usually, if you're a buyer, you don't know how much is going to the publishers from an ad network and how much is going to whoever owns the ad network.”). In contrast, demand-side platforms provide this level of transparency so that advertisers can have greater control over their advertising spend. Tr. Sept. 10 AM 140:19 –143:2 (Friedman (Goodway Group)) (describing transparency and controls within a DSP, including the value of “frequency capping” offered by DSPs but not advertiser ad networks).

418. Ad exchanges also are not a substitute for modern advertiser ad networks,²⁴ which allow their advertiser customers to buy from a variety of sources of publisher ad inventory including ad exchanges. Advertisers cannot bid directly into an ad exchange but rather must use a buying tool like an advertiser ad network; therefore, an ad exchange is not a substitute for an advertiser ad network. Tr. Sept. 9 AM 109:22–111:12 (Casale (Index Exchange)) (distinguishing advertiser ad networks' and ad exchanges' business models); *id.* 129:7–17 ((Index does not compete against advertiser ad network Google Ads because ad exchanges like Index “do not service the buy-side directly,” “cannot take a dollar from a marketer or an advertiser,” and “for money to come into Index, it has to come through a platform whether that platform be an ad network or a DSP.”); Tr. Sept. 10 PM 31:2–6, 63:12–19 (Friedman (Goodway Group)) (concurring that advertiser ad networks “provide a means to aggregate inventory and audiences from multiple sources into a single buying opportunity for media buyers” and noting that the ad

²⁴ Although advertiser ad networks are still referred to in the industry by their legacy name (“networks”), advertiser ad networks generally do not operate as closed networks buying only from publishers within the same network, but rather bid for and purchase publisher ad inventory from a variety of sources both within and outside any associated publisher network. *See* Tr. Sept. 9 AM 109:22–110:25, 129:11–17 (Casale (Index Exchange)).

exchange PubMatic is distinct from an advertiser ad network); Tr. Sept. 11 PM 107:16–108:7 (Dederick (The Trade Desk)) (emphasizing that buy-side tools like DSPs serve buyers’ interests while ad exchanges represent publishers’ interests).

419. Because of these distinct features of advertiser ad networks, many small advertisers exclusively use advertiser ad networks to purchase open-web display ads. Using Google log level data, Prof. Lee found that Google Ads predominates as a buying tool as advertiser size diminishes, with the lowest ranked advertisers by spend using Google Ads almost exclusively. PTX1235; *see also* PTX1231 (showing that over 99% of advertisers (over 4 million in total) who used Google Ads to purchase indirect open-web display ad inventory did not also use DV360, Google’s demand-side platform).

420. Large advertisers also use advertiser ad networks, often as complements to demand-side platforms because of the different services advertiser ad networks provide. Tr. Sept. 19 PM 101:23–103:4 (Lee (Pls. Expert)) (explaining how Google data presented in PTX1232 indicates that DV360 and Google Ads cater to different customers and have different attributes); DTX1514 at 950–53 (Google sales training slides: “Google Ads and DV360: Better Together”). For example, advertiser ad networks typically provide advertisers with proprietary data to enable audience or contextual targeting, whereas generally demand-side platforms require the advertiser to use its own data or separately purchase third-party data for targeting. Tr. Sept. 26 PM 85:22–87:13 (Israel (Def. Expert)) (discussing reasons why a large advertiser would use Google Ads, including Google Ads’ click prediction capability); Tr. Sept. 13 AM 52:18–55:17 (LaSala (Google)) (acknowledging Google Ads’ use of its own unique and contextual data to enable a differentiated buying process relative to buying via DSP); Tr. Sept. 11 PM 105:21–106:15 (Dederick (The Trade Desk)) (explaining the differences in how DSPs and ad networks use data

to buy ads; “a demand-side platform is about leveraging buy-side interests and deploying buy-side data,” and the DSP is going to “put that data to work for them,” whereas “in an ad network, the data that is being applied is derived from the supply side. And it’s typically being used to create whatever targeting is available on that ad network[.]”); Tr. Sept. 20 AM 30:18–31:15 (Lee (Pls. Expert)); Tr. Sept. 20 PM 25:23–26:6 (Lee (Pls. Expert)).


421. *Industry recognition.* Industry participants recognize advertiser ad networks as a distinct product from other ad tech tools, including demand-side platforms. *E.g.*, Tr. Sept 19 PM 101:5–11 (Boland (Meta)) (advertiser ad networks are “a different beast than a standalone DSP”). For example, Jay Friedman of the Goodway Group testified that an advertiser ad network would not be an alternative to switch to in response to poor DSP performance, noting that “if we’re not able to extract performance using the most sophisticated tool, we . . . will not regress to a less sophisticated tool in order to – as the next option of trying to achieve a marketer’s goal.” Tr. Sept. 10 AM 145:9–19 (Friedman (Goodway Group)). *See also id.* 140:7–141:19 (distinguishing between advertiser ad networks and DSPs generally); Tr. Sept. 11 PM 104:1–107:2 (Dederick (The Trade Desk)) (advertiser ad networks and DSPs are “not at all” the same because, among other things, an ad network will not have the same setup or pricing model as a DSP or abide by RTB standards like a DSP). A well-known industry “LUMAscape” document depicting different ad tech players identifies “ad networks” as a distinct category of competition. DTX1514 at -903.

422. Notably, Google offers two different tools for advertisers to purchase open-web display advertising: an advertiser ad network, Google Ads, and a demand side platform, DV360. The tools are geared toward different customers. PTX0579 at -509 (excerpt below).

GDN/DBM: Customer Segmentation Summary

Messaging: Google offers two programmatic buying options for display: GDN and DBM. Each are built to deliver performance at scale in display. The choice between whether to use one platform or the other (or both) is dependent on a customer's objectives, core competencies/assets & organizational structure.

	<u>Differentiation</u>	<u>Target Use Case</u>	<u>Customer Segmentation</u>
GDN	Deeply integrated into AdWords with synergies for marketers and agencies using AdWords	Most effective starting point for display and as a turnkey media solution . <ul style="list-style-type: none"> - Broad reach - Sophisticated targeting - Automated bidding - Scaled creative 	Typically smaller and mid-sized marketers who are able to satisfy their display needs with a simple, low-touch solution with minimal customization.
DBM	An integral part of DDM to more effectively create and manage holistic campaigns across multiple channels/inventory sources.	Marketers who need platform-driven features for more customization across multiple inventory sources . <ul style="list-style-type: none"> - Broad access to all major exchanges - Integration/control of proprietary data - Demand aggregator features 	Large display buyers interested in consolidating their display buying across channels and deploying a strategy with a single view of a customer.




423. Google differentiates its advertiser ad network and demand side platform along several dimensions, including inventory, cross channel features, reservation capabilities, pricing, and access to advanced features. DTX1514 at -947 (excerpt below); *see also* PTX0579; Tr. Sept. 25 PM 82:16–83:25 (Stewart (Google)) (acknowledging differentiation between Google Ads and DV360). Google’s sales teams pitch DV360 to certain Google Ads customers as a complement, and vice versa. DTX1514 at -950–53 (Google sales training slides: “Google Ads and DV360:


Better Together”).

Proprietary - Confidential

Platform Differentiators



Google Ads



Display & Video 360

	“Automation” <small>Advertisers seeking automation and outcome based objectives</small>	“Customization” <small>Enterprises and agencies seeking hands-on, full media consolidation</small>
Margin	Cannot add margin as a % of media within platform	Can add margin (as a % of media or CPM markup) in platform
Fee	Pay per conversions, included in CPM/CPC; no ad tech fee	Transparent to contract owner; billed as % of media
Measurement	Path reporting, conversion lift, audience insights, store visits and offline conversions, etc.	More tracking: 3rd party ad serving, verification, viewability, etc.
Management	Managed by a variety of teams based on staffing, strategic complexity and account structure	Typically managed by trading desk, agency or in-house team
Who	Best for clients who are performance-focused, interested in early new features and exclusive O&O inventory	Manage YouTube alongside exchange inventory and control frequency across inventory sources
Other Benefits	Most YouTube alphas and betas come to Google Ads first	Consolidated campaign management, Auction & Reservations in a single platform

424. *Direct deals are not reasonable substitutes.* Advertisers utilizing advertiser ad networks could not turn to direct deals with publishers as an alternative to purchasing open-web display ads via an advertiser ad network. Advertisers lack the resources and ability to directly negotiate with each publisher from whom they might buy ad inventory via an advertiser ad network. Tr. Sept. 23 PM 104:11–23 (Oliphant (Census)) (replacing direct deals with programmatic display “doesn’t make sense”; Census does not “have that time or inclination to go website by website.”); Tr. Sept. 9 PM 63:16–64:5, 113:7–25 (Lowcock (IPG)) (“direct advertising involves a lot more labor, skills, and resources in negotiation and contracts and relationships” relative to programmatic buying); PTX0904 at -543 (“Direct sales: marketer (advertiser) reaching out to buy inventory directly. This is very time consuming. Ad Networks: remnant inventory sent to Ad Networks (allowed marketers to buy lots of different inventories in a single place algorithmically)”; PTX0978 at -625 (linking Google Ads (GDN) to “OA”

[open auction] and distinguishing from programmatic guaranteed deals, another form of direct deal).

425. *Advertiser ad networks that facilitate the purchase of other forms of advertising are not reasonable substitutes.* Advertiser ad networks for open-web display ads allow advertisers to purchase advertisements with a different format, reach, cost, and other attributes as compared to tools that allow advertisers to buy other types of advertisements.

426. In general, other forms of advertising—such as in-app, native, retail media, and instream/connected TV advertising—are complements rather than close substitutes to open-web display advertising, and so are the separate tools used by advertisers to purchase them. As a result, advertisers that want to purchase display ads on the open web to capture the unique audiences and ad formats available through this advertising channel must use buying tools (such as advertiser ad networks for open-web display advertising) to purchase those ads, potentially alongside other buying tools to purchase other types of advertisements.

427. Social media advertising—such as advertising on Instagram—reaches a defined population of consumers that is distinct from the open-web, uses some unique advertising formats, and is more appealing to particular types of advertisers, making it a complement of open-web display advertising. Tr. Sept. 11 PM 123:9–24 (Dederick (The Trade Desk)) (“Q. What are some of the distinguishing features between [social media ads and open web display ads]? A. Social media ads are different creative specifications. Again, the context of a social media ad is extremely different. They’re appearing in user-generated content. You need to anticipate the mindset of a consumer in social media. Open web display advertising is really not typically associated with that. So, you know, I think – I don’t know any advertisers that would think of those as interchangeable, I don’t think.”); Tr. Sept. 9 PM 66:9–68:11, 112:9–15 (Lowcock (IPG))

(detailing several ways in which social media advertising is not substitutable with open-web display advertising); Tr. Sept. 17 PM 146:8–147:10 (Schiekofer (GroupM)) (for advertisers who want broad reach, display and social are “complements” rather than “substitutes,” because buying both “extends the audience” by allowing advertisers to reach users who are “not on social” or by reaching users multiple times to “reinforce[] the message”); DTX1179 at -430 (Criteo commenting on Facebook advertising: “[d]epending on your target market, most of the large potential audience [on Facebook] can be irrelevant” and Facebook was “[m]ost suitable for those operating in B2C markets”); DTX1207 at -525 (Disney slide treating social partners as a distinct group from, e.g., Programmatic SSP partners (at -527) and detailing content considerations across social platforms); PTX1524 at 11 (Facebook slide distinguishing between Social and, inter alia, Programmatic). For these reasons, advertisers do not view open-web and social advertising as substitutes. Tr. Sept.17 PM 59:9–17 (Cadogan (OpenX)) (“[S]ocial media [is] like a different planet. Those companies -- those large platforms -- say Facebook is the biggest. It runs its own advertising system. It’s inaccessible to us. We had no viable way to access any of their inventory. Advertisers run in their own-and-operated system. They run through a separate set of agencies even. [REDACTED]

[REDACTED] Tr. Sept. 11 PM 132:2–6 (Avery (Kevel)) (“[C]ompanies like Facebook or Meta . . . aren’t participating in the programmatic ecosystem.”); Tr. Sept. 9 AM 112:1–22, 115:12–15 (Casale (Index Exchange)) (describing differences between social and “open web”); Des. Tr. 234:11–235:10 (John (Microsoft)) (Social and display are “not substitutes. . .there’s a separate group or team that. . .buy[s] social media advertising . . . one won’t be able to replace or substitute the other.”).

428. For example, Jay Friedman testified that advertiser Goodway Group does not use the same tools to buy media in “walled gardens” like Meta or Amazon that it does to buy display media on the open-web (i.e., DSPs DV360 and the Trade Desk), explaining that

one of the main differences and reasons for choosing [between advertising in walled garden environments vs. on the open internet] is access to data once the campaign is delivering. And through walled gardens, the data tends to be pretty restrictive in terms of what we as an agency can get, and therefore, mine for insights. Whereas when buying in other tools that are not walled gardens, there tends to be more data available to us, which we can then turn into better insights for our clients.

Tr. Sept. 10 AM 137:22–139:20 (Friedman (Goodway Group)).

429. Mobile app advertising also reaches a defined population of consumers that is distinct from the open web, uses some unique advertising formats, and is more appealing to particular types of advertisers, especially those seeking to advertise their own apps. Tr. Sept. 9 PM 71:9–74:2 (Lowcock (IPG)) (discussing the ways in which in-app advertising differs from open-web display advertising); Tr. Sept. 11 PM 123:25–124:21 (Dederick (The Trade Desk)) (similar); Tr. Sept. 12 PM 72:24–74:11 (Goel (PubMatic)) (identifying unique characteristics of in-app advertising); DTX0712 (Facebook presentation noting that “web has much larger Torso and Tail than App”); PTX0939 at -009 (Google training presentation on P&L statements differentiating between “Web” as an “Established, at scale business[]” and “Apps” as an “Emerging” business”); Tr. Sept. 19 PM 53:19–54:3 (Lee (Pls. Expert)). There are distinct ad software tools that specialize in the sale of mobile app ads, such as Google’s AdMob product. Tr. Sept. 20 PM 59:17–23 (Sheffer (Google)) (“[AdMob] provides advertisements for app inventory specifically.”); DTX0076 at -474 (“Of course, mobile is a huge opportunity, and to that end, we completed the AdMob acquisition...”).

430. Likewise, native advertising has distinct characteristics and uses and is sold via separate ad tech tools. Tr. Sept. 9 PM 68:20–70:21 (Lowcock (IPG)) (describing native ads and

why they differ from open-web display advertising); PTX0764 at -259 (Google document delineating “Native Web” as a category in which to track revenue among different types of digital advertising); Tr. Sept. 17 PM 61:6–18 (Cadogan (OpenX)) (noting that Taboola and Outbrain are not competitors to ad exchanges for open-web display advertising because exchanges like OpenX “were competing to maximize revenue in a different part of the page from Taboola and Outbrain were seeking to achieve”); Tr. Sept. 10 AM 29:8–30:10 (Layser (News Corp)) (“Taboola is a specific use case. It’s a specific use case for publishers that monetizes at the bottom of your page. It’s not a full-featured ad server where you would be able to manage all of your ad inventory.”).

431. Similarly, in-stream video and connected TV advertising have distinct features that make them complements of display advertising and are purchased through specialized buying tools. Tr. Sept. 9 AM 117:12–118:12 (Lowcock (IPG)) (distinguishing instream video ads and display ads); Tr. Sept. 17 PM 138:14–139:11 (Schiekofer (GroupM)) (distinguishing Connected TV and video ads from display ads); Tr. Sept. 9 PM 21:8–23 (Casale (Index Exchange)) (“[S]treaming television has represented new customers in a different category for Index for new growth opportunity[.]”). As with other forms of advertisements, in-stream video and connected TV advertisements are complements to open-web display advertising, and so are their associated ad buying tools. Tr. Sept. 10 AM 131:6–132:17 (Friedman (Goodway Group)) (discussing how Goodway recommends numerous channels, e.g., connected TV, streaming audio, social, search, native, mobile in-app, because of their unique purposes in ad campaigns); PTX1017 at -168 (“Different Ads products (Display, YT, Search) can be used for different parts of the marketing funnel[.]”). Google itself accounts for revenue from display, video, and search advertising separately and develops separate go-to-market approaches. PTX1017 at -164

(“Alphabet Financial Snapshot” breaking out “Search & other[:] Ads on Google Search, Gmail, Maps, Google Play,” “YouTube ads[:] Ads on YT properties,” and “Google Network Members’ properties[:] AdSense, Google AdManager”); *see* DTX0486 at -580 (Google presentation setting goal to “[u]nderstand Google’s baseline *display* position within market” and “align on challenges in current *display* go-to-market approach” (emphasis added)).

432. Advertisers do not typically substitute between buying tools (such as advertiser ad networks) used to purchase open-web display ads and social media ads, although advertisers may use both types of tools as part of their overall marketing plans. Tr. Sept. 10 AM 137:22–139:20 (Friedman (Goodway Group)); PFOF Sec. III.C.

433. Although advertisers may utilize multiple forms of advertising and occasionally shift spend between them as their ad campaigns change or evolve, trial testimony confirmed that advertisers do not view open-web display and other types of advertising formats as substitutes. For example, Luke Lambert of the Omnicom (OMD) advertising ad agency testified that it would be “very unlikely” for his ad agency to shift money from display into another channel that had been more responsible for achieving a campaign goal, noting “I’m not going to move those dollars out; I’m going to optimize within [specific channels] and make sure I’m talking to the right people at the right time with the right message in the right place.” Tr. Sept. 13 PM 41:8–42:10 (Lambert (OMD)); *see also id.* 36:19–37:6 (Lambert (OMD)) (analogizing digital advertising types to the players on a baseball team, where “one channel is my pitcher, another channel is my catcher, their jobs are different, but both of them as a team are going to deliver on my awareness goal. So if I find that my pitcher channel is not performing for my client, I’m probably going to go to them and say we may want to change the way we’re compensating our pitcher and maybe pay a little bit more money to the catcher or we take the pitcher out of the

game and we put a new one in.”), 37:7–22 (calling the extent to which advertising channels are interchangeable “limited” because, for example “if I have an audience that I’m only reaching in an awareness play through linear television but they’re not moving, my optimization is not to take the linear dollar and move it into another channel . . .”), 34:1–13 (shifting “happen[s] exclusively within the individual platforms through which we’re buying and activating”); Tr. Sept. 9 PM 112:21–114:1 (Lowcock (IPG)) (noting inhibitors to reallocating ad spend from open-web display to video, social, and direct deals); Tr. Sept. 20 PM 138:7–12 (John (Microsoft)) (“So you need to have the demand to fuel the ecosystem on the platform.”).

434. U.S. government agencies—and the ad agencies that advise them on advertising campaigns—act similarly. For example, the U.S. Army and its ad agency Omnicom (OMD) develop distinct, nuanced tactical plans for Social, Programmatic Video, and Programmatic Display. DTX1151 at 326–334. They also create and track distinct monthly planned spend amounts among these (and other) digital channels. *Id.* at 386–391. In its plans, the ad agency estimates these channels’ respective contributions to Key Performance Indicators. *Id.*

435. Additionally, witnesses from major ad agencies stressed the value of a “channel mix” given the unique roles of different types of advertising. Tr. Sept. 13 PM 27:14–18 (Lambert (OMD)) (“Every [digital advertising] channel has a role to play in delivering the final [campaign] outcome . . . We need more than one channel to deliver [outcomes] across the entire marketing funnel.”); Tr. Sept. 17 PM 147:1–10 (Schiekofer (GroupM) (social is a “complement” and not substitute for open-web display advertising); Tr. Sept. 19 PM 11:1–20 (Bradbury (GSD&M)) (GSD&M’s clients need access to multiple digital advertising channels because the “power of a combination, a mix if you will, where a presence of a message in multiple communications forms has greater likelihood of being -- creating an impact and being seen”);

PTX1017 at -168 (“Different Ads products (Display, YT, Search) can be used for different parts of the marketing funnel.”); Tr. Sept. 27 AM 34:25–35:8 (Bumper (Zulily)) (Q. “And does Zulily consider the different parts of the marketing funnel in choosing which advertising channel to use? ... A. Yes.”); *see also* Tr. Sept. 12 PM 75:7–14 (Goel (PubMatic)) (“ad engagement [for in-stream video] is typically quite different, and so the price point that is demanded for that type of ad or that advertisers are willing to pay is typically 2 to 4 x what they’re willing to pay for an open web display ad.”).

436. *Price Sensitivity.* A hypothetical monopolist of advertiser ad networks for open-web display ads could likely charge prices that significantly exceed competitive levels. In addition to the qualitative evidence described above, Google’s own quantitative analyses confirm a hypothetical monopolist would be able to profitably raise prices in excess of competitive levels. In 2014, Google experimented with increasing Google Ads’ fee from 14% to 15%—a 7% increase—and found that this would increase Google Ads’ profit by 5.3% and overall Google profit by 2.2%. PTX1808 at -186. Google then implemented this price increase. PTX0858 at -246 (reflecting Google Ads fee at 15%). In 2018, Google performed simulations in which it altered Google Ads’ fee and found that it could profitably raise Google Ads’ fee further from 15% up to 20%, which would have been a 33% increase (although Google ultimately opted not to implement this change). PTX0858 at -246–247. Google declined to impose the rate increase in 2018 due to “reputational and potentially legal concerns.” PTX0605 at -698.

437. There is additional direct evidence, in the form of the conduct discussed above, that indicates advertiser ad networks constitute a relevant product market. For example, even after the tie between Google Ads and AdX was partially relaxed via AWBid, Google was able to charge significantly higher fees for transactions that occurred on rival ad exchanges (32% to

50%), which amounts to a significant price increase borne by Google Ads' advertisers without a competitive response capable of disciplining Google. Tr. Sept. 19 AM 133:16–137:9 (Lee (Pls. Expert)) (discussing Demonstrative R).

2. Google Has Monopoly Power in the Advertiser Ad Network for Open-Web Display Advertising Market.

438. Google has long maintained monopoly power in the advertiser ad network market with no rival approaching even a fraction of its scale, both in terms of the number and diversity of advertiser customers and the number of advertising transactions cleared. Only niche competition remains, focusing on particular types of display advertising or particular types of advertisers. As with the publisher ad server market, even technology behemoths like Meta have failed to gain scale and ultimately exited the market, ceding it to Google. *See, e.g.*, Tr. Sept. 19 PM 118:12–119:2 (Lee Pls. Expert)) (discussing Facebook's exit of the advertiser ad network for open-web display); *see also* Tr. Sept 13 PM 99:17–100:1 (Boland (Meta)) (Google's ad network was "the dominant player" and "significantly larger" than Meta's advertiser ad network for open-web display); Des. Tr. Lipkovitz (Google)) 212:03–212:21 (describing Google Ads as the biggest player in the ad network market for display and unable to recall any new entrants to that market during his time in display).

439. Google's initial power in the advertiser ad network market derived primarily from its existing relationship with a large and unique set of advertisers that separately purchased search advertising on Google Search. Tr. Sept. 11 PM 153:9–19 (Dederick (The Trade Desk)) (referring to "Google search advertisers" as "the greatest source of demand in the history of advertising"); Tr. Sept. 19 PM 30:2–3 (Kim (Google)) (By 2017, Google Ads had an advertiser count "in the millions"); Tr. Sept. 19 PM 99:18–100:2 (Lee (Pls. Expert)) ("a key part of Google Ads' market power comes from the search advertisers us[ing] its product . . . It's a large number

of advertisers ranging from small to large businesses that [] are available to purchase display advertising through Google Ads.”). That provided Google an early significant advantage, one that persists today because Google products remain the only way to access other Google inventory such as YouTube. DTX 1514 at -44 (Google Ads “[i]ncludes ads on Google search results pages, our network of partner sites, YouTube, Gmail, Maps, Discovery Feed, and apps”); Tr. Sept. 10 AM 136:25–137:15 (Friedman (Goodway Group) (“if I wanted to buy YouTube, I can’t buy that anywhere but Google”). For millions of smaller advertisers and those with simple needs who will use a single buying tool for open-web display ads, Google Ads has been and remains the only way to access Google inventory. PTX1231 (showing over 4 million advertisers that use Google Ads do not also use Google’s demand-side platform DV360, which is used by less than 50,000 advertisers in total).

440. Today, the size and makeup of Google Ads’ advertiser pool “makes it a very unique demand source” because “an ad network that has many, many advertisers” is a “very *steady* demand source” despite the “very seasonal cyclical nature” of the advertising business “where there are high and low periods of [advertiser] demand.” Tr. Sept. 9 AM 129:22–130:13 (Casale (Index Exchange)) (emphasis added). Google shares this view internally – that Google Ads demand is unique. PTX0453 at -188 (Google employee J. Bellack describing Google Ads demand as “unique”); PTX0797 at -166 (Google viewed Google Ads’ “relatively unique” demand as a “[s]trength).

441. In addition, Google Ads benefits from its significant scale. For example, having the largest transaction volume of any competitor provides Google with scale and data advantages to develop better algorithms for its advertiser customers. PTX0551 at -048 (“The value of Google’s ad tech stack is less in each individual product, but in the **connections across all of them.**

Google-scale data is Google’s competitive advantage, and that’s where we should focus efforts to increase profitability via media transactions that originate via DFP.”) (emphasis in original); Tr. Sept. 20 PM 25:23–26:6 (Lee (Pls. Expert)) (“as ad tech tools see more transactions, they are able to use that data to better refine certain features of their products. For example, determining how much to bid on a given auction . . . and to optimize CPC to CPM bidding in the case of Google Ads.”); Tr. Sept. 16 PM 13:2–13, 16:17–14 (Weintraub (Pls. Expert)); Tr. Sept. 9 AM 146:4–147:3 (Casale (Index Exchange)) (discussing how amassing transactional data allows companies to more effectively compete).

a) Direct Evidence of Google’s Market Power in the Advertiser Ad Network Market.

442. Google can charge supracompetitive fees and vary those fees significantly across impressions to win auctions and increase profits. This is direct evidence of its monopoly power. *See* PCOL Sec. IV.

443. Google targets a 15% fee for its Google Ads products when Google Ads transacts on Google’s AdX ad exchange.²⁵ *See* PTX0858 at -246; PTX0832 at -424. Google has performed multiple analyses showing that Google can significantly increase margins on Google Ads while increasing Google’s profit and net revenue, which are indicators of Google Ads’ market power. PTX1808 at -186–87 (March 2014 gTrade document proposing “to increase the [Google Ads] buy-side margin to 15%,” from 14% “[f]or [Google Ads] on AdX” resulting in a change of Google Ads’ net revenues on AdX transactions of “+5.3%”); PTX0858 at -247 (Google experiment demonstrating substantial Google Ads margin increases would increase profits while

²⁵ The 15% Google Ads margin on auctions through AdX is in addition to the 20% AdX margin. PTX0832 at -424 (Total target margin for Google Ads is 32%, which results from first applying a 15% Google Ads fee and then a 20% AdX fee to advertiser spend).

losing revenues); PTX0423 at -043–44 (additional Google experiment showing reduction in Google Ads’ margin would decrease total advertiser spend and Google profits); *see also* Tr. Sept. 19 PM 108:24–109:25 (Lee (Pls. Expert)) (observing that the experiment is a “real-world HMT” because an increase from 14% to 15% constitutes a 7% price increase, which “one would expect . . . to lead to a greater reduction in impressions” than the 0.25% reduction calculated).

444. There is evidence that Google has not historically faced price pressure on either portion of the Google Ads fee. PTX0712 at -645 (“[Google Ads] and AdMob have not historically faced price pressure on their 32% revenue share”); PTX0639 at -965 (2018 Google chat, “we are NOT seeing pressure on the AdX 20%”).

445. The only ad network that charges higher prices than Google, that firm is “focusing on remarketing,” Tr. Sept. 20 AM 141:15–19 (Lee (Pls. Expert)) (discussing PTX1281), and is one-sixth the size of Google Ads. Tr. Sept. 20 PM 37:23–38:1 (Lee (Pls. Expert)); PTX1269. In any event, that firm “does not act as a competitive constraint on Google with respect to the exercise of substantial market power by Google Ads. Tr. Sept. 20 PM 38:2–8 (Lee (Pls. Expert)).

446. Google can afford to deviate from competitive behavior while maintaining its market share, without fear that advertisers will switch to alternative products. For example, Google has maintained a dominant market share while restricting Google Ads’ ability to bid into rival exchanges, benefiting AdX, without losing significant transaction volume despite the restriction being a disadvantage to Google Ads relative to other ad networks. Tr. Sept. 19 PM 111:22–112:23 (Lee (Pls. Expert)) (“opening up Google Ads to other exchanges . . . would increase advertiser ROI” so restricting Google Ads’ advertisers from accessing other exchanges amounts to a sustained reduction in quality); PTX0110 at -009 (“we have chosen to limit GDN to buying only on AdX, an exclusivity that makes AdX more attractive to [publishers] . . . why

would advertiser buy thru GDN when they can do the same retargeting on Criteo on the same inventory *plus more inventory.*"); PTX0264 at -872 (“GDN is in an inferior place vis a vis the competition on impression[s] that go to other exchanges . . .”).

447. Google’s ability to effect publisher payout directly and meaningfully is further direct evidence of Google’s market power. Multiple analyses show that Google Ads can meaningfully affect publisher payouts—via auction clearing prices—through Google Ads’ participation in ad exchange auctions. Prof. Lee performed a simulation exercise removing all Google Ads’ bids from a sample of AdX auctions run in June 2023, showing a significant negative effect on publisher revenue. PTX1444 (14.1% drop in publisher payout from removing Google Ads (worldwide)). These results are comparable to those obtained by Google when it ran a similar simulation. PTX0324 at -608–09 (Google simulation summary on the “Impact of GDN not participating in AdX Auctions”). This simulation conducted by Google engineer Nirmal Jayaram showed that Google Ads alone accounted for a significant portion of publisher payouts on AdX (removing Google Ads dropped payouts from \$3.9 million in the experiment to \$1.3 million) and that the impact of Google Ads “not participating in AdX auctions” would be “a 65 percent reduction in publisher payout.” PTX0324 at -608; Tr. Sept. 17 AM 23:6–25:14 (Jayaram (Google)).

b) Google Has a High, Sustained Share of the Advertiser Ad Network Market.

448. From 2018–2022, Google’s worldwide market share was consistently above 85% as measured by impressions among advertiser ad networks. Tr. Sept. 19 PM 119:15–120:18 (Lee Pls. Expert)) (By 2022, “Google Ads had an 87 percent share of this market [on a worldwide basis], six times larger than the next closest rival.”) (discussing PTX1243). Google’s market share in the United States is similarly high at approximately 90% throughout the same period.

PTX1269. Google’s share in both the worldwide and U.S. markets has remained above 80% since at least 2015. PTX1243; PTX1269; Tr. Sept. 19 PM 119:15–120:18 (Lee (Pls. Expert)); *cf.* Tr. Sept. 19 PM 91:9–19 (Lee (Pls. Expert) (explaining that impression share “speaks to scale effects generated by data” and “scale advantages in data”).

c) *There Are Substantial Barriers to Entry and Expansion in the Ad Network Market for Open-web Display.*

449. Google’s market share is durable and protected by significant barriers to entry and expansion in this market.

450. To be successful, an advertiser ad network must attract advertisers. That requires offering advertisers compelling inventory, i.e., impressions to buy, necessary targeting data, and a quality product. *See* Tr. Sept. 19 PM 118:12–21 (Lee Pls. Expert) (discussing barriers to entry in the advertiser ad network market).

451. Google’s advertiser ad network, Google Ads, attracts advertisers not only by offering access to open-web display advertising but also other forms of advertising using different components of Google Ads: search ads (via Google Search) and video ads (via YouTube). DTX1514 at 44; PTX0904 at -549 (discussing Search and “AdSense for Search”). Other ad networks do not have the same access to this Google inventory or comparable inventory and therefore find it more challenging to attract a diverse and numerous set of advertisers (especially small advertisers that likely use a single buying tool). Tr. Sept. 19 PM 99:18–100:2 (Lee (Pls. Expert)); PTX1235; Tr. Sept. 19 PM 103:9–104:16 (Lee (Pls. Expert)) (discussing analysis that “advertisers outside the top hundred thousand” are “pretty much essentially all [] only using Google Ads”); *e.g.*, Tr. Sept. 17 PM 64:15–19 (Cadogan (OpenX)) (“We got some access [to Google Ads] starting in around 2013 to a small subset of demand, which we believe

was mainly focused on what is called a remarketing demand. So we only got a sliver of the demand[.]”).

452. Google’s witnesses went to great lengths to characterize Facebook, now Meta, as a fierce competitor, a strong player in the digital advertising industry, and one of the leading players today. *E.g.*, Tr. Sept. 16 AM 87:7–14 (Mohan (Google)); Tr. Sept. 17 PM 4:22–5:8 (Jayaram (Google)); Tr. Sept. 26 AM 59:20–60:10 (Israel (Def. Expert)); *but see* Des. Tr. 40:24–40:25, 41:02–42:21 (Rowley (Google)) (characterizing Facebook and Amazon as bringing “demand to the digital ecosystem” but conceding that they are not “direct” competitors to Google’s AdX or DFP).

453. And it is true that Facebook is a large technology company with substantial resources. *See* Tr. Sept. 19 PM 69:5–8 (Lee (Pls. Expert)) (noting that Facebook “has relatively deep pockets”); Tr. Sept. 20 PM 25:5–18 (Lee (Pls. Expert)) (“Facebook is a large firm, a very large firm, much larger than average” with “some advantage over firms who may not be in the business of selling advertising at all”). But given Google’s conduct, even Facebook could not compete effectively to offer ad tech tools, in particular an ad server, ad exchange, and advertiser ad network for open-web display ads. Because it had considerable difficulty accessing open-web publisher inventory, it abandoned its plans to build its own open-web display full ad tech stack. Tr. Sept. 13 PM 99:17–100:13, 102:20–103:17 (Boland (Meta)); DTX0758 at -953, -969 (documenting Facebook’s shuttering of its DSP, ad exchange, SSP, and publisher ad server).

454. And with respect to its advertiser ad network specifically, Facebook exited the advertiser ad network market for open-web display advertising in 2019, while continuing to operate as an advertiser ad network that transacted in-app advertising. Facebook was unable to compete sufficiently to even remain in the advertiser ad network market despite the popularity of

its own social media platform, prior purchase of an ad server competitor, the Atlas ad server, and other efforts. Tr. Sept. 13 PM 128:9–130:4 (Boland (Facebook)); PTX1572 at -689. Indeed, facing what it recognized as Google’s monopoly power, Facebook was unable to successfully enter (or expand in) the advertiser ad network market despite, as of 2017, having a network of advertisers for which Facebook’s Audience Network product served “ads to 1 billion people each month” in the app advertising space. Tr. Sept. 13 PM 145:12–17, 148:5–11 (Boland (Facebook)).

455. Despite Google’s characterizations of Facebook as one of the leading players today and a strong competitor, even Facebook could not successfully compete against Google in the advertiser ad network market. From the beginning, Facebook’s employees knew that any foray into the advertiser ad network market for open-web display advertising ran headlong into Google as “the dominant player. . .at the time.” *Id.* 99:17–100:1. Indeed, a mid-2017 document confirms that Facebook’s employees viewed Google as operating “the dominant” layer that was “in between” Facebook “and the supply, the inventory, that [Facebook] wanted to get to” for ad impressions on open-web websites. *Id.* 108:24–109:16 (discussing PTX1709 at -933); *see also* PTX1577 at -540 (Facebook document expressing concern that FAN’s participation in Open Bidding would [REDACTED]). Shortly before entering the advertiser ad network market for open-web display advertising in 2019, it was “a widely held view” at Facebook that “Google has monopolistic power” and that “[i]t uses its power to manipulate the market [to] its favor and disadvantage competition.” Tr. Sept. 13 PM 100:2–19, 109:17–25 (Boland (Meta)). This left only two firms to compete in the advertiser ad network market, Google and a competitor that was six times smaller than Google. Tr. Sept. 19 PM 120:12–22 (Lee (Pls. Expert)); PTX1269; PTX1243.

456. Ultimately, that Facebook could not successfully compete—or even sustain an advertiser ad network product for the purchase of open-web display advertising—with Google came as no surprise to its own employees. Facebook’s documents describe Google’s First Look advantage as “bias [in] their system against us.” PTX1536 at -405; Tr. Sept. 13 PM 103:25–104:12 (Boland (Meta)). In 2016, Facebook recognized internally that “last look” allowed Google to “have a second bite at the apple,” as part of its ability to “cherry-pick the best supply.” Id. 103:25–104:12, 124:9–16, 117:7–21; PTX1710. Leading up to Facebook’s entry into the advertiser ad network market, its employees analyzed the market and concluded that Google held “[m]onopoly power in four key forms,” including two barriers to entry—the “capital requirement to build a competing product” and “technological superiority”—and two other sources of monopoly power, the reality that “[s]ubstitute goods are scarce” and the presence of “[n]etwork externality” as part of a “reinforcing cycle.” Tr. Sept. 13 PM 113:1–114:21 (Boland (Meta)) (explaining PTX1079 at -934); *see also* Tr. Sept. 19 PM 118:12–119:2 (Lee (Pls. Expert)) (explaining that scale and network effects and the costs of overcoming Google’s conduct acted as “barriers to entry” and “contributed to or were a factor in Facebook’s exit of the advertiser ad network for open-web display”). Facebook’s analysis concluded that Google’s monopoly power meant that the “economic viability” for “competing players” was “diminished.” Tr. Sept. 13 PM 114:22–115:3 (Boland (Meta)); PTX1079 at -934.

457. Building a quality advertiser ad network also depends on scale. If an advertiser ad network cannot attract a sufficient quantity of advertisers, the advertiser ad network will lack critical data for developing targeting algorithms, predicting CPC-to-CPM conversions, predicting the probability of an advertiser clicking on an ad, and running experiments to evaluate new features and products. Tr. Sept. 19 PM 118:12–119:2 (Lee (Pls. Expert)). Access to sufficient

quality publisher supply may also be necessary for advertiser ad networks to succeed in open-web display. For example, while Meta's advertiser ad network could not access quality *open-web* inventory (a market it later exited), it did succeed in attracting mobile app publishers and selling those in-app impressions to FAN advertisers. Tr. Sept. 13 PM 144:4–18 (Boland (Meta)); *see also* PTX1536 (Meta email discussing how Google (DFP) had preferred access to the best open-web publisher supply and expressing concern that Google will do the same thing in the future with mobile app publisher supply).

C. Google Has Monopoly Power in the Market for Ad Exchanges for Open-Web Display Advertising.

458. Ad exchanges that transact open-web display advertising constitute a relevant product market, and Google has monopoly power or a dangerous probability of obtaining monopoly power in that market. Tr. Sept. 19 PM 76:9–81:19 (Lee (Pls. Expert)).

1. Ad Exchanges For Open-web Display Advertising Is a Relevant Market.

459. Ad exchanges that transact open-web display ads²⁶ are software products that connect publishers using publisher ad servers with advertisers using advertiser buying tools, such as advertiser ad networks, and conduct real-time auctions for advertising inventory. PTX1031 at -480–81. There are no other types of ad tech tools that allow publishers to offer their ad inventory for sale to a large number of potential advertisers in a comparable way. While many publishers also sell a portion of their ad inventory directly, it is not realistic for publishers to sell all of their ad inventory in that way.

²⁶ Once a publisher has decided to sell an open-web display ad via its publisher ad server and an advertiser has decided to bid for open-web display ads utilizing a buying tool, the only type of exchange that connects the two would be an ad exchange that transacts open-web display ads.

460. *Industry recognition.* Internal Google documents and depictions of the ad tech stack identify ad exchanges as a distinct product from other ad tech tools like publisher ad servers and advertiser ad networks with unique competitors. PTX0847 at -261 (internal depiction of the ad tech stack where AdX is separate from publisher ad servers (DFP), ad networks, and DSPs); PTX1646 at -469 (depiction of the ad tech stack with ad exchange separate). Publishers, advertisers, and other providers of ad tech likewise view ad exchanges as distinct products within the broader ad tech stack. Tr. Sept. 19 PM 81:11–19 (Lee (Pls. Expert)) (observing that industry participants and Google regard “ad exchanges as a separate set of products”); Tr. Sept. 18 AM 127:23–128:1, 133:15–19 (Wheatland (Daily Mail)) (ad exchanges include AdX, Pubmatic, Index Exchange, and Magnite, but not DFP (Google’s publisher ad server) or Smart Ad Server (a third-party publisher ad server)); Tr. Sept. 9 AM 122:23–123:6 (Casale (Index Exchange)) (regards Index Exchange’s ad exchange as competing with AdX, not DFP).

461. *Other types of ad tech tools are not reasonable substitutes.* Although direct connections between advertiser buying tools and publisher ad servers—often referred to as “supply path optimization” (“SPO”) tools—exist, they are limited in nature and do not reflect a reasonable alternative to publishers or advertisers looking to transact open-web display ads. Tr. Sept. 19 PM 78:22–79:19 (Lee (Pls. Expert)) (“supply path optimization” tools are not focused on open-web display and serve a limited number of customers; they do not impose a competitive constraint on ad exchanges); Tr. Sept. 11 PM 117:6–23 (Dederick (The Trade Desk)) (The Trade Desk’s SPO tool “it’s not a service offered to publishers to help serve their interests” nor does it conduct auctions of publisher ad inventory). Although certain demand-side platforms, such as The Trade Desk, have recently launched some programs that allow advertisers to bid directly into a publisher ad server—without going through an ad exchange—such programs are limited. As a

result, they do not represent a reasonable alternative for publishers seeking to auction off inventory to a large number of buyers or advertisers looking to bid widely on publisher inventory. At trial, John Dederick of The Trade Desk testified that advertisers do not consider Open Path—one such program—to be a viable alternative to bidding through ad exchanges, because “[i]t’s too small.” *Id.* 118:5–14; Tr. Sept. 19 PM 79:7–19 (Lee (Pls. Expert)) (only twenty publishers work with The Trade Desk’s Open Path product). In any event, SPO products are not viable alternatives to exchanges for open-web display advertising purchasing. Tr. Sept. 11 PM 118:5–14 (Dederick (The Trade Desk)) (explaining that none of The Trade Desk’s advertiser customers exclusively buy their open-web advertising impressions through Open Path and that in his experience advertisers “absolutely” do not consider Open Path a viable alternative to bidding through ad exchanges for open-web display ads); Tr. Sept. 19 PM 79:7–19 (Lee (Pls. Expert)) (The Trade Desk’s Open Path product “wasn’t meant to be a competitor for exchanges.”). There is no evidence that it has or will grow significantly over time. The same is true for PubMatic’s supply path optimization product, which is limited to direct-sold inventory for connected television (“CTV”) and online video, not for programmatic open-web display advertising. Tr. Sept. 12 PM 154:12–24 (Goel (PubMatic)).

462. *Direct transactions are not a reasonable substitute.* Industry participants and observers recognize ad exchanges as a distinct product from other means of buying and selling display advertising, such as traditional direct one-on-one transactions between publishers and advertisers. Meaningful substitution from open auction transactions on ad exchanges to direct transactions is something that publishers and advertisers simply cannot do. Tr. Sept. 19 PM 77:12–25 (Lee (Pls. Expert)) (publishers and advertisers cannot reasonably substitute away from ad exchanges by increasing their reliance on direct deals); Tr. Sept. 9 PM 63:16–64:5, 113:7–25

(Lowcock (IPG)) (stating that direct advertising is not a reasonable substitute for indirect transactions); Tr. Sept. 18 AM 135:15–136:3 (Wheatland (Daily Mail)) (stating the same); Des. Tr. 133:24–135:3 (Blom (Buzzfeed)) (agreeing “it would not be easy to switch a large amount of advertising from open auction to direct display” because “open auction is different demand than what a direct sold sales team is going to go out there and get.”). For publishers, only ad exchanges can reasonably facilitate the programmatic sales that maximize publishers’ monetization of ad inventory. Tr. Sept. 19 PM 77:12–25 (Lee (Pls. Expert)) (ad exchanges facilitate the programmatic sale of remnant (unsold) ad inventory via auctions).

463. Dr. Israel asserts that “what is sold by a direct deal depends on how hard you work – how hard your salespeople work to go make another direct deal.” Tr. Sept. 26 AM 87:20–23 (Israel (Def. Expert)). *Cf.* Tr. Sept. 9 AM 63:10–64:6 (Wolfe (Gannett)) (“even as large as Gannett is, we don’t necessarily have enough salespeople and feet on the street to actually get in front of the maybe tens of thousands of potential advertisers who are out there.”). But multiple industry participants testify that direct deals between publishers and advertisers require significant resources to negotiate and require publishers and advertisers to enter into one-to-one agreements in advance of an internet user visiting a website. Accordingly, direct deals are used for a limited quantity of higher-value transactions. Tr. Sept. 11 PM 104:25–105:20 (Dederick (The Trade Desk)) (“A demand-side platform is about an advertiser coming in with certain knowledge of their business and applying that to what ads they choose to buy. That usually requires a robust marketing department. Often it requires agency relationships[.]”); Tr. Sept. 9 PM 63:16–64:5, 113:7–25 (Lowcock (IPG)) (stating that direct advertising is not a reasonable substitute for indirect transactions because “direct advertising involves a lot more labor, skills, and resources in negotiation and contracts and relationships versus the skills on programmatic

advertising are much more technical skills. I have separate teams that look after each differently, and those people are not interchangeable.”); *see also* Tr. Sept. 11 PM 116:11–118:14 (Dederick (The Trade Desk)); DTX0007 at -548 (direct deals through an SPO tool are not viable alternatives to programmatic ad buying through ad exchanges); DTX0007 at -548 (Google presentation noting key efficiency differences between direct and indirect transactions); DTX1499 at -410 (GroupM presentation noting the same). This also means there is overall less advertiser demand for direct transactions as compared to open auction transactions that occur via ad exchanges. Des. Tr. 58:11–19 (Blom (Buzzfeed)) (“Far less demand for direct display than open auction.”).

464. Given the volume of ad inventory for sale, the number of potential advertisers interested in purchasing that ad inventory, and the unique characteristics of each impression available for sale, it is not practical for most significant website publishers to sell any more of their ad inventory via direct deals than they already do. Des. Tr. 134:11–23 (Blom (Buzzfeed)) (“If you think about open auction, it’s hundreds of advertisers spending anywhere from \$5 to \$100,000, right, in a given month or week, if you will. So we would have to have a much bigger footprint in order to find all those clients . . . and it would be a needle in the haystack to sort of kind of manage that process. It would take more time, more people, and more effort.”). As publisher witnesses explained, “we’re doing [direct deals] as much as we can,” Tr. Sept. 10 AM 36:39 (Layser (News Corp)), and, that they are already selling as many direct ads as they can, given that they can charge higher prices, but selling direct ads is “typically a fairly long process,” Tr. Sept. 18 AM 134:20–135:9 (Wheatland (Daily Mail)); *see also* Tr. Sept. 9 PM 130:4–15 (Avery (Kevel)) (“You can find pretty large publishers that just have a couple of people running programmatic demand and don’t have any direct sales team.”), 131:7–13 (“for the last ten years

it's kind of been a one-way direction of mostly towards programmatic when we're talking about traditional publishers, like they're selling more and more programmatically and less direct pretty much every year[.]”).

465. The distinction between exchange-mediated indirect transactions and direct transactions is reflected in the markedly different prices for each. Prof. Lee analyzed Google data and found that direct deals sold on average for \$7 per thousand impressions, while indirect deals sold on average for \$1 per thousand impressions. Tr. Sept. 19 PM 78:1–21 (Lee (Pls. Expert)); *see also* Tr. Sept. 18 AM 135:15–136:3 (Wheatland (Daily Mail)) (Daily Mail can charge higher prices for direct deals than programmatic display ads).

466. Google’s own documents acknowledge that shifts between direct deals and indirect channels of advertising demand, such as ad exchanges, would be “highly unlikely” in part because of “[e]fforts required to make and maintain direct connections” and “supply and demand dynamics.” PTX0978 at -625.

467. In addition to selling impressions via an open auction, some publishers sell a portion of their advertising inventory using programmatic ad tech tools but based on pre-agreed terms individually negotiated with advertisers; the foundation for these sales are traditional directly negotiated deals between publishers and advertisers and therefore the volume and nature of these transactions are limited for many of the same reasons. These transactions, referred to as programmatic guaranteed (“PG”) or preferred deals (“PD”) often provide an advertiser with the right to buy certain advertising inventory in a pre-negotiated way that may be specific to an advertiser’s ad campaign. Tr. Sept. 10 AM 37:15–38:10 (Layser (News Corp)) (explaining that the differences between programmatic guaranteed and open auctions are “[t]he same differences that exist between direct and Open Auction” inventory and that “[i]t would be difficult” to shift

impressions from open auction to programmatic guaranteed inventory); Tr. Sept. 10 AM 146:13–147:20 (Friedman (Goodway Group)) (explaining that direct deals and programmatic guaranteed are not substitutes for buying programmatically via open auctions on exchanges, and that “for a direct deal, we have to contact the publisher, we have to negotiate a rate” which “is simply impossible” to do for all publishers with potentially valuable ad inventory because of “the cost of labor and human energy that has to be expended if we had to call 1,000 websites or email, et cetera”); DTX0940 at -724–27 (comparing direct, programmatic guaranteed, private marketplace and open exchange); Joint Glossary at 7, ECF. No. 1309 (defining “Preferred deal (PD),” “Programmatic guaranteed (PG)”). Because these transactions resemble traditional non-programmatic direct deals, they require the publisher to utilize an advertising sales force and involve significant time and resources, but often allow the publisher to charge meaningfully higher prices. *See* PFOF Sec. V.A, above. Google also charges publishers significantly different take rates for PD/PG (5 percent) versus Open Auction (20 percent), differential pricing which confirms the complementary nature of those transaction types. PTX0712 at -651 (Google document reflecting 20 percent take rate for Open Auction and 5-10 percent take rate for PD/PG). Because of these differences between PG/PD and open auction transactions, Google and publishers view them as complements of each other, with neither likely to fully cannibalize the other. Tr. Sept. 10 AM 38:15–17 (Layser (News Corp)) (“Q. Do you view programmatic guaranteed as a substitute to Open Auction or a complement? A. Complement.”); PTX0978 at -625 (Google analysis concluding that “Cannibalization” and “Any [advertising] budgets moving from O[pen] A[uction] to PG would be highly unlikely[.]”). *See also* DTX0384 at -423–4 (OpenX presentation discussing “addressable . . . markets” for Open Auction versus Programmatic Direct deals).

468. *Price Sensitivity.* A hypothetical monopolist of ad exchanges for open-web display ads could likely charge prices that significantly exceed competitive levels. *See* Tr. Sept. 19 PM 73:14–75:2, 76:9–77:11 (Lee (Pls. Expert)) (other digital advertising formats would not constrain a hypothetical monopolist of various tools for open-web ads, including ad exchange tools). In addition to qualitative evidence discussed above, Google’s own quantitative analyses indicate that Google already prices AdX significantly above competitive levels, reflecting the lack of reasonable substitutes to ad exchanges. PTX0499 at 15 (2016 Google experiment showing limited effect of AdX price reduction on transaction volume); PTX0423 at -043 (Google experiment showing lowering margins would not win more impressions); Tr. Sept. 19 PM 62:20–64:10 (Lee (Pls. Expert)) (explaining PTX0423).

469. Because there is evidence that prevailing rates in the ad exchange market are not competitive but are instead inflated due to Google’s anticompetitive conduct and exercise of market power, as described below, any analysis of a hypothetical monopolist’s ability to raise exchange prices at prevailing prices would understate that monopolist’s ability to raise prices. *See* PCOL ¶ 39, *infra*; Tr. Sept. 19 PM 58:24–60:3 (Lee (Pls. Expert)) (explaining the “cellophane fallacy,” where “a firm is already exercising significant market power” via monopoly pricing such that the degree “at which there is going to be significant substitution to alternatives” by the monopolist’s customers has already been realized).

470. Google’s own estimation of publishers’ likely responsiveness to price increases (something known to economists as elasticity of demand) on its AdX platform confirms its substantial market power. As Professor Lee explained, “elasticity is an economic concept, one that I teach my students” and “it represents the percent change in quantity for a percent change in price.” Tr. Sept. 19 PM 83:23–84:1 (Lee (Pls. Expert)). “So an elasticity of, let’s say, 2 says for a

1 percent change in price, quantity would change by 2 percent. Now, an elasticity of one or less than one is known as inelastic demand, and that's a strong indicator of possessing significant market power." Tr. Sept. 19 PM 84:1–5 (Lee Pls. Expert)). In sum, "when a firm faces inelastic demand, it can raise prices, increase revenue, and generate profit" because customers will not switch away, even in the face of price increases. Tr. Sept. 19 PM 84:5–7 (Lee Pls. Expert)).

471. As Professor Lee explained, Google employees performed just such an elasticity analysis in the ad exchange market. The analysis indicated, consistent with Google's possession of substantial monopoly power in the ad exchange market, that publishers would not substitute away from AdX in response to a price increase. Analyses performed by Google in 2014 showed that reducing AdX's fee from 20 percent to 15 percent—a 25 percent decrease in the price or fee AdX was charging—would have a limited impact on transaction volume or market share, indicating inelastic demand. Google's employees concluded that "[r]educing AdX rev share was likely value destroying" for most AdX publishers, meaning that publishers and advertisers are not sensitive enough to changes in price to prevent a hypothetical monopolist from charging prices significantly above competitive levels. PTX0188 at -012–17. Professor Lee explained this exhibit in detail at trial. Tr. Sept. 19 PM 82:22–85:15 (Lee (Pls. Expert)). "[F]or . . . publishers representing over 70 percent of AdX's gross revenue" Google calculated that "their elasticity is one or less," meaning those publishers would be unlikely to significantly switch away from AdX in the event of a price increase. *Id.* at 84:8–11 (discussing PTX0188 at -979). "And for the smallest [AdX] publishers, the OPG ones," Google found that their "elasticity [is] approximately zero; that is, these publishers aren't price responsive. They wouldn't substitute away [in the event of] an increase in price." *Id.* at 84:11–15. In evaluating the total blended number at the bottom of the 2014 document's expected elasticity column (" <1 ") Professor Lee explained that "[i]t shows

that across all of these publishers weighted – demand is inelastic or elasticity is less than one.” *Id.* at 84:17–21 (discussing PTX0188 at -014). Ultimately, consistent with Google’s own analyses, Professor Lee concluded that “this slide indicates that AdX possesses significant market power over its consumers” and that it “possesses substantial market power.” *Id.* at 84:15–16, 84:24–25.

472. In addition to Google’s contemporaneous analysis of its ability to raise and lower fees on the AdX ad exchange, Prof. Simcoe concluded that Google has been able to profitably charge supracompetitive fees for AdX without a meaningful competitive response in the form of publishers or advertisers switching to other ad tech products to constrain AdX’s prices. Tr. Sept. 18 PM 7:13–8:3 (Simcoe (Pls. Expert)).

473. Importantly, it is not dispositive under the hypothetical monopolist test whether one side of a two-sided market, like the ad exchange market, has reasonably close substitutes. Rather, even if only one side of the market lacks reasonably close substitutes, a hypothetical monopolist could profitably raise prices above competitive levels. Tr. Sept. 19 PM 73:14–23 (Lee (Pls. Expert)) (“As long as one side of the market lacks close substitutes and would be willing to bear above-competitive prices to keep using those products, then the hypothetical monopolist test would pass. And this would still form a relevant product market.”). Here, website publishers are relatively inelastic compared to advertisers because a website publisher seeking to sell display ads on its website cannot transform those ads into other forms of advertisements to be sold on different types of ad exchanges (e.g., ad exchanges that transact video advertisements). *Id.* at 77:8–10 (Lee (Pls. Expert)) (open-web publishers “have web display inventory that’s not monetizable through these other formats[.]”); 83:2–84:25 (analyzing

PTX0188, a 2014 Google analysis showing marked price inelasticity for publishers, “They wouldn’t substitute away for an increase in price.”).

474. The way AdX’s fees are paid illustrates this economic principle in practice. The revenue share fee Google charges for its ad exchange is negotiated between the website publisher and ad exchange and is formally “paid” by the publisher when the ad exchange deducts for itself a portion of the winning advertiser bid before passing the remaining funds to the publisher. Tr. Sept. 9 PM 140:18–141:17 (Casale (Index Exchange)) (ad exchange fees are akin to fees charged by credit cards to merchants for merchant transactions processed on the credit card’s platform). However, because ad exchanges are two-sided platforms, the fees charged by the ad exchange are in reality borne by both sides of the market (publishers and advertisers). Tr. Sept. 18 PM 33:11–34:3, 35:12–37:3 (Simcoe (Pls. Expert)). Like a sales tax, the exchange fee acts as an additional cost taken out of the sale of the advertisement, part of which is paid by the advertiser and part of which is paid by the publisher. Tr. Sept. 25 AM 94:21–24 (Chevalier (Def. Expert)) (tax incidence framework model determines the relative impact of a tax on buyers and sellers); Tr. Sept. 18 PM 33:11–34:3, 35:12–37:3 (Simcoe (Pls. Expert)). The portion of the tax paid by each side of the platform is based on the degree to which that side has close substitutes to the platform; the side of the platform with fewer close substitutes to turn to will bear most of the tax or fee. Tr. Sept. 18 PM 81:9–10 (Simcoe (Pls. Expert)) (“The elasticities of supply and demand depend on other options that advertisers and publishers have.”).

475. So long as one side of the platform is relatively inelastic (i.e., those customers have few close substitutes to turn to), a hypothetical monopolist of the platform could increase prices of the platform overall, even if customers on the other side of the platform have relatively elastic demand (i.e., they have many close substitutes). Tr. Sept. 19 PM 73:14–75:2 (Lee (Pls.

Expert)) (“As long as one side of the market lacks close substitutes and would be willing to bear above-competitive prices to keep using those products, then the hypothetical [monopolist] test would pass. And this would still form a relevant product market.”). The relatively less elastic side of the platform will simply pay most of that price increase. In an extreme case, a hypothetical monopolist could profitably pass along all of the price increase to one side of the platform with no competitive response at all from the other side of the platform to constrain the monopolist. *Id.* at 73:24–74:22 (hypothetically, if advertisers could freely substitute away, then the fees charged by the monopolist would become the burden of non-advertisers).

476. Here, because, as explained above, open-web publishers have particularly inelastic demand for ad exchanges, PTX0188 at -012–017; Tr. Sept. 19 PM 82:22–85:15 (Lee (Pls. Expert)), publishers bear most of the burden of price increases above a competitive level. Tr. Sept. 18 PM 36:14–19 (Simcoe (Pls. Expert)). Indeed, this is reflected in Prof. Simcoe’s analysis, finding that most of the supracompetitive fee is borne by publishers. Tr. Sept. 18 PM 36:14–19 (Simcoe (Pls. Expert)) (finding that “publishers incur between 70 and 80 percent of the harm from the [AdX] overcharge” whereas advertisers would bear between 20 percent and 30percent.).

2. Google Has Monopoly Power In The Ad Exchange For Open-Web-Display Advertising Market.

477. Google has sustained monopoly power in the ad exchange market. Google derives that power largely from its anticompetitive conduct discussed above. *See* PFOF Sec. IV.

478. The importance and durability of network and scale effects means that the impact of Google’s actions have had a synergistic effect that amplifies its monopoly power, and those effects likely persist even for conduct that has been discontinued. Tr. Sept. 19 PM 146:5–16 (Lee (Pls. Expert)) (explaining that the effects of Google’s Google Ads-AdX conditioning, and its

DFP-AdX conditioning which “still persist today, as well due to the durability of network effects and the exit of competitors”).

a) Direct Evidence Of Google’s Market Power In The Ad Exchange Market.

479. Direct evidence of Google’s substantial and sustained market power in the ad exchange market includes Google’s ability to charge supracompetitive prices without regard to competitors’ prices or concern that customers will switch to rival ad exchanges. Tr. Sept. 19 PM 81:20–84:25, 85:8–89:12 (Lee (Pls. Expert)). Google documents indicate that AdX charges higher take rates than rival ad exchanges. PTX0712 at -646 (in 2018, “our rev share (20%) is much higher than other exchanges (generally 10%)”); PTX0188 at -013 (in 2014, “AdX @20% [sic] rev share while direct competitors at 10-20%”). Google’s executives, customers, and other industry participants recognize the same. Tr. Sept. 18 AM 220:18–221:3 (Pappu (Google)) (testifying that AdX’s “competition was generally at 10 percent”); Tr. Sept. 18 AM 134:3–12 (Wheatland (Daily Mail)) (explaining that AdX’s “20 percent” take rate was “around double” the take rate Daily Mail paid to other exchanges, which was “roughly around a 10 percent take rate” with one exchange “operating at 7 percent” and “one operating at 9 percent[.]”); Tr. Sept. 10 AM 150:8–18, 152:7–19 (Friedman (Goodway Group)) (testifying that AdX charges higher take rates than other exchanges and refused to negotiate lower rates with Goodway Group, unlike rival exchanges).

480. Since 2012, Google has charged a roughly 20 percent take rate (or revenue share fee) for open auction transactions through AdX. Tr. Sept. 13 AM 42:16–21, 43:15–17 (LaSala

(Google)) (testifying that AdX’s take rate has held steady at 20 percent for over a decade); Tr. Sept. 19 PM 81:24–82:6 (Lee (Pls. Expert)) (discussing the same).²⁷

481. Only a small minority of Google’s publisher customers were able to negotiate a discount to AdX’s 20 percent take rate—according to a 2017 internal review, Google calculated that only 13 out of 3,815 of AdX’s largest publisher customers had an exception to the 20 percent rate, and of those 13 negotiated tiered reductions, only 6 publishers had reached the tiers to trigger the discount. PTX0549 at -079, -086.

482. Evidence presented at trial demonstrates that Google was aware that it could continue to charge supracompetitive prices without losing a significant number of customers. Former Google employee Chris LaSala admitted that Google rarely offered discounts to AdX’s fee; that any discounts were minimal; and that the long-standing 20% AdX rate held. Tr. Sept. 13 AM 42:25–43:17, 67:11–13 (LaSala (Google)). He also admitted that during his time at Google he could not recall a single publisher switching away from AdX even in the face of Google’s regular denials of customer discount requests. Tr. Sept. 13 AM 49:15–20 (LaSala (Google)).

483. That is consistent with the experience of other market participants that testified at trial. Tr. Sept. 10 AM 150:8–23 (Friedman (Goodway Group)) (explaining that Goodway Group could negotiate take rates with ad exchanges except AdX. “We were told it wasn’t an option” for

²⁷ Google’s expert, Professor Chevalier, testified about a full-stack take rate. But that analysis “improperly combines products that are not substitutes for each other but rather complements.” Tr. Sept. 18 PM 44:14–45:7 (Simcoe (Pls. Expert)). Indeed, a full-stack take rate analysis is, in this case, analogous to adding the price of apples and oranges sold by one fruit producer and comparing that sum to the combined price of apples and oranges from another fruit producer in order to suggest that the first fruit producer is charging a competitive price for apples. Tr. Sept. 18 PM 44:22–45:4 (Simcoe (Pls. Expert)). Prof. Chevalier also acknowledged that full-stack take rate analysis did not include all potential paths through which transactions could flow or account for differences in the volume of transactions that flowed through each path. Tr. Sept. 25 AM 61:15–62:5 (Chevalier (Def. Expert)).

AdX.); Tr. Sept. 27 AM 6:24–7:5 (Pauley (Vox)) (testifying that “[n]othing” happened when Vox tried to negotiate a lower take rate for AdX; “the AdX take rate stayed the same”).

484. Google assessed that customers of AdX demonstrated very limited responsiveness to changes in AdX’s price. Tr. Sept. 19 PM 82:15–84:25 (Lee (Pls. Expert)); PTX0188 at -979. As Professor Lee has explained, one key way economists define market power is “the ability to profitably charge prices above-competitive levels.” Tr. Sept. 19 PM 49:10–11 (Lee (Pls. Expert)). Indeed, at the heart of the economic inquiry of market power is whether “a single firm by controlling the set of products” within a market “could profitably price significantly above-competitive levels because enough customers would keep buying those products and not go elsewhere.” Tr. Sept. 19 PM 50:2–6 (Lee (Pls. Expert)). Record evidence shows that Google possesses this significant market power in the ad exchange market. For example, Google’s employees have considered reducing the AdX take rate but concluded that it need not do so because it would not result in any meaningful change in sales volume but would negatively impact profits. PTX0421 at -227; PTX0417 at -758 (Google employees discussing “data that lowering the sell-side [AdX] revshare does not look like it is going to have tactical benefit. It doesn’t win many queries compared to the profit lost, and sales does not think it will help them win deals.”); PTX0423 at -043–44. This evidence is additional confirmation that Google’s customers are not responsive to price changes—including a potential price decrease—in a way that constrains Google’s profitability, which is strong evidence of market power. *See* Tr. Sept. 19 PM 84:4–15 (Lee (Pls. Expert)) (explaining that “when a firm faces inelastic demand, it can raise prices, increase revenue, and generate profit”).

485. AdX’s take rate has remained largely constant over time even though other ad exchanges have reduced their take rates. PTX0686 at -044 (Google presentation noting “margin

compression” on rival ad exchanges that had “slashed take rate in half” and “reduced their take rate even further” in 2017); Tr. Sept. 9 AM 139:18–24 (Casale (Index Exchange)); PTX0686 at -044. This pattern of Google’s take rate remaining steadily higher than its rivals’ is also present in the data produced by Google and other ad exchanges. PTX1242 (comparison of worldwide fees for AdX versus the average third-party ad exchange for open-web display ads shows AdX remains high); Tr. Sept. 19 PM 81:20–82:9, 97:9–25 (Lee (Pls. Expert)); PTX1279 (comparison of U.S. fees for AdX versus the average third-party ad exchange for open-web display ads shows AdX remains high); PTX1280 (comparison of AdX take rates to those of individual third-party ad exchanges shows AdX remained high, for worldwide open-web display ads); DTX2066 (AdX’s take rate is higher than the weighted average take rate charged by non-Google ad exchanges); Tr. Sept. 19 PM 97:9–25 (Lee (Pls. Expert)) (discussing PTX1242).²⁸

486. Google has been able to impose the same supracompetitive 20% fee on open auction transactions for over a decade, even though its own employees have recognized that fees in a competitive market would be much lower, and Google’s rivals have reduced their own fees over time. PTX0562 at -259–60 (by 2017 “[ad exchange] margins [we]re coming down, way down, because the technology, demand and supply that [ad exchanges] offer ha[d] been commoditized to a large extent” and were estimated to “stabilize at around 5%” resulting in a “race to the bottom” for take rates among third-party exchanges, but not Google); PTX1199 (analysis of the take rates for worldwide open-web display reveals that AdX has been able to maintain a nearly flat 19.8% take rate while rivals have consistently reduced their take rates since at least 2016).

²⁸ One rival, Index Exchange, experimented with reducing its take rate, even down to zero, but did not observe any substantial impact on Index Exchange’s win rate. Tr. Sept. 9 AM 138:8–139:17 (Casale (Index Exchange))

487. Even the introduction and growth of header bidding ultimately did not alter AdX's 20% take rate. Tr. Sept. 20 PM 16:10–15 (Lee (Pls. Expert)) (AdX average take rate did not change with header bidding). Initially, Google employees considered lowering AdX's take rate in response to header bidding and the lower take rates charged by competing exchanges. Des. Tr. 258:16–258:21, 270:4–11 (Lipkovitz (Google)) (acknowledging that the 20% take rate on AdX was part of the problem that led to header bidding), (recommending that Google lower AdX take rate to “7 to 10%” in light of header bidding). Ultimately, Google decided against lowering its fees and instead pivoted to the conduct described above to respond to the competitive threat posed by header bidding. *See* PFOF Sec. IV.B, V.A. As one Google executive admitted in August 2018, after header bidding had already gained significant adoption, “[w]e are not seeing pressure on the AdX 20%[.]” PTX0639 (message from Chris LaSala to Jim Giles); Tr. Sept. 20 PM 17:16–18:3 (Lee (Pls. Expert)) (discussing PTX0639). *See also* Tr. Sept. 20 PM 19:2–20:7 (Lee (Pls. Expert)) (explaining how an out-of-market product and complement, not substitute, like header bidding can pose a competitive threat).

488. Google's own employees recognized that AdX's 20% take rate is high and likely facilitated by Google's anticompetitive conduct, including the tie between Google Ads and AdX. *See* PFOF Sec. V.A; PTX0290 at -983 (Google executive explaining that “[e]xclusive access to GDN demand” is how Google “justif[ies] a 20% rev share”); PTX0562 at -259–60; PTX0198 at -703; Tr. Sept. 18 AM 228:11–229:12 (Pappu (Google)); Tr. Sept. 19 AM 148:24–149:2 (Bellack (Google)); Tr. Sept. 19 PM 36:18–25, 37:1–8 (Kim (Google)). This tie is a source of market power. Tr. Sept. 18 AM 121:10–122:12 (Abrantes-Metz (Pls. Expert)). Indeed, Google internally recognized that a valuable feature for Google Ads would be bidding into exchanges other than AdX, PTX0198; Tr. Sept. 18 AM 13:5–20 (Spencer (Google)), but Google decided to forgo that

valuable feature which would have undercut the tie between Google Ads and AdX. PTX0639 at -965 (Google executive stating that “[i]f GDN bought liberally through all 3PEs [third-party exchanges] . . . the 20% would crater.”). Google’s take rate would be between 5% and 15% in a competitive market. PTX0562 at -259–60 (by 2017 “[ad exchange] margins [we]re coming down, way down, because the technology, demand and supply that [ad exchanges] offer ha[d] been commoditized to a large extent” and were estimated to “stabilize at around 5%” resulting in a “race to the bottom” for take rates among third-party exchanges, but not Google); PTX0461 at -145 (“We never originally intended to have AdX as a premium over other exchanges, that was market price. Now that Index is at 10% and AppNexus is offering 5% at least as a promotion, the question is whether we can defend a 50% or 100% premium . . . I do not think it is feasible to try to defend a 3–4x premium (15–20% vs 5%) on third party AdX buyers.”); Tr. Sept. 18 AM 220:13–221:3 (Pappu (Google)); Tr. Sept. 18 AM 133:3–12 (Wheatland (Daily Mail)) (AdX’s take rate is “around double” those of other exchanges Daily Mail uses). Google considered reducing the AdX take rate but concluded that it would not be economically beneficial and was not needed to respond to competition. PTX0421 at -227; PTX0417 at -758; PTX0363 at -633, -640; PTX0401 (Google presentation “Jedi++ Header Bidding response and options” discussing the option to “[l]ower AdX rev share”); PTX0536 at -361; PTX0402 at -469 (“Effect in short term would be to move a lot of rev to AdX and put pressure on header bidding infrastructure[.]”); Tr. Sept 17 AM 77:2–17 (Jayaram (Google)) (discussing PTX0402); PTX0520 at -390.

489. One ad exchange with a higher take rate for the years 2021 or 2022, for which data is available, was ██████████, which had a 1% share worldwide and is differentiated from other ad exchanges because it specializes in a certain type of native ad. PTX1280 (indicating ██████████ take rate and market share for 2021 and 2022 for worldwide open-web display); Tr. Sept. 20 PM

35:3–19 (Lee (Pls. Expert)) (discussing PTX1280). As Prof. Lee explained, the existence of firms—especially very small firms—with higher take rates (that changed over time, unlike AdX) does not negate the reality that AdX possesses a “significant advantage overall of its rivals” and that “the totality of evidence is consistent with substantial and sustained market power on the part of AdX.” PTX1280; Tr. Sept. 20 PM 110:7–112:5 (Lee (Pls. Expert)). Importantly, there is no record evidence, whether in testimony or documents, showing that [REDACTED] acted as a competitive constraint on Google’s pricing.

490. Direct evidence of Google’s substantial and sustained market power in the ad exchange market also includes its ability to degrade AdX’s quality by limiting effective access and use of its real-time bids to DFP. *See, e.g.*, PTX1031 at -500 (“Google Ad Manager” or DFP “is the only way to access Google Ad Exchange as a publisher”). Publishers using non-DFP ad servers are not able to effectively access the AdX’s inventory; Google made a decision to degrade access to AdX. PTX0551 at -048 (“Launching AdX into a non-DFP server destroys this competitive first look advantage and would most likely lead to AdX [] losing access to overall queries, and [] losing access to the *highest-value* queries.”); PTX0128 at -045–46 (opening up AdX demand and features to third party ad servers would be good for business, but Google prohibits it).

491. In a competitive market, an ad exchange would likely not be able to profitably restrict access to the supply of inventory available to advertiser customers, since doing so would risk losing a large amount of its transaction volume to ad exchange rivals that did not impose such restrictions. As examples of the feasibility of allowing ad exchange rivals to access AdX inventory and Google Ads demand, ad exchange competitors such as PubMatic integrate with Google’s advertiser ad network and DSP because it increases their access to advertiser inventory.

Tr. Sept. 12 PM 77:17–78:8 (Goel (PubMatic)). Such an integration is relatively inexpensive. *Id.* at 93:8–21 (explaining that it would take “three to six months for a handful of engineers, maybe five to seven. So we’re talking about less than half a million dollars[.]”). Along these lines, between 2012 and 2014, Kevel’s customers requested to integrate their publisher ad server with AdX, but Google blocked Kevel’s publisher customers from obtaining access to real-time bids from AdX. Tr. Sept. 9 PM 139:13–140:24 (Avery (Kevel)). By contrast, Kevel integrated its publisher ad server with non-Google ad exchanges, which is not technically difficult because of the common connection point that all ad tech tools use to communicate. Tr. Sept. 9 PM 140:25–141:14 (Avery (Kevel)).

492. One important way in which Google is able to keep publishers constrained to using AdX is that a publisher stands to lose significant revenue, more than one-quarter of revenue on average, from removing AdX from its roster of exchanges through which it sells inventory; this represents a 50 times difference between AdX and its next closest rival. PTX1395; Tr. Sept. 19 PM 88:2–21 (Lee (Pls. Expert)) (discussing PTX1395). Publisher testimony at trial reinforced this reality. Tr. Sept. 9 AM 104:9–23 (Wolfe (Gannett)) (“Google represents about 50 percent of the programmatic revenue that Gannett generates” including Google’s “ad exchange and specifically ad words” products), 75:22–76:18 (Gannett believed it must continue to use AdX even if it could save on publisher ad server fees because any such switching away from DFP, which would have meant losing the ability to compare real-time bids from AdX with other exchanges, “was not going to offset the revenue loss of not having direct access to the Google ad exchange as a demand source for our inventory”); Tr. Sept. 10 AM 12:19–13:2 (Layser (News Corp)) (AdX represents “between 40 and 60 percent” of News Corp’s programmatic ad revenues, as does Google Ads demand). *See also* PTX1393; Tr. Sept. 19 PM

85:16–86:25, 87:10–16 (Lee (Pls. Expert)) (discussing PTX1393) (independent quantitative analysis showing that for a sample of approximately 20 billion log-level or bid-level impressions, AdX wins half of all impressions identified in the data and “for over 60 percent or almost two thirds of the auctions that AdX wins, it faces no competition” whereas “for all of the other exchanges, they face competition on 70 percent or more [on] the impressions they win”); PTX1395; Tr. Sept. 19 PM 88:2–89:7 (Lee (Pls. Expert)) (discussing PTX1395).

493. Direct evidence of Google’s substantial and sustained market power in the ad exchange market also includes Google’s ability to vary its revenue share and reserve prices significantly across impressions. Through Sell-Side Dynamic Revenue Sharing (SSDRS), discussed further above, launched in August 2015 and persisting until September 2019, Google changed the take rate that AdX levied at the impression (or query) level. PFOF Sec. IV.B.3; PTX1040 at -264 (“In dynamic sell-side revshare bids are NOT taken out [of] revshare before comparing with reserve price.”); Tr. Sept. 11 AM 114:5–115:12 (Ravi (Pls. Expert)) (explaining sell-side revenue share). According to Google, assuming “an agreed[-]upon aggregate revenue share of 20% with a [DFP] publisher,” AdX was able to charge a take rate as high as 40% “on a per-query basis.” PTX1096 at -593. The ability to vary AdX’s take rate at will, essentially doubling the take rate on a given query from the average fee, is consistent with Google possessing monopoly power. Tr. Sept. 19 PM 81:20–82:14 Lee (Pls. Expert)); *see also* Tr. Sept. 16 PM 130:3–131:8 (Abrantes-Metz (Pls. Expert)).

b) Google’s High Market Shares Relative to the Next Largest Competitor Provide Indirect Evidence of Google’s Substantial and Sustained Market Power in the Ad Exchange Market.

494. Google’s most significant competitors and customers view AdX as dominant and the only ‘must-have’ ad exchange. Tr. Sept. 13 PM 72:9–18 (Creput (Equativ)) (testifying that

AdX has a “dominant position” in the ad exchange market); Tr. Sept. 13 AM 20:3–16 (Kershaw (Magnite)) (explaining that while a publisher could choose to turn off AdX, that would be analogous to taking the “option to starve to death”); Tr. Sept. 10 AM 156:18–157:4 (Friedman (Goodway Group)) (explaining that AdX was the only exchange that simply could not be turned off as compared to other exchanges that could be turned off); Tr. Sept. 10 AM 67:1–68:8 (Friedman (Goodway Group)) (explaining that all ad exchanges other than AdX competed with each other but that AdX did not need to compete, including on negotiating rates and transparency)); Tr. Sept. 27 AM 7:8–24 (Pauley (Vox)) (describing “limited leverage” in negotiations over AdX’s fees due to lack of “any reasonable alternatives [] for where the Open Auction revenue would go if not through AdX”); Tr. Sept. 10 AM 26:4–15 (Layser (News Corp)) (“It’s impossible to negotiate with Google” and in negotiations Google would “accept little to none” of NewsCorp’s requests as compared to negotiation with other exchanges for which negotiations were “a lot easier”).

495. Critically, AdX demand is not entirely replaceable by using other ad exchanges, which lack the number and diversity of advertisers buying via Google’s ad exchange. PFOF Sec. IV.A.2.; Tr. Sept. 13 AM 56:4–15 (LaSala Testimony (describing Google Ads advertising demand as “special”); PTX1717 at -644 (Daily Mail analysis estimating nearly half of the impressions it sells via AdX are unique to AdX); Tr. Sept. 9 AM 104:15–23 (Wolfe (Gannett)) (AdX/Google Ads demand represents 50% of Gannett’s revenues); Tr. Sept. 10 AM 12:23–13:2, 13:3–15, 113:2–114:3, 115:16–21 (Layser (News Corp)) (estimating AdX/Google Ads demand is 40-60% of NewsCorp revenues). *See also* Tr. Sept. 17 PM 55:8–19 (Cadogan (OpenX)) (AdX/Google Ads is the “largest sources of advertising revenue” for publishers); Tr. Sept. 16 PM 129:15–21 (Abrantes-Metz (Pls. Expert)) (AdX is singular source of large, unique demand).

496. According to data produced by Google and rival ad exchanges, between 2018 and 2022, Google had a market share of roughly 63% to 71% in the ad exchange market worldwide based on the number of impressions sold. PTX1258; Tr. Sept. 19 PM 90:12–92:3 (Lee (Pls. Expert)) (discussing PTX1258).²⁹ Impressions are the more useful market share and power evaluation benchmark because they can “tell or could speak to scale advantages in data that different exchanges have.” Tr. Sept. 19 PM 91:12–19 (Lee (Pls. Expert)). Even by a more conservative estimate, extrapolating from data produced by DSPs and advertiser ad networks, Google’s market share was approximately 54% to 66% between 2018 and 2022. PTX1258; Tr. Sept. 19 PM 92:14–19 (Lee (Pls. Expert) (discussing PTX1258)). Even using this measure, Google’s worldwide market share was roughly nine times the size of its nearest rival in 2022, no rival had more than a 6% share of impressions in 2022, and only six exchanges that produced data had more than a 1% share. PTX1237; PTX1238; Tr. Sept. 19 PM 94:3–94:22 (Lee (Pls. Expert)) (discussing PTX1238).

497. Google’s market share has been remarkably durable and has generally grown over time. PTX1314; Tr. Sept. 16 PM 12:5–24 (Weintraub (Pls. Expert)) (discussing PTX1314); Des. Tr. 215:14–216:17, 216:19–217:13 (Lipkovitz (Google)) (describing AdX as the “largest” player in the market and stating that revenue from AdX increased year over year while he worked in the display group). Notably, any decline in market share is not an indication, standing alone, that a firm lacks substantial and sustained market power, and the “totality of evidence” including “relative scale advantages, differentiation” and “direct evidence of market power” is the proper way to evaluate market power. Tr. Sept. 19 PM 91:14–98:11 (Lee (Pls. Expert)).

²⁹ These exchange market share calculations include header bidding transactions won by an ad exchange. Tr. Sept. 20 PM 15:16–16:3 (Lee (Pls. Expert)).

498. Based on revenue, on a worldwide basis AdX accounts for over 55% of total fees collected by ad exchanges for which data was available. PTX1258.

499. In the United States, for impressions shown to U.S. internet users, AdX's share is between 46% and 56% from 2018 through 2022. PTX1259; PTX1260; PTX1259; Tr. Sept. 19 PM 93:8–19 (Lee (Pls. Expert)).³⁰ By this measure, AdX's market share in 2022 was five times as large as the next largest ad exchange competitor, which had less than a 10% share. PTX1261; Tr. Sept. 19 PM 95:6–13 (Lee (Pls. Expert)).

c) There are Substantial Barriers to Entry and Expansion in the Ad Exchange Market.

500. Ad exchanges are complex, expensive products to engineer and exhibit substantial network effects. These both act as significant barriers to entry in the ad exchange market. For example, an employee for one exchange competitor explained both barriers:

There are significant network effects and costs, very real costs to being an ad exchange. The network effects would be you have to attract both demand and supply simultaneously to be interesting to either. So if you were to found a new exchange today, buyers want to buy Disney or the New York Times or very, very esteemed publishers. Publishers expect you to have demand. It's really hard to solve that chicken and an egg. For us, it took years and years and years and years to start to establish the credibility that required us to eventually land big names, which then attracted a bigger demand.

DSPs also have to make an investment in every exchange by way of the technical integration to integrate with an exchange, which is also a very onerous process,

³⁰ As a robustness check, Professor Lee calculated exchange market shares that captured supply path optimization (“SPO”) or DSP-to-publisher ad server transactions. PTX 1258; PTX1259; Tr. Sept. 19 PM 92:10–22 (Lee (Pls. Expert)). Because of the relatively very small volume of these SPO transactions, including them in ad exchange market share calculations has no meaningful impact. Tr. Sept. 19 PM 92:17–19 (Lee (Pls. Expert)) (explaining that including SPO in his market share calculations “doesn’t change market share by very much”). That SPO accounts for a very small share of the relevant market is confirmed by DSP testimony. Tr. Sept. 11 PM 116:11–118:4 (Dederick (The Trade Desk) (describing the volume of impressions available through The Trade Desk’s SPO product as “minimal by comparison” to the volume available through its ad exchange product)).

they're very selective. Some DSPs we've literally waited five years to integrate into Index. So that's just a significant amount of human time. And then, additionally, we're in the business of scale, so there's a significant infrastructure required to assume the scale of the exchange, which is a significant investment, not just in compute in the servers, but also software and the engineering required to facilitate the platform. Those would be a couple of examples.

Tr. Sept. 9 AM 144:3–145:1 (Casale (Index Exchange)). *See also* Tr. Sept. 17 PM 55:25–56:8 (Cadogan (OpenX)) (explaining that it was difficult to build an ad exchange because of the large initial investments required in terms of capital, personnel, time, and effort).

501. Ad exchanges benefit from network effects. Ad exchanges are more highly valued by publishers to the extent they can connect publishers to advertiser demand, and vice versa. *See e.g.*, Tr. Sept. 11 PM 110:12–25 (Dedrick (The Trade Desk) (explaining that “scale is critical” to an exchange); PFOF Sec. III.F, V.C. A new entrant in the ad exchange market lacking access to substantial publisher supply or advertiser demand will find it hard to build an attractive exchange. Tr. Sept. 19 AM 75:3–76:8 (Lee (Pls. Expert)) (“network effects” are “oftentimes seen as a significant barrier to entry and expansion” because an exchange “has to get . . . both publishers and advertisers” “on board”); Tr. Sept. 16 PM 35:7–36:7 (Weintraub (Pls. Expert)) (concluding that Google conditioning full access to Google Ads demand on publishers’ use of its ad exchange AdX resulted in a decrease in rival exchanges’ share of impressions); Tr. Sept. 11 AM 140:16–141:2 (Ravi (Pls. Expert)) (concluding that Google conditioning Google Ads access on AdX use reduces rivals’ scale); Tr. Sept. 16 PM 132:3–6 (Abrantes-Metz (Pls. Expert)) (concluding the same). Unsurprisingly, competitor exchanges have not been able to achieve AdX’s scale despite engaging in competition on the merits. Tr. Sept. 17 PM 87:17–21 (Cadogan (OpenX)) (testifying that, despite seeing success and growth, OpenX’s ad exchange is “still a peanut” when compared to AdX); Tr. Sept. 9 PM 135:8–12 (Casale (Index Exchange)) (testifying

that, despite seeing success and growth, Index’s ad exchange is “tiny compared to [AdX]”); Tr. Sept. 18 AM 133:21–134:2 (Wheatland (Daily Mail)) (“Historically, over the last few years, anywhere between 40 to 60 percent of programmatic impressions go through Google AdX, and the next closest competitor is probably more like 6 percent, 7 percent, something like that maybe.”).

502. Ad exchanges also benefit from scale, including data. Access to user data gives existing exchanges a substantial advantage over new exchanges without access to the same data. Exchanges with additional auction and targeting data help publishers and advertisers value and monetize their inventory. Tr. Sept. 9 AM 136:15–21, 145:14–147:17, 160:24–161:4 (Casale (Index Exchange)) (“So any [exchange] that is clearing significantly more transactions than us would simply have a better handle on what is interesting to an advertiser” because that exchange then has a significantly larger cache of data to draw from). Rival exchanges have recognized the lack of data as a barrier to competing successfully in the exchange market. Tr. Sept 9 PM 135:19–136:21 (Casale (Index Exchange)) (explaining that ad exchanges have a “massive data task” when it comes to optimization and “organiz[ing] what [advertisers] what to buy as intelligently as possible.” The more data exchanges have, “[t]he better of a job we do at that” and “the more likely we are to clear impressions[.]”).

503. Furthermore, Google’s conduct has impaired the competitiveness of non-Google ad exchanges, particularly in terms of rivals’ ability to invest in innovation. Tr. Sept. 13 PM 71:19–72:1 (Creput (Equativ)) (discussing how Google’s conduct “weakens competition both in terms of rival ad servers and rival SSPs” to Google, which results in a market that “substantially limits the capacity [of rivals] to innovate”). In addition to reduced innovation for its own products, which results in diminished quality for customers, Google’s conduct has also resulted

in reduced benefits that rivals could expect to gain from their own innovation. Tr. Sept. 19 PM 145:15–146:5 (Lee (Pls. Expert)).

D. Worldwide and the United States are Relevant Geographic Markets For Each Product.

504. Worldwide³¹ is a relevant geographic market for each of the product markets defined above. In evaluating the propriety of a worldwide geographic market, Professor Lee examined the interaction of the relevant products, supplier competition, and Google’s conduct. Tr. Sept. 19 PM 122:16–21 (Lee (Pls. Expert)). Professor Lee found that a worldwide hypothetical monopolist of any one of the relevant products would be able to degrade product quality without consequence or profitably raise prices above competitive levels, and the evidence described in detail below supports the worldwide market finding. *See generally* Tr. Sept. 19 PM 61:14–17 (Lee (Pls. Expert)) (the publisher ad server market for open-web display passes the HMT); Tr. Sept. 19 PM 85:1–7 (Lee (Pls. Expert)) (the ad exchange market for open-web display passes the HMT); Tr. Sept. 19 PM 112:24–113:3 (Lee (Pls. Expert)) (the advertiser ad network market for open-web display passes the HMT).

505. The worldwide market is the optimal means of assessing Google’s conduct and is the most appropriate market in the case. As Professor Lee explained, Google’s “conduct crosses country boundaries and [a]ffects customers worldwide.” Tr. Sept. 19 PM 126:13–127:3 (Lee (Pls. Expert)). “[I]n terms of value and the competitive effects of Google’s conduct” a worldwide market is particularly appropriate especially when considering “that customers interact across country boundaries, supplier competition is global, and the scope of Google’s conduct is global

³¹ A worldwide market excludes a limited number of countries (such as China), where government regulation of the internet or U.S. sanctions limit the operation of digital advertising technology companies. Tr. Sept. 19 PM 122:6–9 (Lee (Pls. Expert)).

as well.” Tr. Sept. 19 PM 126:13–127:3 (Lee (Pls. Expert)). Several attributes of the ad tech markets at issue in this case make analysis at the worldwide level appropriate.

506. First, advertisers and open-web publishers that use these ad tech tools are located in countries around the world and transact across national boundaries, making it challenging to assign any particular customer to a particular smaller geographic market. PTX0978 at -577 (Google “Business Forecast Meeting: Sell-Side” presentation, reporting revenues for Americas, EMEA, and APAC); PTX0904 at -553 (illustrating revenue “overlap” between publishers and advertisers in different geographic regions of the world); Tr. Sept. 19 PM 124:15–22 (Lee (Pls. Expert)) (“[P]ublishers. . . are selling impressions to customers located worldwide, but also, the suppliers of these products, these ad tech products[,] are located worldwide and sell to customers located worldwide as well.”).

507. Second, open-web display advertising spend is global in nature, with many website publishers selling impressions shown to internet users around the world, who may be of interest to advertisers located in a wide variety of locations, e.g., a hotel in Norway advertising to a user in Virginia looking to escape the summer heat. PTX0904 at -553 (showing that nearly 30% of advertising spend within the “Americas” originates from another region); Tr. Sept. 9 AM 111:15–25 (Casale (Index Exchange)) (“[P]ublishers [] domiciled in the United States, they might still have impressions in the UK or Australia.”).

508. Third, suppliers of the ad tech products described above typically offer the same ad tech tools regardless of the location of the publisher or advertiser customer, and advertisers and publishers around the world face similar competitive options (or lack thereof) in choosing ad tech tools to use. Tr. Sept. 9 AM 111:17–25 (Casale (Index Exchange)) (explaining that Index’s ad exchange is a “global platform. . . we don’t really view us as having any regional limits on the

platform”); Tr. Sept. 9 PM 117:19–118:1 (Avery (Kevel)) (Kevel’s publisher ad server is sold in “just about every country that we are allowed to offer it for sale” including “the United Kingdom, Netherlands, Portugal, Singapore, Philippines, of course the United States, Canada, [and] Mexico.”); DTX1524 at 14 (Xandr presentation describing Xandr as “[a]n open and flexible platform with global scale trusted by the world[’]s most sophisticated [p]ublishers”); DTX0682 at 28 (“[e]xchange running at global scale”). Google, for example, sells the same publisher ad server, ad exchange, and advertiser ad network products globally. PTX0946 at -807 (“[Google’s] Ad Manager is business critical to many of the world’s largest publishers, with 85% of ‘display web’ addressable inventory flowing through.”).

509. Fourth, Google organizes its ad tech businesses and tracks their performance on a global basis. Tr. Sept. 19 AM 119:25–120:5 (Bellack (Google)) (testifying that he was the product leader for AdX and DFP “around the world”); Tr. Sept. 19 PM 125:4–13 (Lee (Pls. Expert)) (discussing PTX0657, a Google document that tracked open-web display impressions processed by Google’s sell-side products on a global basis, exempting China).

510. Fifth, Google’s fees for its AdX ad exchange are generally consistent worldwide, including the 20% fee it charges for open auction transactions. PTX1199 (analysis of the take rates for worldwide open-web display).

511. Sixth, scale and network effects, which play a significant role in the ability of ad tech companies to compete effectively, can be aggregated across national and regional boundaries. An ad tech firm’s worldwide scale with respect to the number of advertising transactions processed (transaction volume) and the data derived from those transactions impacts the firm’s ability to compete for customers and transactions globally. Tr. Sept. 16 PM 13:2–13 (Weintraub (Pls. Expert)) (a firm’s transaction volume effects its ability to run experiments, train

algorithms, and enact cost efficiencies, all of which allows the firm to increase the quality of its products). In part for this reason, Google typically conducts experiments to test changes in its products on a worldwide basis, utilizing data samples that are global in scope. Tr. Sept. 16 PM 20:21–21:10 (Weintraub (Pls. Expert)) (out of 50 Google experiments, all showed results on a worldwide basis; none showed results on a U.S.-only basis); PTX0326 at -837 (“Add global data”); PTX0432 at -227.

512. The conduct described above was implemented without distinction as to regional or national boundaries, and therefore its competitive effects are felt globally. *E.g.*, PTX1099 at -866-7 (discussing Google’s implementation of dynamic allocation within DFP for European publisher customers); *see also* Tr. Sept. 19 PM 126:13–127:3 (Lee (Pls. Expert)) (Google’s “conduct crosses country boundaries and effects customers worldwide.”).

513. In the alternative to a worldwide market, a United States market exists for each of the ad tech products identified above. A hypothetical monopolist of each of these ad tech products within a United States market would be able to profitably increase prices above competitive levels. Tr. Sept. 19 PM 125:17–126:4 (Lee (Pls. Expert)) (“[G]iven evidence that Google is actually able to price discriminate on its products, charge different fees at the customer level or even impression level, a hypothetical monopol[ist] of any of these products could also target price differences to customers located in a particular geographic region.”). Although Google’s experts do not agree with the precise contours of Plaintiffs’ product markets, they agree the United States would be a relevant geographic market. Tr. Sept. 26 AM 109:23–25 (Israel (Def. Expert)) (“Q. And what’s your opinion of what’s the appropriate geographic market to consider for this case? A. I would look at the United States.”); Tr. Sept. 25 AM 19:23–20:18 (Chevalier (Def. Expert)).

514. Google’s ordinary course documents are consistent with the existence of a distinct United States submarket. Google regularly tracks the performance of its products within the United States—in addition to globally or regionally. PTX0978 at -597. The United States also accounts for a significant portion of the revenues and profits tied to Google’s overall open-web display ad tech business. Tr. Sept. 25 AM 19:23–20:18 (Chevalier (Def. Expert)) (Google’s data shows that many of its ad tech “transactions begin and end in the U.S.”); Tr. Sept. 19 PM 125:17–126:4 (Lee (Pls. Expert)) (the United States makes up a “particular meaningful share of revenues” for ad tech players including Google).

E. A Single, Two-Sided Market that Combines All Ad Tech Tools Is Inconsistent With Market Realities.

515. The documents and testimony at trial confirm that the various ad tech products at issue, including publisher ad servers and ad exchanges, could be mixed and matched such that customers would use Google’s own ad tech tools with others from third parties. This has long been the reality of how digital advertising was bought and sold, including in the era where yield management was an emerging technology. *E.g.*, PTX0112 at -978 (“60% of DFP customers *also* use a Yield Manager[.]”); PTX0085 at -716 (“60%+ of paying DFP publishers are using a third party yield manager or a competitive exchange”; “A growing percentage of AFC+AdX publishers are working with yield managers, too.”). Witness testimony confirmed that ad tech tools are interchangeable with each other, including tools like the publisher ad server. *E.g.*, Tr. Sept. 20 PM 78:4–25 (Sheffer (Google)) (“the ad server is a mission-critical enterprise software tool that publishers use” which can “drive their direct sales efforts” and the “indirect monetization” of open-web inventory); Tr. Sept. 19 PM 61:18–63:3, 64:4–65:20 (Lee (Pls. Expert)); PFOF Sec. VII.A.1 ¶¶ 367–375 (explaining why other types of ad tech tools are not reasonable substitutes for publisher ad servers). Advertiser buying tools, including advertiser ad

networks, are also properly characterized as distinct ad tech tools. *E.g.*, Sept. 10 AM Tr. 145:9–19 (Friedman (Goodway Group)) (explaining with respect to DSP performance that “if we’re not able to extract performance using the most sophisticated tool, we . . . will not regress to a less sophisticated tool in order to – as the next option of trying to achieve a marketer’s goal”); PTX0579 at -509. The same is true for ad exchanges. *E.g.*, Tr. Sept. 18 AM 127:23–128:1, 133:15–19 (Wheatland (Daily Mail)) (ad exchanges include AdX, PubMatic, Index Exchange, and Magnite, but not DFP (Google’s publisher ad server) or Smart Ad Server (a third-party publisher ad server)); Tr. Sept. 9 AM 122:23–123:6 (Casale (Index Exchange)) (regarding Index Exchange’s ad exchange as competing with AdX, not DFP); PTX0847 at -261 (internal depiction of the ad tech stack where AdX is separate from publisher ad servers (DFP), ad networks, and DSPs). In its internal documents, Google itself treats each of these ad tech products as distinct tools. For example, in an “Ad Manager Ecosystem 101” document from 2019, Google distinguishes between the functions of the “tools” it offers, including its publisher ad server, ad exchange, demand side platform, and its Google Ads advertiser ad network. PTX1031 at -478–484. Google also assesses the competitive dynamics separately for each product, as the identity and relative strength of companies offering each product varies. *See, e.g.*, DTX0435 at -062 (2017 Google document focusing on display competition and breaking down separate “strength of threat” assessments for Amazon vis-à-vis DFP, AdX, GDN, DBM, and Exchange Bidding, and concluding Amazon is a “low” threat to DFP).

516. In attempting to contradict Plaintiffs’ market definition, while admittedly failing to define the “exact edges” or “boundaries” of any alternative market, Google’s main economic expert, Dr. Mark Israel testified to a “single two-sided market for matches” for “ad tech that facilitates these connections.” Tr. Sept. 26 AM 42:11–20. Dr. Israel’s proffered opinion on market

definition stands alone. Neither of Google's other two expert witnesses offered any opinion on market definition. Tr. Sept. 24 PM 22:7–8, 23:1–2 (Milgrom (Def. Expert) (admitting “I haven't analyzed competition in this market” and that he did not study AdX's market share)); Tr. Sept. 25 AM 48:3–13 (Chevalier (Def. Expert) (“Q. Professor Chevalier, you're not offering an opinion about the proper market definition for any of the ad tech tools at issue in this case; is that right? A. I am not”)).

517. But Google itself has, in another court, taken a detailed and unambiguous position on whether a single two-sided market in the buying and selling of digital advertising was appropriate. In the *In re Google Digital Advertising*, 2021 WL 2021990, at *3 (N.D. Cal. May 13, 2021) case, Google argued the court should dismiss an antitrust claim that—in its view at the time—alleged “a single market that . . . is comprised of four different services and/or products: publisher ad servers, supply-side platforms, demand-side platforms, and advertiser ad servers.” 2021 WL 7083558 at 7; ECF No. 1158-2 at 7. Google acknowledged the alleged market there as “a single intermediation market.” 2021 WL 7083558 at 7; ECF No. 1158-2 at 7. Google insisted such a market was an improperly pled “broad overarching services market.” 2021 WL 7083558 at n.2. Google critiqued plaintiffs' market there because it “describes various services for advertisers (or publishers) as essentially complementary of one another from the perspective of advertisers and publishers, respectively--rather than as substitutes” and yet combined them into a single market.” *Id.* Google argued to that court that plaintiffs' failure to address differences “between services for advertisers and publishers” meant that, among other reasons, the plaintiffs' market definition could not be “save[d].” 2021 WL 7083558 at *7; ECF No. 1158-2 at 7. Ultimately, the “Court agree[d] with Defendants,” including Defendants' argument “that

Plaintiffs' proposed market improperly includes services for both advertisers and publishers." *In re Google Digital Advert. Antitrust Litig.*, 2021 WL 2021990, at *3 (N.D. Cal. May 13, 2021).

VIII. Google Trained Employees to Avoid Creating Discoverable Communications

518. Google intentionally created a culture in which Google employees were trained to hide documents from discovery in civil litigation by using "off the record" chats and pretextual claims of privilege.

519. Google required its employees to undergo a training program known as "Communicate with Care." Tr. Sept. 11 AM 78:6–13 (Bender (Google)); Tr. Sept. 12 AM 98:10–17 (Srinivasan (Google)). The mandatory training program warns Google's employees that it is "constantly in the public eye ... and the courthouse" and that it often must "produce employee communications as evidence," which could "hurt or embarrass us as a company." PTX1777 at 4. At the end of the training, Google employees are required to "certify" that they have "fully reviewed, understand and are responsible for applying the advice and guidelines provided in this training" to their "interactions, responsibilities, and work at and for Google." PTX1777 at 54.

520. The "Communicate with Care" training program targeted two areas to prevent litigation adversaries from discovering relevant information.

521. First, the program encouraged Google employees to discuss sensitive topics via "off the record . . . chats" instead of "sending [an] email" because such chat messages "are not retained by Google as emails are." PTX1777 at 14. This created a culture of using "off the record" chats, that is, chats which are not preserved. *See, e.g.*, PTX0851 at -549 (Google employees complaining that chats in "rooms" do not "have a history off option," so they would "need to go thru a convoluted set of steps to make a history off group chat in old classic hangouts

and then use that here”); PTX1033 at -656 (chat in which a Google employee requests, “Please keep history off on this legally sensitive chat room”).

522. Indeed, Google employees regularly communicated about business matters through internal “chat” functions on their computers and mobile devices with history off. Tr. Sept. 17 AM 103:11–20 (Jayaram (Google)); Tr. Sept. 11 AM 31:25–33:12 (Bender (Google)) (discussing PTX1736); Tr. Sept. 23 AM 137:1–3, 138:4–6, 165:21–166:6 (Korula (Google)) (discussing chats in PTX0949, PTX0933, and PTX0911); Tr. Sept. 13 AM 129:15–17, 131:24–132:2, 133:11–19 (LaSala (Google)) (discussing PTX0992).

523. Google employees continued using “off the record” chats after receiving litigation holds even while acknowledging that their “off the record” chats would not be preserved. Tr. Sept. 11 AM 33:1–12, 88:13–89:7 (Bender (Google)) (Google employee in charge of both sell-side and buy-side products explaining that he left the default option of turning off chat history despite receiving a litigation hold); Tr. Sept. 13 AM 121:23–124:3 (LaSala (Google)) (explaining that the chat history setting defaulted to off and that even after receiving a litigation hold, it was difficult to turn chat history on for every single chat); Tr. Sept. 17 AM 103:11–20 (Jayaram (Google)) (noting use of chats for substantive business purposes but that he did not turn chat history on to preserve those chats); Tr. Sept. 18 AM 25:20–27:14 (Spencer (Google)) (describing that chat history was turned off by default and not knowing how to turn chat history on after receiving litigation hold); Tr. Sept. 19 PM 16:20–17:4 (B. Stewart (Google)) (Google’s vice president of global partnerships since 2012 testifying that she had never intentionally marked a chat as “on the record”). In some cases, these employees used “off the record” chats precisely because they knew those chats would not be preserved—even though they were subject to

litigation holds. *See, e.g.*, PTX1107 at -661–63 (Google employees governed by the “lit hold” create a “whatsapp group” and discuss other private messaging apps).

524. The culture of using “off the record” chats started at the top. For example, Google’s global strategy lead testified that he knew, based on the litigation hold and his involvement with Google’s U.S. competition investigations working group, that the government was investigating Google’s ad tech business and that, based on the “Communicate with Care” training, documents related to Google’s ad tech business would likely be provided to the government. Tr. Sept. 13 AM 124:17–125:17, 137:1–13 (LaSala (Google)) (discussing PTX0925). Nevertheless, he announced in at least two chats after receiving a litigation hold that he would start chats for sensitive topics “with history turned off” or “off-the-record.” Tr. Sept. 13 AM 133:11–136:25 (LaSala (Google)) (discussing chat messages contained in PTX0992 and PTX1818 a year after receipt of litigation hold and admitting, “My MO was mostly off the record”). He was aware at the time that off-the-record chats would not be preserved and therefore could not be produced to the government. *Id.* 137:19–138:1. He did not know how many chats were destroyed because chat history had not been turned on. Tr. Sept. 13 AM 139:5–9, 139:20–140:4 (LaSala (Google)).

525. Even when Google’s engineering director for ad serving and sell-side ads quality did abide by the litigation hold requirement to preserve his chat history, he encouraged others to start new chats without him so that they could keep chat history off, even on topics relevant to this litigation. Tr. Sept. 11 AM 164:20–167:4 (Korula (Google)) (discussing PTX0911 at -534–35, -538).

526. The fact that Google trained employees to discuss sensitive topics in “off the record” chats and then destroyed these chats after 24 hours unless users changed the default

setting so chats were “on the record” or “history on,” combined with the steps individual employees took to avoid preserving chat messages, reflects a willful effort to evade civil discovery.

527. *Second*, the “Communicate with Care” training program cultivated a corporate culture of hiding documents from discovery by training Google employees to leverage pretextual claims of privilege. PTX0997 at -391 (noting that “a few Googlers are advising their colleagues to communicate with care, and lawyers posted on threads on Eng-Misc and IndustryInfo to remind Googlers about communication guidelines”); *see also id.* at -389 (using “Privileged – seeking advice Ted” as an email header despite not seeking any advice from Google in-house counsel Ted Lazarus, who appears in the “To” line). The training noted that “phrases like ‘confidential,’ ‘sensitive,’ and ‘private’ may alert Googlers to the sensitivity of your communication,” but “they won’t protect it from being disclosed in the course of a legal or investigative matter, as would be the case if it were protected by the attorney-client privilege.” PTX1777 at 31. A substantial portion of the training program then provides details and examples of how best to give emails the appearance of being privileged. PTX1777 at 32–41.

528. Another Google document titled “Five Rules of Thumb” provides “guidelines” when putting things in writing, given that “[w]ords matter. Especially in antitrust law.” PTX0850 at -663. Since “Courts and regulators often focus on the intent behind a decision,” the “Five Rules of Thumb” include “guidelines” to “ensure that what we write accurately reflects our intent,” including “Our users should always be free to switch, and we don’t lock anyone in,” “We’ve got lots of competitors, so don’t assume we control or dominate any market,” “Don’t try and define a market or estimate our market share,” and “Assume every document you generate, including email, will be seen by regulators.” *Id.* For the latter point, the Google document

elaborates, “We’re often legally required to produce internal business records, including email and stuff that was intended for ‘internal use only,’” so employees should “be careful what you write.” PTX0850 at -664.

529. Though the “Communicate with Care” training program mentions that “Attorney-client privilege is a legal concept that protects a confidential communication between a Googler and a Google lawyer that is about the Googler asking for or getting legal advice from the Google lawyer,” PTX1777 at 31, Google employees took the advice from “Communicate with Care” and made pretextual privilege claims in order to prevent discovery into matters they thought were sensitive. For example, in 2019, a product manager for AdX and later Google Ad Manager added “PRIVILEGED and CONFIDENTIAL” to the top of a non-privileged email and a lawyer to the “To” line, and asked the Google employees on the email to “communicate with care” because they “should assume that every document (and email) [they] generate will likely be seen by regulators.” PTX0884 at -249; Tr. Sept. 12 AM 151:2–152:16 (Srinivasan (Google)). Because of the possibility that communications could be reviewed by regulators, the product manager explained, “We should avoid any suggestion that our intent is to directly impact header bidding, when a publisher uses on [sic] our stack.” PTX0884 at -249. Similarly, in 2020, Google’s Managing Director, Global Programmatic Sell-Side Solutions provided “guidance for how to address the inquiries around the DOJ investigations,” reminding Google employees “to always communicate with care” and review the “Five Rules of Thumb” described above, as well as “to stick to our scripts.” PTX0927 at -256.

530. Likewise, Google’s global strategy lead for sell-side products explained that “if someone else” applied a privilege claim to an email, “I typically just added it as well . . . without thinking about it too much,” and without consideration as to whether the email was actually

privileged. Tr. Sept. 13 AM 71:18–72:2 (LaSala (Google)). Similarly, Google’s product manager for DFP admitted that he labels emails as attorney-client privileged even when he does not ask for legal advice and merely when he “wanted [an attorney] to be aware” of a communication. Tr. Sept. 19 AM 128:10–129:7 (Bellack (Google)) (discussing PTX1507); *see also id.* 129:17–130:22 (discussing PTX0719).

531. Consequently, many non-privileged documents that Google employees acknowledged not to be privileged have false attorney-client-privilege markings. *See, e.g.*, Tr. Sept. 11 AM 76:21–78:13 (Bender (Google)) (noting that DTX0549 did not contain privileged information but was nevertheless labeled as “CONFIDENTIAL & PRIVILEGED”); Tr. Sept. 12 AM 62:12–63:1 (Srinivasan (Google)) (discussing the “PRIVILEGED and CONFIDENTIAL” label in an email, PTX0715 at -428, and not recalling “what legal advice I was specifically asking for here”); *id.* 93:7–15 (discussing PTX0784, an email marked “PRIVILEGED and CONFIDENTIAL,” and acknowledging that there were no “specific asks for legal advice”); *id.* 96:19–24 (similar, discussing PTX0819); *id.* 150:1–11 (similar, discussing DTX0829); Tr. Sept. 13 AM 78:8–16 (LaSala (Google)) (similar, discussing PTX0864); Tr. Sept. 17 AM 68:2–18 (Jayaram (Google)) (similar, discussing PTX0815); *id.* 95:25–96:4 (similar, discussing PTX0734); *id.* 99:22–100:3 (similar, discussing PTX0929); *id.* 35:1–8, 36:24–37:7 (similar, discussing PTX0791 and PTX0791 at -239); PTX0699 at -260; Tr. Sept. 16 AM 122:16–123:4 (Mohan (Google)) (discussing DTX0184 and stating that “Attorney Client Privilege” “was added [to a document] when there might be a question that might come up that might be a legal related question or what have you”).

PLAINTIFFS' POST-TRIAL PROPOSED CONCLUSIONS OF LAW

1. The Sherman Act protects the “unrestrained interaction of competitive forces” and establishes “free and unfettered competition as the rule of trade.” *N. Pac. Ry. Co. v. United States*, 356 U.S. 1, 4 (1958). It is black-letter antitrust law that there are some things a monopolist cannot do. In particular, it is unlawful for a company that has monopoly power to “maintain this position through means other than competition on the merits.” *United States v. Microsoft Corp.*, 253 F.3d 34, 56 (D.C. Cir. 2001) (en banc). Here, the evidence presented at trial demonstrated that Google has monopoly power in three distinct tools that website publishers use to sell, and advertisers use to buy, open-web display advertising. The evidence also showed that Google has not maintained these monopolies by competing on the merits—i.e., by offering products that website publishers and advertisers freely choose because they are superior in price, quality, or innovation to alternatives. Rather, Google built and protected its monopoly positions by acquiring competitors, depriving would-be competitors of scale, controlling and degrading its customers’ choices, and leveraging its power to control auction rules to make it harder for Google’s customers to do business with its rivals. In sum, Google has subverted the competitive process that the Sherman Act protects.

2. At trial, the evidence established that (i) publisher ad servers, (ii) ad exchanges, and (iii) advertiser ad networks for open-web display advertising, respectively, are relevant markets. Website publishers and advertisers have no meaningful alternative tools with which to buy and sell open-web display ads, and other forms of digital advertising cannot constrain monopolies on open-web display advertising tools. This is because open-web publishers have ad inventory on their websites that they can *only* monetize through open-web display ads, and thus these publishers must use tools that enable the sale of that inventory. Similarly, because alternative ad formats are not reasonable substitutes for open-web display ads from the

perspective of advertisers, they too require tools that facilitate the purchase of open-web display ads. While alternative ad formats may be *complements* to open web display ads for some advertisers in some circumstances, alternative ad formats do not constrain a monopolist of advertiser-facing tools that advertisers use to buy open-web display ads.

3. The evidence also established that Google has monopoly power in the markets for each of these tools because Google is able to (and does) act unconstrained by competitive forces, has high market shares, is insulated by significant barriers to entry, benefits from substantial scale effects, is able to forego short-run profits, and can thwart consumer choice without losing customers.

4. Finally, the evidence also demonstrated that Google maintained its monopolies unlawfully through a series of actions that, both standing alone and in a mutually reinforcing manner, undermined the ability both of customers to choose non-Google ad tech tools and of rivals to offer viable alternatives. This conduct included acquisitions of would-be competitors, tying of Google's separate ad tech products together, and manipulating the way auctions work to favor Google while disadvantaging rivals and overriding consumers' choices. Google's conduct is unjustified under the law, and, in any event, the competitive harms of that conduct far outweigh Google's purported justifications for it.

5. Plaintiffs have met their burden on each element of their claims—monopolization, attempted monopolization, and tying. Therefore, the Court should find Google liable under the Sherman Act as the first meaningful step towards restoring competition in these vital markets on which the free and open internet and its future expansion depend.

I. The Court Has Jurisdiction, And Venue Is Proper

6. This Court has subject-matter jurisdiction under Section 4 of the Sherman Act, 15 U.S.C. § 4, and 28 U.S.C. §§ 1331, 1337(a), and 1345. The United States has standing under

Section 4 of the Sherman Act, 15 U.S.C. § 4, and the States have standing under Section 16 of the Clayton Act, 15 U.S.C. § 26, as *parens patriae* on behalf of and to protect their general economies and welfare of their residents. This Court has personal jurisdiction over Google; venue is proper in this district under Section 12 of the Clayton Act, 15 U.S.C. § 22, and under 28 U.S.C. § 1391, because Google transacts business and is found in this District. *See* Mem. Op. on Def.’s Mot. to Transfer 14, ECF No. 60.

II. Legal Framework

7. Section 2 of the Sherman Act makes it unlawful to “monopolize, or attempt to monopolize . . . any part of the trade or commerce among the several States.” 15 U.S.C. § 2.

8. The offense of **monopolization** under Section 2 of the Sherman Act has two elements: (1) “possession of monopoly power in the relevant market,” and (2) “willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident.” *Microsoft*, 253 F.3d at 50 (quoting *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966)); *see also Duke Energy Carolinas, LLC v. NTE Carolinas II, LLC*, 111 F.4th 337, 353 (4th Cir. 2024) (same).

9. The first element requires either direct or indirect proof that the defendant has “the power to control prices or exclude competition” in a relevant market. *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, 391 (1956).

10. The second element requires proof that the defendant engaged in anticompetitive (or exclusionary) conduct, i.e., that the defendant “uses its monopoly power to foreclose competition, to gain a competitive advantage, or to destroy a competitor.” *Duke Energy*, 111 F.4th at 353 (quoting *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 482–83 (1992)) (cleaned up). In other words, the Sherman Act prohibits conduct “intended to exclude rivals on some basis other than efficiency.” *Duke Energy*, 111 F.4th at 353 (quoting *Aspen Skiing*

Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585, 605 (1985)) (cleaned up); *see also Viamedia, Inc. v. Comcast Corp.*, 951 F.3d 429, 452–53 (7th Cir. 2020) (conduct is “exclusionary in nature” when it “impair[s] rivals’ opportunity to compete in a way that is inconsistent with competition on the merits”) (cleaned up).

11. Courts apply a burden-shifting approach to determine whether a defendant’s conduct is anticompetitive, recognizing that the ultimate question is whether the monopolist’s conduct “as a whole” has “harm[ed] the competitive process and thereby harm[ed] consumers.” *Microsoft*, 253 F.3d at 58–59; *see also Duke Energy*, 111 F.4th at 354–55. Under that framework, a plaintiff bears the initial burden of showing that the monopolist’s conduct is anticompetitive. *Microsoft*, 253 F.3d at 58–59. “[I]f a plaintiff successfully establishes a prima facie case under § 2 by demonstrating anticompetitive effect, then the monopolist may proffer a ‘procompetitive justification’ for its conduct”—meaning a “nonpretextual claim that its conduct is indeed a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal.” *Id.* A monopolist’s proffered procompetitive justification must be both “valid[] and sufficien[t]” to justify the challenged conduct. *Kodak*, 504 U.S. at 483. If a defendant satisfies this step, “then the burden shifts back to the plaintiff to rebut that claim.” *Microsoft*, 253 F.3d at 59.

12. The offense of **attempted monopolization** has three elements: “(1) that the defendant has engaged in predatory or anticompetitive conduct with (2) a specific intent to monopolize and (3) a dangerous probability of achieving monopoly power.” *Spectrum Sports v. McQuillan*, 506 U.S. 447, 456 (1993); *see also E. I. du Pont de Nemours & Co. v. Kolon Indus.*, 637 F.3d 435, 441 (4th Cir. 2011) (“*Kolon I*”). The first element is functionally the same as the second element of a monopolization claim and is satisfied by a showing of anticompetitive

conduct. *See infra* PCOL §§ V, VII. The second element can be inferred from exclusionary conduct or proven directly. *See infra* PCOL §§ V, VII. The third element “employ[s] the same concept of market power as that used in a completed monopolization claim,” except that “a lesser degree of market power” and a “lowered quantum of proof” suffices. *Tops Markets, Inc. v. Quality Markets, Inc.*, 142 F.3d 90, 100 (2d Cir. 1998).

13. **Tying** the purchase of two separate products together can satisfy the anticompetitive conduct element under Section 2 of the Sherman Act when done by a monopolist. *See Viamedia*, 951 F.3d at 468. But tying is also unlawful under Section 1 of the Sherman Act—which prohibits agreements that unreasonably restrain trade, *see* 15 U.S.C. § 1—when four elements are satisfied: (1) the existence of two separate products, (2) an agreement conditioning purchase of the tying product upon purchase of the tied product (or at least upon an agreement not to purchase the tied product from another party), (3) the seller’s possession of sufficient economic power in the tying product market to restrain competition in the tied product market, and (4) a not insubstantial impact on interstate commerce. *Serv. & Training, Inc. v. Data Gen. Corp.*, 963 F.2d 680, 683 (4th Cir. 1992); *see also Kodak*, 504 U.S. at 461–62; *Microsoft*, 253 F.3d at 85. Tying under Section 1 “do[es] not require that the defendant have a monopoly” in “the market for a tying product.” *U.S. Steel Corp. v. Fortner Enter., Inc.*, 429 U.S. 610, 620 (1977); *see also Kodak*, 504 U.S. at 461–62 (“appreciable economic power” in the tying product market sufficient); *It’s My Party, Inc. v. Live Nation, Inc.*, 811 F.3d 676, 681 (4th Cir. 2016).

III. Google Illegally Acquired And Maintained Monopolies In The Relevant Markets

14. “[M]arket definition has two components—the relevant product market and the relevant geographic market.” *Kolon I*, 637 F.3d at 441.

15. In both cases, a relevant market is the “area of effective competition,” *Tampa Elec. Co. v. Nashville Coal Co.*, 365 U.S. 320, 328 (1961), and denotes the “arena within which

significant substitution in consumption or production occurs,” *Ohio v. Am. Express Co.*, 585 U.S. 529, 543–44 (2018) (“*Amex*”) (emphasis added). Thus, market definition is “not an end unto itself,” but instead “an analytical tool” for identifying the zone of competition where a defendant may have market power or competitive effects are the most likely. *United States v. Bertelsmann SE & Co. KGaA*, 646 F. Supp. 3d 1, 24 (D.D.C. 2022); see also *FTC v. Ind. Fed’n of Dentists*, 476 U.S. 447, 460 (1986) (“[T]he purpose of the inquiries into market definition and market power is to determine whether an arrangement has the potential for genuine adverse effects on competition.”); *United States v. Brown Shoe Co.*, 370 U.S. 294, 320–24 (1962) (market definition helps a court ascertain the “locus of competition” in which competitive effects are assessed); *Geneva Pharms. Tech. Corp. v. Barr Labs. Inc.*, 386 F.3d 485, 496 (2d Cir. 2004) (market definition “provides the context against which to measure the competitive effects” of the challenged conduct).

16. Defining the relevant market is a “pragmatic, factual” analysis and not a “formal, legalistic” one. *Brown Shoe*, 370 U.S. at 336; see also *Kodak*, 504 U.S. at 482 (market definition is “factual inquiry into ‘commercial realities’ faced by consumers”). There is no one true market: “[E]ven if alternative submarkets exist . . . or if there are broader markets that might be analyzed, the viability of such additional markets does not render the [markets] identified by the government unusable.” *Bertelsmann*, 646 F. Supp. 3d at 28; see also *United States v. Aetna, Inc.*, 240 F. Supp. 3d 1, 39–40 (D.D.C. 2017) (evaluating market definition does not necessarily “identify a single relevant market”).

17. The boundaries of a relevant market are “not intended to be a rigid bright line.” *Bertelsmann*, 646 F. Supp. 3d at 27. Rather, “there is some artificiality in any boundaries,” and “such fuzziness is inherent in bounding any market.” *FTC v. Tronox Ltd.*, 332 F. Supp. 3d 187,

202 (D.D.C. 2018); *see also, e.g., United States v. Continental Can Co.*, 378 U.S. 441, 449 (1964) (“no precise formula” for defining relevant market); *Times-Picayune Publ’g Co. v. United States*, 345 U.S. 594, 611 (1953) (“The ‘market,’ as most concepts in law or economics, cannot be measured by metes and bounds.”); *Vasquez v. Ind. Univ. Health, Inc.*, 40 F.4th 582, 587–88 (7th Cir. 2022) (“[R]ealistically, some fuzziness about market boundaries will occur in most cases.”). Moreover, “[a] broad market may also include relevant submarkets which themselves may ‘constitute product markets for antitrust purposes.’” *FTC v. Whole Foods Mkt. Inc.*, 548 F.3d 1028, 1037–38 (D.C. Cir. 2008) (quoting *Brown Shoe*, 370 U.S. at 325); *see also FTC v. Staples, Inc.*, 970 F. Supp. 1066, 1075 (D.D.C. 1997) (“[T]he mere fact that a firm may be termed a competitor in the overall marketplace does not necessarily require that it be included in the relevant product market for antitrust purposes.”); *FTC v. IQVIA Holdings Inc.*, 710 F. Supp. 3d 329, 358 (S.D.N.Y. 2024).

18. A plaintiff may prevail even if the court finds a relevant market that differs from the one defined by the plaintiffs, or if the court agrees with only a subset of the relevant markets alleged, so long as the evidence establishes that a relevant market exists in which to evaluate plaintiffs’ claims. *See Continental Can*, 378 U.S. at 452–53 (proposed merger would harm competition in relevant market as defined by the Court); *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 978 n.9 (9th Cir. 2023) (court may find “in-between” market rather than adopting plaintiff’s or defendant’s proposed market); *United States v. Energy Sols., Inc.*, 265 F. Supp. 3d 415, 436–37 (D. Del. 2017) (declining to accept plaintiff’s four proposed markets but instead collapsing the four alleged markets into two).

A. Publisher Ad Servers, Advertiser Ad Networks, and Ad Exchanges for Open-Web Display Advertising Are Relevant Product Markets Because Other Tools Are Not Substitutes

19. Plaintiffs have sufficiently established three relevant product markets:

(1) publisher ad servers for open-web display advertising; (2) advertiser ad networks for open-web display advertising; and (3) ad exchanges for open-web display advertising. Plaintiffs have established these markets through both qualitative and quantitative evidence under well-established legal frameworks and robust sources of evidence.

1. Market Definition Requires Reasonable Substitutability

20. A relevant product market must be defined to include only “reasonably interchangeable” products. *du Pont*, 351 U.S. at 395, 404. Reasonable interchangeability “depends on” “how far buyers will go to substitute one commodity for another” and “how different from one another are the offered commodities in character or use.” *du Pont*, 351 U.S. at 393.

21. Interchangeability is assessed from the perspective of the buyer (or consumer). *See Kodak*, 504 U.S. at 482 (“The proper market definition in this case can be determined only after a factual inquiry into the commercial realities faced by consumers.”); *It’s My Party, Inc. v. Live Nation, Inc.*, 88 F. Supp. 3d 475, 491 (D. Md. 2015), *aff’d*, 811 F.3d 676 (4th Cir. 2016) (“The proper perspective when defining a market is that of the consumer[.]”). The relevant buyers or customers are the users of the *products* at issue—here, the publishers that use publisher ad servers and ad exchanges, and the advertisers that use ad exchanges and advertiser ad networks. Those buyers are not necessarily the end *viewers* of the ads, such as the website visitors who see an open-web display ad but do not use the ad tech tools that enabled the sale or purchase of the ad. *See, e.g., IQVIA*, 710 F. Supp. 3d at 358 (determining whether “social media and endemic websites . . . provide a reasonably interchangeable substitute” to programmatic

advertising from the perspective of healthcare advertisers, not healthcare providers who are targets of advertising); *United States v. Bazaarvoice, Inc.*, 2014 WL 203966, at *22 (N.D. Cal. Jan. 8, 2014) (“ratings and reviews” platforms defined by the perspective of online retailers who choose the platforms, not website visitors).

22. To determine “how far buyers will go to substitute one commodity for another,” *du Pont*, 351 U.S. at 393, courts often refer to the economic concept of “cross-elasticity of demand.” “When products have ‘high’ cross-elasticity, it means that small changes in the price or quality of one product has dramatic effects on the sales of the other. When products have ‘low’ cross-elasticity, it means that price and quality changes in one product causes little or no change in the sales of the other.” *Cmty. Publishers, Inc. v. Donrey Corp.*, 892 F. Supp. 1146, 1153 n.7, 1159 (W.D. Ark. 1995), *aff’d* 139 F.3d 1180 (8th Cir. 1998); *see also It’s My Party*, 811 F.3d at 683 (describing cross-elasticity of demand); *In re Zetia (Ezetimibe) Antitrust Litig.*, 587 F. Supp. 3d 356, 361 (E.D. Va. 2022) (same).

23. In antitrust cases, a court’s assessment of “cross-elasticity of demand” does not require a specific quantitative or mathematical measurement. Rather, that assessment aids in the more general concept of economic substitutability at the heart of the market definition exercise. *See, e.g., Illumina, Inc. v. FTC*, 88 F.4th 1036, 1050 (5th Cir. 2023) (plaintiff not “required to mathematically demonstrate cross-elasticity of demand”); *McWane, Inc. v. FTC*, 783 F.3d 814, 829 (11th Cir. 2015) (“technical analysis” or “econometric analysis” of cross-elasticity not required); *see also* Pls. Opp. to Mot. to Exclude Lee, ECF No. 1132, at 18 (collecting additional cases). Thus, although most products have possible substitutes, “a relevant market cannot meaningfully encompass that infinite range” of products and must instead “exclude any other

product to which, within reasonable variations in price, only a limited number of buyers will turn.” *Times-Picayune*, 345 U.S. at 612 n.31.

24. Reasonable interchangeability thus requires that substitution among the products in question “be sufficiently great that the defendants’ charging of supracompetitive prices”—or some other exercise of market power such as a decrease in quality—“would drive away not just some consumers but a large enough number to make such [conduct] unprofitable.” *United States v. Visa U.S.A., Inc.*, 163 F. Supp. 2d 322, 335 (S.D.N.Y. 2001); *see also United States v. Google LLC*, -- F. Supp. 3d --, 2024 WL 3647498, at *85 (D.D.C. Aug. 5, 2024) (“*Google Search*”) (“Products are reasonably interchangeable only if ‘significant’ substitution occurs in response to a price increase.”) (quoting *Amex*, 585 U.S. at 543–44).

25. As a result, products that compete “to some degree” in a broader market of all business transacted within a sector or industry may belong in different product markets in an antitrust case. *United States v. H&R Block, Inc.*, 833 F. Supp. 2d 36, 54 (D.D.C. 2011); *Staples*, 970 F. Supp. at 1075 (“[T]he mere fact that a firm may be termed a competitor in the overall marketplace does not necessarily require that it be included in the relevant product market for antitrust purposes.”); *Bon-Ton Stores, Inc. v. May Dep’t Stores Co.*, 881 F. Supp. 860, 868 (W.D.N.Y. 1994) (that products “in a broad sense . . . compete in a vast marketplace encompassing retailers in general” does not make them part of the same product market).

26. *Google Search* applied these key principles. There, Google made the same argument it makes here: that courts have “rejected antitrust claims reliant on proposed advertising markets limited to a single form of advertising.” Def. PCOL ¶ 53.¹ But the *Google Search* court rejected that assertion, explaining that “decisions . . . with the benefit of a factual

¹ Citations to “Def. PFOF” or “Def. PCOL” refer to Google’s pre-trial Proposed Findings of Fact and Conclusions of Law, ECF No. 1178.

record[] have refused to lump together various forms of digital advertising merely because advertisers spend in different channels.” 2024 WL 3647498, at *86. Thus, while acknowledging that “certain advertisers shift spend” between different advertising forms, *id.* at *90, the court held that because these different channels serve “different purposes,” *id.* at *86, “the reallocation of some spending between [different advertising forms] does not on its own reflect significant substitution,” *id.* at *90.

27. *Google Search* is by no means an outlier in holding that “[t]he fact that advertisers may move money between [different ad channels] to achieve varying goals does not make them substitutes.” 2024 WL 3647498, at *85. For example, in *IQVIA*, the court held that “the fact that an [advertising] agency might shift money around during a campaign does not establish that these alternative channels are substitutes for the distinct features that programmatic advertising provides.” 710 F. Supp. 3d at 358. *Google Search* and *IQVIA* accord with decades of precedent. *See, e.g., Omni Outdoor Adver., Inc. v. Columbia Outdoor Adver., Inc.*, 891 F.2d 1127, 1140–41 (4th Cir. 1989), *rev’d on other grounds, City of Columbia v. Omni Outdoor Adver., Inc.*, 499 U.S. 365 (1991) (“[T]he economic utility of a particular media for a particular purpose makes statements concerning general competition between them inconclusive as to whether each is a separate product market.”); *Cnty. Publishers*, 892 F. Supp. at 1156 (local daily newspaper advertising was relevant product market even though “businesses . . . divide their advertising budget among various advertising media” because “[m]any advertisers use radio and television to complement, but not replace, their use of print advertising”).

28. The upshot of this precedent is clear: a “broad sense” of competition “for advertising dollars in a broader market” does not undermine the existence of a narrower ad-format-specific antitrust market. *IQVIA*, 710 F. Supp. 3d at 359; *see also Bazaarvoice*, 2014 WL

203966, at *22 (“Bazaarvoice proposed a much larger cluster market including [reviews and ratings platforms] and other social commerce tools, like Q & As, blogs, forums and social networks internationally. The Court finds, in light of the facts below and the expert testimony, that . . . the relevant product market is [reviews and ratings] platforms.”).

29. Relatedly, even if two products might offer the same or similar functionalities, they are not in the same market if consumers would not “respond to a slight increase in the price of one product by switching to another product.” *Todd v. Exxon Corp.*, 275 F.3d 191, 201–02 (2d Cir. 2001); *see also FTC v. Syngenta Crop Protection AG*, 2024 WL 149552, at *9 (M.D.N.C. Jan. 12, 2024) (reasonable interchangeability is “more than simply technical interchangeability”). In other words, “the applicable analysis is whether or not the products are *economic* substitutes, not whether they appear to be functionally similar.” *Regeneron Pharms., Inc. v. Novartis Pharma AG*, 96 F.4th 327, 339–40 (2d Cir. 2024); *see also, e.g., Swedish Match*, 131 F. Supp. 2d at 158 (“[F]inding two products to be functionally interchangeable . . . does not end the analysis.”). Courts have repeatedly rejected arguments that functional similarity can alone define a market, including in cases finding that:

a. Digital do-it-yourself tax preparation products are not in the same product market as assisted tax preparation or manual tax preparation, even though “[a]ll tax preparation methods provide taxpayers with a means to perform the task of completing a tax return.” *H&R Block*, 833 F. Supp. 2d at 54.

b. General-purpose credit cards are not in the same product market as debit cards, private-label credit cards, cash, or checks, even though they are all “an option for payment by consumers.” *Visa*, 163 F. Supp. 2d at 337–38.

c. Medicare Advantage insurance plans and Original Medicare insurance plans are not in the same product market, despite both being ways for seniors to obtain Medicare insurance benefits. *Aetna*, 240 F. Supp. 3d at 21–23 (“Not every competitor—not even every competitor with a functionally interchangeable product—must be included in the product market.”).

d. Wholesale pharmaceutical drug distribution is not in the same product market as other methods of drug distribution, even though “the actual function of drug delivery from manufacturers to dispensers is basically the same regardless of the distributor.” *FTC v. Cardinal Health, Inc.*, 12 F. Supp. 2d 34, 47 (D.D.C. 1998).

e. Drugs treating the same conditions are not in the same relevant market despite “substitutability . . . in certain circumstances” because “something more than mere therapeutic equivalency is required to define the relevant antitrust market.” *In re Zetia*, 587 F. Supp. 3d at 365.

f. Drugs sold in pre-filled syringes are not necessarily in the same market as the same drug sold in vials, notwithstanding “real-world functional similarities.” *Regeneron*, 96 F.4th at 339–40.

g. Carbonated soft drinks are not in the same product market as other beverages, “even though it is true that other beverages quench thirst and that the human stomach can consume only a finite amount of liquid in any given period of time.” *FTC v. Coca-Cola Co.*, 641 F. Supp. 1128, 1133 (D.D.C. 1986), *vacated as moot*, 829 F.2d 191 (D.C. Cir. 1987).

h. Consumable office supplies sold at office supply superstores are not in the same product market as consumable office supplies sold at non-superstores, even though “[t]he products in question are undeniably the same no matter who sells them.” *Staples*, 970 F. Supp. at 1074–75.

30. In light of these principles, Google’s assertion that it views other firms as “competitors” in the digital advertising space broadly does not mean that those firms should be included in the relevant markets for the specific ad tech tools that publishers and advertisers use to facilitate sales and purchases of display advertising inventory on the open web. *See Google Search*, 2024 WL 3647498, at *72 (“[T]he mere fact that a firm may be termed a competitor in the overall marketplace does not necessarily require that it be included in the relevant product market for antitrust purposes.”) (citing *Staples*, 970 F. Supp. at 1075).

31. Furthermore, not every function of a multifunctional product must be included in the same market. To the contrary, “services are not in the same product market merely because they have a common provider.” *United States v. Rockford Mem. Corp.*, 898 F.2d 1278, 1284 (7th Cir. 1990). Thus, where a product has multiple functions—e.g., an ad tech product that can transact both display and non-display advertisements—a single function of that product can comprise a relevant market. Courts have applied this principle across industries to find separate markets, for example, for leisure and business airlines passengers, despite both kinds of passengers flying alongside each other on the same airplanes, *Spirit Airlines, Inc. v. Nw. Airlines, Inc.*, 431 F.3d 917, 933–34 (6th Cir. 2004); for consumable and non-consumable office supplies, despite both being sold at the same stores, *Staples*, 970 F. Supp. at 1075, 1079; and for championship boxing matches and all professional boxing matches, despite the “physical identity of the products,” *Int’l Boxing Club of N.Y., Inc. v. United States*, 358 U.S. 242, 249–50 (1959) (quotation omitted).

32. Google thus errs when it asserts that because ad tech tools have multiple functions, markets defined around these tools must include all the functions of that tool. *See, e.g.*, Def. PCOL ¶ 66.2. As the above cases make clear, a well-defined market can be limited to

certain uses of a tool and not others. For example, the ability of AdX to conduct auctions for video advertisements is not a reasonable alternative for publishers that need to sell open-web display ad inventory. PFOF ¶¶ 473, 476. Likewise, as discussed as an analogy during trial, in evaluating a relevant product market for retail gas, it would make sense to include only gas stations' sale of retail gas, even if gas stations also “perform tire changes, replace your oil, [and] sell potato chips.” Tr. Sept. 19 PM 56:13–57:8, 62:25–63:20 (Lee (Pls. Expert)).

2. Relevant Markets Are Established By Practical Indicia

33. Courts use both qualitative and quantitative tools to define relevant markets, but “market definition turns on the actual dynamics of the market rather than rote application of any formula.” *Regeneron*, 96 F.4th at 341 n.8. “Thus, so long as an antitrust plaintiff adequately references one or more of the legal frameworks [] recognized as supporting a proposed market, ‘there is no requirement to use any specific methodology.’” *Id.*

34. One way of determining whether products are reasonably interchangeable is a qualitative analysis of the “practical indicia” set forth by the Supreme Court in *Brown Shoe*: “industry or public recognition of the [market] as a separate economic entity, the product’s peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors.” 370 U.S. at 325. Applying the well-established principle that a relevant market must be grounded in “commercial realities,” *Kodak*, 504 U.S. at 482 (cleaned up), courts consider these practical indicia by reference to whether the product reflects a meaningfully distinct good in the industry. *See, e.g., Regeneron*, 96 F.4th at 339 (“Courts . . . often look to” *Brown Shoe* indicia “to identify whether two products are economic substitutes and compete within the same antitrust market.”).

35. *Brown Shoe* factors can independently support a product market definition, without any “quantitative proof” or “econometric analysis.” *Google Search*, 2024 WL 3647498,

at *68 (cleaned up); *accord Regeneron*, 96 F.4th at 340–41 & n.8 (same); *Optronic Techs.*, 20 F.4th at 482 (same); *Illumina*, 88 F.4th at 1049–50 (affirming market definition on the basis of *Brown Shoe* factors without any quantitative econometric analysis); *Polypore Int'l, Inc. v. FTC*, 686 F.3d 1208, 1217–18 (11th Cir. 2012) (same); *FTC v. Meta Platforms Inc.*, 654 F. Supp. 3d 892, 912 (N.D. Cal. 2023) (courts have determined relevant markets using “only the *Brown Shoe* factors”).

36. A relevant market “can exist even if only some [*Brown Shoe*] factors are present.” *Staples*, 970 F. Supp. at 1075; *Illumina*, 88 F.4th at 1055 (affirming market-definition analysis that “omit[ed] three of the *Brown Shoe* factors”) *Google Search*, 2024 WL 3647498, at *81, 86 (search advertising was properly defined relevant market based on some but not all *Brown Shoe* factors); *IQVIA*, 710 F. Supp. 3d at 355 (healthcare programmatic advertising was properly defined relevant market based on some but not all *Brown Shoe* factors).

37. Another framework for defining a relevant product market is the hypothetical monopolist test (“HMT”). The HMT asks whether a single firm that became the only seller of a product would have the power to harm buyers of that product by profitably raising prices above competitive levels. “If so, the products may comprise the relevant product market.” *Google Search*, 2024 WL 3647498, at *67 (cleaned up). Courts can use qualitative analysis or quantitative analysis (e.g., econometric analysis) to conduct an HMT. *See, e.g., McWane*, 783 F.3d at 829–30 (affirming qualitative HMT analysis because “courts routinely rely on qualitative economic evidence to define relevant markets”) (cleaned up); *Tevra Brands LLC v. Bayer HealthCare LLC*, 2024 WL 2261946, at *3–6 (N.D. Cal. May 16, 2024) (“qualitative HMT” was an acceptable methodology for defining markets); *see also* Pls. Opp. to Mot. to Exclude Lee, ECF No. 1132, at 15 n.8 (collecting additional cases). A defendant’s ordinary-course experiments

measuring the effect of price increases on consumer demand can also serve as a “‘real-world’ hypothetical monopolist inquir[y]” supporting a relevant market definition. *Google Search*, 2024 WL 3647498, at *68.

38. In two-sided markets such as ad exchanges, *see* PFOF ¶ 473, a market may be properly defined pursuant to the HMT even if one side of the market can more readily substitute to other products in response to a price increase than the other side can. For example, while Plaintiffs dispute that advertisers could readily shift away from ad exchanges in response to a price increase, even assuming they could do so would not affect the HMT if publishers would be willing to bear a price increase to continue using ad exchanges. As *Amex* expressly acknowledged, properly defined two-sided markets may have “differences in the two sides’ demand elasticity.” 585 U.S. at 544. But a hypothetical monopolist in a two-sided market may still raise net prices by focusing a price increase on the side less able to substitute away from the product. *Id.* (two-sided platforms may “charge *one* side a price that is above or below cost” depending on differences in their ability to substitute) (emphasis added).

39. Where a firm has been operating as a monopolist for many years, the fact that some customers may switch to alternative products in response to a small, significant non-transitory increase in price (known as a “SSNIP”) at prevailing monopoly prices—that is, prices already above the competitive level—does not necessarily mean that those alternative products are in the relevant market. To avoid the “*Cellophane* fallacy,” assessment of a SSNIP must account for the fact that customers *already facing* prices above the competitive level may respond to a further increase in price by choosing a poor substitute rather than accepting a price increase. In other words, “[a]t a high enough price, even poor substitutes look good to the consumer.” *United States v. Eastman Kodak Co.*, 63 F.3d 95, 105 (2d Cir. 1995) (cleaned up); *see*

also Kodak, 504 U.S. at 471 (“[T]he existence of significant substitution in the event of *further* price increases or even at the *current* price does not tell us whether the defendant *already* exercises significant market power.”) (quotation omitted). In this circumstance, substitution may be “the product of monopoly power rather than a belief on the part of consumers that the products are good substitutes for one another.” *Eastman Kodak*, 63 F.3d at 105. Thus, courts have cautioned that in “markets in which a defendant has substantial market power or monopoly power (and has *already* exercised that power to charge a supracompetitive price),” the HMT “must not be used uncritically, and alternative indicia of market power”—including the “several ‘practical indicia’ that the Supreme Court highlighted in *Brown Shoe*”—“should be explored.” *Epic Games*, 67 F.4th at 975–76 & n.7 (cleaned up).

3. Plaintiffs Have Properly Established Each Of The Three Relevant Markets

40. Plaintiffs demonstrated at trial both through the *Brown Shoe* factors and through Professor Lee’s application of the HMT that publisher ad servers, advertiser ad networks, and ad exchanges for open-web display advertising are each relevant product markets in accord with commercial realities. Specifically, Plaintiffs established that each product is recognized as distinct in the industry, serves a distinct customer base, and has peculiar characteristics and uses. Other ad tech tools are not reasonably interchangeable for these products. PFOF ¶¶ 366–372 (publisher ad server); PFOF ¶¶ 414–420 (advertiser ad network); PFOF ¶ 461 (ad exchange). Plaintiffs have likewise established that a hypothetical monopolist in each market would find it profitable to charge prices significantly above competitive levels or offer quality significantly below competitive levels. PFOF ¶¶ 391–393 (publisher ad server); PFOF ¶¶ 436–437 (advertiser ad network); PFOF ¶¶ 468–476 (ad exchange).

41. Google’s contrary arguments are unavailing.

42. *First*, Google is incorrect to contend that the existence of “open-web display advertising” as a commercially distinct form of digital advertising turns on how often that exact four-word phrase is used. *See, e.g.*, Def. PCOL ¶ 44. “In applying the antitrust laws, we care more about economic substance than about form.” *Viamedia*, 951 F.3d at 470. Thus, in assessing whether a defined product market has recognition in the industry, courts look to whether a certain product has “peculiar characteristics and uses,” or serves customers that have “unique needs and preferences.” *Bertelsmann*, 646 F. Supp. 3d at 30–32. The fact that industry participants may use different terminology to describe a product is not dispositive; the question is whether the defined market “[r]egardless of nomenclature . . . reflects the ‘commercial realities,’” *Id.* at 32. Instead, the fulcrum of the analysis is whether the “key aspects” of the market’s description “correspond to elements of the existing marketplace that would make it possible to profitably target a subset of customers for price increases.” *FTC v. Wilh. Wilhelmsen Holding ASA*, 341 F. Supp. 3d 27, 52 (D.D.C. 2018); *id.* (explaining that “commercial reality does not depend on whether industry participants used the FTC’s definition of the term Global Fleets,” and instead hinges on whether the defined market “capture[s] key aspects of the economic reality” of the industry); *see also FTC v. Tapestry, Inc.*, 2024 WL 4564523, at *20, 24 (S.D.N.Y. Oct. 24, 2024) (recognizing that “uniform terminology is not required” and finding “accessible luxury handbags” to be a relevant market even though industry participants used various terms to describe the market); *Le v. Zuffa, LLC*, 216 F. Supp. 3d 1154, 1165–67 (D. Nev. 2016) (declining to dismiss Section 2 claim based on argument that “Elite Professional MMA Fighters” was not a term used in the industry). Multiple industry participants testified that they had heard or used the phrase “open web display advertising”—or closely related language—to describe a distinct and well-recognized form of

advertising, which reflects the commercial reality that such advertising is a distinct product for antitrust purposes (however it may be captured in words). *See* PFOF § III.A.

43. *Bertelsmann* is illustrative on this point. There, market participants used different language to refer to “expected top seller” books, including “lead titles” and “priority titles.” *Bertelsmann*, 646 F. Supp. 3d at 32. The court still recognized an antitrust market for anticipated top seller books given “clear evidence” across the industry “demonstrat[ing] the practice of identifying and giving special support” to books anticipated to be top sellers even if industry participants used different words to refer to these books. *Id.* So too here: the evidence at trial showed that industry participants understand open-web display advertisements to occupy a unique position for publishers and advertisers alike regardless of whether they used the precise label “open-web display” to describe these advertisements. PFOF ¶¶ 31–32, 385, 426–435.

44. *Second*, Google is incorrect to argue that ad tech tools facilitating the sale of digital ads *other than* open-web display ads—including mobile app ads, connected TV ads, native ads, instream video ads, and ads appearing in social media “walled gardens”—are improperly excluded from the relevant markets. Def. PCOL ¶¶ 45–49. These tools are properly excluded from the market because they are not reasonably interchangeable with open-web display advertising tools used by publishers or advertisers.

45. The range of digital advertising channels available to *advertisers* does not speak to the alternatives available to *publishers*, who have a fixed and perishable inventory of open-web display ads to sell. This fact alone demonstrates that the ad tech tools used by publishers to sell open-web display ads—i.e., publisher ad servers and ad exchanges—are not reasonably interchangeable with tools that sell other kinds of digital ad inventory. Google’s suggestion that publishers could simply shift their businesses to sell different kinds of ad inventory (e.g., mobile

app inventory rather than web inventory, Def. PCOL ¶ 49) has no basis in law, *see supra* PCOL § III.A.1, and does not reflect commercial reality, *see* PFOF ¶¶ 164–165 (publishers cannot shift their businesses between different platforms for multiple reasons, including prohibitive costs); PFOF ¶¶ 365–366, 386 (publishers’ lack of control over their *users*’ choices on whether to access publisher content over web or mobile app).

46. Even as to advertisers, the evidence showed that advertising through channels other than open-web display advertising is a complement, not a substitute, for advertising through open-web display advertising. *See* PFOF ¶¶ 413, 425–435. Specifically, open-web display ads serve purposes that are fundamentally different than other kinds of digital ads, both in terms of the role they serve in an advertiser’s marketing strategy, and the audiences they are best suited to reach, *see* PFOF ¶¶ 425–435. Google itself acknowledges that courts have found single-channel advertising markets appropriate. *See* Def. PCOL ¶¶ 54–56. That result is unsurprising because allocation of a finite advertising budget among different kinds of advertising “does not necessarily mean those channels are reasonably interchangeable substitutes that must be included in the relevant product market.” *IQVIA*, 710 F. Supp. 3d at 359; *see supra* PCOL ¶¶ 26–28.

47. The fact that advertisers may shift spending between different advertising channels to maximize their return on investment does not have the legal significance Google claims, Def. PCOL ¶ 45, because it does not demonstrate that other forms of digital advertising are in the same antitrust market as open-web display advertising. Namely, the evidence does not support Google’s claim that a desire for return on investment would lead advertisers or publishers to substitute away from the use of open-web display ad tech tools to a degree that would constrain a monopolist of such tools. *See supra* PCOL ¶ 24.

48. As discussed above, *see supra* PCOL ¶ 26, the court in *Google Search* rejected the very same argument that Google presses here—that advertisers “mov[ing] ad spend across different channels to maximize their ROI” is evidence that all digital advertising is part of the same product market. *See* 2024 WL 3647498, at *84. Specifically, the court in *Google Search* held that “Google’s focus on ROI misse[d] the forest for the trees,” because “mov[ing] money between search and social ads to achieve varying goals does not make them substitutes.” *Id.* at 85. The court also emphasized that the evidence presented in that trial—like the evidence presented here, *see* PFOF ¶¶ 425–435—showed that advertisers would not “substitute search ads for another ad type absent some campaign-level reason to do so.” *Id.* That reasoning applies fully to the similar facts here. *See* PFOF ¶¶ 425–435 (constraints on advertisers’ shifting of spending away from open-web display ads).

49. *Third*, Google incorrectly contends that Plaintiffs’ markets “fail” because they do not account for supply-side substitution—i.e., whether firms that are *not* currently in the product market are likely to shift their production to compete in that market. *See* Def. PCOL ¶¶ 69–73.

50. The possibility of supply-side substitution (or “repositioning”) by other firms relates, at best, to whether Google’s conduct harms competition in the relevant markets—not to market definition. *See H&R Block*, 833 F. Supp. 2d at 88 (considering whether repositioning would defeat unilateral prices increases); *FTC v. Penn State Hershey Med. Ctr.*, 838 F.3d 327, 351 (3d Cir. 2016) (evaluating whether “repositioning . . . will be sufficient to constrain post-merger prices”); *cf. FTC v. RAG-Stiftung*, 436 F. Supp. 3d 278, 293 (D.D.C. 2020) (“[S]upply-side substitution . . . focuses on *suppliers*’ responsiveness to price increases and their ability to constrain anticompetitive pricing[.]”). As discussed above, markets are defined from the perspective of consumers, not suppliers. *See supra* PCOL ¶ 21.

51. Insofar as repositioning by other firms could be relevant as a consideration at the market-definition stage, such repositioning must be “(1) nearly universal among the firms selling one or more of a group of products, (2) easy, and (3) profitable.” *RAG-Stiftung*, 436 F. Supp. 3d at 293 (cleaned up); *accord, e.g., Penn State Hershey*, 838 F.3d at 351–52; *Chi. Bridge & Iron Co. N.V. v. FTC*, 534 F.3d 410, 427–30 (5th Cir. 2008); *FTC v. CCC Holdings Inc.*, 605 F. Supp. 2d 26, 47 (D.D.C. 2009). But the evidence at trial showed that during Google’s dominance over more than a decade, even as the demand for open-web display ad technology tools has grown, there has been no meaningful or constraining entry in any of these markets. The evidence showed that entry is unlikely due to differences in competitive conditions between the open-web display advertising tool markets and other markets and Google’s longstanding and durable scale and data advantages. For those same reasons, any entry that might occur is unlikely to be sufficient to counteract Google’s monopoly power. PFOF §§ VII.A.2.c, VII.B.2.c, VII.A.2.c. Indeed, the evidence showed that many firms, including large, sophisticated firms like Meta, have *exited* these markets in the face of Google’s dominance. PFOF § V.C, ¶¶ 452–456.

B. A Broad Single Two-Sided Market Is Made For Litigation And Fails Basic Antitrust Market Definition Requirements

52. The evidence established that publisher ad servers, advertiser ad networks, and ad exchanges belong in separate product markets. Goods are substitutes when they are reasonably interchangeable. *See supra* PCOL § III.A.1. By contrast, goods are complements (not substitutes) when they are used together but are not interchangeable (e.g., tires and gasoline, or toothbrushes and toothpaste). *See, e.g., Kodak*, 504 U.S. at 463. Grouping complementary goods into the same market is “economic nonsense” because they are, by definition, not reasonably interchangeable. *Intel Corp. v. Seven Networks, LLC*, 562 F. Supp. 3d 454, 461–62 (N.D. Cal. 2021) (“[A] product market is generally about substitutes, not complements.”).

53. For example, witnesses testified that, because each tool serves a distinct function, they could not use an ad exchange as either a publisher ad server or advertiser ad network; nor could they use a publisher ad server as either an ad exchange or advertiser ad network; nor could they use an advertiser ad network as either an ad exchange or publisher ad server. PFOF ¶¶ 367–372, 414–420, 461. This testimony accords with other evidence of commercial realities, namely that (1) each product serves different functions; (2) each is purchased by different groups of customers; (3) Google organizes its employees separately around “buy-side” products, including an advertiser ad network, and “sell-side” products, including a publisher ad server and ad exchange; and (4) each product is priced separately. PFOF ¶¶ 51–53, 55–57, 62–63, 322, 376, 418–419, 444–447, 480. Each of these commercial realities are “practical indicia” of these three products being in separate markets. *See supra* PCOL § III.A.2.

54. Google contends, however, that these products are not separate antitrust markets but rather collectively make up a single omnibus “two-sided transaction platform that connects ad space sellers and buyers to facilitate ad transactions.” Def. PCOL ¶ 32. That is a made-for-litigation contention and a misguided effort by Google to hang its defense on the Supreme Court’s decision in *Amex*, which found “two-sided transaction platforms” as distinct types of products that “facilitate a single, simultaneous transaction between participants.” 585 U.S. at 545. Google’s argument is wrong on the law and the facts.

55. Two-sided platforms facilitate transactions between two sets of participants on a platform. *See Amex*, 585 U.S. at 534. Two-sided “transaction platforms” are a distinct type of two-sided platform. Courts have interpreted *Amex* as setting forth four relevant features of two-sided transaction platforms: they “(1) offer[] different products or services, (2) to different groups of customers, (3) whom the ‘platform’ connects, (4) in simultaneous transactions.” *US*

Airways, Inc. v. Sabre Holdings Corp., 938 F.3d 43, 58 (2d Cir. 2019) (citation omitted). And though a two-sided transaction platform has two sides, it is a single platform offered by a single firm that “suppl[ies] only one product—transactions,” such that “[o]nly other two-sided platforms can compete with a two-sided platform for transactions.” *Amex*, 585 U.S. at 545–46. Thus, for example, “[a] credit-card company that processed transactions for merchants, but that had no cardholders willing to use its card, could not compete with Amex.” *Id.* at 546.

56. Under *Amex*, ad exchanges for open-web display advertising are two-sided transaction platforms. Ad exchanges offer different services to different groups of customers—open-web publishers get access to advertisers, and advertisers get access to open-web advertising inventory—and they connect both groups in simultaneous transactions for open-web display ad impressions. PFOF ¶¶ 62–64. An ad exchange for open-web display advertising is also a single platform offered by a single firm, and, like the credit-card networks in *Amex*, an ad exchange “can sell its services only if a [publisher] and [advertiser] both simultaneously choose to use” it. 585 U.S. at 545. Google’s ad exchange (AdX) is uniquely positioned among ad exchanges because Google has dominant shares in the tools that sit on both sides of the ad exchange and that publishers and advertisers use to sell ads through the ad exchange.

57. Google’s argument about two-sided markets falls apart when it attempts to tack on publisher ad servers and advertiser ad networks to two-sided ad exchanges to create a single, two-sided product it calls “ad tech.” Def. PCOL ¶¶ 32, 35–36. Publisher ad servers and advertiser ad networks are not properly fused into a single two-sided transaction platform market because they each sell services only to publishers or only to advertisers, respectively, that do not require that “both simultaneously choose to use” the tool. *Amex*, 585 U.S. at 545. And unlike in *Amex*, those services are not just different sides of a single transaction, but a suite of services distinctly

serving either publishers' or advertisers' needs beyond the consummation of a transaction. *See id.* at 547 (“the product that credit-card companies sell is transactions, not services to merchants”).

58. For example, publisher ad servers provide publisher-specific services like reporting, tracking, forecasting, managing inventory, and deciding whether to fill an impression with a direct deal or a programmatic sale. PFOF § VII.A.1. For advertiser ad networks, non-transaction services provided only to advertisers include converting CPM pricing to CPC pricing to better meet advertisers' goals, helping advertisers manage their ad campaigns, and providing advertisers with use of the ad network's proprietary data. PFOF ¶¶ 416–420. Google's assertion that each of these services must nonetheless be lumped into a single two-sided market would be the equivalent of saying that in *Amex*, even a payment terminal in a grocery store must be included in the two-sided market because it “participates in the matching of an ad space seller and buyer.” Def. PCOL ¶ 38.

59. That these three tools are offered by three different sets of almost entirely non-overlapping firms (other than Google) underscores that these tools are complements, rather than substitutes, and therefore are not reasonably interchangeable. *See supra* PCOL § III.A.1. The inappropriateness of lumping each of these discrete products into a single antitrust market is demonstrated by Dr. Israel's failure to adequately explain what products could even be deemed “competitors” in Google's proposed market. Dr. Israel testified, for example, that Facebook and TikTok would be “in there”—despite later admitting that neither firm offers any functionality for a publisher trying to sell display advertising inventory on its website, and thus neither firm represents a substitute to a publisher ad server. PFOF ¶ 375. And, in an attempt to explain how a single market could include services that are not reasonably interchangeable with each other, Dr. Israel asserted that “some of the competitors would be . . . combinations of products for more

than one company,” Tr. Sept. 26 PM 47:15–17 (Israel (Def. Expert)), but did not otherwise specify what those combinations would be, nor who the *customers* of those competitors would be (given that different groups of customers are purchasers of different components within the stack).

60. Because publisher ad servers and advertiser ad networks each offer separate sets of non-transaction services to different groups of customers, they are not reasonably interchangeable with each other or with ad exchanges (which offer only transaction services that must be simultaneously chosen by both publishers and advertisers). *See supra* PCOL § III.A.1. Therefore, they should not be joined in a single antitrust market.

61. Perhaps unsurprisingly, Google previously adopted this same position in litigation before a different tribunal. In *In re Google Digital Advertising*, 2021 WL 2021990, at *3 (N.D. Cal. May 13, 2021), Google successfully took the position that a single “ad tech stack” market would be improper because many of the discrete services included within the stack “are used only by advertisers,” whereas others “are used only by publishers.” Mot. to Dismiss, ECF No. 66, 2021 WL 7083558, at 5 (Jan. 15, 2021) (“N.D. Cal. MTD”). Google emphasized that the various products within the ad tech stack are “‘distinct’ from one another,” and that a single two-sided market would improperly “include[] products and services that Plaintiffs and other advertisers admittedly do not purchase or use.” *Id.* And, like Plaintiffs here, Google took issue with the idea of a “single intermediation market” because the “various services for advertisers (or publishers)” were “essentially complementary of one another from the perspective of advertisers and publishers, respectively—rather than as substitutes.” *Id.*

62. The doctrine of judicial estoppel bars Google from taking a contrary position here. *See, e.g., Lowery v. Stovall*, 92 F.3d 219, 224 (4th Cir. 1996); Pls. Mot. in Limine, ECF No.

1191, at 2–8. The position Google previously took on defining markets for ad tech tools is properly characterized as “one of fact rather than law or legal theory.” *Lowery*, 92 F.3d at 224. The substance of Google’s earlier position was that services for advertisers and publishers are “distinct”; that they are “complementary . . . rather than [substitutes]”; and that they serve different groups of customers. N.D. Cal. MTD at 5. These are all statements or inferences of fact, not law, and Google’s prior position is irreconcilable with the position it takes now. Because Google advanced a contrary position successfully in prior litigation, it is appropriate to preclude Google from now being able to benefit from two contrary positions on the same factual question. *See 1000 Friends of Md. v. Browner*, 265 F.3d 216, 226 (4th Cir. 2001) (judicial estoppel “prevent[s] a party from playing fast and loose with the courts”) (citation omitted).²

63. Even assuming *arguendo* that the entire “ad tech stack” could be treated as a single two-sided market, the record is replete with evidence of Google’s demonstrated monopoly power and anticompetitive effects across a putative “ad tech stack.” The fact that Google has sustained supracompetitive pricing for its ad exchange (AdX) for many years constitutes direct evidence that Google has monopoly power. *See* PFOF §VII.C.2.a. Importantly, neither publishers nor advertisers have been able to substitute to other products to stop Google from charging a supracompetitive fee. Nor has the existence of supposed alternative pathways that might obviate the need for an ad exchange, such as SPO, caused Google to abandon its supracompetitive fees. For these reasons, Google’s supracompetitive take rates would constitute direct evidence of

² That Google’s prior statements were made in the context of motion-to-dismiss briefing does not preclude judicial estoppel because each element of judicial estoppel is met, *see* Pls. Memo of Law in Supp. of Mot. in Limine 2–8, ECF No. 1191; Pls. Rep. on Mot. in Limine 3–6, ECF No. 1283, and “[a]n equitable doctrine, judicial estoppel is invoked in the discretion of the district court[.]” *King v. Herbert J. Thomas Mem’l Hosp.*, 159 F.3d 192, 196 (4th Cir. 1998). Moreover, the purposes of judicial estoppel are implicated in any kind of judicial proceeding. *See 1000 Friends of Md.*, 265 F.3d at 226 (judicial estoppel “protect[s] the essential integrity of the judicial process” (citation omitted)).

monopoly power even in a putative “ad tech stack” market, since no other competitive options within such a market have caused Google to lower its prices to competitive levels. Similarly, Google has, in many ways, been able to degrade the quality of its products without losing customers to rivals—and this too constitutes direct evidence of Google’s market power within the three relevant markets. *See* §VII.A.1.a, VII.A.2.a, VII.A.2.c. This is also evidence of monopoly power even in a single “ad tech stack” market, as no competitors within such a market have created sufficient competitive pressure for Google to need to better serve the interests of its customers.

C. The World And The United States Are Both Geographic Markets

64. Courts apply similar principles to define geographic markets and product markets. The relevant geographic market is the area “within which the defendant’s customers who are affected by the challenged practice can practicably turn to alternative suppliers if the defendant were to raise its prices or restrict its output.” *Kolon I*, 637 F.3d at 441. Like the product-market analysis, defining the geographic market is a “fact-intensive exercise centered on the commercial realities of the market and competition.” *Id.* at 442. And, like a product market, a geographic market “need not . . . be defined with scientific precision.” *United States v. Conn. Nat’l Bank*, 418 U.S. 656, 669 (1974).

65. The United States and the world are both appropriate geographic markets for each of Plaintiffs’ relevant product markets. PFOF § VII.D.

66. Google does not contest that the United States is a relevant geographic market. *See* Def. PCOL ¶ 101. But Google argues against a worldwide geographic market based on what it calls the “smallest market rule,” under which plaintiffs can only ever plead the smallest

possible market, even if the market dynamics are global. Def. PCOL ¶ 104.³ Google’s proposed “smallest market rule” cannot be reconciled with the consistently recognized principle that “there may be more than one relevant geographic market.” *United States v. Marine Bancorporation, Inc.*, 418 U.S. 602, 621 & n.20 (1974). For example, there may be a national market as well as regional or local submarkets. *See, e.g., United States v. Pabst Brewing Co.*, 384 U.S. 546, 551–52 (1966) (relevant geographic markets included “Wisconsin,” “the three-state area of Wisconsin, Illinois, and Michigan,” and “the entire country”); *United States v. Anthem, Inc.*, 855 F.3d 345, 350–51 (D.C. Cir. 2017) (both 14-state “national accounts” market and at least one local market within one of the states); *New York v. Deutsche Telekom AG*, 439 F. Supp. 3d 179, 203–05 (S.D.N.Y. 2020) (both national market and “additional local markets”); *Cardinal Health*, 12 F. Supp. 2d at 51 (both national market and “Los Angeles, San Francisco, and Seattle regions” were relevant geographic markets).

67. Google’s “smallest market rule” also undermines the principle that market definition is a “pragmatic, factual” exercise rather than a “formal legalistic” one. *Brown Shoe*, 370 U.S. at 336; *see also Consul, Ltd. v. Transco Energy Co.*, 805 F.2d 490, 495 (4th Cir. 1986) (“The geographic demarcation should not be too tightly drawn, unless clear evidence exists that potential competitors outside the region are hindered from entering.”).

68. In appropriate circumstances, “courts regularly recognize global markets” for software products. *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 1026 (N.D. Cal. 2021), *aff’d in part, rev’d in part on other grounds*, 67 F.4th 946 (9th Cir. 2023); *see, e.g., id.* (global

³ Google’s primary citation in support of this “rule” is *E.I. Du Pont De Nemours & Co. v. Kolon Indus., Inc.*, 683 F. Supp. 2d 401, 413 (E.D. Va. 2009), *rev’d*, 637 F.3d 435 (4th Cir. 2011). *See* Def. PCOL ¶ 104. But in a subsequent proceeding in the very same case the district court acknowledged that “it appears that a Sherman Act plaintiff’s asserted ‘geographic market’ can be ‘global’ in scope” and granted leave to amend the market-definition allegations. *E.I. DuPont de Nemours & Co. v. Kolon Indus., Inc.*, 688 F. Supp. 2d 443, 457 (E.D. Va. 2009) (citing cases).

market, excluding China, for mobile gaming transactions); *Microsoft*, 253 F.3d at 52 (worldwide market for computer operating systems).

69. The market realities of the three product markets at issue here support a worldwide geographic market (as well as a United States geographic market). For example, Google itself evaluates the relevant products on a worldwide basis, PFOF ¶ 509, and conducted internal experiments as to these products based on worldwide data, PFOF ¶ 511. Moreover, (1) customers of all three products are located worldwide and many buy and sell open-web display ads internationally; (2) competition among ad tech providers is global, and major competitors for each tool serve customers globally; (3) ad tech firms enjoy indirect network effects and scale benefits not limited to narrow geographic regions; (4) Google's display advertising business operates globally; and (5) Google's challenged conduct harms competition in similar ways across the world. PFOF ¶¶ 505–512.

IV. Google Has Monopoly Power in Each of the Relevant Markets

70. Monopoly power is the “power to control prices or exclude competition.” *du Pont*, 351 U.S. at 391. It may be proven either (1) directly through “evidence of the control of prices or the exclusion of competition,” *R.J. Reynolds Tobacco Co. v. Philip Morris Inc.*, 199 F. Supp. 2d 362, 394 (M.D.N.C. 2002), or (2) indirectly “from the structure and composition of the relevant market,” *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 2013 WL 6682981, at *4 (E.D. Va. Dec. 18, 2013).

71. The evidence demonstrates that Google has monopoly power in each of the three relevant markets for open-web display advertising tools: (1) publisher ad servers, (2) advertiser ad networks, and (3) ad exchanges.

A. Direct Evidence Establishes Google's Monopoly Power in Each Relevant Market

72. Direct evidence of monopoly power is behavior that is “difficult to explain unless [a firm has] a monopoly,” including evidence of setting the terms of dealing “without considering rivals.” *Microsoft*, 253 F.3d at 57–58; *Google Search*, 2024 WL 3647498, at *92 (“Google does not consider competitors’ pricing when it sets text ads prices. That is something a firm without a monopoly would have been unable to do.”); *McWane*, 783 F.3d at 832 (competitors’ “inability to constrain McWane’s pricing” may serve as direct evidence of monopoly power). Direct evidence also includes conduct that “could only be rational if the firm knew that it possessed monopoly power,” *Microsoft*, 253 F.3d at 57–58, including “the ability to degrade product quality without concern of losing customers,” *Google Search*, 2024 WL 3647498, at *75; *see also id.* (“The fact that Google makes product changes without concern that its users might go elsewhere is something only a firm with monopoly power would do.”) (citing *Microsoft*, 253 F.3d at 58).

73. Although sustained supracompetitive pricing is direct evidence of monopoly power, a firm may still possess monopoly power if prices are falling overall in a market. Otherwise, “a great many defendants with market power, such as Alcoa in the 1920s and perhaps even the former AT&T telephone monopoly could be insulated from antitrust attack.” *Allen-Myland, Inc. v. Int’l Bus. Machs. Corp.*, 33 F.3d 194, 211 (3d Cir. 1994). Likewise, a firm may possess monopoly power even when prices remain constant over time if those prices are maintained notwithstanding “reduc[tions] [in] the amount of service” actually provided, *Red Lion Med. Safety, Inc. v. Ohmeda, Inc.*, 63 F. Supp. 2d 1218, 1229 (E.D. Cal. 1999), where prices “did not fall” in response to attempts at competition from rivals, *McWane*, 783 F.3d at 839, or

where the defendant's price is "low" on an absolute basis and less than the price of rivals, *Microsoft*, 253 F.3d at 56-58.

74. Likewise, although a firm's ability to restrict output constitutes direct evidence of market power, *see, e.g., R.J. Reynolds*, 199 F. Supp. 2d at 394, in some circumstances "a dominant firm [may have] no incentive to restrict output to earn monopoly profits," *Google Search*, 2024 WL 3647498, at *80. For example, in *Google Search*, the court noted that because "Google's marginal cost of responding to one additional query is near zero," "reduced output [was] an ill-fitting indicia of monopoly power." *Id.* ("[T]he fact that search output has grown is not inconsistent with monopoly power in search."). That conclusion is confirmed by a century of precedent. For example, the domestic supply of petroleum products increased between 1870 and 1906, which coincided with Standard Oil illegally monopolizing commerce in those products in a way that "operated to destroy the potentiality of competition which otherwise would have existed" in those markets. *Standard Oil of N.J. v. United States*, 221 U.S. 1, 74-77 (1911). Similarly, the market for Intel-compatible PC operating systems grew considerably in the 1990s, during which time Microsoft possessed and illegally maintained monopoly power in the market. *See Microsoft*, 253 F.3d at 51-80.

75. Here, Plaintiffs have established direct evidence of Google's monopoly power. PFOF §§ VII.A.2.a., VII.B.2.a., VII.C.2.a. With respect to the publisher ad server market, Google exploited publishers' inability to switch away from DFP to force publishers to accept UPR, which insulated AdX from competition and which was not in publishers' best interest. PFOF ¶¶ 254-256, 279, 395-397. UPR is direct evidence of monopoly power because UPR was a degradation in quality—it took away a product function that publishers valued—and Google was able to impose that degradation without needing to worry about publishers switching to other ad

servers. That is “something only a firm with monopoly power would do.” *Microsoft*, 253 F.3d at 58; PFOF ¶¶ 253–256, 395–396 (Xandr’s publisher ad server allows publishers to set multiple floors). Google also exploited publishers’ inability to switch away by granting AdX a First Look, which conferred on AdX informational advantages and also was not in publishers’ best interest. PFOF ¶¶ 169–174, 178–179, 181–182. And Google did much the same thing with Last Look, again using its power in the ad server market to grant itself an artificial auction advantage that was not in publishers’ best interest. PFOF ¶¶ 202–203, 215, 230–235. UPR, First Look, and Last Look all demonstrate Google’s monopoly power in the publisher ad server market, as only a monopolist could make product changes that are detrimental to its customers without discipline from the threat of competition.

76. Similarly, with respect to the ad exchange and advertiser ad network markets, Google used its control over AdX and the unique demand attributable to Google Ads to force publishers to use DFP—even though many would have preferred to use a different publisher ad server—and caused rival publisher ad servers to exit the market. PFOF ¶¶ 103–107, 118–119, 140–149. Google’s power to force publishers to use a product that they would have preferred not to use and to exclude rivals through means other than competition on the merits is behavior that is “difficult to explain unless [a firm has] a monopoly.” *Microsoft*, 253 F.3d at 57. Google also set a durable, 20 percent take rate in the exchange market even in the face of rival exchanges offering lower take rates and the entry of header bidding—illustrating that AdX was immune from price competition. PFOF ¶¶ 479–489. And for the advertiser ad network market, Google similarly assessed that Google Ads was immune from price competition and could increase its margins without losing revenues. PFOF ¶¶ 443–444. In addition, Google Ads largely bid only on

AdX—even though doing so was not in its advertiser customers’ best interests, PFOF ¶¶ 109–110, § IV.A—another conduct that makes sense only if Google has monopoly power.

77. Overall, the evidence establishes Google’s ability to degrade quality and set durable, supracompetitive prices without considering its rivals’ prices, PFOF §§ VII.A.2.a, VII.B.2.a, VII.C.2.a, VII.C.2; the lack of a competitive response to its pricing practices, *id.*; limited switching by customers, PFOF ¶¶ 144–150, 304–395, 406–407, 484, 492, 494; its exclusion of competitors, *see, e.g.*, PFOF ¶¶ 148–149; and the cumulative and reinforcing effects of its monopoly positions in several related markets, PFOF § V, PCOL § V.B.1.

78. Even in a market comprised of the entire “ad tech stack,” which would be improper for the reasons discussed *supra* PCOL § III.B, the evidence likewise demonstrates Google’s monopoly power in a two-sided transaction market comprised of the entire “ad tech stack.” Google’s sustained supracompetitive pricing and quality degradation over each of the component products within the stack—without considering substitution to rival products—is direct evidence of monopoly power affecting publishers and advertisers alike. PFOF §§ V.A–V.B.

B. Indirect Evidence Establishes Google’s Monopoly Power in Each Relevant Market

79. Monopoly power may also be found indirectly from a firm’s possession of a “dominant share of a relevant market that is protected by entry barriers.” *Microsoft*, 253 F.3d at 51. Such indirect evidence is not required to prevail on a Section 2 claim if there is direct evidence of monopoly power. *See, e.g., Re/Max Int’l, Inc. v. Realty One, Inc.*, 173 F.3d 995, 1018 (6th Cir. 1999); *Meijer*, 572 F. Supp. 2d at 54–55. Nevertheless, indirect evidence independently shows Google’s monopoly power here because Google has a durable and dominant market share

in each relevant market, and that dominant position is protected by high barriers to entry and expansion.

1. Google’s Market Shares For Publisher Ad Servers For Open-Web Display Advertising Are Evidence Of Monopoly Power

80. The evidence shows that Google’s share of the market for publisher ad servers is 87% in the United States market and 91% in the worldwide market. PFOF ¶ 400. Those shares, alongside Google’s dominance and durability in the United States and worldwide markets for publisher ad servers, PFOF § VII.A.2.b, and the barriers to entry characterizing those markets, PFOF § VII.A.2.c, are sufficient to establish that Google has monopoly power in publisher ad servers. *See, e.g., Kolon I*, 637 F.3d at 451 (market shares above 70%, along with numerous barriers to entry, sufficient to plead indirect evidence of monopoly power); *see also, e.g., Intellectual Ventures*, 99 F. Supp. 3d at 624 (“70% is circumstantial evidence of monopoly power”).

2. Google’s Market Shares for Advertiser Ad Networks for Open-Web Display Advertising Are Evidence of Monopoly Power

81. The evidence shows that Google’s share of the market for advertiser ad networks is 90% in the United States market, and 85% in the worldwide market. PFOF ¶ 448. Taken in conjunction with Google’s dominance and durability in the United States and worldwide markets for advertiser ad networks, PFOF § 7.B, as well as the barriers to entry characterizing those markets, PFOF ¶¶ 449–451, these shares are sufficient to establish that Google has a monopoly share in those markets. *See Kolon I*, 637 F.3d at 451.

3. Google’s Market Shares For Ad Exchanges For Open-Web Display Advertising Are Evidence Of Monopoly Power

82. The evidence established that Google’s share of the market for ad exchanges is between 46% and 56% in the United States market and between 63% and 71% in the worldwide

market. PFOF § VII.C. Google’s shares are high and durable. PFOF ¶¶ 496–497. Google is roughly nine times larger than its next-largest competitor in the worldwide market and five times larger in the United States, PFOF ¶¶ 496–499. In addition, Google’s dominance across multiple ad tech products has limited the ability of customers to substitute comparable ad exchanges—including by making Google Ads demand exclusive to AdX. PFOF § IV.A.2. Taken in conjunction with the barriers to entry characterizing those markets, PFOF §§ VII.B.2.c, VII.C.2.c, as well as Google’s monopoly power in related markets that Google has connected to the ad exchange market through a course of mutually reinforcing exclusionary conduct, PFOF ¶¶ 361, 380, 381, 446, Google’s shares in the markets for ad exchanges are sufficient to establish that Google had monopoly power both in the United States and global markets for ad exchanges.

83. While shares above 70% are presumptively *sufficient* for showing monopoly power alongside a showing of barriers to entry, *see Kolon I*, 637 F.3d at 451, there is “no minimum percentage” *necessary* to prove monopoly power indirectly, *Google Search*, 2024 WL 3647498, at *76. The Fourth Circuit has cited approvingly to cases holding that market shares as low as 50%—in conjunction with other factors such as the “durability of the defendant’s market power”—may establish monopoly power. *Kolon I*, 637 F.3d at 450–51 (citing *Domed Stadium Hotel, Inc. v. Holiday Inns, Inc.*, 732 F.2d 480, 489 (5th Cir. 1984)); *see also Hayden Publ’g Co., Inc. v. Cox Broad. Corp.*, 730 F.2d 64, 69 n.7 (2d Cir. 1984) (“[A] party may have monopoly power in a particular market, even though its market share is less than 50%.”); *US Airways, Inc. v. Sabre Holdings Corp.*, 2022 WL 1125956, at *9 (S.D.N.Y. Apr. 15, 2022) (market share between 49% and 52% percent sufficient for monopoly power).

84. Bright-line market share requirements are inappropriate for monopolization claims because the Supreme Court defines monopoly power in light of real-world market

dynamics rather than by reference to artificial cut-offs. *See, e.g., du Pont*, 351 U.S. at 391 (monopoly power is “the power to control prices or exclude competition”). Thus, percentages alone are “not the only consideration” in determining whether a firm has monopoly power. *Kolon Indus., Inc. v. E.I. du Pont De Nemours & Co.*, 2012 WL 1155218, at *11 (E.D. Va. Apr. 5, 2012) (“*Kolon II*”). For example, in addition to the “durability of the defendant’s market power,” *Kolon I*, 637 F.3d at 451, courts consider “the size and strength of competing firms, freedom of entry, pricing trends and practices in the industry, ability of consumers to substitute comparable goods, and consumer demand,” *United States v. Dentsply Int’l, Inc.*, 399 F.3d 181, 187 (3d Cir. 2005).

85. Because “the size and strength of competing firms” is a key consideration in evaluating monopoly power, *id.*, market-share percentages alone may also understate monopoly power when a firm’s market shares are closer to 50% but are significantly larger than those of a defendant’s next-closest rivals. *See, e.g., Fineman v. Armstrong World Indus., Inc.*, 980 F.2d 171, 203 (3d Cir. 1992) (finding “persuasive” evidence a 48% market share “exceed[ing] even the combined market share of its three closest competitors and equal[ing] over three times the market share of its nearest competitor”); *Reazin v. Blue Cross & Blue Shield of Kan., Inc.*, 899 F.2d 951, 969 (10th Cir. 1990) (sufficient evidence to support monopoly power notwithstanding market-share estimates of “somewhere between forty-seven and sixty-two percent” given that defendant was “by far the largest private source of health care financing in its service area”); *Syufy Enters. v. Am. Multicinema, Inc.*, 793 F.2d 990, 995 (9th Cir. 1986) (finding “60–69% market share . . . accompanied by a fragmentation of competition,” where “no competing exhibitor . . . ever had a greater share than 24.7%” sufficient to infer monopoly power); *Pac. Coast Agric. Exp. Ass’n v. Sunkist Growers, Inc.*, 526 F.2d 1196, 1204 (9th Cir. 1975) (market

share of “45 to 70%” sufficient to establish monopoly power where the defendant’s competitors “were relatively small,” with no single competitor controlling over 18 percent of the market).

4. Google’s Shares In Each Relevant Market Are Protected By Significant Barriers To Entry

86. “Entry barriers are particular characteristics of a market which impede entry by new firms into that market.” *Kolon II*, 2012 WL 1155218, at *11 (quoting *Reazin*, 899 F.2d at 968). In other words, “[a]ny market condition that makes entry more costly or time-consuming and thus reduces the effectiveness of potential competition as a constraint on the pricing behavior of the dominant firm should be considered a barrier to entry, regardless of who is responsible for the existence of that condition.” *FTC v. Surescripts, LLC*, 665 F. Supp. 3d 14, 44 (D.D.C. 2023) (quoting *S. Pac. Commc’ns Co. v. Am. Tel & Tel. Co.*, 740 F.2d 980, 1001 (D.C. Cir. 1984)).

87. Barriers to entry and expansion include high capital costs, economies of scale, network effects, entrenched brand preferences, previous failed entry by potential rivals, control of key distribution channels, mutually reinforcing monopolies in related markets, and exclusivity or other conditions on dealing. *See, e.g., Google Search*, 2024 WL 3647498, at *76, 111–12 (capital costs, control of key distribution channels, brand preferences, scale, network effects, and exclusive contracts); *Microsoft*, 253 F.3d at 55–56 (indirect network effects); *Surescripts*, 665 F. Supp. 3d at 45 (indirect network effects); *FTC v. Sysco Corp.*, 113 F. Supp. 3d 1, 80 (D.D.C. 2015) (capital costs and incumbency); *H&R Block*, 833 F. Supp. 2d at 75 (reputation and brand impacts on consumer behavior); *Image Tech. Servs., Inc. v. Eastman Kodak Co.*, 125 F.3d 1195, 1208 (9th Cir. 1997) (control of essential or superior resources, entrenched buyer preferences, high capital costs, and economies of scale); *United States v. Syufy Enters.*, 903 F.2d 659, 667 (9th Cir. 1990) (exclusive contracts designed to lock out potential competitors); *Jefferson Parish Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 14 (1984) (tying can create barriers to entry in the market

for the tied product); *United States v. AT&T*, 552 F. Supp. 131, 171 (D.D.C. 1982) (control of “strategic bottleneck” products); *Cardinal Health*, 12 F. Supp. 2d at 56–57 (“history of entry into the relevant market”).

88. Barriers to entry are often pronounced in digital markets, where courts have consistently recognized the durability of monopolists and the difficulty of unseating them once they have achieved scale and network effects in the market. *Bazaarvoice*, 2014 WL 203966, at *50 (citing that the proposed transaction would “tip the scales” in “permanent favor” of the dominant firm and create a “protective moat” from competition). In two-sided digital markets like ad exchanges, higher-quality features by new entrants may not be able to unseat a monopolist, as new products may be “inherently less valuable because [they have] a smaller user base than incumbent services.” *Klein v. Facebook, Inc.*, 580 F. Supp. 3d 743, 780 (N.D. Cal. 2022); *see also Microsoft*, 253 F.3d at 49 (“In markets characterized by network effects,” once “a product or standard achieves wide acceptance, it becomes more or less entrenched.”); *In re Google Play Store Antitrust Litig.*, 2024 WL 4438249, at *6 (N.D. Cal. Oct. 7, 2024) (“Even a corporate behemoth like Amazon could not compete with the Google Play store due to network effects.”).

89. Each relevant market here has significant barriers to entry. Publisher ad servers, ad exchanges, and advertiser ad networks each require significant capital expenditure to develop and maintain and their commercial success depends to a large degree on economies of scale, network effects, and overcoming high switching costs. PFOF §§ VII.A.2.c. For example, building a publisher ad server would require significant time, capital investment, and engineers—so much so that Meta, one of the largest technology companies in the world, determined that building one from the ground up was not a viable option. PFOF ¶ 404.

90. The importance of scale and network effects are particularly important for ad exchanges and advertiser ad networks, which require significant amounts of both publisher inventory and advertiser demand to become viable. PFOF ¶¶ 89, 97, 456, 511. These barriers to entry are illustrated by the evidence of unsuccessful or failed entry, such as Meta’s decision to cease purchasing open-web display inventory through its advertiser ad network. PFOF ¶¶ 404, 149. Google’s conduct has exacerbated these barriers to entry by allowing Google to maintain flanking monopolies in each of these three closely related markets, PFOF § VII, gaining unmatched scale advantages with respect to data and transaction volume, PFOF ¶¶ 441, 448, 496, 497, restricting expansion of its rivals by preventing them from effectively competing for hundreds of billions of individual transactions, PFOF § V.C. In addition, Google’s advertiser ad network monopoly is reinforced by Google’s unlawful monopoly in general search text advertising, since advertisers use Google Ads to buy general search text ads. *See Google Search*, 2024 WL 3647498, at *48, 129; PFOF ¶¶ 58–59, 93, 97, 104, 111, 115, 414, 439, 451.

91. The theoretical possibility that new forms of competition could diminish a defendant’s market position at some indeterminate future time cannot refute evidence of monopoly power today. In assessing market power, a court considers “only substitutes that constrain pricing in the reasonably foreseeable future.” *Microsoft*, 253 F.3d at 53–54; *see also id.* at 55 (“[W]ere middleware to succeed, it would erode the applications barrier to entry. . . . But as the District Court found, middleware will not expose a sufficient number of APIs to erode the applications barrier to entry in the foreseeable future.”). Thus, the district court in *Google Search* rejected an argument that Google’s search monopoly was not protected by barriers to entry because of potential disruption by artificial intelligence, concluding that “the advent of artificial intelligence (AI) has not sufficiently eroded barriers to entry—at least not yet,” and that “such

innovation is meaningful only if it can change the market dynamic in the ‘foreseeable future.’” 2024 WL 3647498, at *80 (quoting *Microsoft*, 253 F.3d at 55). Google cites *Kolon III* for the proposition that monopoly power must be durable, Def. PCOL ¶ 124, but durability is evaluated by looking at “uncontested facts” about past trends rather than speculating beyond the foreseeable future. See *Kolon Indus. Inc. v. E.I. DuPont de Nemours & Co.*, 748 F.3d 160, 174–75 (4th Cir. 2014) (“*Kolon III*”). And here the facts show that Google’s monopoly power has been remarkably durable, and nothing in the foreseeable future threatens that durable market power. See PFOF ¶¶ 106, 402–404, 449, 497. To the contrary, the data advantages that Google has accumulated from its scale across the ad tech stack, see PFOF ¶¶ 286, 441, will continue to benefit Google’s artificial intelligence going forward, see PFOF ¶ 288, and serve as a barrier to entry for firms that lack such data.

V. Google Has Engaged In Exclusionary Conduct To Protect Its Monopolies

92. Google’s exclusionary conduct has harmed competition and enhanced its significant monopoly power. As described more fully below, Google has engaged in a series of anticompetitive acts. See PCOL § V.A. These anticompetitive acts work together and have mutually reinforcing effects. PCOL § V.B.1. In addition, whether viewed individually or collectively, Google’s conduct harms competition in ways that are both important and well-recognized in the caselaw. PCOL § V.B.2. Finally, Google’s conduct has harmed competition even if the relevant markets are analyzed as two-sided transaction platform markets. PCOL § V.B.3.

A. Google Has Engaged in a Series of Anticompetitive Acts

93. Courts evaluate whether conduct is anticompetitive under a burden-shifting framework. See PCOL ¶ 11. At the first step of that framework, a plaintiff must “establish[] a prima facie case . . . by demonstrating anticompetitive effect.” *Microsoft*, 253 F.3d at 59.

Evidence of an anticompetitive effect may take the form of “proof of actual *or* threatened consumer harm,” and such proof “need not invariably be elaborate.” *Google Search*, 2024 WL 3647498, at *103 (emphasis added). Evidence of harm to competition can include evidence that conduct (1) supports the defendant’s ability to charge a supracompetitive price, (2) reduces innovation or quality, (3) limits consumer choice, including by forcing customers to use products they would not otherwise want to use, (4) raises barriers to entry or otherwise reduces the competitiveness of the market by reducing rivals’ scale, (5) excludes rivals on a basis other than competition on the merits, (6) limits competition from a nascent competitive threat, and, in some cases (7) completely excludes rivals by causing them to exit. *See, e.g., Amex*, 585 U.S. at 542 (prices, quality); *Duke Energy*, 111 F.4th at 353, 358, 362–63 (excluding rivals “on some basis other than efficiency”) (internal citation omitted); *Viamedia*, 951 F.3d at 475–76 (reduced innovation, forcing of customers, and exit of rivals); *US Airways*, 938 F.3d at 62–63 (prices, quality, and innovation); *McWane*, 783 F.3d at 838–39 (depriving rivals of scale and slowing or preventing effective entry); *Dentsply*, 399 F.3d at 194 (limiting consumer choice); *Microsoft*, 253 F.3d at 62, 71 (keeping rivals’ usage below the critical level necessary to pose a threat to defendant’s monopoly, excluding rivals “through a means other than competition on the merits”); *Google Search*, 2024 WL 3647498, at *109–19 (depriving rivals of scale, reducing rivals’ incentive and ability to innovate).

94. Because “anticompetitive conduct comes in many different forms that cannot always be categorized,” the Fourth Circuit has emphasized that “Section 2 focuses on anticompetitive conduct, not on court-made subcategories of that conduct.” *Duke Energy*, 111 F.4th at 354; *see also id.* at 354–55 (“[T]he means of illicit exclusion, like the means of legitimate competition, are myriad.”) (cleaned up). Insofar as such categories of conduct are

useful, their “purpose . . . is to help determine the presence or absence of harmful effects.” *Viamedia*, 951 F.3d at 453 (citation omitted). “[A] dominant firm’s conduct may [also] be susceptible to more than one court-defined category of anticompetitive conduct,” *id.*, and “categories of conduct[,] [including] refusals to deal and tying[,] are conceptually related and may overlap,” *Duke Energy*, 111 F.4th at 354–55 (cleaned up). Where this occurs, the categorization exercise “should not cause confusion if [a court] stay[s] focused on the underlying inquiry: the conduct ‘must harm the competitive process and thereby harm consumers.’” *Id.*; *see also Microsoft*, 253 F.3d at 62 (key question in Section 2 cases is whether a monopolist has acquired or maintained its power “through a means other than competition on the merits”); *see also Google Search*, 2024 WL 3647498, at *97 (focusing analysis on Google’s efforts to maintain dominance through means other than competition on the merits).

95. Because court-made categories of conduct are a useful tool to identify harms to competition, rather than rigid constraints on the Court’s analysis, “[i]t is foundational that alleged anticompetitive conduct must be considered as a whole,” rather than separated into “manufactured subcategories.” *Duke Energy*, 111 F.4th at 354–55. “[C]ourts must not dismember the individual acts of an exclusionary campaign when those acts are interconnected.” *Id.* at 355. This is particularly true where, as here, a defendant engaged in mutually reinforcing actions to achieve an anticompetitive end. *See, e.g., Cont’l Ore Co. v. Union Carbide & Carbon Corp.*, 370 U.S. 690, 698–99 (1962) (“plaintiffs should be given the full benefit of their proof without tightly compartmentalizing the various factual components and wiping this slate clean after scrutiny of each”); *City of Anaheim v. S. Cal. Edison Co.*, 955 F.2d 1373, 1376 (9th Cir. 1992) (“[I]t would not be proper to focus on specific individual acts of an accused monopolist while refusing to consider their overall combined effect.”).

96. “Conduct that might otherwise be lawful may be impermissibly exclusionary under antitrust law when practiced by a monopolist.” *Kolon I*, 637 F.3d at 441; *see also Dentsply*, 399 F.3d at 187 (same); *McWane*, 783 F.3d at 836 (“[T]he behavior of monopolists faces more exacting scrutiny under the antitrust statutes.”); *Sargent-Welch Sci. Co. v. Ventron Corp.*, 567 F.2d 701, 711–12 (7th Cir. 1977) (similar).

97. In evaluating whether conduct is anticompetitive, courts must consider market realities, i.e., “the particular structure and circumstances of the industry at issue.” *Verizon Commc’ns, Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 411 (2004); *accord NCAA v. Alston*, 594 U.S. 69, 93 (2021) (“Whether an antitrust violation exists necessarily depends on a careful analysis of market realities.”). That includes the real-world behavior of customers and competitors, as well as the defendant’s conduct that may not be independently anticompetitive, especially when it is “interconnected” with exclusionary conduct. *See Duke Energy*, 111 F.4th at 355; *see also Google Search*, 2024 WL 3647498, at *78 (“Though the Chrome [internet browser] default is not alleged to be exclusionary conduct, it is a market reality that significantly narrows the available channels of distribution and thus disincentivizes the emergence of new competition.”). The possibility that new forms of competition “might be developed in the future is not relevant to the court’s assessment of the market realities today.” *Google Search*, 2024 WL 3647498, at *101; *see also id.* at 101 n.9 (“this court’s task is not to peer into the future when determining the present effects of the [exclusionary agreement]”).

98. One market reality is particularly important here: Google’s market power in three adjacent relevant markets gives it a unique ability to “use [its] economic power in one market to restrict competition on the merits in another,” *N. Pac. Ry.*, 356 U.S. at 11, and create

“bottlenecks” to influence auctions and competition, *see, e.g., AT&T*, 552 F. Supp. at 171 (control of companies with “strategic bottleneck position” allowed firm to maintain monopoly).

99. Additionally, although “intent” is not a separate element of a monopolization claim under Section 2, “knowledge of intent may help the court to interpret facts and to predict consequences.” *Bd. of Trade of City of Chi. v. United States*, 246 U.S. 231, 238 (1918); *see also Aspen Skiing*, 472 U.S. at 602 (“evidence of intent is merely relevant to the question whether the challenged conduct is fairly characterized as ‘exclusionary’ or ‘anticompetitive’ . . . or ‘predatory’”); *LePage’s Inc. v. 3M*, 324 F.3d 141, 163 (3d Cir. 2003) (en banc) (“The Supreme Court has made clear that intent is relevant to proving monopolization.”). “[N]o monopolist monopolizes unconscious of what he is doing,” and therefore “[i]mproper exclusion (exclusion not the result of superior efficiency) is always deliberately intended.” *Aspen Skiing*, 472 U.S. at 602–03; *see also Sargent-Welch*, 567 F.2d at 712 (“The anticompetitive quality of an act may depend . . . upon the purpose with which it was done.”).

100. A plaintiff is not required to show that the defendant’s conduct is the “but-for” cause of any anticompetitive effects. The evidence need only show that the challenged conduct “reasonably appear[s] capable of making a significant contribution to . . . maintaining monopoly power.” *Microsoft*, 253 F.3d at 79; *see also Viamedia*, 951 F.3d at 485; *McWane*, 783 F.3d at 839; *Dentsply*, 399 F.3d at 187; *Google Search*, 2024 WL 3647498, at *104.

101. The conduct that Google has employed to willfully acquire and maintain monopoly power in the relevant markets consists of several intentional and interrelated anticompetitive steps. *First*, after acquiring DoubleClick, Google effectively tied DFP, AdX, and Google Ads together, harming competition in a variety of ways, including by restricting publishers’ ability to switch away from its dominant ad server, DFP. *Second*, Google used its

monopoly power in the ad server market to limit competition in the ad exchange market by forcing customers to accept auction practices that were not in their best interest—i.e., First Look, Last Look, and UPR. *Finally*, Google acquired and substantially reduced the competitive threat posed by an innovative competitor, Admeld, and, through Project Poirot, manipulated the bids of DV360 to limit the effectiveness of Google’s exchange competitors. This conduct has, individually and collectively, led to higher prices, lower quality, less innovation, and reduced choice for publishers and advertisers, while foreclosing rivals of opportunities to compete for customers and depriving them of the scale needed to effectively challenge Google.

102. Google argues that Plaintiffs have “abandoned” their challenge of several exclusionary acts because Plaintiffs’ experts did not opine directly that they were exclusionary. *See* Def. PFOF ¶¶ 647–702. But Plaintiffs are still challenging the DoubleClick acquisition, Sell-side Dynamic Revenue Share (discussed below as part of Last Look), and Project Poirot, and the evidence demonstrates that each of these are anticompetitive. Whether there is expert testimony or not is no barrier to demonstrating that the conduct is exclusionary. While “[e]xpert testimony is useful as a guide to interpreting market facts, [] it is not a substitute for them,” *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 242 (1993), and indeed expert testimony has less “probative value” compared to evidence of the underlying “economic factors,” *id.* (quoting in part *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 594 (1986)). “[C]ommon sense. . . suggest[s] that expertise in antitrust economics [is] not required to determine that certain actions by a competitor have detrimental effects on its competition.” *Insignia Sys., Inc. v. News Am. Mktg. In-Store, Inc.*, 2011 WL 167259, at *6 (D. Minn. Jan. 14, 2011). The anticompetitive effects of each component of Google’s course of conduct are described below. The synergistic, mutually reinforcing effects of Google’s course of

conduct, “considered as a whole,” *Duke Energy*, 111 F.4th at 354, are further described below in PCOL § V.B.

1. Google’s DoubleClick Acquisition Harmed Competition

103. Google’s 2008 acquisition of DoubleClick is the antecedent act that enabled Google’s anticompetitive course of conduct here. The acquisition gave Google an ad exchange, cemented Google’s position in the publisher ad server market, established Google’s control over multiple related markets for ad tech tools, and enabled Google’s subsequent conduct by securing Google’s dominance over publishers and their open-web display inventory. PFOF § IV.A.1; *see Grinnell*, 384 U.S. at 576 (“By those [three] acquisitions [the defendant] perfected the monopoly power to exclude competitors and fix prices.”). Buying DoubleClick also gave Google the tools it would need to lock in publishers (reducing consumer choice), dictate auction rules to prevent rivals from achieving scale, and exclude competitors by tying DFP to Google Ads and AdX. *See, e.g., Microsoft*, 253 F.3d at 71 (conduct that kept usage of rivals’ products “below the critical level necessary . . . to pose a real threat” to Microsoft found to be anticompetitive); *Google Search*, 2024 WL 3647498, at *109 (conduct that “den[ies] rivals access to user queries, or scale, needed to effectively compete” found to be anticompetitive).

104. The caselaw recognizes that acquisitions can harm competition by means of “foreclosure”—meaning that acquisitions can allow a firm to reduce the competitiveness of its rivals by limiting their access to an important source of supply, distribution outputs, or inputs. For example, in *Illumina*, the Fifth Circuit assessed the risk to competition from a monopolist that supplied a key input based on the risk that the monopolist might cut off its rival’s access to the input. 88 F.4th at 1051–53; *see also Brown Shoe*, 370 U.S. at 323–24 (mergers can harm competition “by foreclosing the competitors of either party from a segment of the market

otherwise open to them”; “the arrangement may act as a clog on competition, which deprives rivals of a fair opportunity to compete”) (cleaned up).

105. Google’s acquisition of DoubleClick allowed for precisely this type of anticompetitive effect. Many Google Ads customers are small advertisers that rely on Google Ads to buy Google’s general search text ads—a market that Google has monopolized. *See* PFOF ¶¶ 58–59, 93; *Google Search*, 2024 WL 3647498, at *129. Google used its acquisition of DoubleClick to restrict access to Google Ads’ unique set of small advertisers to Google’s own ad exchange and publisher ad server. PFOF § IV.A.2. Therefore, at one level of the ad tech stack, Google controls a vital input (demand from Google Ads advertisers) for ad exchanges and publisher ad servers. Upon acquiring DoubleClick’s ad exchange and publisher ad server products (AdX and DFP), Google foreclosed this vital input from the rivals of its newly acquired products. This inhibited rival publisher ad servers and ad exchanges from competing on the merits of their products because no matter what innovations or incentives those rivals offered, publishers were compelled to use AdX and DFP to access “must have” Google Ads demand. PFOF § IV.A.2.

2. Google Ads’ Exclusivity to AdX Harms Publishers and Advertisers

106. Google restricts the ability of its advertiser customers to use the Google Ads advertiser ad network to buy ad impressions through any exchange other than Google’s AdX. PFOF ¶¶ 104, 109. Google maintains this restriction *not* because it is in the best interest of Google’s advertiser customers, who would benefit from being able to bid on open-web display ad inventory made available through non-Google exchanges. *See* PFOF ¶ 110. Rather, Google restricts Google Ads advertisers to buying through AdX because doing so benefits *Google* by creating an artificial competitive advantage for AdX. *See* PFOF ¶¶ 112–113, 118, 120–124.

Google’s own employees and documents have recognized the anticompetitive purpose and effect of restricting Google Ads demand to AdX. PFOF ¶¶ 110, 121–125.

107. Google’s decision to restrict Google Ads demand to AdX harms competition both in the exchange market and in the publisher ad server market. It harms competition in the exchange market in part by “coerc[ing] the abdication of [publishers’] independent judgment as to the . . . merits” of which ad exchange to use. *Times-Picayune*, 345 U.S. at 605. In other words, it forces publishers to use AdX, not because it offers the lowest prices or highest quality, but because it is the only exchange that offers publishers effective access to Google Ads demand.

108. Additionally, the restriction of Google Ads to AdX harms competition in the exchange market by depriving Google’s exchange rivals of scale, which limits their ability to compete. PFOF § V.C. And it also contributes to AdX’s ability to charge a supracompetitive take rate, which harms publishers, advertisers, and ultimately consumers. PFOF ¶¶ 269, 273, 312–313.

109. The restriction of Google Ads to AdX also harms competition in the publisher ad server market by increasing the coercive power of the DFP/AdX tie. The tying of real-time bids from AdX to DFP forces publishers to use DFP if they want to be able to effectively access AdX. *See* PFOF § IV.A.2.b. And the restriction of Google Ads to AdX makes that tie even more impactful: if a publisher wants to get full access to Google Ads, it needs to use AdX, and if it wants to get effective access to AdX, it needs to use DFP. *See id.* This makes it even harder for publishers to switch away from DFP and reduces the competitiveness of the ad server market.

3. The DFP/AdX Tie Harms Competition

110. Google’s tying of DFP to real-time bids from AdX harms competition and contributes to Google’s near-total dominance of the publisher ad server market. Because Google provides real-time bids from AdX only to publishers that use DFP, publishers cannot effectively

run an auction that involves AdX unless they use DFP. PFOF ¶¶ 103, 105. And AdX is important to publishers because it is the largest exchange (roughly nine times the size of the next largest rival) and is the only way for publishers to effectively access the large pool of unique demand from Google Ads. PFOF ¶¶ 105–107, 496. Accordingly, the DFP-AdX tie forces publishers to use DFP. PFOF § IV.A.2.

111. The tie between AdX and DFP also reduces innovation. PFOF § IV.A.2. Publishers observed that DFP was not acting in their best interests in a variety of ways, including, for example, by forcibly removing publishers’ ability to set a higher price floor for AdX (i.e., UPR). PFOF § IV.B.5. In a competitive market, publishers would be able to switch to another ad server or use the threat of switching to encourage Google to better serve their interests. *See* PFOF ¶¶ 152, 394–399. But the tie between DFP and AdX means that they are unable to do so. *Id.* The tie between DFP and AdX also reduces innovation by limiting rival ad servers’ ability to innovate. PFOF § V.C.

112. The tie between DFP and AdX also caused rivals to exit the publisher ad server business completely, or to reposition in a way that made them compete less directly with DFP. *See* PFOF ¶¶ 148, 157, 283, 311, 410–411, 438. And the tie makes competing with DFP very difficult even for the ad servers that remain in the market as well. PFOF ¶¶ 395, 405–411. Google accomplished this not through competition on the merits—i.e., not because DFP had better features or higher quality—but instead because publishers are dependent on AdX and the unique, exclusive Google Ads demand that it enjoys. *See* PFOF ¶ 105.

113. Moreover, the DFP/AdX tie has all the hallmarks of tying or similar conduct that courts have found to be anticompetitive in the past: it forces customers to use a product that they do not want to use, it makes it difficult for rivals to compete, it has caused rivals to exit or re-

orient to focus less on competing with Google, and it has contributed to Google's ~90% share in the publisher ad server market. *See, e.g., Viamedia*, 951 F.3d at 471–75 (reversing summary judgment of tying claim in case where defendant had forced customers to use its product and caused the exit of its main rival); *LePage*, 324 F.3d at 154–57, 159–63 (bundled discounts forced distributors to drop rival's products, largely excluding rival from market); *Microsoft*, 253 F.3d at 64–67, 78–80 (conduct significantly reduced rivals' share, deterred OEMs from installing rivals' products, and protected Microsoft's monopoly). In addition, the anticompetitive nature of Google's conduct can also be seen by the fact that it allows Google to exclude rivals through something other than competition on the merits. *See Duke Energy*, 111 F.4th at 353, 358, 362–63 (excluding rivals "on some basis other than efficiency"); *Microsoft*, 253 F.3d at 64–67.

114. The availability of AdX Direct tags does not alter any of these conclusions. AdX Direct does not provide access to real-time bids, *see* PFOF ¶ 159, and the evidence at trial shows that it is not an effective alternative, *see* PFOF § IV.A.2.b(4). In fact, less than 1% of AdX's revenue comes from non-DFP publishers that use AdX Direct, *id.* The fact that AdX is used separately from DFP so infrequently supports the conclusion that the products are effectively tied together. *Cf. Cascade Health Sols. v. PeaceHealth*, 515 F.3d 883, 915 (9th Cir. 2008) (noting that 14% separate sales "plac[ed] this issue in the realm of disputed facts").⁴

115. Google's tying of real-time bids from AdX to DFP (along with its restriction of Google Ads to AdX, discussed above) also laid the foundation for much of its other anticompetitive conduct. Because publisher ad servers act as the decision-maker for how a

⁴ This is one factor that distinguishes *It's My Party*, 811 F.3d at 685. In that case, customers chose to use the tied product separately from the tying product fourteen percent of the time, *id.* at 685, which means that the products were used separately much more often than is the case here. In addition, in that case, "[t]he record contain[ed] little basis for concluding that artists were coerced into taking the tied product," *id.* at 685, while this case does involve significant evidence of publishers being coerced into using DFP, *see* PFOF § IV.A.2.b.

publisher's inventory is sold, Google's dominant position in the publisher ad server market, supported and enhanced by the DFP/AdX tie, allowed Google to manipulate auctions to favor itself and disadvantage rival ad exchanges, including through UPR, First Look, and Last Look.

4. Unified Pricing Rules Harm Competition

116. UPR significantly harmed competition in the ad exchange market. Prior to UPR, publishers had the ability to set different price floors for different exchanges—an ability they used, among other things, to reduce their dependence on AdX, to weed out low quality ads, and to facilitate volume discount agreements with other exchanges. *See* PFOF ¶¶ 246–249. UPR took that control away from publishers, preventing them from setting a higher price for AdX than for other exchanges and making it harder for publishers to shift transactions from AdX to other exchanges. *See* PFOF ¶¶ 251–252, 255.

117. Importantly, UPR allowed AdX (and Google Ads) to “exclude rivals on some basis other than efficiency.” *Duke Energy*, 111 F.4th at 353 (quoting *Aspen Skiing*, 472 U.S. at 605). In other words, UPR caused AdX to win not because it was a better or less expensive ad exchange, but because Google prevented publishers from using variable price floors to channel transactions away from AdX and toward rival exchanges. Thus, UPR is yet another example of Google taking business from rivals for reasons unrelated to competition on the merits.

118. UPR also restricted customers' ability to deal with rivals, which courts have recognized as anticompetitive. *See, e.g., Lorain Journal Co. v. United States*, 342 U.S. 143, 154 (1951) (newspaper's interference with advertisers' ability to buy ads from radio stations held anticompetitive). For example, in many ways, UPR is analogous to an anti-steering or most-favored nation (“MFN”) provision, which can harm competition by limiting customers' ability to deal with rivals, as UPR does. *See, e.g., US Airways*. 938 F.3d at 51, 60–63 (reasonable jury could find that anti-steering clauses harm competition); *In re Payment Card Interchange Fee &*

Merchant Discount Antitrust Litig., 714 F. Supp. 3d 65, 79–80, 116–18 (E.D.N.Y. 2024) (similar); *United States v. Blue Cross Blue Shield of Mich.*, 809 F. Supp. 2d 665, 674 (E.D. Mich. 2011) (plausible that MFNs had anticompetitive effects); *Blue Cross & Blue Shield of Ohio v. Bingaman*, 1996 WL 677094, at *3–5 (N.D. Ohio June 24, 1996) (similar); *see also FTC v. Amazon.com, Inc.* 2024 WL 4448815, at *6–7 (W.D. Wash. Sept. 30, 2024) (plaintiffs plausibly claimed that anti-steering practices limited competition); *see also* Tr. Sept. 24 PM 21:16–22:12 (Milgrom (Def. Expert)) (agreeing that UPR is analogous to an MFN and that MFNs can harm competition).⁵

119. UPR also has exclusionary effects similar to those at issue in *Actavis*, where the Second Circuit found that a “hard switch” harmed competition by depriving customers of a choice that they had previously used to promote competition. *New York ex rel. Shneiderman v. Actavis PLC*, 787 F.3d 638, 652–59 (2d Cir. 2015); *see also In re Loestrin 24 Fe Antitrust Litig.*, 261 F. Supp. 3d 307, 350–52 (D.R.I. 2017) (similar). As the court recognized in *Actavis*, choice is critical because “the market can determine whether one product is superior to another only so long as the free choice of customers is preserved.” 787 F.3d at 654–55. As in *Actavis*, here Google has deprived publishers of a choice that they previously enjoyed—i.e., the ability to set a higher price floor for AdX—which had allowed publishers to shift transactions to competitors and reduce their reliance on Google. And here too, if Google thought equal price floors were a

⁵ UPR is even more problematic than some MFN and anti-steering provisions because, in some cases, customers may agree to an MFN or anti-steering agreement as part of a negotiation over a broader agreement that provides customers at least some benefits. Here, however, no such negotiation happened. Instead, Google imposed UPR on publishers by fiat. *Cf. McWane*, 783 F.3d at 834 (the defendant’s “Full Support Program arguably posed a greater threat to competition than a conventional exclusive dealing contract” because it was “unilaterally imposed by fiat upon all distributors”) (internal quotation marks omitted).

worthy objective, it could have tried to persuade publishers to adopt them, but when it “cross[ed] the line from persuasion to coercion,” 787 F.3d at 654, its behavior became anticompetitive.

120. UPR also reduced the scale of rival exchanges. *See* PFOF ¶¶ 298. This reduction, both on its own and in conjunction with Google’s other conduct, enhanced AdX’s monopoly power by reducing its rivals’ scale and limiting their ability to compete. *See* PFOF ¶¶ 298, 302–309.

121. For similar reasons, UPR also harmed competition in the advertiser ad network market. UPR removed publishers’ ability to floor Google Ads higher than other advertiser ad networks, which in turn limited publishers’ ability to make the competitive choice to shift transactions to other buying tools. This limitation had the effect of suppressing potential competition with Google Ads from other advertiser ad networks. After Google imposed UPR, a rival ad network could not attempt to secure a foothold in the market—and build needed scale—by negotiating with publishers for a lower price floor than Google Ads’. Likewise, an advertiser choosing between Google Ads and a rival advertiser ad network would know that it would not benefit from lower floors—and thus the ability to buy impressions at lower prices—by bidding through the rival rather than Google Ads. UPR therefore restricted the ability of rival advertiser ad networks to compete on the merits against Google Ads and disincentivized the introduction and growth of alternative advertiser ad networks.

5. First Look

122. First Look was another Google auction rule that harmed competition in the exchange market. Prior to the emergence of header bidding, Google gave itself a “First Look,” meaning that it allowed AdX to submit real-time bids before calling other exchanges. *See* PFOF ¶¶ 169–170. This gave AdX a series of artificial competitive advantages, including an informational advantage and an advantage in winning (“cream-skimming”) higher-value

impressions. *See* PFOF ¶¶ 171–172. It also harmed competition by reducing rivals’ scale, *see* PFOF ¶¶ 177–179, and limiting price competition, *see* PFOF ¶ 180. In addition, by allowing AdX to win not because it had the highest bid or highest quality, first look too allowed Google to exclude rivals through something other than competition on the merits. *See* PFOF ¶¶ 174, 180.

123. First Look is also similar to much of the anti-competitive conduct at issue in *Microsoft*, 253 F.3d at 65–67. In that case, Microsoft removed Internet Explorer from its Add/Remove Programs utility, over-rode users’ choice of Internet Explorer as the default browser, and commingled browser code with operating code. *Id.* at 65-67. The court found that all of this conduct had anti-competitive effects (but also concluded that Microsoft provided a valid justification for the default over-ride). *Id.* That conduct, like First Look, involved a dominant firm reducing its rivals’ share “not by making [its own product] more attractive to customers,” but by using its monopoly power to impose artificial technical limitations that made it harder for customers to do business with rivals. *Id.* at 65.

124. Google suggests that various technological “workarounds” allowed publishers to circumvent Google’s First Look advantage and call other exchanges ahead of AdX. But, as discussed above, these theoretical workarounds had significant drawbacks and in reality were not commonly used. *See* PFOF ¶¶ 187–189. In addition, the caselaw recognizes that conduct may be anticompetitive even if it does not fully foreclose competitors from accessing the relevant market or if there is some partial workaround. *See, e.g., Google LLC*, 2024 WL 3647498, at *98–101 (finding that Google’s browser agreements were exclusive and had anticompetitive effects even though they did not bar rivals from promoting rival search engines and even though users could choose to use other search engines; noting that “[u]sers are free to navigate to Google’s rivals through no-default search access points, but they rarely do”); *Viamedia*, 951 F.3d at 476 (holding

that although the defendant technically allowed customers “Interconnect access” if the customers used their own in-house ad rep services rather than the defendant’s, “this result still would have been harmful” because “[f]orcing [Viamedia’s customers] to forsake the benefits they had gained by outsourcing ad sales to an independent Viamedia would have dramatically raised their costs”); *McWane*, 783 F.3d at 837 (exclusive dealing can harm competition even when it does not totally foreclose all distribution channels); *Microsoft*, 253 F.3d at 63-64, 68-71 (similar); *In re Keurig Green Mountain Single-Serve Coffee Antitrust Litig.*, 383 F. Supp. 3d 187, 215, 230 (S.D.N.Y. 2019) (holding that monopolization claims were viable based on allegations that Keurig designed its 2.0 brewer to lock out competitors even though “some competitors” were successfully able to “reverse-engineer[] 2.0 Brewer-compatible Portion Packs”).

125. Finally, Google may argue, based on the theoretical analysis of its expert, Prof. Milgrom, that First Look created a disadvantage for Google, rather than an advantage. But this argument is inconsistent with the evidence at trial, including statements by Google itself, as well as by various other knowledgeable industry participants who described the artificial competitive advantages that First Look creates for AdX (and corresponding disadvantages for its rivals). *See* PFOF § IV.B.1. In addition, the utility of this theoretical analysis is further limited by the fact that Prof. Milgrom did not express any opinion about whether First Look harmed competition. *See* PFOF ¶ 186.

6. Last Look Harmed Competition

126. In reaction to First Look, industry participants created a system called “header bidding,” which introduced new competitive options by allowing other exchanges to participate in an auction before AdX. *See* PFOF ¶ 200. This only meant, however, that AdX’s First Look advantage turned into a Last Look advantage. *See* PFOF ¶ 201-202. Google took advantage of Last Look by, among other things, effectively allowing AdX to vary its bid after seeing the

highest other bid from the header bidding auction. As a result, Google won auctions by simply bidding a penny or fraction of a penny higher rather than competing in real time like everyone else. *See* PFOF ¶ 231.

127. Last Look harmed competition in the ad exchange market. Like First Look, Last Look allowed AdX to win through means other than competition on the merits: AdX won bids because Google used its control of the publisher ad server to give AdX the power to bid last, without the auction pressure of having to compete in real time against other exchanges, rather than because it had the best ad exchange. *See* PFOF ¶ 203. In addition, Last Look further harmed competition because it limited the ability and incentive for other exchanges to compete by offering lower take rates, *see* PFOF ¶ 213, and because it limited the scale of rival exchanges, *see* PFOF ¶ 214.

128. Like First Look, Last Look is analogous to various forms of conduct that courts have found to be anticompetitive in the past. Most importantly, as discussed above, Last Look allowed Google to exclude rivals for reasons unrelated to efficiencies or competition on the merits. *See, e.g., Microsoft*, 253 F.3d at 65 (“Microsoft’s conduct, through something other than competition on the merits, has the effect of significantly reducing usage of rivals’ products[.]”). In addition, Last Look is analogous to exclusive dealing or to a right of first refusal—though in this instance, it is a right of last refusal, rather than a right of first refusal. *See* PFOF ¶ 203. Finally, the conduct is similar to many of the restrictions that Microsoft imposed that made it more difficult for customers to use the products of rivals. *See Microsoft*, 253 F.3d at 65–67.⁶

⁶ In addition, the fact that Google imposed Last Look “by fiat” also makes it more competitively suspect. *Cf. McWane*, 783 F.3d at 834 (the defendant’s “Full Support Program arguably posed a greater threat to competition than a conventional exclusive dealing contract” because it was “unilaterally imposed by fiat upon all distributors”) (quotation omitted).

129. As with First Look, Google may argue based on Prof. Milgrom’s theoretical analysis that Last Look did not create a significant advantage for AdX, but this argument is undermined by the record. *See* PFOF § IV.B.1. In addition, as with First Look, the utility of this analysis is further limited by the fact that Prof. Milgrom did not take a position on whether Last Look harmed competition. *See* PFOF ¶ 186.

7. Admeld Acquisition Harmed Competition

130. Google’s acquisition of Admeld also substantially reduced competition in the ad server and exchange markets. Prior to the acquisition, Google had identified Admeld as one of its three key competitors—and the competitor that was the “largest concern.” PTX0088 at -597; *see generally* PFOF § IV.B.2. Admeld had posed a competitive threat to Google in a variety of ways. Its yield management technology gave publishers an alternative way of managing remnant inventory that they could use in place of DFP and AdX, threatening Google’s strategy of “owning the remnant tag.” PTX0056 at -780, -783, -789–90; *see generally* PFOF § IV.B.2. Admeld also offered nascent real-time bidding capabilities, which was bringing it into even closer competition with AdX, along with the submission of real-time bids to publishers using other ad servers. *See generally* PFOF § IV.B.2. Google’s documents show that its executives recognized its acquisition of Admeld would limit competition. *See* PFOF ¶¶ 196–197.

131. It is well established that acquiring a key competitor can reduce competition and help a company maintain or enhance its monopoly power. *See, e.g., Microsoft*, 253 F.3d at 79 (“[S]uffice it to say that it would be inimical to the purpose of the Sherman Act to allow monopolists free reign to squash nascent, albeit unproven, competitors at will[.]”); *FTC v. Facebook, Inc.*, 581 F. Supp. 3d 34, 53–55 (D.D.C. 2022) (it is “well established” that acquisitions of actual or potential competitors by a monopolist can violate Section 2); *Grinnell*, 384 U.S. at 576 (acquisitions can constitute “unlawful and exclusionary practices” under Section

2); *Standard Oil*, 221 U.S. at 70–77 (same). Courts are particularly willing to find that acquisitions are anticompetitive where, as here, a firm is acquiring one of its key competitors. *See, e.g., IQVIA*, 710 F. Supp. 3d at 383–84 (finding anticompetitive effects likely in part because the companies viewed each other as “key competitor[s]”).

132. In addition, courts often find acquisitions anticompetitive where, as with Google’s purchase of Admeld, the acquiring company’s contemporaneous documents show that the company expects the acquisition to have anticompetitive effects or that the company plans to reduce the threat posed by the acquired company after the merger. *See, e.g., St. Alphonsus Med. Ctr. - Nampa, Inc. v. St. Luke’s Health Sys. Ltd.*, 778 F.3d 775, 786–87 (9th Cir. 2015) (merger anticompetitive in part because acquiring company’s emails stated that “the clout of the entire network” could be used to “pressure payors” and extract more favorable terms from insurers); *Tapestry*, 2024 WL 4647809, at *58–59, *63 (documents showing plans to increase prices; deal documents showed concerns about close competition between the two firms).

133. Moreover, while Google has argued that only a small number of customers used Admeld’s real-time bidding capabilities, this argument ignores the other ways in which the acquisition was anticompetitive and also ignores that, at the time, the market was moving towards real-time bidding, *see* PFOF § IV.B.2, suggesting that the capability would have increased in popularity but for the acquisition. In fact, in future years, most, if not all, of the other major exchanges developed the capability to submit real-time bids to other ad servers, *see* PFOF § IV.B.2, further reinforcing the conclusion that this technology would have grown if Admeld had remained an independent competitor. And Google also ignores the caselaw that recognizes that excluding a “nascent” threat can be anticompetitive. *See, e.g., Microsoft*, 253 F.3d at 79 (concluding that “as a general matter the exclusion of nascent threats is the type of

conduct that is reasonably capable of contributing significantly to a defendant’s continued monopoly power”); *Google Search*, 2024 WL 3647498, at *114 (“The loss of nascent competitors is a clear anticompetitive effect.”); *see also* Tr. Sept. 18 AM 115:4–14 (Abrantes-Metz (Pls. Expert)) (explaining how acquisitions of nascent competitors can harm competition as a matter of economics).

8. Project Poirot

134. Project Poirot also harmed competition in the exchange market. As discussed above, Project Poirot grew out of Google’s recognition that header bidding had the potential to increase competition from other exchanges by undoing some of the limitations of Google’s First Look advantage. *See* PFOF ¶¶ 236–239. In response to the new opportunities that header bidding provided to rival exchanges, Google internally proposed to “dry out HB SSP” by having DV360 not buy impressions via header bidding unless the impressions were available only on third party exchanges. PTX0426 at -741; *see* PFOF ¶¶ 236–239. When Google realized that this would be infeasible, it shifted instead to a system called Project Poirot under which Google would “bid shade” on other exchanges, but not AdX, even though bid shading on AdX would have been in advertisers’ interest. *See* PFOF ¶¶ 238–240.

135. Project Poirot limited competition in the exchange market for at least two reasons. First, Project Poirot limited the scale of rival exchanges, which limited their ability to compete and helped Google remain insulated from competitive pressure. *See* PFOF ¶¶ 242–243. Some exchanges were, in fact, hit particularly hard; at least one exchange (OpenX) had to respond by laying off a significant number of employees, harming its ability to compete on a going-forward basis. *See* PFOF ¶ 244. Second, like much of Google’s other conduct, Project Poirot allowed AdX to win transactions at rivals’ expense not because AdX successfully competed on the merits,

but instead because Project Poirot artificially caused DV360 to bid shade on rivals (without doing so for AdX), which effectively made rivals' products worse.

B. Google's Conduct Has Caused Individual and Mutually Reinforcing Anticompetitive Effects

136. Google's conduct has caused a variety of anticompetitive effects. To fully analyze these competitive effects, Google's course of conduct must be evaluated in its entirety. *See* PCOL § V.B.1. But whether viewed together or individually, Google's conduct has harmed competition and customers for a variety of reasons—including by leading to higher prices, lower quality and innovation, reduced consumer choice, and reduced competition as a result of Google depriving rivals of the scale necessary to compete effectively. *See* PCOL § V.B.2. Finally, the analysis of harm to competition remains essentially unchanged even if the relevant markets are viewed as two-sided transaction platforms. *See* PCOL § V.B.3.

1. Google's Course of Conduct

137. While each individual act described above has produced anticompetitive effects on its own, the anticompetitive consequences of Google's course of conduct are magnified when considered as a whole. *See* PFOF ¶¶ 293–295. By acquiring DoubleClick, Google acquired control over publishers, power in multiple related markets, and the means to exclude competition and manipulate auctions in Google's favor. *See* PFOF § IV.A.1.

138. Next, Google tied real-time bids from AdX to DFP and tied Google Ads to AdX, increasing Google's dominance in the publisher ad server market and making it impossible for publishers to switch away from DFP. *See* PFOF § IV.A.2. Google then used its monopoly power in the ad server market to enhance its power in the ad exchange and ad network markets, through First Look, Last Look, and UPR. *See* PFOF §§ IV.B.1, IV.B.3, IV.B.5. None of these actions

were in the best interests of publishers, but the ties between DFP, AdX, and Google Ads made it impossible for publishers to switch to another firm or use the threat of switching to encourage Google to do what was best for customers. Tr. Sept. 10 AM, 51:19-52:7, 53:8-10, 55:6-56:19, 109:23-110:6 (Layser (News Corp.)) (“I was frustrated that I had to use [Google’s] ad server in order to get access to AdX demand” because “they were making product decisions that were not in the best interests of my business, and I felt stuck.”); *see generally* PFOF § IV.A. In other words, Google was able to use its monopoly power in the publisher ad server market “as a lever” to “extend[] market control” into the exchange and advertiser ad network markets. *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 274–75 (2d Cir. 1979); *see also* *Duke Energy*, 111 F.4th at 353 (a monopolist violates Section 2 when it uses its monopoly power “to gain a competitive advantage”) (citation omitted); *United States v. Griffith*, 334 U.S. 100, 107 (1948) (condemning the use of monopoly power in “one town” to “acquire privileges in a [different] city” as “a trade weapon”); *cf. In re Tether & Bitfinex Crypto Asset Litig.*, 576 F. Supp. 3d 55, 96–97 (S.D.N.Y. 2021) (using dominant position in one market to manipulate a closely related market can be “direct evidence of anticompetitive effects through price control”).

139. Google’s conduct worked together in other ways, too. Each of First Look, Last Look, UPR, Poirot, and the restriction of Google Ads to AdX individually harmed competition by reducing the scale of rival exchanges. *See* PFOF ¶¶ 118, 173, 179, 214, 242, 258, 293, 295–302. The effect of these conducts together was greater than they would have been individually. *See* PFOF ¶ 283, 294, 303; *Google Search*, 2024 WL 3647498, at *107 (analyzing aggregate effects of multiple conducts); *see also* *Microsoft*, 253 F.3d at 72 (similar).

140. Google has thus executed a “a scheme of willful acquisition or maintenance of monopoly power” and used its monopoly power to foreclose competition, gain a competitive

advantage, and exclude competitors. *Kodak*, 504 U.S. at 483; *see also Grinnell*, 384 U.S. at 576 (affirming a judgment against a monopolist whose exclusionary campaign included anticompetitive restrictive agreements, pricing practices, and acquisitions). And each part of Google’s scheme was mutually reinforcing, in part because Google’s monopoly power in each of these markets helped it acquire and maintain power in the others. *See Berkey Photo*, 603 F.2d at 275 (“It is clear that a firm may not employ its market position as a lever to create or attempt to create a monopoly in another market.”); *see also LePage’s*, 324 F.3d at 162 (discussing fact that defendant’s anti-competitive conducts “reinforced” each other).

2. Google’s Conduct Harms Competition

141. Google’s conduct, both on an individual basis and when viewed together as a whole, have created several important anticompetitive effects that harm both publishers, advertisers, and everyday Internet users. Those effects include (1) higher prices, (2) lower quality and less innovation, (3) reduced choice, and (4) reduced competition in the relevant markets due to Google’s conduct depriving rivals of the scale necessarily to compete effectively. These effects are both significant and well-recognized in the caselaw as being the types of harm to competition that the antitrust laws are designed to prevent. *First*, “increased prices” are “[d]irect evidence” of an “actual detrimental effect[] [on competition].” *Amex*, 585 U.S. at 542 (quoting *Ind. Fed’n of Dentists*, 476 U.S. at 460). Here, the evidence—including contemporaneous internal Google documents and communications—established that Google’s 20% average take rate for open auction transactions on its ad exchange, AdX, is propped up and protected by Google’s anticompetitive conduct. PFOF § III.C.2. This take rate is supracompetitive, meaning that it is above the take rate Google could charge in a competitive market. *See* PFOF ¶ 486. And Google’s AdX take rate has been remarkably durable, enduring for years virtually unchanged. *See* PFOF ¶¶ 479-486. Google’s elevated take rate means that for each dollar an advertiser spends to buy

display advertising on publisher websites, advertisers get less advertising, publishers get less revenue to reinvest in content that Internet users value, and Google pockets the difference.

142. *Second*, “decreased quality” is also “direct evidence” of an “actual detrimental effect[] on competition.” *Amex*, 585 U.S. at 542; *see also Viamedia*, 951 F.3d at 476. Reduced product innovation and variety are anticompetitive effects as well. *FTC v. Hackensack Meridian Health, Inc.*, 30 F.4th 160, 172 (3d Cir. 2022); *Viamedia*, 951 F.3d at 475. Here, the evidence showed that Google has reduced quality, innovation, and variety in the relevant markets in several ways. For example, the ties between DFP, AdX, and Google Ads make it very difficult for publishers to switch away from DFP, insulating DFP from competitive pressure and allowing DFP to adopt policies and procedures that are not in publishers’ best interests without fear the publishers will use competition to discipline that behavior. *See* PFOF ¶¶ 144-158. In addition, Google suppresses the quality of its own products and slow-rolls innovations: its advertiser ad network, Google Ads, cannot buy freely on rival exchanges, and its ad exchange, AdX, cannot send real-time bids to non-Google publisher ad servers. PFOF ¶ 346. Moreover, Google’s web of restrictions and restraints inhibits publishers and advertisers from finding higher-quality “matches,” which would create more economic value for publishers, advertisers, and internet users who view open-web display ads. *See, e.g.*, PFOF ¶¶ 36, 55, 60, 65, 120, 148, 153. In addition, Google’s conduct has harmed rivals’ ability to innovate, in part by depriving them of the necessary scale to improve their products. *See* PFOF ¶¶ 283, 293-309. Finally, Google’s conduct ultimately harms publishers’ ability to invest in making their own products better, too. *See* Tr. Sept 18 AM 151:1–14 (Wheatland (Daily Mail)).

143. *Third*, Google’s conduct has also “reduced consumer choice,” *Duke Energy*, 111 F.4th at 354, both as to which ad tech tools publishers and advertisers use, and how publishers

use those tools to buy and sell impressions. This too is an “anticompetitive consequence[]” of Google’s conduct. *Id.* “[T]he market can determine whether one product is superior to another only ‘so long as the free choice of consumers is preserved.’” *Actavis*, 787 F.3d at 654–55 (quoting *Berkey Photo*, 603 F.2d at 287); *see also U.S. v. JetBlue Airways Corp.*, 712 F. Supp. 3d 109, 153 (D. Mass. 2024) (elimination of consumer choice is a “cognizable harm to competition”). For example, it would constitute exclusionary conduct for a monopolist to present customers with a “Hobson’s choice” in which a monopolist requires a customer to buy an unwanted service as a condition of using the monopolist’s platform, which the customer “need[s] to compete effectively” in its own business. *Viamedia*, 951 F.3d at 435. Here, Google forces publishers to make just such a choice: use DFP as their publisher ad server and receive real-time bids from Google’s ad exchange and advertiser demand from Google’s advertiser ad network, or choose another publisher ad server and forgo the revenue from critical advertiser bids and demand. *See* PFOF ¶¶ 85, 98, 199.

144. *Fourth*, Google’s conduct has foreclosed competition and deprived rivals of the “scale[] needed to effectively compete.” *Google Search*, 2024 WL 3647498, at *109. This has kept usage of rivals’ products “below the critical level necessary” to threaten Google’s monopolies. *Microsoft*, 253 F.3d at 71; *Dentsply*, 399 F.3d at 191 (same); *accord McWane*, 783 F.3d at 838 (evidence that program deprived rivals “of distribution sufficient to achieve efficient scale, thereby raising costs and slowing or preventing effective entry” showed harm to competition) (citation omitted). Google’s efforts to deny rivals scale creates a “negative feedback loop” that “further harm[s] competition” and amplifies other anticompetitive effects. *Viamedia*, 951 F.3d at 476. When a monopolist’s exclusionary conduct denies rivals of scale and “prevent[s] one or more new or potential competitors from gaining a foothold in the market,” its

conduct is “not only injurious to the potential competitor but also to competition in general.”

LePage’s, 324 F.3d at 159.

145. Finally, while evidence of supracompetitive pricing is evidence of harm to competition, proving that the defendant’s prices are higher than those of rivals is not required. *See Microsoft*, 253 F.3d at 56-58. Here, while Google’s prices are supracompetitive, its conduct also harms competition in other ways, such as by forcing customers to use its products, providing Google with unique access to data, and by insulating DFP, AdX, and Google Ads from the competitive pressures that would normally cause Google to innovate and act in customers’ best interests. *See, e.g.*, PFOF ¶¶ 151–154, 181–183, 446

3. Google’s Conduct Harms Competition Even if the Relevant Markets Are Viewed as Two-Sided Transaction Platforms

146. As discussed more fully above, the relevant markets for ad servers and advertiser ad networks are not two-sided transaction platforms. *See* PCOL § III.B. But the harm to competition from Google’s conduct is clear, regardless of whether the relevant markets are viewed as two-sided transaction platforms or not.

147. The caselaw recognizes that higher prices, reduced innovation and quality, reduced consumer choice, and limiting competition by excluding competitors or through depriving rivals of the scale required to compete effectively all constitute harm to competition even in two-sided transaction platform markets. *See, e.g., Amex*, 585 U.S. at 542 (“Direct evidence of anticompetitive effects would be . . . increased prices, or decreased quality in the relevant market.”); *PLS.Com, LLC v. Nat’l Ass’n of Realtors*, 32 F.4th 824, 839–40 (9th Cir. 2022) (preventing “innovative competitors” from “growing large enough to meaningfully compete,” leaving both sets of customers with “fewer choices,” “supra-competitive prices,” and “lower quality products,” constitute valid harm); *US Airways*, 938 F.3d at 62 (supracompetitive

prices constitutes valid harm; so does “ma[king] entry . . . extraordinarily difficult, reduc[ing] the quality of options . . . and l[eading] to technological stagnation”) (cleaned up); *In re Payment Card*, 714 F. Supp. 3d at 115–18 (limiting entry and decreasing quality).

148. And with good reason—higher prices, lower quality, reduced choice, and the exclusion or weakening of rivals can harm customers on both sides of a market, as is the case here. For example, AdX’s supracompetitive take rate harms both publishers and advertisers. *See* PFOF § V.A. Relatedly, by reducing rivals’ scale, Google’s conduct enhances AdX’s monopoly power, enhances its ability to charge a supracompetitive take rate, and thus harms both publishers and advertisers. *See* PFOF § V.C. And Google’s conduct harms both advertisers and publishers for a variety of other reasons, including: (1) Last Look and First Look, by limiting rivals’ ability and incentive to compete on price, harmed both advertisers and publishers, *see* PFOF ¶¶ 180, 213; (2) the restriction of Google Ads to AdX, by compelling transactions to go through higher-cost AdX as opposed to lower-cost rivals, harms both publishers and advertisers, *see* PFOF ¶ 124; (3) the ties between DFP, AdX, and Google Ads, by reducing publishers’ ability to switch away from DFP, allowed Google to adopt various anticompetitive practices that in turn enhance AdX’s monopoly power and reinforce its ability to charge a supracompetitive take rate, *see* PFOF ¶¶ 151-152, 181-183, 253-256; and (4) Google’s acquisition of Admeld, by enhancing Google’s monopoly power in both the publisher ad server and exchange markets, reinforced all of the above effects, harming both publishers and advertisers, *see* PFOF ¶¶ 190-199.

149. In addition, even though Plaintiffs have proven that Google’s conduct harms *both* publishers and advertisers, such a showing is not required even in two-sided transaction platform market cases. Instead, it is sufficient to prove harm to one side of the market that is not outweighed by benefits to the other side. *See PLS.com*, 32 F.4th at 839 (“It is possible that a

practice harming participants on one side of the market could outweigh the benefits to participants on the other, causing anticompetitive effects on the market as a whole.”); *see also Epic Games*, 67 F.4th at 985 (similar). For that reason, and because, as explained more fully below, Google has not identified any valid procompetitive justifications for its conduct, *see* PCOL § VI, the evidence establishes that Google conduct is anticompetitive even if some of the harm caused by Google’s conduct affects only one set of customers (publishers or advertisers).

VI. Google Has Not Established Valid And Sufficient Procompetitive And Nonpretextual Justifications For Its Conduct

150. Once a plaintiff demonstrates the challenged conduct has an anticompetitive effect, then the burden shifts to the defendant to establish a procompetitive justification that is both “valid[]” and “sufficien[t].” *Kodak*, 504 U.S. at 483. To carry this burden, Google must “specif[y] and substantiat[e]” “a nonpretextual claim that its conduct is indeed a form of competition on the merits” and that justifies the “specific means” in question. *Microsoft*, 253 F.3d at 59, 66, 71.

151. Google argues that a plaintiff bears the burden to show that a monopolist had “no valid business reason or concern for efficiency” when it engaged in the challenged conduct. *See* Def. PCOL ¶¶ 163, 260 (quoting *Oksanen v. Page Mem’l Hosp.*, 945 F.2d 696, 710 (4th Cir. 1991) (en banc)). That is incorrect. Where a plaintiff establishes a prima facie case that a monopolist’s conduct harms competition, it is the defendant’s burden to establish procompetitive justifications—not merely a facially valid business reason. Any suggestion otherwise in *Oksanen* is no longer good law because a year after *Oksanen* was decided the Supreme Court clarified that a defendant cannot satisfy its burden of procompetitive justifications merely by offering facially plausible business justifications. Instead, a defendant must substantiate through evidence that its justifications are both “valid[] and sufficien[t]” to

justify the challenged conduct. *Kodak*, 504 U.S. at 483; *see also id.* at 483 n.32 (“legitimate” and “competitive” justifications are required); *id.* at 485–86 (concluding that “[n]one of Kodak’s asserted business justifications, then, are sufficient”); *id.* at 484 (discussing “reasons to question” Kodak’s proffered justification); *id.* (“Kodak’s actions appear inconsistent with” its justification); *Microsoft*, 253 F.3d at 66 (rejecting Microsoft’s facially valid procompetitive benefit—“general claims regarding the benefits of integrating the browser and the operating system”—because it “neither specifies nor substantiates those claims”); *see also Duke Energy*, 111 F.4th at 362 (rejecting facially valid procompetitive justification (lowering prices) when the defendant’s conduct “taken together, had the effect of foreclosing a more efficient rival from competing”); *M & M Med. Supplies & Serv., Inc. v. Pleasant Valley Hosp., Inc.*, 981 F.2d 160, 167 (4th Cir. 1992) (en banc) (holding that despite defendant hospital’s “business justification” for referring patients to its subsidiary, the evidence “support[ed] an inference that [the defendant] was not motivated by efficiency concerns”).

152. And, despite Google’s attempt to place on Plaintiffs the burden of refuting any procompetitive justification, the burden for demonstrating procompetitive justifications lies with the monopolist defendant. In *Kodak*, the Court held that a defendant must present evidence of procompetitive justifications to rebut the plaintiff’s showing of anticompetitive effect. *See Kodak*, 504 U.S. at 483 (assessing the justifications that “Kodak contends” can “explain [its] actions” after plaintiffs “have presented evidence that Kodak took exclusionary action to maintain its parts monopoly”). *Microsoft* relied on this passage from *Kodak* when it held that, under the burden-shifting framework, the burden is on the monopolist to proffer a procompetitive justification. *See Microsoft*, 253 F.3d at 59 (citing *Kodak*, 504 U.S. at 483). Google’s argument to the contrary conflicts not only with *Kodak*, *Microsoft*, and *Duke Energy*,

but also the Supreme Court’s decision in *Aspen Skiing* from which *Oksanen*’s “no valid business reason” language originated. *See Oksanen*, 945 F.2d at 710 (quoting *White v. Rockingham Radiologists, Ltd.*, 820 F.2d 98, 105 (4th Cir. 1987), which in turn cites *Aspen Skiing*). *Aspen Skiing* highlighted the defendant’s “failure to offer any efficiency justification” and noted it was the defendant that failed to “persuade the jury that its conduct was justified by any normal business purpose.” 472 U.S. at 608; *see also Duke Energy*, 111 F.4th at 362 (noting that defendant “argue[d]” its conduct was “procompetitive”). Moreover, Google’s position would undermine the purpose behind the burden-shifting framework, as “any evidence of procompetitive justifications [is] likely to be under the defendant’s control,” and thus the defendant is best positioned to proffer any purported justifications. *Viamedia*, 951 F.3d at 464.⁷

A. A Proffered Justification Must Be Procompetitive

153. A proffered business justification is valid only if it is *procompetitive*, meaning that it facilitates competition. *Kodak*, 504 U.S. at 485 (proffered justification invalid because it confused erecting entry barriers with preventing free riding). Thus, “a defendant’s assertion that it acted in furtherance of its economic interests does not constitute the type of business justification that is an acceptable defense to § 2 monopolization.” *LePage’s*, 324 F.3d at 163.

Instead, the defendant must explain how their conduct actually *promotes* competition. *See Aspen*

⁷ The analysis performed in the only post-*Kodak* Fourth Circuit case cited by Google—the unpublished decision of *Imaging Ctr., Inc. v. W. Md. Health Sys., Inc.*, 158 F. App’x 413 (4th Cir. 2005)—accords with the standard as described by Plaintiffs. There, the court applied a full rule-of-reason, burden-shifting analysis as part of assessing the whether the challenged the conduct was anticompetitive under Section 1 of the Sherman Act. *Id.* at 419–20. The court noted that even assuming plaintiffs had established anticompetitive effects, “[d]efendants have offered evidence of the *procompetitive benefits* justifying these contracts” and that the plaintiff “had offered no effective rebuttal to these *procompetitive justifications*.” *Id.* at 420 (emphases added). The court explicitly referred back to this burden-shifting analysis—which parallels the burden-shifting analysis called for by *Microsoft* under Section 2—when assessing whether the conduct was exclusionary under Section 2. *Id.* at 421.

Skiing, 472 U.S. at 608 (noting Ski Co.’s “failure to offer any efficiency justification whatever for its pattern of conduct”); *Image Tech. Servs.*, 125 F.3d at 1212 (“A plaintiff may rebut an asserted business justification by demonstrating . . . that the justification does not legitimately promote competition[.]”).

154. Likewise, a justification is not procompetitive if it is premised on the idea that “an unrestrained market . . . will lead [consumers] to make unwise and even dangerous choices.” *Ind. Fed’n of Dentists*, 476 U.S. at 463. This is because the Sherman Act supports neither “a defense based on the assumption that competition itself is unreasonable,” nor does it permit an inquiry as to “whether competition is good or bad.” *Nat’l Soc’y of Prof’l Eng’rs v. U.S.*, 435 U.S. 679, 695–96 (1978).

B. A Proffered Justification Must Not Be Pretextual

155. A proffered business justification is likewise invalid if it is pretextual. *Kodak*, 504 U.S. at 483–84; *Aspen Skiing*, 472 U.S. at 608–10; *Duke Energy*, 111 F.4th at 366; *Microsoft*, 253 F.3d at 59; *see also* Black’s Law Dictionary (12th ed., 2004) (defining “pretext” as “[a] false or weak reason or motive advanced to hide the actual or strong reason or motive”). A justification is likely to be pretextual when it is inconsistent with market realities, contradicted by the defendant’s other statements or conduct, or inadequately substantiated. *See Kodak*, 504 U.S. at 483–84 (noting that the Supreme Court had rejected business justifications “in the absence of proof” of the purported procompetitive benefits) (citing *Int’l Bus. Mach. Corp. v. United States*, 298 U.S. 131, 139-40 (1936), and *Int’l Salt Co. v. United States*, 332 U.S. 392, 397-98 (1947)).

156. To assess whether proffered justifications are pretextual, courts give “greater weight to the contemporaneous statements contained in the company’s internal records, than later trial testimony in which [its] employees declined to ratify those statements.” *Google*

Search, 2024 WL 3647498, at *41 n.2; *Actavis*, 787 F.3d at 658 (concluding, “[b]ased largely on Defendants’ own documents,” that “[a]ll of Defendants’ procompetitive justifications for withdrawing [a product] are pretextual”); *McWane*, 783 F.3d at 841–42 (quoting *Eastman Kodak*, 504 U.S. at 483) (affirming that the defendant’s “damning internal documents seem to be powerful evidence that its procompetitive justifications are ‘merely pretextual’”); *Duke Energy*, 111 F.4th at 365 (relying on internal communications to support an inference that the defendant manufactured a justification for terminating its agreement with the plaintiff); *In re High-Tech Employee Antitrust Litig.*, 289 F.R.D. 555, 576 (N.D. Cal. 2013) (“The Court is more persuaded by the internal, contemporaneous documents created by Defendants before and during the [anticompetitive] agreements” than by “Defendants’ own employees’ declarations, which were drafted specifically” in the context of litigation). Such evidence carries significant weight because courts “assume that economic actors usually have accurate perceptions of economic realities.” *Rothery Storage & Van Co. v. Atlas Van Lines, Inc.*, 792 F.2d 210, 218 n.4 (D.C. Cir. 1986).

157. Conversely, courts often give “little weight to subjective evidence and statements provided by [a defendant’s] employees during the course of [antitrust] litigation” because “the bias affiliated with such ex post facto testimony is widely recognized and unavoidable.” *Meta*, 654 F. Supp. 3d at 932; accord *United States v. U.S. Gypsum Co.*, 333 U.S. 364, 395 (1948) (when self-serving trial testimony “is in conflict with contemporaneous documents we can give it little weight”); *United States v. Falstaff Brewing Corp.*, 410 U.S. 526, 548 (1973) (Marshall, J., concurring) (firm’s “subjective evidence” about its own conduct “is inherently unreliable and must be used with great care”); *FTC v. OSF Healthcare Sys.*, 852 F. Supp. 2d 1069, 1087–88 (N.D. Ill. 2012) (testimony by Defendant’s executives “add[ed] little to the analysis” because the

executives “would be expected to publicly disavow any improper conduct and not condone such conduct in the future.”).

158. By the same token, it is a “common-sense proposition that a firm’s behavior undertaken with the aim of persuading a court or the government regarding the legality of [its conduct] may not be predictive of how that firm will behave once the court or the government are no longer engaged.” *Aetna*, 240 F. Supp. 3d at 80; *see also Chi. Bridge*, 534 F.3d at 434–36 & n.16 (in merger context, post-acquisition evidence has “extremely limited” value because “such evidence could arguably be subject to manipulation”); *Hosp. Corp. of Am. v. FTC*, 807 F.2d 1381, 1384 (7th Cir. 1986) (“Post-acquisition evidence that is subject to manipulation by the party seeking to use it is entitled to little or no weight.”).

159. When a company has “trained its employees . . . not to create ‘bad’ evidence,” *Google Search*, 2024 WL 3647498, at *134, including specifically because the firm recognizes the risk of a government enforcement action, the reliability of self-serving contemporaneous documents is particularly suspect.

160. In Section 2 cases, courts have also held that the existence of less-restrictive alternatives to a monopolist’s conduct can serve as “circumstantial evidence” that a proffered procompetitive justification is pretextual. In other words, if a monopolist could have achieved its purported procompetitive justifications through methods that had less deleterious effects on competition than the methods that it actually chose, the less-restrictive alternative casts doubt on the monopolist’s purported justifications. *See, e.g., Impax Labs., Inc. v. FTC*, 994 F.3d 484, 498 (5th Cir. 2021) (explaining that “existence of less restrictive alternatives may allow courts . . . to ‘smoke out’ anticompetitive effects or pretextual justifications for the restraint”); *McWane*, 783

F.3d at 841–42 (monopolist’s procompetitive justification was “merely pretextual” where monopolist “could instead compete” in a different, less restrictive way).

C. A Proffered Justification Is Insufficient If The Challenged Conduct Does Not Actually Promote The Claimed Objective

161. A justification is insufficient to justify the monopolist’s conduct unless the challenged conduct “is a substantial cause of” a particular benefit. *Google Search*, 2024 WL 3647498, at *122 (citing *United States v. Apple, Inc.*, 791 F.3d 290, 334 (2d Cir. 2015), and *McWane*, 783 F.3d at 841). That is, the defendant must establish “a procompetitive justification for the specific means here in question[.]” *Microsoft*, 253 F.3d at 71; *see also id.* at 66–67 (focusing on Microsoft’s justifications for specific “challenged actions” and “aspect[s] of its product design” rather than “general claims regarding the benefits of integrating” its products); *Kodak*, 504 U.S. at 484–85 (“[Kodak’s inventory-costs] justification fails to explain respondents’ evidence that Kodak forced OEM’s, equipment owners, and parts brokers not to sell parts to ISO’s, actions that would have no effect on Kodak’s inventory costs.”); *Google Search*, 2024 WL 3647498, at *120 (“Assuming Google has established the value of a default placement to competition and consumers, it has not shown that *exclusive* defaults across nearly all key search access points have such utility.”).

D. A Proffered Justification Is Insufficient if it Is Not Substantiated by Evidence

162. To establish claimed procompetitive justifications, a monopolist must “specif[y]” and “substantiate[] those claims” with evidence. *Microsoft*, 253 F.3d at 66. For example, in *Google Search*, the court rejected Google’s claim that its revenue sharing payments resulted in lower-priced and higher-quality smartphones because Google “produced little industry evidence” beyond the testimony of a single wireless carrier, which was insufficient “to establish procompetitive benefits in the market as a whole.” 2024 WL 3647498, at *124. And while

Google offered its own employees' testimony on this issue, the court dismissed it as "largely speculative." *Id.* Similarly, in *Microsoft* the defendant asserted that license restrictions were necessary to ensure that Windows remained "a stable and consistent platform." 253 F.3d at 63. But because Microsoft cited only a single one of its own documents as support, the court held that it "never substantiate[d]" this claim." *Id.* at 63–64; *see also Kodak*, 504 U.S. at 483–84 (need to maintain high quality service insufficient to justify summary judgment when evidence showed that some equipment owners preferred independent servicers to Kodak).

163. Evidentiary support is particularly important when a defendant's theoretical justification "does not square with market realities." *Google Search*, 2024 WL 3647498, at *121. For example, Google argued in *Google Search* that price competition to be the default search engine on a smartphone reduced barriers to entry because it allowed a new entrant to "'buy' their way into the market." *Id.* The court found no evidence, however, that any entrant had actually been able to do this. *Id.* Google also argued that competition to be the default search engine incentivized firms to make quality improvements, but the evidence showed that there was "no genuine competition" to be the default search engine, undermining any theoretical incentive to invest in quality improvements. *Id.*

E. All Of Google's Claimed Justifications Are Invalid, Insufficient, Or Unsubstantiated

164. Google has failed to prove valid procompetitive justifications for any of its conduct. Google's justification arguments suffer from significant general flaws. PCOL §VI(E)(1). In addition, each of the proposed justifications that Google has offered are invalid, unsupported by evidence, pretextual, and not specific to the anticompetitive conduct. PCOL §VI(E)(2).

1. Google's Analysis Is Legally Flawed

165. In offering various justifications for its challenged conduct, Google makes two important cross-cutting errors.

166. *First*, Google attempts to justify its anticompetitive conduct by arguing that its conduct made Google's products "more attractive" to publishers and advertisers. *See, e.g.*, Def. PFOF ¶ 590 (Last Look), Def. PCOL ¶ 178 (Google Ads-AdX tie). This argument ignores that Google's conduct increased its own usage share and protected its monopolies not by making its own products (AdX, Google Ads, and DFP) better, but instead by creating artificial competitive advantages for itself, and corresponding disadvantages for rivals. But any exclusionary conduct can be described as making a defendant's product relatively more attractive, compared to the products of rivals. That, alone, is not sufficient to show that the defendant's conduct is procompetitive. *See, e.g., McWane*, 783 F.3d at 841 (winning business away from a rival by reducing the rival's output rather than by lowering prices or improving quality was not a procompetitive justification); *PLS.com*, 32 F.4th at 835–36 (rejecting argument that rule requiring agents to list houses on defendant's multi-listing service was procompetitive because it allowed buyers to see more houses on defendant's website; such a rule might enhance the quality of defendant's product but does not enhance competition).⁸

167. *Second*, Google attempts to substantiate its proffered justifications primarily through *ex post* testimony from a handful of its own employees and documents created after Google was aware of the risk of litigation. But courts rightly give less weight to this kind of self-serving evidence. PCOL § VI.B.1.

⁸ As another example, in *LePage's*, 324 F.3d at 154–57, 159–61, 163–64, the defendant's bundled discounts caused distributors to drop rivals' products, and thus could have been described as making the defendant's products relatively more attractive compared to the products of rivals. But the court found this to be evidence of harm to competition and rejected the claim that valid business justifications existed. *Id.*

2. Google Failed to Substantiate Valid and Sufficient Justifications Its Conduct

168. Google has not provided valid procompetitive justifications for any of its conduct. To the contrary, its proposed justifications are invalid, unsupported by evidence, pretextual, and not specific to the anticompetitive conduct.

a) Tying AdX to DFP

169. Google has proposed three justifications for tying AdX to DFP.

170. *First*, Google has argued that the tie is justified by a need to prevent spam, fraud, malware, or other quality-related issues. But this argument is undercut by the evidence introduced at trial. As discussed above, Google's buy-side, which acted on behalf of the advertisers that would be injured by an increase in spam or fraud, actively argued that Google Ads should bid on third-party exchanges, even though those exchanges submitted real-time bids to other ad servers. *See* PFOF ¶¶ 324. In addition, the evidence shows that AdX is not better than other exchanges at preventing fraud and other quality-related issues. *See* PFOF ¶ 325.

171. Moreover, Google has provided no explanation for why Google's tie between AdX and DFP is well-designed to address fraud, spam, or related issues. *See* PFOF ¶¶ 326-327. Even with the tie, Google allows AdX to transact with publishers that do not use DFP. The critical difference is that Google refuses to tell publishers the price Google is willing to bid in real time, which interferes with their ability to run an auction. *See id.* Google has not explained why submitting ads to non-DFP publishers, but doing so in a way that interferes with their ability to conduct auctions, is designed to combat fraud, spam, or related issues. *See id.* Indeed, as discussed above, Google's documents show that the real reason it does not submit real-time bids to non-DFP publishers is that this insulates DFP from competition. *See id.* Thus, Google has not substantiated this proposed justification and regardless it is pretextual.

172. *Second*, Google argues that tying AdX to DFP was necessary to promote innovation. This argument is legally insufficient and factually unsupported. Legally, Google’s argument amounts to an assertion that it will have a greater ability to innovate if it can use revenues from both AdX and DFP to fund innovation. *See* Tr. Sept. 26 PM 4:19–6:18 (Israel (Def. Expert)). But courts have repeatedly held that “recovery of investment costs has been explicitly excluded from the narrowly-construed exceptions to the per se rule against tie-ins.” *Image Tech. Serv., Inc. v. Eastman Kodak Co.*, 903 F.2d 612, 618–19 (9th Cir. 1990), *aff’d Eastman Kodak Co. v. Image Tech. Servs.*, 504 U.S. 451, 485 (1992); *see also Digidyne Corp. v. Data General Corp.*, 734 F.2d 1136, 1343–44 (9th Cir. 1984) (similar). And with good reason. Any rule that recovery of proposed investment expenditures could justify a tie would create a situation in which competitors must enter two markets, rather than one, in order to compete, which is precisely the “evil” that the antitrust prohibition on tying is designed to prevent. *Kodak*, 903 F.2d at 619; *see also Kodak*, 504 U.S. at 485 (similar); *Digidyne*, 734 F.2d at 1344 (similar). In addition, an investment cost exception would swallow the rule against tying, as virtually any tie could be justified on the grounds that it would increase the defendant’s revenue, and the defendant could use some of that revenue to invest in its products.

173. In any event, Google has not shown that the tie between DFP and AdX was a substantial cause of any innovation. *See* PFOF ¶ 334. Google has not, for example, provided any specific evidence about innovation it would not have pursued absent the tie. *See id.* And the record also shows that the DFP/AdX tie has actually reduced innovation, rather than enhancing

it, both by insulating Google from the competitive pressure that would cause it to innovate and by reducing rivals' ability to innovate. *See id.*⁹

174. *Third*, Google argues that the cost of undoing the DFP/AdX tie justifies its decision to tie the two products together. As an initial matter, whether purported cost savings from refusing to undo a tie constitutes a valid justification is doubtful, given that such savings would not necessarily accrue to customers.¹⁰ In addition, a cost savings justification would risk immunizing a wide variety of anticompetitive tying and similar conduct, as defendants could almost always argue that undoing ties would involve some amount of costs. *See also Microsoft*, 253 F.3d at 65–66 (finding that Microsoft's commingling of browser code and operating system code was anticompetitive, even though undoing that restriction presumably would have involved some costs). In any event, as discussed above, Google has not substantiated its claims that the tie

⁹ Google also argues more generally that vertical integration promotes investment. Google has not substantiated these claims. *See* PFOF ¶ 333n.19 ___. Similarly, to the extent that Google argues that its other conduct (e.g., UPR or first look) is justified based on the need to increase Google's incentive to invest, that would run into the same issues as those discussed above—i.e., that this argument would seem to justify virtually any exclusionary conduct, that it would create the evil the antitrust laws are designed to prevent by requiring firms to enter in multiple markets, and that Google has provided no evidence to substantiate its claims.

¹⁰ In the merger context, cost savings are a valid efficiency only if they are passed on to customers in the form of “lower prices, improved quality” or other benefits. *See, e.g., Penn State Hershey*, 838 F.3d at 350. This is consistent with the similar principle articulated in Section 2 cases that “a defendant's assertion that it acted in furtherance of its economic interests does not constitute the type of business justification that is an acceptable defense to § 2 monopolization . . . a business justification is valid if it relates directly or indirectly to the enhancement of consumer welfare[.]” *LePage's Inc. v. 3M*, 324 F.3d 141, 163–64 (3d Cir. 2003) (internal citations omitted). In this case, Google has made no showing that any savings would be passed on to customers. *Cf. In re Data Corp.*, 490 F. Supp. 1089, 1109 (N.D. Cal. 1980) (rejecting argument that bundling products produces lower costs in part because defendant “presented no evidence that the allegedly lower costs have been passed along to customers”). In addition, unlike other cost savings that might result from a tie, any one-time cost savings that could result here from not undoing the tie are seemingly fixed cost savings, which are less likely to be passed on to customers. *See, e.g., Aetna*, 240 F. Supp. 3d at 95 n.50 (“Reductions in fixed costs are even less likely to be passed on to consumers.”).

between DFP and AdX was substantiated by the need to avoid significant costs. *See* PFOF ¶¶ 329–333.

b) Restricting Google Ads to AdX

175. Google’s arguments purporting to justify the tying of Google Ads to AdX fail for similar reasons. In particular, any argument that this restriction is justified by the need to prevent spam, fraud, or latency issues is undermined by the record. For example, Google’s documents show that its buy-side employees advocated for Google Ads to buy on other exchanges, *see* PFOF ¶¶ 324, Google acknowledged that spam on other exchanges was at an acceptable level, *see* PFOF ¶¶ 317, and AdX and Open Bidding were not meaningfully better at preventing quality-related issues when compared to other exchanges or header bidding, *see* PFOF ¶ 318. In fact, the record shows Google refused to allow Google Ads to bid more widely on other exchanges because Google recognized that undoing this restriction would eliminate one of AdX’s competitive advantages. *See* PFOF ¶ 322. Relatedly, Google has not shown that any supposed quality concerns could not be addressed through alternative solutions. For these reasons, this justification is both unsubstantiated and pretextual.

176. Similarly, to the extent that Google claims that restricting Google Ads to AdX is justified by the need to increase Google’s incentive to innovate, that claim too is inconsistent with the caselaw and overbroad. *See* PCOL ¶ 172. In addition, Google has not provided any evidence substantiating its claims that this conduct enhanced Google’s ability to innovate. *See* PFOF ¶ 319.

177. Finally, any claim that this conduct is justified by the cost of undoing this restriction would also fail. Here, too, Google has failed to show that undoing this anticompetitive conduct would be unnecessarily costly. In addition, any such claim would be inconsistent with the record, including evidence that (a) Google Ads already bids on other exchanges in limited

circumstances, (b) most other buy-side tools bid on a wide variety of exchanges, and (c) the debate within Google about AWBid shows that Google limited AWBid not because of cost, but to protect AdX's monopoly power. *See* PFOF ¶¶ 320–322.

c) First Look

178. Google's justifications for First Look fare no better.

179. *First*, Google's argument that Dynamic Allocation increased publishers' revenues is irrelevant, because it does not address the conduct that Plaintiffs argue is anticompetitive—i.e., First Look itself. *See* PFOF ¶ 335–338. Dynamic Allocation refers to a broader set of auction systems within DFP and AdX, not First Look specifically. The fact that other aspects of Dynamic Allocation may increase publisher revenue does not mean that First Look increases publisher revenue. *See id.* For example, documents showing that incorporating real-time bids into DFP as part of Dynamic Allocation increases publisher revenue does not mean that First Look increases publisher revenue. *See* PFOF ¶ 336–337.¹¹

180. *Second*, Google's argument that First Look benefited advertisers is contrary to the evidence. *See generally* PFOF ¶¶ 339–341. Even if First Look benefits the advertiser who buys the impression through AdX, that win comes at the expense of other advertisers that could have been willing to pay more for the impression, so it is not a benefit to advertisers overall. *See* PFOF ¶ 339. In addition, First Look harmed advertisers for a variety of other reasons, including by enhancing Google's market power, limiting rivals' scale, and limiting price competition. *See* PFOF ¶ 340.

¹¹ The caselaw also recognizes that where one aspect of a product feature is anticompetitive, courts may evaluate the challenged aspect of the feature, not the feature as a whole. *See, e.g., In re Apple iPod iTunes Antitrust Litig.*, 796 F. Supp. 2d 1137, 1146–47 (N.D. Cal. 2011) (focusing on whether a challenged feature of a software update constituted a genuine improvement rather than evaluating the overall benefit of the software update).

d) Last Look

181. To the extent Google argues that Last Look increased publisher revenue, that claim is contrary to the evidence. As discussed above, absent bid inflation, Last Look provided little, if any, revenue gains for publishers, and Google has not proven that bid inflation was common or free of significant downsides. PFOF § IV.B.3.b. In addition, there is evidence that Last Look may have in fact *decreased* publisher revenues, compared to a unified auction where all exchanges (including AdX) competed without an artificial advantage. PFOF ¶¶ 234–235.

182. Google also cannot claim that Last Look benefited advertisers. As with First Look, the fact that Last Look benefited a specific advertiser buying through AdX is of no moment, as that win would only come at the expense of another advertiser that may have been willing to pay more for the impression. PFOF ¶ 341. In addition, Last Look harmed advertisers by, among other things, reducing price competition among ad exchanges and thereby allowing Google to charge a supracompetitive price, which harms both advertisers and publishers. *Id.*

e) UPR

183. Google’s justification claims for UPR fail.

184. *First*, Google has not shown that UPR is necessary to prevent “price fishing.” This argument fails for a number of reasons, including that UPR does not actually prevent price fishing, given that publishers can still set a higher floor for other exchanges than for AdX, even after UPR. PFOF ¶ 352. Google also has not shown that it could not limit price fishing through less restrictive means. PFOF ¶ 353. The fact that UPR does not actually prevent price fishing, along with Google’s failure to show that less restrictive means were unavailable, means that this justification is, at best, pretextual. Finally, limiting price fishing is not a cognizable procompetitive justification, because it does not increase economic surplus overall; instead, at

most, it would only transfer money from one set of customers (publishers) to another (advertisers). PFOF ¶ 354.

f) Google's Acquisition of Admeld

185. Google failed to identify a valid procompetitive justification for its acquisition of Admeld. To be valid, efficiencies must be merger-specific, meaning that they must be efficiencies that the companies could not achieve absent the merger. *See, e.g., Penn State Hershey*, 838 F.3d at 348 (“[E]fficiencies must be merger-specific, meaning they must be efficiencies that cannot be achieved by either company alone.”) (cleaned up); *Saint Alphonsus*, 778 F.3d at 790–91 (similar). There are no such merger-specific efficiencies here, however. Instead, to the contrary, any claimed efficiencies would not be merger specific because (a) customers could use Admeld’s products together with Google’s products even prior to the merger, (b) Google has not provided any explanation for why Google owning both sets of products would create any technical benefits for customers, (c) Google itself determined that Admeld’s technology was “irrelevant to us” and, after a transition period, shut down Admeld’s products and rebuilt some of those features within Google Ad Manager, and (d) Google could have built its own yield management technology absent a merger, as it had planned to do. PTX0112 at -985; PFOF § VI.F; *see also United States v. Phil. Nat’l Bank*, 374 U.S. 321, 370 (1963) (rejecting justification that merger would allow merging banks to operate in new areas; banks could have opened new branches instead).

g) Poirot

186. Finally, Google has not identified any valid, non-pretextual justifications for Project Poirot. Google may argue that Project Poirot benefited advertisers by increasing advertiser surplus when Google shaded its bids into third-party exchanges. But this would not justify Google’s decision not to bid-shade on AdX, which also would have increased advertiser

surplus. PFOF § VI.E. In addition, Google’s documents show that Google’s intent with Project Poirot was to undermine exchanges competing through header bidding, suggesting that any justification based on increased advertiser surplus would be pretextual. PFOF ¶¶ 236–241.

F. The Anticompetitive Harm From Google’s Conduct Outweighs Any Procompetitive Benefits

187. If a defendant carries its burden of showing a sufficient “procompetitive justification,” the burden shifts to the plaintiff either “to rebut that claim” or “demonstrate that the anticompetitive harm of the conduct outweighs the procompetitive benefit.” *Microsoft*, 253 F.3d at 59.

188. Given the shortfalls in each of Google’s proffered justifications, the Court need not reach the balancing stage. *See Actavis*, 787 F.3d at 658 (“Because we have determined that Defendants’ procompetitive justifications are pretextual, we need not weigh them against the anticompetitive harms.”).

189. Nevertheless, if the Court finds that Google’s conduct has both anticompetitive and procompetitive effects in any of the relevant markets, the Court must weigh the harms and benefits within that market. When conducting this balancing analysis, the Court should not weigh benefits in one relevant market against anticompetitive effects in another. *See, e.g.*, 15 U.S.C. § 2 (declaring unlawful monopolization of “*any part* of the trade or commerce among the several States”) (emphasis added); *United States v. Topco Assocs., Inc.*, 405 U.S. 596, 611 (1972) (“If a decision is to be made to sacrifice competition in one portion of the economy for greater competition in another portion this too is a decision that must be made by Congress and not by private forces or by the courts.”); *Smith v. Pro Football, Inc.*, 593 F.2d 1173, 1186–87 (D.C. Cir. 1978) (explaining that while the professional football player draft may “heighten athletic competition and thus improve the entertainment product offered to the public,” it did not improve

competition in the “market for players’ services,” and thus the draft’s “‘anticompetitive’ and ‘procompetitive’ effects are not comparable” and the “demonstrated procompetitive effects are nil”); *cf. Amex*, 585 U.S. at 574 (Breyer, J., dissenting) (“A Sherman Act § 1 defendant can rarely, if ever, show that a procompetitive benefit in the market for one product offsets an anticompetitive harm in the market for another.”). For example, conduct that harms competition in the publisher ad server market cannot be justified by purported benefits in the advertiser ad network market or the ad exchange market, and conduct that harms the advertiser ad network market cannot be justified by purported benefits in the publisher ad server market or the ad exchange market. In the context of the ad exchange market specifically, because ad exchanges are two-sided transaction platforms, anticompetitive harms that publishers and advertisers experience in the ad exchange market must be weighed against procompetitive benefits to publishers and advertisers in the ad exchange market. That kind of balancing is appropriate given that both sides of a two-sided transaction platform comprise a *single* product market under *Amex*, *id.* at 546, and therefore does not constitute cross-market balancing of harms and benefits within *different* product markets (e.g., between ad exchanges and either publisher ad servers or advertiser ad networks).

190. The evidence at trial established that the anticompetitive effects of Google’s conduct in each of the relevant markets outweigh any cognizable, in-market benefits proffered by Google—to the extent they take are found to exist at all—in each of those relevant markets. *See generally* PFOF §§ V (anticompetitive effects of Google’s conduct), VI (Google’s proffered justifications are insufficient to outweigh anticompetitive effects).

VII. In the Alternative, The Evidence Demonstrates That Google Has Attempted To Monopolize the Ad Exchange Market

191. Even if the Court were to conclude that Google has not monopolized the ad exchange market because Google does not have sufficient market power in that market, *see supra* PCOL ¶¶ 76, 82–85, 89–91, the evidence shows that Google has *at least* attempted to monopolize that market, in violation of Section 2, *see* 15 U.S.C. § 2 (prohibiting the “attempt to monopolize . . . any part of the trade or commerce among the several States”).

192. The first element of attempted monopolization—anticompetitive conduct—is satisfied by the evidence of Google’s exclusionary conduct in the ad exchange market. *See supra* PCOL § V.

193. The second element—specific intent to monopolize—is satisfied by the evidence of Google’s exclusionary conduct in the ad exchange market, *see supra* PCOL § V, as well as evidence of Google’s anticompetitive intent, *see infra* PCOL § IX.B.2, which is bolstered by Google’s spoliation of evidence, *see infra* PCOL § X.

194. The third element—a dangerous probability of success—is satisfied based on Google’s share of the market for ad exchanges (between 45% and 55% in the United States, and between 63% and 71% worldwide). *See supra* PCOL § IV.B.3. “Compelling evidence of an intent to monopolize or of anticompetitive conduct reduces the level of market share that need be shown,” *M & M Med.*, 981 F.2d at 168, and these shares—combined with Google’s anticompetitive course of conduct—are more than sufficient to satisfy this element. *See id.* (30–50 percent share sufficient when “conduct is invidious”); *Domed Stadium*, 732 F.2d at 490 (share of less than 50 percent “may support a claim for attempted monopolization” if accompanied by “other factors such as concentration of market, high barriers to entry, consumer demand, [or] strength of the competition”). *See* PFOF §§ IV (evidence of anticompetitive conduct), V

(evidence of anticompetitive effects), VII.C.2 (evidence of AdX’s market power). Google argues that there is no dangerous probability if AdX’s market share has declined, but AdX’s market share has been relatively stable over a five-year period. *See* PFOF ¶¶ 496–497. In any event “a drop in market share does not defeat an attempted monopolization claim when there is evidence to support the claim,” *Multiflex, Inc. v. Samuel Moore & Co.*, 709 F.2d 980, 992 (5th Cir. 1983), and there is a dangerous probability of Google monopolizing the ad exchange market given that it is situated between two other product markets dominated by Google, and Google’s control over DFP, which makes the final decision about which ad exchange’s bid wins an auction.

VIII. Google’s Restrictions on AdX And DFP Constitute Anticompetitive Tying Under Sections 1 And 2

195. Although the anticompetitive nature of Google’s conduct is best understood when considered as a whole, Google’s restrictions on AdX—which prevent AdX from submitting real-time bids to publisher ad servers other than DFP—also constitutes unlawful tying when viewed in isolation, in violation of both Sections 1 and 2 of the Sherman Act.

196. “[T]he essential characteristic of an invalid tying arrangement lies in the seller’s exploitation of its control over the tying product to force the buyer into the purchase of a tied product that the buyer either did not want at all, or might have preferred to purchase elsewhere on different terms.” *Jefferson Parish*, 466 U.S. at 12; *see also N. Pac. Ry.*, 356 U.S. at 11 (“[T]he vice of tying arrangements lies in the use of economic power in one market to restrict competition on the merits in another.”); *see* PCOL ¶ 13 (elements of a tying claim).

197. The same tying conduct can support a claim under either Section 1 or Section 2. *See Microsoft*, 253 F.3d at 84 (considering same tying allegations under both § 1 and § 2); *Md. & Va. Milk Producers Ass’n, Inc. v. United States*, 362 U.S. 458, 463 (1960) (“[Section 1 & 2 of the

Sherman Act] closely overlap, and the same kind of predatory practices may show violations of all.”).

A. Google’s Restrictions Help Maintain And Expand Its Monopoly Power In The Publisher Ad Server Market In Violation Of Section 2

198. While courts analyze tying claims similarly under Section 1 and Section 2, *see id.*, “when the defendant is a dominant firm and meets a much stricter power requirement, . . . the special screening function of the tying factors is largely unnecessary, and the more general standards of § 2 of the Sherman Act become relevant.” *Viamedia*, 951 F.3d at 468 (cleaned up). Tying thus violates Section 2 when a tie “contributes significantly to the maintenance or creation of monopoly power . . . even though it is unilaterally imposed.” *Id.* at 469; *cf. LePage’s*, 324 F.3d at 162 (“3M’s bundling of its products . . . reinforced the exclusionary effect of [3M’s other] programs.”).

199. Google’s technological and policy restrictions linking AdX (the tying product) and DFP (the tied product) constitute tying in violation of Section 2 of the Sherman Act because they helped Google “maintain and expand” monopoly power in the market for publisher ad servers. *In re Google Digit. Adver. Antitrust Litig.*, 627 F. Supp. 3d 346, 402 (S.D.N.Y. 2022). Because AdX is by far the largest ad exchange and exclusively enjoys unique demand from small advertisers that use Google Ads, publishers would lose significant revenue if they did not use AdX. But Google does not allow publishers to receive real-time bids and pricing from AdX—which is necessary to put AdX advertisers in real-time competition for impressions—*unless* the publisher also agrees to use Google’s publisher ad server (DFP). Publishers’ need to use AdX therefore coerces publishers to use DFP—not because publishers view DFP as superior to competitors on the merits, but because Google has conditioned real-time bids from AdX on

publishers' use of DFP. The AdX-DFP tie therefore enabled Google to monopolize the market for publisher ad servers. *See generally* PFOF ¶¶ 95–102; PCOL ¶ 13).

B. Google's Restrictions on AdX Compel Publishers To Use DFP and Constitute Tying In Violation Of Section 1

200. To analyze a potential anticompetitive restraint under Section 1 of the Sherman Act, courts apply essentially the same burden-shifting framework used in Section 2 cases. *See Alston*, 594 U.S. at 96–97.¹² First, a plaintiff must show that the restraint has a substantial anticompetitive effect. *Id.* at 96. If a plaintiff does so, the burden shifts to the defendant to show a procompetitive justification for the restraint. *Id.* If a defendant makes such as showing, the burden shifts back to the plaintiff to demonstrate that the procompetitive benefits could reasonably be realized through a less restrictive alternative. *Id.* at 97. And where a restraint has both procompetitive and anticompetitive effects, and there is no less restrictive alternative, the court must “balance the restriction’s anticompetitive harms against its procompetitive benefits.” *Epic Games*, 67 F.4th at 994.

1. The AdX-DFP Tie Has A Substantial Anticompetitive Effect

201. “Tying suppresses competition in two ways: First, the buyer is prevented from seeking alternative sources of supply for the tied product; second, competing suppliers of the tied product are foreclosed from that part of the market which is subject to the tying arrangement.” *It's My Party*, 811 F.3d at 684. To show a substantial anticompetitive effect under step one of the

¹² “Courts sometimes distinguish between per se illegal tying arrangements, and tying arrangements reviewed under the rule of reason,” but some courts have declined to “parse the differences . . . for the analysis is substantially similar.” *It's My Party*, 88 F. Supp. 3d at 490 n.11; *see also BookLocker.com, Inc. v. Amazon.com, Inc.*, 650 F.Supp.2d 89, 97 n. 2 (D. Me. 2009) (“[T]he gap between a per se claim and a rule of reason claim in the tying context may not be wide.”). Under the per se standard, a defendant’s procompetitive justifications are not considered. Here, Plaintiffs can prevail under either a per se or rule of reason analysis.

burden-shifting framework here, a plaintiff must satisfy four elements. *See Serv. & Training*, 963 F.2d at 683.

202. *First*, a plaintiff must show “the existence of two separate products.” *Serv. & Training*, 963 F.2d at 683. The key inquiry is whether there is consumer demand to buy each product separately. *See Jefferson Parish*, 466 U.S. at 19–22. Here, ad exchanges and publisher ad servers are separate products because publishers can buy services of ad exchanges and of publisher ad servers from different sellers, and many firms sell either only ad exchange services (e.g., Index Exchange) or only publisher ad server services (e.g., Kevel). *See PFOF* ¶ 64; III.B.1.b.2.

203. *Second*, the defendant must have “an agreement conditioning purchase of the tying product upon purchase of the tied product,” *Serv. & Training*, 963 F.2d at 683, or have “used its market power to force its customers to accept the tying arrangement,” *Faulkner*, 905 F.2d 769, 772 (4th Cir. 1990). *See also It’s My Party*, 88 F. Supp. 3d at 490 (defendant must have “conditioned the sale of one product on the purchasing of a different, ‘tied’ product”). Even “in the absence of an explicit agreement requiring the purchase as a condition of the sale, courts will accept proof suggesting any kind of coercion by the seller or unwillingness to take the second product by the buyer.” *Advanced Computer Servs. of Mich., Inc. v. MAI Sys. Corp.*, 845 F. Supp. 356, 368 (E.D. Va. 1994) (cleaned up). The coercion element is satisfied when a defendant’s policies make purchasing the tying and tied products together “the only viable economic option.” *Nobel Sci. Indus., Inc. v. Beckman Instruments, Inc.*, 670 F. Supp. 1313, 1324 (D. Md. 1986); *see also Tire Sales Corp. v. Cities Serv. Oil Co.*, 637 F.2d 467, 473 (7th Cir. 1980) (coercion exists when a buyer is “induced to purchase from” a monopolist “because of the inherent power which the [monopolist] possessed as a company upon which [buyers] depended”).

204. Here, Google has coerced publishers to use DFP as their publisher ad server by conditioning real-time bids from AdX on the use of DFP. *See* PFOF § IV.A.2. Google’s restriction thus makes DFP the only viable economic option to obtain real-time bids from AdX and thereby “coerce[s] the abdication of buyers’ independent judgment as to the ‘tied’ product’s merits [i.e., DFP’s] and insulate[] it from the competitive stresses of the open market.” *Jefferson Par. Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 13 (1984).

205. Google is incorrect to argue that the conditioning element has not been met because publishers “are not required to buy GAM” and can use AdX Direct “tags” without using DFP. Def. PCOL ¶ 198. As Google’s own customers testified, using DFP is “the only viable economic option,” *Nobel Sci. Indus.*, 670 F. Supp. at 1324, because AdX demand is critically important to publishers, as is the need to access such demand in real time. *See* PFOF ¶¶ 141-146. The availability of AdX Direct tags, which do not permit publishers to put bids from AdX into real-time auctions with bids from other exchanges, is not an economically viable way for publishers to use AdX because it does not enable publishers to put AdX’s bid in real-time competition with the bids other exchanges (which maximizes publisher revenue). *See* PFOF IV.A.2.a.4. The existence of a theoretical means of purchasing the tied product alone is not sufficient to defeat a tying claim. *See It’s My Party*, 811 F.3d at 685 (noting that a small number of separate sales do not necessarily rebut a tying claim, as 10% of sales being conducted separately “has been cited as the minimum benchmark sufficient to rebut any inference of tying”); *Cascade Health*, 515 F.3d at 915 (holding that 14% of purchasers making a separate purchase creates a material issue of fact as to whether there was coercion).

206. *Third*, the plaintiff must show that “the seller’s possession of sufficient economic power in the tying product market to restrain competition in the tied product market.” *Serv. &*

Training, 963 F.2d at 683. Notably, tying cases “do not require that the defendant have a monopoly or even a dominant position throughout the market for a tying product.” *U.S. Steel*, 429 U.S. at 620; *see also In re Deere & Co. Repair Serv. Antitrust Litig.*, 703 F. Supp. 3d 862, 909 (N.D. Ill. 2023) (“in [the tying] context ‘market power’ doesn’t need to reach the level of monopoly power”). Rather, the inquiry focuses on “whether the seller has the power, within the market for the tying product, to raise prices or to require purchasers to accept burdensome terms that could not be exacted in a completely competitive market. In short, the question is whether the seller has some advantage not shared by his competitors in the market for the tying product.” *Fortner*, 429 U.S. at 620.

207. For this reason, Plaintiffs can prevail on their Section 1 tying claim so long as Google has market power—even if it does not have monopoly power—in the ad exchange market. Google has at least market power in the ad exchange market because, among other things, publishers testified that they are reliant on AdX to monetize their open-web display ad inventory, AdX has high market share, AdX is nine times larger than its second-biggest rival, and AdX charges supracompetitive take rates. *See supra* PCOL ¶¶ 76, 82.

208. Google is incorrect to claim that Plaintiffs’ market definition for the tying product “depends on a claim about power in an undefined market of ‘advertiser demand.’” Def. PCOL ¶ 200; *see also id.* ¶ 232 (suggesting that Plaintiffs must show market power in “advertiser demand”). This misinterprets Plaintiffs’ tying claim, which is that Google has used its market power in its ad exchange (AdX) to coerce publishers to purchase its publisher ad server (DFP). *See* Am. Compl., ECF No. 120, ¶¶ 337–38. The *sources* of AdX’s market power include, but are not limited to, the unique set of small advertisers that use Google Ads (which exclusively bids through AdX) and the large total number of advertisers (including large advertisers) that bid

through AdX. *See* PFOF § VII.C. But the *market* in which AdX operates is the ad exchange market. The markets in which both Google’s tying product (AdX) and tied product (DFP) operate are both well defined, *see* PFOF §§ VII.A, VII.C, and there is no need to define a separate market for “advertiser demand.”

209. *Fourth*, the tying arrangement must have affected a “not insubstantial” amount of commerce. *Serv. & Training*, 963 F.2d at 683. Google does not contest this element, *see* Def. PCOL ¶ 195, and it is easily met, *see* PFOF § IV.A.2. *See It’s My Party*, 88 F. Supp. 3d at 490 (citing precedent holding that \$200,000 was “not insubstantial”).

2. Google Tying AdX To DFP Does Not Have Any Cognizable Procompetitive Rationale

210. Once plaintiffs have established anticompetitive harm, the burden shifts to the defendant to offer a procompetitive rationale for the tie. *See Alston*, 594 U.S. at 96–97. As discussed above, however, Google’s justifications for the tie between DFP and AdX fail. *See* PCOL § VI.E.2(a).

3. Any Benefits Arising From Google’s Conduct Are Attainable Through Less-Restrictive Alternatives

211. Even if the Court credits defendants’ evidence of procompetitive benefits, Google’s conduct is nevertheless unreasonable because a less-restrictive alternative exists. *See Alston*, 594 U.S. at 97. “[I]t is unreasonable to justify a restraint based on a purported benefit to competition if that same benefit could be achieved with less damage to competition.” *Impax Labs*, 994 F.3d at 497; *see* PCOL § VI.E.2(a); PFOF ¶¶ 331-333.

212. A less-restrictive alternative satisfies Plaintiffs’ burden in a Section 1 claim if it is “substantially less restrictive” while achieving “the same procompetitive benefits.” *Alston*, 594 U.S. at 100. Less-restrictive alternatives need only achieve proven benefits—meaning that proffered benefits not accepted by the Court play no role. *See id.* (plaintiffs need only show less

restrictive means existed to achieve those benefits “proven at the second step”); *Google Search*, 2024 WL 3647498, at *125 n.15 (“[T]he principle only applies to ‘proven competitive benefits.’”); *see also In re NCAA Athletic Grant-in-Aid Cap Antitrust Litig.*, 375 F. Supp. 3d 1058, 1103 n.43 (N.D. Cal. 2019) (“Because Defendants have not shown that the challenged rules can be justified on the ground that they promote integration, the Court does not consider whether any proffered less restrictive alternatives would promote integration.”).

213. Here, the evidence showed that Google could have achieved its goals without tying DFP to AdX. *See* PCOL § VI.E.2(a); PFOF ¶¶ 331-333. For example, Google could have expanded AdX Direct to include the submission of real-time bids to publishers that do not use DFP. Because Google’s proffered justifications for tying AdX to DFP are attainable through less-restrictive alternatives, its conduct is unreasonable under the rule of reason for purposes of Plaintiffs’ Section 1 tying claim. *See, e.g.*, PFOF § IV.A.b.2.

4. Any Procompetitive Benefits Of Tying AdX To DFP Are Outweighed By The Anticompetitive Effects

214. Finally, if the AdX-DFP tie has both pro- and anticompetitive effects, and there are no less-restrictive alternatives, “the district court must proceed to . . . balance the restriction’s anticompetitive harms against its procompetitive benefits.” *Epic Games*, 67 F.4th at 994; *see also Alston*, 594 U.S. at 97 (noting that the “whole point” of the rule of reason is to condemn any restraint that “unduly harms competition” after a “weigh[ing of] all of the circumstances of a case”). Here, numerous industry participants, including publishers, rival publisher ad servers, and rival ad exchanges, have testified that the AdX-DFP tie is the primary means by which Google has driven nearly all competitors from the publisher ad server market and secured a lasting 90% market share. Wiping away all meaningful competition in the publisher ad server market is such a severely anticompetitive effect of the AdX-DFP tie that it overwhelms any purported

procompetitive benefits. *See In re NCAA*, 375 F. Supp. 3d at 1109 (final balancing at the end of the rule-of-reason analysis avoids an outcome where “an egregious restraint with a minor procompetitive effect would have to be allowed to continue, merely because a qualifying less restrictive alternative was not shown”). *See* PFOF Section VII.A.

C. The AdX-DFP Tie Is Not Protected As A Refusal To Deal With Rivals

215. Google is also wrong that the AdX-DPF tie is protected from liability by “Supreme Court law on duty to deal.” Def. PCOL ¶ 190. Google’s argument gets things backwards: a tie is definitionally and doctrinally distinct from a refusal to deal. For example, in *Kodak*, Kodak argued that its policy of only selling copier parts to third parties if they agreed not to buy service from Kodak’s service-repair competitors was a unilateral refusal to deal. 504 U.S. at 463 n.8. The Supreme Court rejected that argument, concluding that “[a]ssuming, *arguendo*, that Kodak’s refusal to sell parts to any company providing service can be characterized as a unilateral refusal to deal, its alleged sale of parts to third parties on condition that they buy service from Kodak is not.” *Id.* Indeed, since all ties can be described as refusals to deal with respect to the tying product unless the buyer also purchases the tied product, if Google’s refusal-to-deal argument were correct it would effectively abrogate tying as a form of anticompetitive conduct. For the reasons described *infra* in PCOL § IX, however, Google misinterprets controlling precedent on refusals to deal.¹³

¹³ Google cites two Fourth Circuit cases for the proposition that tying claims fail if they can be construed as “forced sharing of technology and customers,” Def. PCOL ¶ 192, but both were decided on straightforward failures by the plaintiffs to meet the elements of a tie. *See Serv. & Training*, 963 F.2d at 685–86 (plaintiff “introduced no evidence” that the defendant imposed a tie); *It’s My Party, Inc. v. Live Nation, Inc.*, 811 F.3d at 684–85 (tying claim failed because the “plaintiff has no prospect of satisfying” the necessary element of “coercion”). Without analysis, the district court in *It’s My Party* had elected to assess certain challenged conduct as a refusal to deal (the defendant’s policy of only hosting concerts it promoted) while assessing other challenged conduct as a tie (the defendant’s policy of only promoting concerts on a condition they occur at defendant-owned venues). *See* 88 F. Supp. 3d at 492, 501. On appeal the Fourth Circuit only discussed the district court’s tying analysis.

216. Similarly, Google misses the mark by arguing that AdX and DFP are not tied because the “the proper remedy” to a tie is “to enjoin the tie, not to create a duty to deal.” Def. PCOL ¶ 190 (quoting *Authenticom, Inc. v. CDK Glob., LLC*, 874 F.3d 1019, 1026 (7th Cir. 2017)). Remedies are not currently at issue (much less preliminary-injunction remedies like those at issue in *Authenticom*), but Google could eliminate the AdX-DFP tie by “disaggregat[ing] what it sells to its customers,” Def. PCOL ¶ 190, and offering its publisher customers AdX’s real-time bids and pricing information without also requiring those publishers to use DFP.

IX. Google’s Anticompetitive Conduct Is Not Immune from Antitrust Scrutiny Under Conduct-Specific Tests for Refusals to Deal With Rivals Or Product Design.

217. Google asks this Court to examine each aspect of Google’s exclusionary conduct in isolation, classify each as a “refusal to deal” or “product design,” and then find that Google’s conduct is “per se lawful,” Def. PCOL ¶ 227, or “immune from antitrust scrutiny,” Def. Mem. in Supp. Mot. for Summ. J., ECF No. 571 (“Def. MSJ”), at 19, 21. This piecemeal approach is squarely foreclosed by precedent, most recently set forth in *Duke Energy*, 111 F.4th at 354. *See* PCOL § IX.A. Google’s “refusal to deal” and “product design” arguments fail for two additional, independent reasons: Google’s conduct is not properly classified as a “refusal to deal” or “product design” in the first instance, and even if it were, that conduct would still give rise to liability under the Sherman Act. *See* PCOL § IX.B (regarding refusals to deal); PCOL § IX.C (regarding product design).

A. Courts Evaluate Complex, Anticompetitive Courses of Conduct in Their Totality, Rather in Piecemeal Subcategories Like “Refusal to Deal with Rivals” and “Product Design.”

218. The facts of *Duke Energy* are instructive as to why Google’s piecemeal approach is improper. That case involved a multi-pronged, multi-year course of anticompetitive conduct, much of which the defendant attempted to characterize as a refusal to deal with a rival under

Trinko. 111 F.4th at 352. *Duke Energy* concerned a long-running rivalry between two electric power generation companies: Duke Energy, the dominant firm, and NTE Energy Services, a recent startup. *Id.* at 344. The rivalry came to a head when NTE attempted to persuade the City of Fayetteville to select NTE at the next opportunity for contract renewal (or termination) with Duke, which was approaching. *Id.* at 345. Winning Fayetteville’s business was key to NTE’s long-term growth plans, including the construction of a new power plant in Reidsville, North Carolina. *Id.* Duke took a series of interconnected measures, over many years, to prevent NTE from winning Fayetteville’s business, including:

- (1) offering Fayetteville a “massive discount” on the remaining term of Fayetteville’s existing contract with Duke, coupled with a price *increase* in subsequent years above NTE’s rates;
- (2) offering to quadruple the rate it was paying Fayetteville for excess power generated by Fayetteville’s own aging power plant—an above-market rate;
- (3) inducing NTE to stop paying Duke on a contract for construction of infrastructure to link the new Reidsville plant to the power grid;
- (4) claiming (falsely) that NTE had breached its contract with Duke for construction of that infrastructure due to non-payment;
- (5) harming NTE’s relationship with investors by filing a notice in an industry database that an NTE project was “canceled”; and
- (6) intervening in a separate North Carolina regulatory proceeding to try to prevent NTE from receiving a necessary construction permit for its Reidsville plant. *Id.* at 346–50.

219. NTE brought a monopolization claim, and Duke moved for summary judgment. *Id.* at 351–52. In granting summary judgment to Duke, the district court did precisely what Google (incorrectly) invites the Court to do here: it “divided NTE’s allegations into discrete challenges to assess whether each individually amounted to an antitrust violation . . . [,] applied separate tests as relevant to each subject, found each of them lawful, and declined to consider the acts taken as a whole.” *Id.* at 352. The district court reasoned, “[a]dding up several instances of lawful conduct cannot total unlawful conduct” — “[i]n simple mathematical terms, $0 + 0 = 0$.” *Id.* (cleaned up).

220. The Fourth Circuit reversed the grant of summary judgment. It held that the district court “erroneously ‘compartmentalized’ the various aspects of Duke’s anticompetitive conduct and asked whether each one, *independently*, was unlawful.” *Id.* at 354. As the Court of Appeals explained: “[i]t is foundational that alleged anticompetitive conduct must be considered as a whole,” and “when a court is faced with allegations of a complex or atypical exclusionary campaign, the individual components of which do not fit neatly within pre-established categories, its application of such specific conduct tests would prove too rigid.” *Id.* In such a case, courts should assess the “the scheme or conduct . . . as alleged [and] not in manufactured subcategories.” *Id.* at 355. That is because categorizing conduct is not an end unto itself, but rather “the purpose of identifying these categories of conduct is to help determine the presence or absence of harmful effects[.]” *Viamedia*, 951 F.3d at 453. Ultimately, the relevant question under Section 2 of the Sherman Act is not how challenged conduct should be *categorized*, but whether that conduct “harm[s] the competitive process.” *Microsoft*, 253 F.3d at 58; *see also Duke Energy*, 111 F.4th at 354–55.

221. This conclusion holds even if certain portions of Google’s conduct might *resemble* a refusal to deal or other subcategory of conduct. For example, in *Duke Energy*, Duke’s interference with NTE’s effort to connect its Reidsville plant to the power grid using Duke’s transmission lines literally involved Duke refusing to deal with a rival (NTE). *Id.* at 362–64. But the Fourth Circuit ultimately concluded that it “need not determine, as a matter of law, whether” the conduct satisfied the requirements of the specialized test for refusal-to-deal-with-rivals claims because “this conduct was but part of a larger scheme.” *Id.* at 366. As part of that scheme, Duke’s refusal to connect NTE to the power grid “occurred during the very same time” Duke took other anticompetitive actions against NTE which “were executed simultaneously and *to the same effect.*” *Id.* Since the overall consequence of Duke’s scheme was to inhibit competition from NTE, the court held that such “foreclosure to competition”—including the Reidsville conduct that Duke argued should be analyzed under the specialized test for refusal-to-deal-with-rival claims—“is precisely what [Section 2] seeks to proscribe.” *Id.*

222. Here, Google has conducted an “exclusionary campaign” that was “complex” and “atypical.” *Duke Energy*, 111 F.4th at 355. Google’s campaign lasted nearly two decades, continues today, and involves an array of conduct spanning *three mutually reinforcing monopolies*, included acquisitions of competitors and potential competitors, restrictions on its customers that inhibit their ability to use rivals’ offerings, and manipulation of complex auction processes to bolster its position at the expense of rivals. *See* PCOL §§ V.A, V.B.1. This conduct was also overlapping in time, and, furthermore, Google’s anticompetitive acts are “interconnected,” *Duke Energy*, 111 F.4th at 355, and work together synergistically. PCOL §§ V.A, V.B.1. It would therefore be inappropriate to silo them into a “rigid” set of “pre-

established categories,” such as refusal to deal with rivals or product design. *See Duke Energy*, 111 F.4th at 354–55.

223. The conduct in this case has the same attributes that made granular analysis of specific components of conduct inappropriate in *Duke Energy*. The conduct in this case includes numerous interrelated and overlapping measures. For example, Google Ads’ restriction of its bidding activity and Google’s conditioning of real-time bids from AdX on the use of DFP stretch throughout Google’s entire exclusionary campaign and overlap with all of the other conduct in the case, except the acquisition of DoubleClick. Last Look also overlapped with Sell-Side Dynamic Revenue Sharing. *See* PFOF ¶¶ 206-208. All of this conduct was directed “to the same effect,” *Duke Energy*, 111 F.4th at 366, of acquiring and maintaining dominance over the ad tech tools that facilitate open web display transactions. *See* PCOL § V.

224. Thus, for the same reasons stated by the *Duke Energy* court, zeroing in on specific components of Google’s conduct and evaluating them individually is not the proper mode of analysis here. Instead, the appropriate mode of analysis is to assess whether Google’s conduct, in its totality, had an anticompetitive effect in the relevant product and geographic markets. Additionally, as explained below, even if the Court were to analyze Google’s conduct piecemeal, Google still cannot escape liability through reliance on “refusal to deal” or “product design” caselaw.

B. None of Google’s Conduct Is Properly Classified as a Refusal to Deal With Rivals, and Such a Classification Would Not Bar Liability in Any Event.

225. Google has incorrectly argued that “all” of the challenged exclusionary conduct should be categorized as a “lawful refusal[] to deal,” Def. PCOL ¶ 219, and as such is “per se

lawful,” *id.* ¶ 227.¹⁴ This argument fails twice over. *First*, even analyzed individually, none of Google’s conduct constitutes a refusal to deal with rivals. *Second*, even if the conduct were categorized as a refusal to deal with rivals—and it should not be—it is not “per se lawful” and would still violate the Sherman Act.

1. Even when analyzed on an individual basis, none of Google’s conduct qualifies as a refusal to deal with rivals under *Trinko* and its progeny.

226. Google freely labels large swathes of its conduct as refusals to deal with rivals, but an examination of the actual facts and holding of *Trinko* and its progeny reveals that none of Google’s conduct at issue here fits in the refusal-to-deal-with-rivals subcategory. *Trinko* itself illustrates why. *Trinko* involved the market for telephone service in the New York area. 540 U.S. at 402. Under the Telecommunications Act of 1996, incumbent telephone carriers in a market were required to share their network infrastructure with competitors in order to facilitate better competition for telephone service. *Id.* Companies interested in providing telephone service using Verizon’s infrastructure were required by law to place orders with Verizon for certain network infrastructure access. *Id.* at 403. The customer of a competitor sued, arguing that Verizon violated the antitrust laws by not filling orders for network access, which discouraged phone service customers from switching to Verizon’s rivals. *Id.* at 404–05. Among other claims, the plaintiff brought a Sherman Act Section 2 claim against Verizon based on this conduct. *Id.* at 405.

227. The district court dismissed the Sherman Act claim, and the Supreme Court ultimately agreed with the district court because “Verizon’s alleged insufficient assistance in the

¹⁴ As stated previously, Google incorrectly suggests that Plaintiffs have “abandoned” reliance on conduct for which Plaintiffs’ experts did not expressly opine that the conduct was anticompetitive as a matter of economics. Plaintiffs have done no such thing, and as a result, Google’s argument that “all” of its conduct at issue in the case should be characterized as a refusal to deal is not just wrong, it is also lacking because Google never even addresses Sell-Side Dynamic Revenue Sharing, Project Poirot, or the DoubleClick acquisition.

provision of service to rivals is not a recognized antitrust claim[.]” *Id.* at 410. In other words, standing alone, failure to provide sufficient or timely assistance to a rival (i.e., a competitor in a given market) did not give rise to antitrust liability. The Court went on to explain that there are circumstances in which a refusal to deal with a rival could give rise to antitrust liability, but *Trinko* was not such a case. *See id.* at 408–09 (citing *Aspen Skiing*, 472 U.S. at 601).

228. In claiming that virtually everything that has happened in this case is a refusal to deal, Google fails to acknowledge two key aspects of the ruling in *Trinko*. First, *Trinko* was about refusals to deal *with rivals in the same product market*, i.e., rival telephone service providers seeking to compete head-to-head with Verizon, not refusals to deal with other entities like customers or with firms that provided complementary or related products. *See* Section IX.A.1(a). Second, *Trinko* involved unilateral, *unconditional* refusals to deal—the provision, or lack thereof, of a connection to Verizon’s network infrastructure—not *conditional* refusals to deal such as ties or other arrangements that involve a give and take between the parties to the deal. *See* Section IX.A.1(a). *Trinko*’s progeny and other cases that limit antitrust liability for refusals to deal with rivals share these same two attributes. *See, e.g., Pac. Bell Tel. Co. v. linkLine Comm’cns, Inc.*, 555 U.S. 438, 442, 449 (2009) (rejecting Sherman Act claim based on the defendant’s increase in its wholesale prices it was offering to a competitor because “as in *Trinko*, the defendant has no antitrust duty deal with its rivals at wholesale”); *New York v. Meta Platforms*, 66 F.4th 288, 305 (D.C. Cir. 2023) (rejecting Sherman Act claim where restrictions were imposed on rival app developers); *Novell, Inc. v. Microsoft Corp.*, 731 F.3d 1064, 1071–77 (10th Cir. 2013) (rejecting Sherman Act claim based on Microsoft’s refusal to provide technical assistance to the creator of a rival word processing program to Microsoft Word); *Google Search*, 2024 WL 3647498, at *129–31 (declining to impose Sherman Act liability for Google’s refusal

to extend proprietary feature of its own search engine management tool to search engine rival Microsoft that would have facilitated Microsoft's competition with Google in markets for general search engines and search-text advertising).

229. None of the conduct at issue in this case falls under the *Trinko* rubric because Google's conduct involved restrictions placed on its publisher and advertiser customers rather than on rivals in the same product market, and those restrictions involved various types of conditional dealing rather than the unilateral conduct at issue in *Trinko* and related cases.

- a) *Google's conduct in this case is not a refusal to deal with rivals because Google's conduct involved interactions with its publisher and advertiser customers, not rivals in the same product market.*

230. Google's conduct involved dealings directly with its own customers (publishers and advertisers), not its rivals. Through First Look, Google used its control of DFP to force its publisher customers to give AdX a right of first refusal over all impressions offered for sale programmatically. PFOF § IV.B.1; PCOL § V.A.5. Last Look similarly forced publishers to give AdX a final opportunity to bid on impressions after header bidding auctions. PFOF § IV.B. 3; PCOL§ V.A.6. Google Ads' exclusivity to AdX and the tie between AdX and DFP likewise did not involve an interaction or refusal to deal with a rival in the advertiser ad network, ad exchange, or publisher ad server markets; they were a series of conditions that Google imposed on publisher customers using DFP or AdX and advertiser customers using Google Ads. PFOF § IV.A.2; PCOL§ V.A.2. In this regard, Google required its advertiser customers seeking to bid on inventory through Google Ads to confine their bids (predominantly) to inventory offered through AdX, and Google required its publisher customers seeking access to real-time bids from AdX to use DFP as their publisher ad server. PFOF ¶¶ 103, 104, 109, 110; PCOL ¶¶ 106, 110. To be sure, Google's conduct had grievous consequences for competition in the markets at issue in this case, and by extension, competitors in those markets. But where, as here, the defendant

engages in conduct that affects competition and competitors *because of* restrictions it has placed on customers, *Trinko* does not apply. *See, e.g., Chase Mfg., Inc. v. Johns Manville Corp.*, 84 F.4th 1157, 1173 (10th Cir. 2023) (holding that district court erroneously applied refusal-to-deal framework in analyzing challenge to conditions that the defendant placed on sales to customers); *accord Lorain Journal*, 342 U.S. at 152–53 (holding that newspaper was liable for violating the Sherman Act where it refused to place ads from advertisers who were also placing ads on a local radio station).

231. Other aspects of Google’s conduct are similarly far afield of refusals to deal with rivals. For example, Google’s acquisitions of DoubleClick and Admeld were just that—acquisitions—not refusals to deal with anyone.

232. Google argues incorrectly that *Microsoft*, 53 F.3d at 74–75, establishes that conduct related to the design or interoperability of a monopolist’s products qualifies as a refusal to deal. *See* Def. PCOL ¶ 223. In fact, *Microsoft* directly refutes this argument. Google quotes *Microsoft*’s statement that “a monopolist does not violate the antitrust laws simply by developing a product that is incompatible with those of its rivals.” Def. PCOL ¶ 223 (quoting *Microsoft*, 253 F.3d at 75). But the very next sentence of the opinion explains that “[i]n order to violate the antitrust laws, the incompatible product must have an *anticompetitive effect* that *outweighs any procompetitive justification* for the design.” *Microsoft*, 253 F.3d at 75 (emphases added). In other words, the D.C. Circuit applied its standard formulation for exclusionary conduct to *Microsoft*’s decision to make incompatible products. *Id.* Applying the standard balance-shifting framework, the court held that certain of *Microsoft*’s decisions that rejected interoperability with other products were anticompetitive. *See id.* at 75–77.

233. Google further argues erroneously that the only alternative to this anticompetitive conduct is some level of “forced” sharing or interoperability with its rivals, which would infringe on its ability to deal with competitors on terms of its own choosing. Def. PCOL ¶¶ 167–69. In other words, Google argues that “fixing” or “undoing” any of this conduct would result in forced sharing or interoperability with competitors.

234. The Court should reject this argument because Google is prematurely injecting questions of remedy into the liability phase of this case. Should the Court determine that Google is liable for violating the Sherman Act, it will have broad discretion to determine the appropriate remedy, after the parties have had an opportunity to provide further information to the Court in subsequent proceedings. A district court recently addressed and persuasively dispensed with this exact argument in another case against Google. *See In re Google Play Store Antitrust Litig.*, 2024 WL 4438249, at *7 (N.D. Cal. Oct. 7, 2024). There, Google argued that certain potential remedies related to providing rivals access to its software infrastructure would “amount to forcing it to do business with rivals, in contradiction of” the “general rule” that “even monopolists” are free to choose with whom to do business and on what terms. *Id.* But the court explained, “[t]he problem for Google is that the case is now in the remedy phase, not the liability phase. The question at hand is not whether Google violated the antitrust laws by failing to aid rivals, but what measures are necessary to restore fair competition in the face of the barriers found” during the liability phase. *Id.* Thus, Google cannot evade liability by conflating the remedies and liability phases of this trial, and then attempting to apply *Trinko* to a phase of the trial where it does not belong.

235. The Court should similarly reject Google’s argument that it is shielded from liability because taking any action different from what it took in this case would have required

“technical work.” *E.g.*, Def. PCOL ¶ 158. Everything a technology company does—whether procompetitive, anticompetitive, or otherwise—requires some kind of technical work. Adopting Google’s reasoning would allow refusal-to-deal-with-rivals doctrine to swallow core antitrust prohibitions against tying and other forms of anticompetitive conduct in technology industries, including when a monopolist dominates multiple interconnected technology markets and thus could be considered a rival with virtually every industry player.

b) *The conditional dealing at issue in this case, such as the tie between AdX and DFP, is not a refusal to deal with rivals under Trinko*

236. The tie between Google Ads and AdX and the tie between AdX and DFP are also not refusals to deal with rivals because *Trinko* does not apply to “conditional dealing” arrangements. As addressed previously, Google has imposed conditions on its customers such as (1) if advertisers want to use Google Ads as their buying tool, then they are limited to bidding primarily into AdX as opposed to rival exchanges, *see* PCOL ¶ 106; PFOF ¶¶ 109, 110, and (2) if publishers want to receive the full functionality of AdX, including access to real-time bids, then they must use DFP as their publisher ad server, *see* PCOL ¶ 110; PFOF ¶¶ 103, 104. In *Kodak*, the Supreme Court rejected the defendant monopolist’s argument that its policy of selling one product (repair parts) to customers only on the condition that they not purchase a different product (repair service) from competitor independent service providers should be analyzed only as a refusal to deal with rivals. *See* 504 U.S. at 463 n.8. The Court instead held that “[a]ssuming, *arguendo*, that Kodak’s refusal to sell parts to any company providing service [i.e., rivals] can be characterized as a unilateral refusal to deal, its alleged sale of parts to third parties [i.e., customers] on condition that they buy service from Kodak is not.” *Id.* Similarly, in *Lorain Journal*, the Court did not apply a refusal-to-deal-with-rivals rubric to a monopolist newspaper that conditioned sales of advertising space to customers on those customers agreeing not to place

ads with the newspaper's rival (a new radio station). 342 U.S. at 152–53. And the Tenth Circuit recently declined to categorize as a refusal to deal a monopolist's threats to “cut off” customers if they redirected some of their purchases from the monopolist to a lower-cost rival, holding that it was error to “extend[] a refusal-to-deal-with-rivals analysis” to anticompetitive restraints the monopolist places on customers, *Chase Mfg.*, 84 F.4th at 1173.

237. The Supreme Court's decision in *Trinko* did not disturb these well-settled principles because it remains true that the “[r]efusal to deal doctrine . . . doesn't seek to displace doctrines that address a monopolist's more direct interference with rivals.” *Novell*, 731 F.3d at 1076. There remains a “contrast” between (on the one hand) a monopolist's refusal to deal with rivals and (on the other) conduct that permits a monopolist to interfere with its rivals, including by “limit[ing] the abilities of third parties to deal with rivals (exclusive dealing),” or “requir[ing] third parties to purchase a bundle of goods rather than just the ones they really want (tying).” *Id.* at 1072; *see also Viamedia*, 951 F.3d at 453 (distinguishing “a simple refusal to deal” from other forms of anticompetitive conduct that could be characterized as “conditional refusals to deal”); *Datagate, Inc. v. Hewlett-Packard Co.*, 60 F.3d 1421, 1427 (9th Cir. 1995) (“[F]or the purposes of tie-in analysis, the defendant may sell the tying product to anybody or nobody at all. What it may not do is condition the sale of the tying product upon the purchase of the tied product, thereby expanding its market power into the market for the tied product.”).

238. The precedents that Google relies on to suggest that the refusal-to-deal category is “broad” in fact recognize these same limits. *See* Def. PCOL ¶ 157. For instance, in *New York v. Facebook, Inc.*, the district court held that restrictive conditions on *customers*, such as tying and exclusive dealing, are “categorically different from unilateral conduct that involves only the monopolist's competitors, such as its refusal to deal with them.” 549 F. Supp. 3d 6, 32 (D.D.C.

2022). The court of appeals affirmed that holding, even as it analyzed other conduct as a refusal to deal under *Trinko*. See 66 F.4th at 304 (citing *Lorain Journal*, 342 U.S. at 149). Google also cites *Novell*, which (as discussed above, see *supra* ¶ 237) notes the “contrast” between other categories of anticompetitive conduct and a refusal to deal, and that the refusal-to-deal category does not seek to displace doctrines that address a monopolist’s more direct interference with rivals. *Novell*, 731 F.3d at 1076.¹⁵

239. The Seventh Circuit’s decision in *Viamedia* is particularly instructive on the facts at issue. See *Viamedia*, 951 F.3d 429. There, the monopolist imposed a condition on customers seeking to access an advertising platform it controlled—it required potential users of the platform to use the monopolist’s advertising representation services rather than a rivals’ advertising representation services. *Id.* at 434–35. The monopolist argued that the conduct could not be the basis of a tying claim because the precise conduct at issue—the manner in which it effectuated the tie—was that it refused to deal with a rival representation service. The court rejected that argument and held that a tying claim “does not fail as a matter of law simply because it was implemented by refusing to deal with an intermediary.” *Viamedia*, 951 F.3d at

¹⁵ In prior briefing, Google cited additional circuit precedent to support the idea that the refusal-to-deal category was broad, but these opinions are also consistent with the described limits on the category. See Def. Rep. Supp. Mot. Summ. J., ECF No. 702, at 10 (citing, in addition to *Meta* and *Novell*, *Aerotec Int’l, Inc. v. Honeywell Int’l, Inc.*, 836 F.3d 1171, 1179, 1184 (9th Cir. 2016) (applying *Trinko* because the claims were based on the monopolist’s “dealing with [the] competitor” that brought the claim and there were no conditions placed on non-competitor third parties); *FTC v. Qualcomm Inc.*, 969 F.3d 974, 993, 1002–03 (9th Cir. 2020) (assessing whether the defendant-monopolist had a duty to “license its [products] to its direct competitors” as a refusal to deal with a rival, while assessing other challenged conduct under alternative frameworks). Google’s remaining support comes from out-of-circuit district cases, but these also do not establish that the refusal-to-deal category is broad enough to encompass conditions on customers. See Def. PCOL ¶ 157 (citing *Google Search*, 2024 WL 3647498, at *129 (applying *Trinko* to a factually distinct situation as explained at ¶ 228, *infra*); *Dream Big Media Inc. v. Alphabet Inc.*, 2024 WL 3416509, at *5 (N.D. Cal. July 15, 2024) (not applying *Trinko* at all and dismissing the challenged conduct for failure to state a tying or exclusive dealing claim); *In re Apple iPod iTunes Antitrust Litig.*, 796 F. Supp. 2d 1137, 1145 (N.D. Cal. 2011) (applying *Trinko* without analysis to a refusal to license software to a competitor)).

472. The monopolist’s conditions could be considered a tying claim because the “refus[al] to deal with [the customers’] chosen intermediary had the effect of forcing” those customers into the “much less desirable” position of purchasing representation services from the monopolist. *Id.* at 471; *see also It’s My Party*, 811 F.3d at 684 (holding that the “crux of tying lies” in the defendant “forc[ing]” purchase of the tied product). Given the monopolist’s “successful capture of a monopoly position” in the tied market (representation services), the court primarily “focus[ed]” on “whether, viewing the monopolist’s conduct as a whole, it has unreasonably maintained or enhanced its monopoly position” rather than whether the “conduct satisfies some platonic ideal of tying conduct.” *Viamedia*, 951 F.3d at 469. Notably, the court in *Viamedia* also considered whether the same conduct was an exclusionary refusal to deal under *Trinko* because “a dominant firm’s conduct may be susceptible to more than one court-defined category of anticompetitive conduct.” *Id.* at 453.

240. The Fourth Circuit quoted *Viamedia*’s reasoning that “categories of conduct[,] [including] refusals to deal and tying[,] are conceptually related and may overlap.” *Duke Energy*, 111 F.4th at 354–55 (quoting *Viamedia*, 951 F.3d at 453). Where overlap occurs, the exercise of categorizing forms of exclusionary conduct “should not cause confusion if [a court] stay[s] focused on the underlying inquiry: the conduct ‘must harm the competitive process and thereby harm consumers.’” *Duke Energy*, 111 F.4th at 354–55 (quoting *Viamedia*, 951 F.3d at 453).

241. Likewise, it is not a refusal to deal when a monopolist makes “assays into the marketplace” to reduce competition by “limit[ing]” (but not necessarily eliminating) “the abilities of third parties to deal with rivals.” *Novell*, 731 F.3d at 1072 (emphasis added). Thus, Google is incorrect that a monopolist’s conduct amounts to a refusal to deal unless it dictates to “customers [that] they may not deal with rivals.” Def. PCOL ¶ 220. While doing so would be

sufficient to constitute exclusionary conduct, *see Lorain Journal*, 342 U.S. at 152–53, it is not necessary. More limited forms of restraints such as exclusive dealing or tying—in which a monopolist discourages, but does not prohibit, customers from purchasing from a monopolist’s rival—are potentially exclusionary and not treated as refusals to deal with a rival. *See, e.g., It’s My Party*, 811 F.3d at 684 (assessing conditional dealings between monopolist and customers as tying); *Novell*, 731 F.3d at 1072; *Facebook*, 549 F. Supp. 3d at 31–32 (when monopolist “interferes with the relationship between rivals and third parties,” it is not a refusal to deal); *Amazon.com*, 2024 WL 4448815, at *6–7 (monopolist’s policies with vendors that served to “deter[]” and “limit” price competition between the monopolist and rivals not evaluated as refusal to deal).

2. Even If Analyzed As A Unilateral Refusal To Deal With Rivals, Google’s Conduct Is Predatory And Exclusionary

242. Google erroneously contends that if its conduct is categorized as a refusal to deal with its rivals, then it is “per se lawful,” Def. PCOL ¶ 227, and “immun[ized] from antitrust scrutiny,” Def. MSJ at 19. To the contrary, however, “[u]nder certain circumstances, a refusal to cooperate with rivals can constitute anticompetitive conduct and violate § 2.” *Trinko*, 540 U.S. at 408–09 (citing *Aspen Skiing*, 472 U.S. at 611); *see also linkLine*, 555 U.S. at 448. Accordingly, even assuming that some or all of the challenged conduct could be categorized as a refusal to deal with rivals, this categorization would not end the inquiry as to whether it is exclusionary.

243. The Supreme Court in *Trinko* noted that “as a general matter, the Sherman Act ‘does not restrict the long recognized right of a trader or manufacturer engaged in an entirely private business, freely to exercise his own independent discretion as to parties with whom he will deal.’” 540 U.S. at 408 (emphasis added) (quoting *United States v. Colgate & Co.*, 250 U.S. 300, 307 (1919)). That “right,” however, is qualified, and depends on the “absence of any

purpose to create or maintain a monopoly.” *Colgate*, 250 U.S. at 307; *see also Lorain Journal*, 342 U.S. at 155 (emphasizing this qualification); *Viamedia*, 951 F.3d at 454; *Covad Commc ’ns. Co. v. Bell Atl. Corp.*, 398 F.3d 666, 675 (D.C. Cir. 2005).¹⁶ Thus, while “as a general matter” there no antitrust duty to deal with a rival, this principle “does not permit action taken for the purpose of creating or maintaining monopoly power.” *FTC v. Vyera Pharms., LLC*, 479 F. Supp. 3d 31, 49 (S.D.N.Y. 2020).

244. As relevant here, a unilateral refusal to deal with a rival constitutes exclusionary conduct where the refusal is (1) “predatory”—i.e., characterized by “attempting to exclude rivals on some basis other than efficiency,” *Aspen Skiing*, 472 U.S. at 605; *see also Trinko*, 540 U.S. at 407–09 (concluding the complaint lacked allegations against the defendant suggesting the requisite “anticompetitive malice” or predatory “motivation of its refusal”)—and (2) has an anticompetitive effect, i.e., “has impaired competition in an unnecessarily restrictive way,” *Aspen Skiing*, 472 U.S. at 605; *see also Viamedia*, 951 F.3d at 462 (refusal to deal unlawful when “[t]he result . . . is to harm competition”).

245. There is no rigid checklist for determining if the monopolist’s refusal is predatory. Rather, “[t]he main lesson of *Aspen Skiing* is that it is fair to characterize a monopolist’s behavior

¹⁶ Google ignores *Colgate* (which *Trinko* embraced) and instead argues that *Trinko* immunizes monopolists that refuse to deal with rivals even if they do so “to limit entry” by would-be rivals. Def. PCOL at ¶¶ 153, 169, 226 (quoting *Trinko*, 540 U.S. at 409). But that is not *Trinko*’s holding; it was the Court’s summary of the plaintiff’s allegation. The Supreme Court’s held that the factual allegations were insufficient to support the plaintiff’s legal conclusion—that the refusal was “prompted . . . by anticompetitive malice” rather than “by competitive zeal.” *Trinko*, 540 U.S. at 409. If the Court’s holding were as broad, as Google argues—i.e., that refusals to deal to limit entry are per se permissible—then the Supreme Court’s discussion of whether the plaintiff had demonstrated that the defendant was motivated by “anticompetitive malice” and how a plaintiff might do so would have been superfluous. *Id.* at 409–10; *see also id.* at 409 (distinguishing, but not reversing, *Aspen Skiing*’s holding, that liability obtained because “the jury may well have concluded that the defendant elected to forgo [] short-run benefits because it was more interested in reducing competition over the long run by harming its smaller competitor.”) (quoting *Aspen Skiing*, 472 U.S. at 608) (cleaned up). This argument is not supported by *Trinko* or any other authority.

as predatory if it has been attempting to exclude rivals on some basis other than efficiency.” *Duke Energy*, 111 F.4th at 362–33 (cleaned up). And the predatory nature of a monopolist’s conduct can be apparent if it “harm[s] competition by entrenching a dominant firm and enabling it to extract monopoly rents once the competitor is killed off or beaten down.” *Viamedia*, 951 F.3d at 462 (cleaned up). A plaintiff can thus establish that conduct is predatory with a variety of direct or circumstantial evidence, such as the monopolist making an important change in the character of the market; probative statements by the monopolist’s executives or agents; discriminatory treatment of rivals as compared to non-rivals; evidence that the refusal was used threateningly and did not continue when a rival capitulated; evidence supporting an inference that the refusal was not motivated by efficiency; or that the monopolist was willing to sacrifice short-run benefits to achieve an anticompetitive end. *Aspen Skiing*, 472 U.S. at 608 & n.39, 610–11; *see also Viamedia*, 951 F.3d at 463 (“A case might present itself in which other factors—such as a prior course of conduct, exploitation of power over a cooperative network, refusal to sell at retail price, and discriminatory treatment of rivals—could plausibly support the inference that a refusal to deal is ‘prompted . . . by anticompetitive malice.’”) (quoting *Trinko*, 540 U.S. at 409) (alterations in original).

246. This inquiry is highly factual and depends on “the particular structure and circumstances of the industry at issue.” *Trinko*, 540 U.S. at 411. The inquiry should consider whether there is “a regulatory structure designed to deter and remedy anticompetitive harm,” or by contrast whether “there is nothing built into the regulatory scheme which performs the antitrust function.” *Id.* at 412 (alternations omitted). In the latter instance, a refusal to deal with a rival is more likely to be exclusionary. *Id.*; *see also Duke Energy*, 111 F.4th at 363 (“An

important distinction between *Aspen Skiing* and *Trinko*” is that *Trinko* “involved a regulated market.”).

247. The factors that the Supreme Court held in *Aspen Skiing* supported a jury finding of predation “are helpful but not dispositive.” *Viamedia*, 951 F.3d at 462. For example, in *Aspen Skiing*, the plaintiff demonstrated predation in part by showing that the monopolist terminated its prior dealings with a rival, 472 U.S. at 608–10, but a prior course of dealing has no talismanic significance. As the Fourth Circuit recently observed, in discussing *Otter Tail Power Co. v. United States*, 410 U.S. 366 (1973), “[a]lthough Otter Tail [the monopolist] had no prior course of dealing with the municipality distribution systems [the rivals], the Supreme Court recognized that Otter Tail’s ‘refusals to sell . . . were solely to prevent municipal power systems from eroding its monopolistic position.’” *Duke Energy*, 111 F.4th at 364 (quoting 410 U.S. at 378).

248. Here, the evidence showed that Google’s conduct was indeed predatory and is therefore a proper basis for liability *even if* it is properly characterized as a refusal to deal with a rival. In this regard, Google consistently acted with the intent to secure a monopoly over the relevant product markets through excluding competitors rather than building better or less expensive products or through more streamlined or efficient operations.

249. For example, shortly after Google’s acquisition of DoubleClick, the former CEO of DoubleClick explained the desire to create “what’s comparable to the NYSE or the London stock exchange; in other words, we’ll do to display what Google did to search,” PTX1814 at -746. He also described a “goal” of “be[ing] able to crush the other networks,” *id.* at -749; *see also supra* PCOL ¶ 104.

250. The record also includes evidence of Google’s “anticompetitive malice” with respect to each of its anticompetitive practices. For example:

- a. Google “[d]idn’t buy [DFP] for the revenue (& growth).” PTX0051 at -726. Instead, Google bought it to use “the primary ad server to get a ‘first look.’” PTX0014 at -278; *see* PFOF § IV.A.1.
- b. Google acquired Admeld, even though it acknowledged that Admeld’s “technology is irrelevant to us” and that Admeld’s “customer set is already a very large overlap . . . so we aren’t buying customers.” PTX0085 at -726. Instead, the acquisition was designed to “pick[] up the [yield manager] with the most traction and park[] it somewhere.” PTX0058 at -800; *see* PFOF § IV.B.2.
- c. In tying Google Ads demand to AdX, Google was willing to sacrifice Google Ads’ performance to protect AdX from competition, which allowed AdX to continue to charge its captive publishers supracompetitive fees. PTX0110 at -083.0009 (tying Google Ads to AdX was “artificially handicapping our buy-side [Google Ads] to boost the attractiveness of our sell-side [AdX],” which “greatly weakens [Google Ads’] position in the market”); *see* PFOF ¶¶ 111, 120–125.
- d. Google understood that the tie of AdX’s real-time bids to DFP served to “‘lock in’ impressions by offering [D]FP to publishers with full AdX dynamic allocation,” and that “AdX can serve as a tool to pull publishers onto [D]FP.” PTX0114 at -049; *see* PFOF ¶ 108; *id.* § IV.A.2.b.
- e. Google recognized that First Look “made it difficult [for rival ad exchanges] to compete on a level playing field with AdX,” PTX0308

at -243, and that “[p]ublishers lose every time the third-party exchange has higher payout than the average,” PTX1539 at -105; *see* PFOF ¶ 171.

- f. Google also recognized that Last Look was “a significant advantage Google ha[d] retained over the past few years” because it “allowed [Google] to beat header bidders . . . as long as our bid value is above the header bidder (HB) bid,” and that it was “perceived as unfair in the market.” PTX0815 at -391. Google understood that with Last Look, it was not “running a fair and competitive auction.” PTX0429 at -757; *see* PFOF ¶¶ 205, 209, 218. Moreover, SSDRS was “just yet another way for AdX to exploit the last look advantage.” PTX0542 at -335; *see* PFOF ¶¶ 208–209.
- g. Google implemented UPR and removed the ability of publishers using DFP to separately set price floors for different ad exchanges not because it benefited publishers, but because the “Adx team wanted . . . to significantly limit the ability of publishers to set floor-prices per buyer (which is a good goal to have).” PTX0762 at -291. Google employees recognized that UPR “by itself makes it look extremely self serving,” but implemented it anyway because the “presence of per demand floors really hurts us and has been one of the biggest challenges for AdX.” PTX0762 at -290; *see* PFOF ¶¶ 251, 259.

251. These examples are provided for illustrative purposes only, and do not paint the whole picture of Google’s “anticompetitive malice” present throughout the trial record. Moreover, Google’s policies and directives to its employees regarding internal business communications, directed specifically at making internal communications more difficult, and

sometimes even impossible, for antitrust enforcers to obtain, *see* PCOL § X; PFOF § VIII: (1) suggest a consciousness on Google’s part that it was acting with anticompetitive malice; and (2) make locating such evidence of anticompetitive malice for use in judicial proceedings more difficult.

252. In addition, although a showing of profit sacrifice or a prior course of dealing is not required to show that a refusal to deal violates the Sherman Act, *see Duke Energy*, 111 F.4th at 364, the restriction of Google Ads to AdX also involves a decision by Google to sacrifice Google Ads’ profits and performance in order to limit competition in the ad exchange and publisher ad server markets. *See* PFOF ¶¶ 120–125, 129 (Google internally expressing concern that it was losing business to advertiser ad network competitors like Criteo due to the tie of Google Ads to AdX). In addition, prior to UPR, Google had previously given its publisher customers the ability to freely set different floors for different exchanges. PFOF ¶¶ 246–249. In other words, UPR is similar to a termination of a prior course of conduct. *See Trinko*, 540 U.S. at 409 (the “termination of a . . . course of dealing . . . suggested . . . an anticompetitive end”). Poirot also amounted to a similar change. Prior to Poirot, DV360 had treated all ad exchanges equally by not bid shading on any of them; Poirot upset that system and replaced it with one in which DV360 bid shade only on ad exchanges other than AdX. *See* PFOF § IV.B.4. Also instructive is Admeld’s submission of real-time bids to other ad servers, prior to its acquisition by Google. *See* PFOF ¶¶ 195, 198. As discussed above, an independent Admeld had an incentive to best serve its publisher and advertiser customers by submitting real-time bids to publisher ad servers it did not own, but after the acquisition, the combined firm had a different incentive, as it was in Google’s interest to limit real-time bidding to insulate DFP from competition. *See* PFOF ¶¶ 198–199.

253. With “no apparent efficiency justification for its conduct,” a record full of evidence concerning Google's “purpose to create or maintain a monopoly,” and evidence of anticompetitive effects, *see* PFOF §§ V (anticompetitive effects of Google’s conduct), VI (Google’s proffered justifications are unsubstantiated, insufficient, or inapposite); PCOL ¶¶ 248–51 (Google’s anticompetitive intent), Google's conduct, even if analyzed as a unilateral refusal to deal, violates Sherman Act § 2 under *Aspen Skiing. Viamedia*, 951 F.3d at 454–55 (citations omitted).

C. A Monopolist’s Conduct Is Not Immune From Antitrust Scrutiny Because The Monopolist Characterizes The Conduct As A Product Design Choice

254. Google has argued that some of the challenged conduct should be viewed as product design changes, and that product design changes are “immune from antitrust scrutiny.” Def. MSJ at 21; *see also* Def. PCOL ¶¶ 165–166. This argument is incorrect. *First*, Google’s conduct is not a simple change to the design of its products and thus is not subject to the product-design-specific test that some courts have applied. *Second*, even if some aspects of Google’s conduct could be characterized as product design, that conduct would not be immunized from antitrust scrutiny. Instead, courts would evaluate the conduct under a rule-of-reason standard.

1. The Exclusionary Conduct At Issue Is Not A Product Design

255. As a general matter, a defendant is not permitted to “relabel a restraint as a product feature and declare it immune from” antitrust scrutiny. *See Alston*, 594 U.S. at 101 (discussing Section 1 of the Sherman Act). Google’s many years of exclusionary conduct—including acquisitions, customer restrictions, and auction manipulations—to monopolize each relevant market are not properly categorized as product design choices. *See supra* PCOL § V.A. These varied acts certainly do not “fit neatly” within a product design category, and thus any

suggestion that the court must apply a “specific conduct test[]” should be rejected. *See Duke Energy*, 111 F.4th at 354.

2. Courts Have Found Product Designs To Be Exclusionary

256. Even if some aspects of the challenged conduct were assessed as a challenge to a product design, that would not provide immunity as “[j]udicial deference to product innovation [] does not mean that a monopolist’s product design decisions are per se lawful.” *Microsoft*, 253 F.3d at 65 (holding product designs constituted exclusionary conduct). Rather, “[w]ell-established case law makes clear that product redesign is anticompetitive when it coerces consumers and impedes competition.” *Actavis*, 787 F.3d at 652; *accord Allied Orthopedic Appliances Inc. v. Tyco Health Care Grp. LP*, 592 F.3d 991, 998 (9th Cir. 2010) (“[C]hanges in product design are not immune from antitrust scrutiny and in certain cases may constitute an unlawful means of maintaining a monopoly under Section 2.”).

257. When assessing whether a product design is anticompetitive, courts evaluate the “specific,” “suspect” aspects of the design that are challenged as anticompetitive, not the product as a whole. *See Microsoft*, 253 F.3d at 64–65. For example, in *Microsoft*, the focus was not on the overarching product at issue (the Windows operating system), but rather three potentially anticompetitive “technical” features, specifically: “[1] excluding IE [Microsoft’s Internet Explorer browser] from the ‘Add/Remove Programs’ utility; [2] designing Windows so as in certain circumstances to override the user’s choice of a default browser other than IE; and [3] commingling code related to browsing and other code in the same files, so that any attempt to delete the files containing IE would, at the same time, cripple the operating system.” *Id.*

258. A design feature is prima facie anticompetitive when it “has the effect of significantly reducing usage of rivals’ products and hence protecting [defendant’s] own . . .

monopoly” by “discouraging,” “detering,” and “preventing” users from using alternatives.

Microsoft, 253 F.3d at 65–66.

259. A product improvement is likewise anticompetitive “when a monopolist *combines* [it] with some other conduct, the overall effect of which is to coerce consumers rather than persuade them on the merits, and to impede competition.” *Actavis*, 787 F.3d at 654; *see also In re Keurig*, 383 F. Supp. 3d at 230 (product design combined with “associated conduct,” including “tying agreements” and “product disparagement,” was exclusionary because its “overall effect” was “to coerce consumers . . . rather than to compete on the merits”); *Allied Orthopedic*, 592 F.3d at 999 (product improvement violates Section 2 if it “involve[s] some associated conduct which constitutes an anticompetitive abuse or leverage of monopoly power, or a predatory or exclusionary means of attempting to monopolize the relevant market”); *Berkey Photo*, 603 F.2d at 286 n.30 (“[S]ome associated conduct . . . supplies the violation.”). Therefore, when a monopolist claims that its challenged conduct is a product improvement or product design choice, it is especially appropriate for the monopolist’s conduct to “be considered holistically,” *Duke Energy*, 111 F.4th at 355, including the effects of any “associated conduct,” *Berkey Photo*, 603 F.2d at 286 n.30.

260. Courts apply a rule-of-reason-based standard to determine if a product design is exclusionary. *Microsoft*, 253 F.3d at 59, 65–67; *see also Actavis*, 787 F.3d at 652–59. This analysis is fundamentally the same as the analysis applied to other forms of potentially exclusionary conduct. *See Microsoft*, 253 F.3d at 65; *see also Actavis*, 787 F.3d at 652 (applying framework based on rule-of-reason standard “generally applied to antitrust claims”).

261. Therefore, the analysis above, showing that Google’s conduct is exclusionary and not supported by procompetitive justifications, *supra* PCOL §§ V–VI, applies regardless of

whether that conduct is characterized as a product improvement or product design choice. Put differently, Google’s conduct does not reflect lawful “product redesign” or “product innovation” decisions because Google’s conduct, considered holistically, “coerce[d] consumers and impede[d] competition.” *Actavis*, 787 F.3d at 652, 658. And the record is replete with “associated” exclusionary conduct that Google combined with its product design choices to impede competition on the merits. *See In re Keurig.*, 383 F. Supp. 3d at 230; *Microsoft*, 253 F.3d at 64–65 (focusing on specific technical features rather than a product as a whole); PCOL § V.A; PFOF §§ IV.B & V.

262. Google’s reliance on *Allied Orthopedic*, 592 F.3d at 994–98, which the Fourth Circuit has never adopted (or even cited), is unavailing. In that case, the sole basis for the plaintiff’s monopolization claim was the defendant medical device company’s design and introduction of a new, improved pulse oximeter sensor, coupled with the withdrawal of a previous model sensor that was compatible with certain competitors’ equipment. The plaintiff failed to come forward with evidence of “some form of coercive conduct by the monopolist.” *Id.* at 1000. Here, in contrast, there is extensive evidence of Google’s coercion over its publisher and advertiser customers. *See supra* PCOL § V.A; PFOF § IV.B. Google’s conduct thus stretches far beyond the mere introduction—and concurrent withdrawal—of a particular product from the marketplace.

263. For all of the foregoing reasons, Google’s conduct is not immune from antitrust scrutiny as a “product design” or “product improvement.”

X. Google’s Failure To Preserve and Systemic Destruction Of Evidence Warrants Sanctions Under Rule 37(e)

264. As the Court recognized during its hearing on Plaintiffs’ Motion for Adverse Inference, Google’s destruction of evidence is indicative of its improper intent. Aug. 27, 2024

Hr’g Tr. (ECF No. 1279) 29:2–9 (“Whether I have to make a formal spoliation decision at the end of the day, I’ll wait and see how all the evidence comes in, but I think this was very serious – this record creates a very serious problem for Google in terms of how much credibility the Court will be able to apply. Intent is a serious issue in this case, and I think it’s going to be a problem given this history.”).¹⁷ Google’s “clear abuse of the [attorney-client] privilege” and its “foolish decision” not to change its default policy of setting Chat history to off warrants condemnation. Aug. 27, 2024 Hr’g Tr. (ECF No. 1279) 27:22–28:24. As explained below, Google’s spoliation conduct also provides the basis for sanctions, including that the Court may reasonably infer that intentionally deleted chats about “sensitive” topics relevant to the claims in this case would have been unfavorable to Google on the core issues that were disputed at trial, including market definition, monopoly power, Google’s intent, the anticompetitive nature of Google’s conduct, and the harm Google’s conduct caused its competitors and customers. *See* Fed. R. Civ. P. 37(e)(2)(A).

1. Legal Standard

265. Spoliation is “the destruction or material alteration of evidence or . . . the failure to preserve property for another’s use as evidence in pending or reasonably foreseeable litigation.” *Silvestri v. Gen. Motors Corp.*, 271 F.3d 583, 590 (4th Cir. 2001). “A court’s power to sanction spoliation derives from two sources: (1) Fed. R. Civ. P. 37(e); and (2) its ‘inherent power . . . to redress conduct ‘which abuses the judicial process.’” *Steves & Sons, Inc. v. JELD-*

¹⁷ In addition to the proposed findings of fact and conclusions of law cited herein that relate to Google’s spoliation of evidence, Plaintiffs’ Motion for an Adverse Inference, ECF No. 1115, remains pending and attaches additional evidence supporting Plaintiffs’ request for sanctions. Such evidence, in addition to that adduced at trial, is properly within the Court’s consideration in determining whether and to what extent to impose sanctions for Google’s misconduct.

WEN, Inc., 327 F.R.D. 96, 103 (E.D. Va. 2018) (quoting *Silvestri*, 271 F.3d at 590). The analysis is “similar” under both sources of authority. *Id.* at 104; *cf.* Fed. R. Civ. P. 37(e).

266. The two elements for imposing sanctions for spoliation under the Court’s inherent power are: (1) “the adverse party had a duty to preserve documents or materials that may be relevant to the litigation or pending litigation,” and (2) “the party breached this obligation, either by failing to preserve, or by destroying or altering, relevant materials or documents with a culpable state of mind.” *E.I. du Pont de Nemours & Co. v. Kolon Indus., Inc.*, 803 F. Supp. 2d 469, 496–97 (E.D. Va. 2011); *accord Silvestri*, 271 F.3d at 591–92.

267. As to the requirement of “a culpable state of mind,” a party’s conduct must be “willful[]” or “intentional” —as opposed to merely “negligent” —but “the party seeking sanctions need not prove bad faith.” *Turner v. United States*, 736 F.3d 274, 282 (4th Cir. 2013).

268. A party seeking spoliation sanctions “cannot be expected to demonstrate with certainty the content of destroyed documents,” and instead “that responsibility falls on the party charged with spoliation.” *Kolon Indus.*, 803 F. Supp. 2d at 498–99. When a party destroys evidence with an intent to deprive an adversary of it, the materiality and prejudice of the spoliation is presumed, and that presumption can only be overcome with “clear and convincing evidence demonstrating that the spoliated material or documents were of minimal or little import.” *Id.* at 499.

269. “[W]hen a proponent’s intentional conduct contributes to the loss or destruction of evidence, the trial court has discretion to pursue a wide range of responses both for the purpose of leveling the evidentiary playing field and for the purpose of sanctioning the improper conduct.” *Vodusek v. Bayliner Marine Corp.*, 71 F.3d 148, 156 (4th Cir. 1995). Such sanctions

can include “unfavorable inferences against the party responsible for the loss or destruction of the original evidence.” *Id.*

270. The Court may also separately impose sanctions under Rule 37(e), which applies a two-step process. At the first step, the movant must establish spoliation of electronically stored information (“ESI”) by satisfying “four threshold requirements”: (1) “ESI should have been preserved,” (2) “ESI was lost,” (3) “the loss was due to a party’s failure to take reasonable steps to preserve the ESI,” and (4) “the ESI cannot be restored or replaced through additional discovery.” *Steves & Sons*, 327 F.R.D. at 104. If those elements are established, a court may proceed to the second step and determine what sanction, if any, is appropriate. *See GMS Indus. Supply, Inc. v. G&S Supply, LLC*, 2022 WL 853626, at *6 (E.D. Va. Mar. 22, 2022).

271. Two kinds of sanctions are available under Rule 37(e). *First*, if the spoliation resulted in “prejudice to another party,” then the Court “may order measures no greater than necessary to cure the prejudice.” Fed. R. Civ. P. 37(e)(1). “The range of such measures is quite broad,” and “[m]uch is entrusted to the court’s discretion.” *Id.*, Advisory Committee’s Note on Subdivision (e)(1) (2015). *Second*, if the spoliating party “acted with the intent to deprive another party of the information’s use in the litigation,” then the Court may impose more severe sanctions, including the Court, as factfinder, “presum[ing] that the lost information was unfavorable to the party.” Fed. R. Civ. P. 37(e)(2).

272. In other words, if a party establishes spoliation and prejudice, it may pursue “not-greater-than-necessary sanctions” under Rule 37(e)(1), without any showing of intent. *Wall v. Rasnick*, 42 F.4th 214, 222 (4th Cir. 2022). And if a party establishes spoliation and intent to deprive, it may pursue more serious sanctions, including an adverse presumption. *Id.* at 222–23 (explaining that “where the spoliator ‘acted with intent to deprive another party of the

information’s use in the litigation,’ the court may ‘presume that the lost information was unfavorable to the party’”) (quoting Fed. R. Civ. P. 37(e)(2)). This is because an intent to deprive “support[s] . . . an inference that the opposing party was prejudiced by the loss of information that would have favored its position.” Fed. R. Civ. P. 37, Advisory Committee’s Note on Subdivision (e)(1) (2015).

2. Google Had An Ongoing Duty To Preserve Relevant Chats Since The Government Opened Its Investigation Into Google.

273. Google had a duty to begin preserving relevant chats once it “reasonably should know that the evidence may be relevant to anticipated litigation.” *Silvestri*, 271 F.3d at 590–91 (inherent power standard); *see Steves & Sons*, 327 F.R.D. at 107 (identical standard under Rule 37, satisfying requirement ESI “should have been preserved”). A governmental investigation that seeks evidence from a party triggers a duty for that party to preserve such evidence, meaning that the duty began at least when the government issued its Civil Investigative Demand to Google in October 2019. *See* Pls. Mem. Supp. Adverse Inference, ECF No. 1116, at 18; *see also Gerlich v. U.S. Dept. of Justice*, 711 F.3d 161, 171 (D.C. Cir. 2013) (holding that duty to preserve was “triggered . . . by a reasonably foreseeable [DOJ] investigation”). At a minimum, Google had a duty to preserve chats responsive to the government’s investigation when it first invoked the work-product doctrine in December 2019. *See* Pls. Mem. Supp. Adverse Inference, ECF No. 1116, at 19; *see also Kettler Int’l, Inc. v. Starbucks Corp.*, 81 F. Supp. 3d 495, 501 (E.D. Va. 2015) (duty to preserve triggered by party’s invocation of work-product doctrine because it is limited to “documents prepared in anticipation of litigation”).

3. Google Destroyed Relevant Chats Because It Failed To Take Reasonable Steps To Preserve Them.

274. Google destroyed relevant chats because it failed to take reasonable steps to preserve them. This meets the second and third “threshold” requirements of Rule 37(e), and the

requirement under the inherent power that a party “breach” its duty to preserve by “failing to preserve . . . relevant materials.” *Kolon Indus.*, 803 F. Supp. 2d at 497.

275. Once a party has a duty to preserve, it must take reasonable affirmative steps to fulfill that duty. *See Steves & Sons*, 327 F.R.D. at 104. Generally, such steps involve some kind of intervention in how the party normally maintains ESI. *See, e.g., Sines v. Kessler*, 2021 WL 4943742, at *9 (W.D. Va. Oct. 22, 2021) (reasonableness “turns on” whether party “changed [their] routine practices . . . to reasonably ensure protection from loss”).

276. Google failed to take the minimally reasonable steps to preserve chats here. Google’s decision to continue auto-deletion of “history off” chats and to continue “history off” as the default chat setting for all employees, even those on litigation hold, was unreasonable because “disabling an autodelete function is universally understood to be one of the most basic and simple functions a party must do to preserve ESI.” *DR Distributions, LLC v. 21 Century Smoking, Inc.*, 513 F. Supp. 3d 839, 977–79 (N.D. Ill. 2021); *see also In re Google Play Store Antitrust Litig.*, 664 F. Supp. 3d 981, 986 (N.D. Cal. 2023) (“*Epic*”) (“Google has the technical ability to set Chat history to ‘on’ as the default for all employees who are subject to a legal hold, but it chooses not to.”). Google’s decision to retain its default of “history off” was particularly egregious here given that at least some litigation hold recipients did not know how to turn Chat history on and failed to do so. *See PFOF* ¶ 523; *see also Google Search*, 2024 WL 3647498, at *134 (“Any company that puts the onus on its employees to identify and preserve relevant evidence does so at its own peril.”).

4. The Deleted Chats Cannot Be Restored or Replaced.

277. The fourth requirement of Rule 37 is met because the deleted chats cannot be restored or replaced. There is no replacement for the spontaneous and informal conversations embodied in the spoliated chats, and Google’s counsel has certified to this Court that Google has

produced all responsive documents that still exist. Def. Status Rpt., ECF No. 492; *see also Epic*, 664 F. Supp. 3d at 993 (finding that Google’s “deleted Chat evidence ‘cannot be restored or replaced through additional discovery’”) (quoting Fed. R. Civ. P. 37 (e)).

5. Google Acted with a Culpable State of Mind

278. The record demonstrates that Google acted with the intent to deprive Plaintiffs of relevant evidence. Because one cannot know exactly what a party was thinking at the time of spoliation, “courts look to circumstantial evidence to determine intent.” *Bistrrian v. Levi*, 448 F. Supp. 3d 454, 475 (E.D. Pa. 2020). Intent to deprive can be inferred from a variety of factors. For example, “a party’s conscious dereliction of a known duty to preserve electronic data”—“whether passive or active”—establishes such an intent. *GMS Indus. Supply*, 2022 WL 853626, at *7. Likewise, a party’s “dismissive” conduct that “demonstrates a contempt for [its] discovery obligations,” supports an inference of intent. *Sines*, 2021 WL 4943742, at *11; *see also Europe v. Equinox Hldgs., Inc.*, 592 F. Supp. 3d 167, 175 (S.D.N.Y. 2022) (“Intent can be inferred when a party has significantly failed in its obligation to preserve and collect documents.”). Similarly, deletion resulting from “affirmative” actions, deletion “in violation of an internal policy,” or a party “preserv[ing] helpful or neutral information while deleting harmful information,” all support an inference of intent. *Bistrrian*, 448 F. Supp. 3d at 475–76.

279. Although a more specific “intent to deprive” is required for certain sanctions under Rule 37, this Court may sanction spoliation under its inherent powers as long as the spoliation conduct was “deliberate.” *Vodusek*, 71 F.3d at 155–56 (expert witness’s destruction of evidence, not intended to deprive anyone of evidence, was still sanctionable because it was “part of [the expert’s] deliberate investigative efforts”); *accord Buckley v. Mukasey*, 538 F.3d 306, 323 (4th Cir. 2008) (holding that district court’s “equating the intentional conduct necessary for such an [adverse inference] instruction with bad faith” as “an error of law,” and finding that “though

not conducted in bad faith,” document destruction “could yet be ‘intentional,’ ‘willful,’ or ‘deliberate’”).

280. Here, Google’s “Communicate with Care” and related policies—including its “history off” chat default—deliberately cultivated a corporate culture of hiding documents and keeping chats from discovery. *See* PFOF § VIII; *see also Bistran*, 448 F. Supp. 3d at 475–76 (“Selective preservation can also reflect intent. Common sense suggests that when a party preserves helpful or neutral information while deleting harmful information, that tends to indicate intentionality.”). For example, as a result of Google’s internal trainings and policies, many non-privileged documents that Google employees acknowledged not to be privileged have attorney-client-privilege markings, creating what the Court described to be “a clear abuse of the privilege” and “absolutely inappropriate and improper.” Aug. 27, 2024 Hr’g Tr. (ECF No. 1279) 27:22–28:11; PFOF ¶¶ 527–531. Because of these false attorney-client-privilege markings, Google’s privilege claims have remained in flux, months after the discovery cut-off date, including Google’s June 17, 2024, production of over 40,000 documents as privilege “downgrades,” and its July 21, 2024, claw back of 27 documents, including documents on both Plaintiffs’ and Google’s own trial exhibit lists and documents used in depositions conducted months ago. *Pls. Mem. Supp. Adverse Inference*, ECF No. 1116, at 14. These continued and prolonged privilege issues have subjected Plaintiffs to significant hardship. Aug. 27, 2024 Hr’g Tr. (ECF No. 1279) 25:13–26:3.

281. Google’s employees knew, through the litigation hold for this case and Google’s “Communicate with Care” training, that internal communications related to Google’s ad tech business would likely be provided to the government. PFOF ¶¶ 524, 527–529. Nevertheless, at least one Google employee announced in at least two chats after receiving a litigation hold that

he would start chats for sensitive topics “with history turned off” or “off-the-record.” Tr. Sept. 13 AM 132:14–136:25 (LaSala (Google)); *see also* PFOF ¶ 523; PTX1108 at -665–68 (chats where a Google employee states, “We’ll let you lit hold folks know what is going on when we meet up in person”). He admitted that he did not know how many substantive and relevant chats have been lost as a result of continuing to chat “off the record,” as advised by Google’s “Communicate with Care” policy, after he received his litigation hold. PFOF ¶ 524. Even those who did turn history on to preserve their chats encouraged others to start new chats without them so that they could keep chat history off when discussing topics relevant to this litigation. PFOF ¶ 525; *see also Epic*, 664 F. Supp. 3d at 987, 993 (finding that “Google employees who received a litigation hold in this case were unable or unwilling to follow the chat preservation instructions, and sometimes disregarded the instructions altogether,” and that Google’s “intentionality manifested at every level within Google to hide the ball with respect to chat”).

282. Such behavior “demonstrates a contempt for [Google’s] discovery obligations.” *Sines*, 2021 WL 4943742, at *11 (cleaned up). Even if that conduct were done for some purpose other than suppression of evidence in litigation, it was, at a minimum, the predictable and logical result of Google’s policies. Therefore, it is sanctionable. *See Vodusek*, 71 F.3d at 156 (finding that while plaintiff’s expert “may have decided that the destroyed [evidence was] not relevant to his theory of the case, that conclusion ignored the possibility that others might have entertained different theories to which the destroyed portions might have been relevant”).

6. Google’s Spoliation of Chats Prejudiced Plaintiffs

283. Given Google’s intent to deprive Plaintiffs of evidence, the “heavy burden” is on Google “to present clear and convincing evidence demonstrating that the spoliated material or documents were of minimal or little import.” *Kolon Indus.*, 803 F. Supp. 2d at 499. Nevertheless, Google’s conduct has caused prejudice here because chats contained uniquely probative evidence

of the candid thought processes, intentions, and observations of those responsible for managing and operating Google’s ad tech products. *See* PFOF ¶¶ 521–522. Google deleted countless relevant chats generated during or after October 2019, and that evidence is now “lost.” Fed. R. Civ. P. 37(e). Google employees acknowledged that they (1) used chats for substantive discussions relevant to Plaintiffs’ claims, (2) did not preserve those chats by turning “history on” for them, and (3) actively encouraged each other to find ways to avoid preserving chat histories. *See* PFOF ¶¶ 521–526; *see also Epic*, 664 F. Supp. 3d at 986 (finding that “Google employees routinely used Chat to discuss substantive business topics”). In addition, if Plaintiffs had access to the spoliated chats, the chats would have been “reasonably calculated to lead to the discovery of [other] admissible evidence.” *Kolon*, 803 F. Supp. 2d at 498 (citation omitted).

7. The Court Should Sanction Google for Its Spoliation of Chats

284. As the Court has recognized, Google’s “absolutely inappropriate and improper” spoliation conduct deserves condemnation. Aug. 27, 2024 Hr’g Tr. (ECF No. 1279) 28:7–11; *see Redwood v. Dobson*, 476 F.3d 462, 470 (7th Cir. 2007) (admonishment); *Myers v. Sessoms & Rogers, P.A.*, 781 F. Supp. 2d 264, 266 (E.D.N.C. 2011) (same); *Clay v. Consol Pa. Coal Co.*, 2013 WL 5408064, at *6 (N.D. W. Va. Sept. 25, 2013) (public reprimand); *Harrell v. United States*, 117 F.R.D. 86, 92 (E.D.N.C. 1987) (censure). Had Google set the default settings for chats to history on, “the government could see . . . in this particular case somebody deleted [a chat], then you could focus on why was that deleted.” Aug. 27, 2024 Hr’g Tr. (ECF No. 1279) 28:17–22. Because Google kept its default settings for chats to history off, “You’ve lost that ability in this case because everything is deleted unless it’s saved.” Aug. 27, 2024 Hr’g Tr. (ECF No. 1279) 28:22–24. As a result, Google’s conduct has thwarted the Court’s truth-seeking function not only in this case but in several other cases. *See, e.g., Google Search*, 2024 WL 3647498, at *134 (“The court’s decision not to sanction Google should not be understood as

condoning Google's failure to preserve chat evidence. Any company that puts the onus on its employees to identify and preserve relevant evidence does so at its own peril. Google avoided sanctions in this case. It may not be so lucky in the next one.”).

285. Condemnation, however, appears not to have been adequate. As the court in *Epic* observed, during an evidentiary hearing on whether the court should provide a mandatory adverse inference instruction to the jury, “[d]espite the seriousness of these issues, and the likelihood that they could affect other litigation matters where Google is a party, [Google’s chief legal officer, Kent] Walker showed little awareness of the problems and had not investigated them in any way,” and “did nothing to assuage the Court’s concerns.” *Epic*, 2024 WL 3302068, at *15. The Court should therefore go beyond mere condemnation to ensure Google’s “contempt” for its “discovery obligations” receives the appropriate sanctions. *Sines*, 2021 WL 4943742, at *11.

286. Because Google acted “with the intent to deprive” Plaintiffs of the use of chats in this litigation, the Court may “presume that the lost information was unfavorable” to Google. Fed. R. Civ. P. 37(e)(2)(A). Specifically, the Court may reasonably infer that intentionally deleted chats about “sensitive” topics relevant to the claims in this case would have been unfavorable to Google on the core issues that were disputed at trial, including market definition, monopoly power, Google’s intent, the anticompetitive nature of Google’s conduct, and the harm Google’s conduct caused its competitors and customers.

287. An adverse presumption is the appropriate sanction to address Google’s conduct, which “partially compromise[s], and thus limit[s],” a party’s ability to present its case. *Kolon*, 803 F. Supp. 2d at 509; see *Collins v. Tri-State Zoological Park of W. Md., Inc.*, 2021 WL 5416533, at *4 (D. Md. Nov. 19, 2021) (recommending adverse inference in bench trial); see

also Trial Tr. (Vol. 16) 3226:19–3230:12, *Epic*, No. 3:21-md-02981-JD, ECF No. 849 (finding that “a mandatory inference would be amply warranted” given Google’s conduct’s “frontal assault on the fair administration of justice,” but that the court would take the “more conservative approach” of a permissive jury instruction); *GMS Indus. Supply*, 2022 WL 853626, at *9 (finding defendant’s employee’s “blatant and intentional disregard for his obligation to preserve ESI on his desktop warrants an adverse inference instruction”). This presumption under Rule 37(e)(2) is particularly applicable here in light of Google’s repeated and persistent efforts to ensure its employees’ chats were deleted despite its known discovery obligations. Trial Tr. (Vol. 16) 3229:12–3230:3, *Epic*, ECF No. 849 (finding that “[t]here is no doubt in my mind a mandatory inference would be amply warranted in this case” given “this rampant and systemic culture of evidence suppression at Google”).

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