UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

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

GOOGLE LLC'S PROPOSED FINDINGS OF FACT

REDACTED VERSION

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PRELIMINARY STATEMENT

There is a vast delta between the evidence promised by the Plaintiffs and the evidence they delivered at trial. The constrained digital advertising ecosystem described in Plaintiffs' complaint bears little resemblance to the real-world marketplace described in the testimony of those who know it best.

Day after day, the Court heard about a vibrant and continually evolving competitive landscape where the biggest and fastest growing companies in the world—Amazon, Microsoft, Meta, and TikTok—along with lesser known but significant and growing ad tech players—The Trade Desk, Criteo, Magnite, PubMatic, Index Exchange, OpenX, and Equativ—all fiercely compete for a share of display advertising in a single two-sided market connecting publishers and advertisers. The result? An extraordinary, uncontested eighteen-fold economic growth in the display advertising market since 2008 that benefited customers and lifted businesses of all sizes. DTX-1828.

Since 2008, as an early entrant into the ad tech industry, Google has invested many billions of dollars and hundreds of thousands of engineering hours to develop a suite of tools "establishing an infrastructure that renders them uniquely suited to serve their customers." *Verizon Commc'ns Inc.* v. *L. Offs. of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004). Prices have never gone up, even as quality, publisher revenue, and advertiser return on investment have all increased. DTX-1886; DTX-1896; DTX-1897; DTX-1895. And—for all its investment and innovation—Google's market share of display advertising spending facilitated is 25% and falling as of the date Plaintiffs filed their complaint. DTX-1875. These facts refute Plaintiffs' antitrust claims, which all depend on proving that Google has developed a "unique demand" source (i.e., Google's advertiser customers) and that rivals should be able to access it on exactly the same terms as Google. For one thing, Plaintiffs never attempted to define a market for advertiser demand or analyze whether

Google Ads demand is actually unique (it is not). For another, the claim is squarely barred by longstanding Supreme Court precedents, including *Trinko* and *linkLine*. These threshold obstacles, among others, are fatal to Plaintiffs' claims.

The fact is that Google is not the only company that has been making enormous investments in ad tech. Meta and TikTok have built proprietary end-to-end technology on two of the widest reaching ad platforms in the world. Amazon offers advertisers tools to buy ads on its many digital properties—Amazon.com, Prime Video, and Twitch to name a few—and on third-party properties, as well as a header-bidding solution that lets publishers connect to numerous exchanges and is a substitute for Google's ad server. Microsoft's acquisition spree gave it an end-to-end stack to supply advertising to the social media, gaming, and retail platforms it owns. Rivals across the marketplace, including The Trade Desk, looking to serve a $1 trillion global market, are pursuing a strategy of "supply path optimization" to reduce the number of intermediary tools like Google's required to match publishers to advertisers. And all of these competitors and more are working to use artificial intelligence to even more fundamentally upend how those matches occur.

If Plaintiffs contend that economic growth would have been even greater but-for Google's role in the market, they never showed it. 9/26/24 AM Tr. 158:19-159:11 (Israel) ("I haven't seen Professor Lee or plaintiffs even try to" show "a but-for world. Meaning but for Google's conduct, [the ecosystem] would have done even better."); 9/20/24 AM Tr. 146:4-23 (Lee) ("I'm not putting forward a specific but-for world"). Just like they never showed the Court how the products they challenge actually work; or presented testimony from a single advertiser; or showed a timeline of auction design changes against the backdrop of industry-wide trends; or called to the stand major, direct competitors like Microsoft, Amazon, Criteo, or Meta (for whom Plaintiffs called a former employee and avoided the corporate representative); or proffered an expert in auction economics

or, for that matter, any rebuttal to Professor Milgrom and Dr. Israel; or perhaps most fundamentally, rebutted the clear efficiency and security benefits of Google's integrated end-to-end system of software. The list goes on and on, deficiency upon deficiency, amounting to Plaintiffs' failure to carry their burden of proof.

At trial, the evidence showed that Google actually went beyond legal requirements. While the law would have protected Google's decision to keep its customer base and technology to itself (like Meta, Amazon and TikTok), the evidence showed that Google did the opposite, creating interoperability that enabled a range of competition and choice.

Start with publishers. Plaintiffs ignore numerous ways that Google has enabled publishers to interoperate with rivals and sell ad inventory without the need to use one or more Google tools. For example, Google made it possible for publishers to use its DFP tool to offer all of their impressions to Amazon's and Prebid's header-bidding offerings, through which publishers reach over 100 competing exchanges. Google also built Open Bidding, a competitive alternative to header bidding that enables publishers to sell inventory through approximately 25 rival exchanges within Google's platform. Google even facilitates publishers' contracts with competing exchanges in Open Bidding because Google wanted to design its product "in a way that made it as easy as possible for them to do so effectively." 9/23/24 AM Tr. 40:25-41:9 (Korula); Korula DX 1.15. A publisher can use DFP in conjunction with header bidding and/or Open Bidding **to sell "every single" impression without ever using AdX**. 9/9/24 AM Tr. 79:4-13 (Wolfe). In essence, Google took the "publisher customer base that we had built and grown and g[ave] our competitors direct access to it, and in many cases, facilitat[ed] those connections where they didn't exist" previously. 9/23/24 AM Tr. 67:24-68:11 (Korula).

Publishers have a wide ability to mix and match tools. Not only can publishers who want to use AdX access advertisers using Google's two buying tools—Google Ads and DV360—but Google has gone out and persuaded over 100 rival buying tools ("Authorized Buyers") to bid into AdX so those publishers can readily access advertisers from within and without Google's platform. A publisher who wants access to Google's advertisers without using DFP can use AdX Direct tags to access that demand. And a publisher who wants access to advertisers on Google Ads, and DV360, and Authorized Buyers without going through AdX and DFP can use AdSense—a tool entirely excluded from Plaintiffs' case. 9/23/24 AM Tr. 170:19-23 (Korula).

Advertisers enjoy similar flexibility. Google's DV360 allows them to bid into over 100 third-party exchanges, and those advertisers can choose to never purchase on AdX. 9/23/24 PM Tr. 42:22-43:7, 43:22-45:2, 45:17-46:4 (Stefaniu); Stefaniu DX 1.25. Even advertisers who choose to use Google Ads can be reached in certain instances from third-party exchanges because Google built AwBid, a feature to help those advertisers reach third-party exchanges in a safe and reliable way. 9/20/24 PM Tr. 63:1-6 (Sheffer). And most advertisers—especially the largest ones that account for the vast majority of ad spend—multi-home and use multiple buying tools. DTX-1902; DTX-1978. For advertisers as well as publishers, there are many choices and paths to effective monetization.

Against this backdrop, Plaintiffs' case boiled down to the persistent complaints of a handful of Google's rivals and several mammoth publishers (who also compete with Google in other lines of business) who have already gotten the vast majority of the interoperability they claim to want from Google. Yet they remain unsatisfied because they believe Google's technology and its customers should be "community property." 9/13/24 AM Tr. 28:1-11 (Kershaw); 9/10/24 AM Tr. 100:14-21, 102:5-9 (Layser); 9/17/24 PM Tr. 51:18-52:6 (Cadogan); 9/9/24 PM Tr. 163:9-16

(Avery); 9/13/24 PM Tr. 68:20-25 (Creput); 9/12/24 PM Tr. 91:1-15 (Goel). Requiring a company to do further engineering work to make its technology and customers accessible by all of its competitors on their preferred terms has never been compelled by U.S. antitrust law; the law protects a company's decision not to do that in order to preserve incentives to invest and innovate. *Trinko*, 540 U.S. at 407-08.

These proposed Findings of Fact and Conclusions of Law detail the factual and legal infirmities in the Plaintiffs' case; this preliminary statement highlights just a few:

Market Definition and Power. "Proof of a relevant market is a threshold" requirement for each of Plaintiffs' claims. *Consul, Ltd.* v. *Transco Energy Co.*, 805 F.2d 490, 493 (4th Cir. 1986). Plaintiffs failed to show, as they must, that their alleged product markets reflect the "commercial realities" of how publishers and advertisers transact to fill digital ad space. *Ohio* v. *Am. Express Co.*, 585 U.S. 529, 544 (2018).

Two-Sided Market for Facilitating Display Ad Transactions. The evidence at trial established a single two-sided market for ad tech for display ad transactions. The hallmark of a two-sided market is a product that "cannot make a sale to one side of the platform without simultaneously making a sale to the other." *Am. Express*, 585 U.S. at 535. That is the case for the tools at issue here, each of which needs a willing buyer and seller to complete a sale. Plaintiffs' own witnesses described themselves as operating on the buy-side and/or the sell-side of one market that connects publishers and advertisers. *E.g.*, 9/9/24 PM Tr. 45:21-46:10 (Casale); 9/11/24 PM Tr. 87:19-88:13, 157:25-158:19 (Dederick); *see also* 9/16/24 PM Tr. 44:1-4 (Weintraub); 9/20/24 AM Tr. 72:9-16 (Lee). Reflecting this view of a two-sided market, testimony and documents from Google and its rivals confirmed that ad tech providers consider their competitors to be not just companies offering certain component tools, but all other companies that compete to facilitate

display advertising transactions. Lawyers' arguments and artful pleading cannot rebut what was plainly established by testimony from nearly every witness in the case.

Plaintiffs also artificially circumscribed their alleged markets based on a category of ads that market participants do not recognize as distinct. As Plaintiffs' own expert acknowledges, this category—"open-web display advertising"—is one delineated specially for this case. 9/18/24 AM Tr. 70:5-15 (Abrantes-Metz). Most witnesses, including Plaintiffs' own experts, had no prior familiarity with the term and not one indicated that they made decisions about tools based on their particular ability to transact this ad format. *E.g.*, 9/19/24 PM Tr. 51:22-52:2 (Lee); 9/9/24 PM Tr. 13:18-14:1 (Casale); 9/23/24 PM Tr. 98:10-99:3 (Oliphant); 9/20/24 PM Tr. 65:25-66:3 (Sheffer); 9/17/24 AM Tr. 107:6-13 (Jayaram).

That is unsurprising: it is undisputed that no ad tech tools exclusively transact the subset of traditional banner ads on the "open web." Rather, the tools work across multiple channels and formats, and compete based on their ability to do so, because advertisers shift spend across them. DTX-59 at 2; DTX-76 at 8; DTX-101 at 2-3; DTX-308 at 5; DTX-319 at 11; DTX-1420 at 13; DTX-1487 at 25. Plaintiffs argue that basing markets on "open-web display ads" is nonetheless appropriate because such ads are "distinct" and there is "direct evidence" of market power. Plaintiffs' Demonstrative O. Yet unrebutted real-world data show substitution between so-called "open-web display ads" and other types of digital display ads because, as even Plaintiffs' witnesses admit, the flow of display advertising dollars is driven by where consumer engagement goes across multiple digital surfaces. *E.g.*, 9/9/24 AM Tr. 56:5-22, 93:1-21 (Lowcock); 9/10/24 PM Tr. 6:11-7:7, 8:2-14 (Friedman) ("all media is just media"). Plaintiffs' expert argued that substitution evidence was irrelevant here, 9/19/24 PM Tr. 58:10-59:15 (Lee), but that claim has no support in

the case law or under the facts of this case where Plaintiffs' own witnesses confirm substitution is happening between Google and major competitors.

Plaintiffs' component-based markets, which are remnants of the way some tools developed in the very early years of display advertising, deliberately exclude significant technological advancements some of which happened, at this point, years ago.

Header bidding—a technology Plaintiffs spent considerable time at trial discussing—is a clear example. This technology emerged to put newly developed real-time bidding by multiple exchanges in head-to-head competition. As Plaintiffs acknowledge, header bidding was a competitive "threat" to which Google responded competitively by creating its own version called Open Bidding. 9/20/24 AM Tr. 5:7-7:13, 16:25-17:14, 25:25-27:15 (Lee); 9/11/24 PM Tr. 44:2-9 (Ravi). Today, multiple header bidding tools compete for ad spend in what Plaintiffs' own witnesses concede is a "hypercompetitive" marketplace. 9/9/25 AM Tr. 155:23-156:9 (Casale); 9/9/24 PM Tr. 23:3-15 (Casale); 9/18/24 AM Tr. 98:1-20 (Abrantes-Metz); 9/20/24 AM Tr. 16:8-24 (Lee); 9/13/24 AM Tr. 32:4-5 (Kershaw). Header bidding allows advertisers and publishers to bypass Google's traditional tools, yet Plaintiffs inexplicably exclude header bidding from their markets.

A similar competitive force is "supply path optimization," the effort to reduce the number of ad tech intermediaries needed to facilitate a display advertising transaction, which again places pressure on Google's products across the ad tech stack. With supply path optimization, advertisers and publishers are increasingly able to bypass ad exchanges, buying tools, and/or publisher ad servers when transacting display ad impressions. 9/11/24 PM Tr. 116:14-117:4 (Dederick); 9/12/24 PM Tr. 40:4-9, 41:6-13 (Dederick); 9/12/24 PM Tr. 142:20-143:19, 144:15-19 (Goel).

A third significant competitive challenge has arisen from the in-house technologies being developed by major publishers like Facebook, Amazon, and TikTok to cut out all intermediaries—third-party buying tools, exchanges, and publisher ad servers—when selling owned-and-operated inventory (as well as third-party inventory). As one of Plaintiffs' experts acknowledged, these proprietary tools serve the same function as Google's tools. 9/20/24 AM Tr. 32:8-33:11 (Lee); *see also* 9/26/24 AM Tr. 105:24-106:20 (Israel).

It is only by ignoring these alternatives that Plaintiffs are able to inflate Google's market shares and exclude major companies that view themselves to and do compete with Google. Once that competition in the market is accounted for, Google's market share of display advertising transactions was never higher than 46% between 2008 and 2022. DTX-1875. And, since 2013, Google's share has been on a steady decline, with a 25% market share in 2022, notwithstanding the steady rise in display ad spend. DTX-1875. These shares are far below the 70% the Fourth Circuit observed has been the threshold for finding monopoly power pursuant to Supreme Court cases. *Kolon Indus. Inc.* v. *E.I. DuPont de Nemours & Co.*, 748 F.3d 160, 174 (4th Cir. 2014).

Component Markets Exclude Key Substitutes. A market is determined by whether products are "reasonably interchangeable by consumers for the same purpose." *Satellite Television & Associated Res., Inc.* v. *Cont'l Cablevision of Va.*, 714 F.2d 351, 356 (4th Cir. 1983). The measure for reasonable interchangeability is the "extent to which consumers will change their consumption of one product in response to a price change in another, i.e., the cross-elasticity of demand." *It's My Party, Inc.* v. *Live Nation, Inc.*, 811 F.3d 676, 683 (4th Cir. 2016). As discussed, Plaintiffs' gerrymandered markets are found in no Google or third-party analysis of markets or market share. Google presented real-world evidence that customers actually substitute and treat the products within and without Plaintiffs' markets as "reasonably interchangeable," and

Plaintiffs' lead market definition expert did not conduct any econometric analysis to rebut that fact.

For example, when it comes to buying tools, Plaintiffs assert Google Ads is a monopoly in a market for "advertiser ad networks for open-web display advertising." "Advertiser ad networks" is another made-up term Plaintiffs' expert admitted he had not used prior to the litigation. 9/20/24 AM Tr. 137:12-15 (Lee). Plaintiffs' fact and expert witnesses agreed that "ad networks" consist of tools that fundamentally serve both advertisers and publishers. 9/16/24 PM Tr. 47:15-25 (Weintraub); Weintraub DX 1; 9/11/24 PM Tr. 102:24-103:13, 104:1-24, 105:21-106:15, 156:21-157:24 (Dederick); 9/10/24 AM Tr. 139:23-140:6 (Friedman). Yet Plaintiffs lopped off the publisher part of the ad network in order to assert an "advertiser ad network" market that no industry participant recognized.

To support that claimed market, Plaintiffs exclude demand-side platforms (DSPs), even though the majority of ad spend on Google Ads comes from advertisers who use DSPs and can and do easily shift spending between these tools. DTX-1970. Plaintiffs also knock out integrated buying tools like the ones to buy ads on Facebook and TikTok even though the testimony at trial showed that advertisers view these as substitutes. 9/27/24 AM Tr. 26:14-24, 28:6-11 (Bumpers); 9/25/24 PM Tr. 9:1-10:11 (Caldwell); 9/23/24 PM Tr. 96:5-13 (Oliphant). Under Plaintiffs' view, there is supposedly just one other competitor in this constructed market—Criteo, which itself lists its competitors as not just Google, but also Amazon, Meta, Microsoft, and The Trade Desk, DTX-1420 at 12, 29 (2022 Criteo 10-K). If this two-firm market were true, Google, an alleged monopolist, would be the discount provider. And Plaintiffs never even called that company to the stand lest they call into question their alleged market, a market unsupported by any competitive

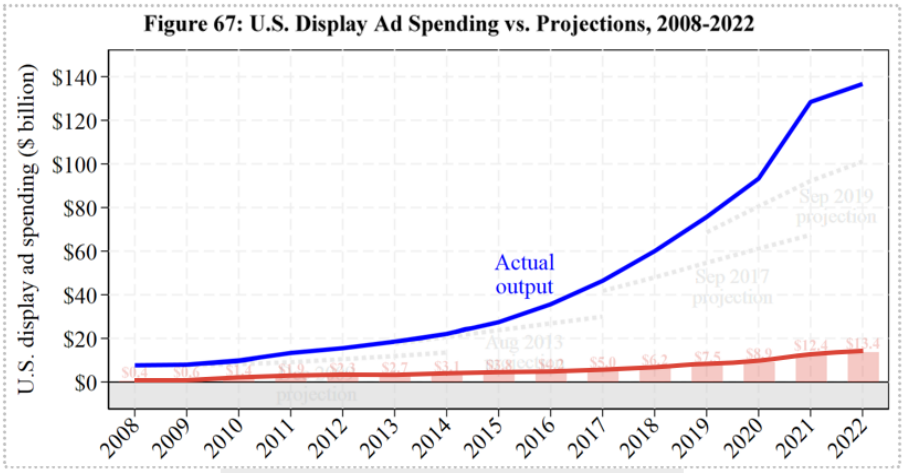
analysis documents. When all these substitutes are taken into consideration, Google's market share in buying tools is not 88%, PTX-1281; it is 19%, DTX-1860.

A similar story plays out when it comes to Plaintiffs' claimed market in ad exchanges. When marking the boundaries of this market, Plaintiffs conspicuously excise 70% of all display advertising spend by excluding all direct transactions, even though those transactions are increasingly carried out using the same programmatic tools as those within Plaintiffs' markets and account for the majority of publisher advertising revenue. 9/26/24 AM Tr. 85:16-86:11 (Israel); DTX-1923; 9/20/24 PM Tr. 48:3-18 (Sheffer). Plaintiffs have no justification for why they excluded the many other tools that auction off web remnant inventory, like AdSense and in-house ad tech tools.

The same goes for tools on the sell-side of the marketplace, where Plaintiffs claim DFP is an unlawful monopoly. To reach this result, Plaintiffs again ignore AdSense, which is used by millions of Google's publisher customers, and the header-bidding tools Prebid and Amazon TAM that help a publisher manage monetization of their inventory just like a publisher ad server does. 9/12/24 PM Tr. 164:2-9 (Kershaw) (Prebid takes "over the auction process that previously had been determined by what was called the ad server"). Plaintiffs also excise in-house ad servers, even though publisher customers choose "on a regular basis" whether to switch between third-party or proprietary ad servers. 9/20/24 PM Tr. 71:25-72:20 (Sheffer). Amazon, Reddit, Disney, and Snapchat, as well as smaller publishers, have switched from Google's ad server to build their own; the New York Times and IMDb switched inventory from their own ad servers to Google's. 9/26/24 AM Tr. 55:2-8, 126:17-25 (Israel); 9/20/24 AM Tr. 73:15-74:3, 78:7-79:1 (Lee); 9/17/24 PM Tr. 123:9-11 (Helfand); 9/20/24 PM Tr. 70:10-24 (Sheffer). And Plaintiffs in no way account for the fact that the majority of large web publishers also operate apps and substitute by focusing

their users and monetization efforts on in-app ads (and the tools to monetize that inventory). 9/26/24 AM Tr. 122:11-123:16 (Israel).

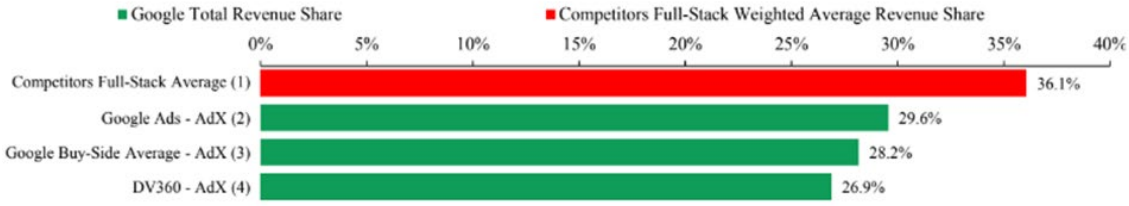
No Monopoly Power. Not only have Plaintiffs failed to prove valid antitrust markets, they have also failed to show monopoly power. Plaintiffs have offered little direct evidence of monopoly power. *See Rebel Oil Co.* v. *Atl. Richfield Co.*, 51 F.3d 1421, 1434 (9th Cir. 1995) (i.e., "evidence of restricted output and supracompetitive prices"). Output has consistently grown during Google's time in the market, repeatedly beating contemporaneous projections. DTX-1884. At the same time, Google's share of the market has steadily declined as other competitors have won business from Google. DTX-1969; DTX-1928. In 2017, a memo from AppNexus' CEO to Microsoft's CEO observed that Google's display ads business was "a bit on the ropes" and "surprisingly vulnerable," while Amazon was "stealthy aggressive and winning." DTX-379 at 2. As depicted below, the market (denoted by the sharply ascending blue line) is growing at a much faster clip than Google's revenue (denoted by the much flatter red line), and Google's share of the overall market has declined considerably as most of that growth is captured by competitors. DTX-1928; DTX-1884.



Moreover Google's prices, which are in line with or lower than rivals, have either stayed the same or gone down. Plaintiffs focused on prices only in one of their proposed markets, "ad

exchanges for indirect open-web display advertising," and did not offer evidence of supra-competitive pricing for their other markets or across the ad tech stack. For exchanges, Plaintiffs contend that one expert's analysis shows Google's price was higher than some exchanges but lower than others—with no accounting for the acknowledged quality difference between exchanges, 9/19/24 AM Tr. 10:25-12:16, 112:7-12 (Simcoe)—and that Google's take rate was 2% higher calculated than what he believed it would be in a competitive market, PTX-1199B; 9/19/24 AM Tr. 48:1-11 (Simcoe). Plaintiffs' argument that any evidence a firm charges a higher price than some other firms selling related products constitutes proof of market definition and market power all at once has never been endorsed by any court. In reality, viewed across the entire ad stack—as the revenue share must be because it is shared by advertisers and publishers, 9/18/24 PM Tr. 36:14-19 (Simcoe)—Google's prices are lower than the vast majority of its competitors, reflecting the quality and efficiency of its integrated software system. DTX-1886; DTX-1977 (Google Ads, AdX, and DFP combined fee lower than the industry average). As shown below, the average full-stack revenue share for competitor tools is 36.1%, whereas each combination of Google's buying tools with Google's ad exchange is lower than 30%. DTX-2071A.

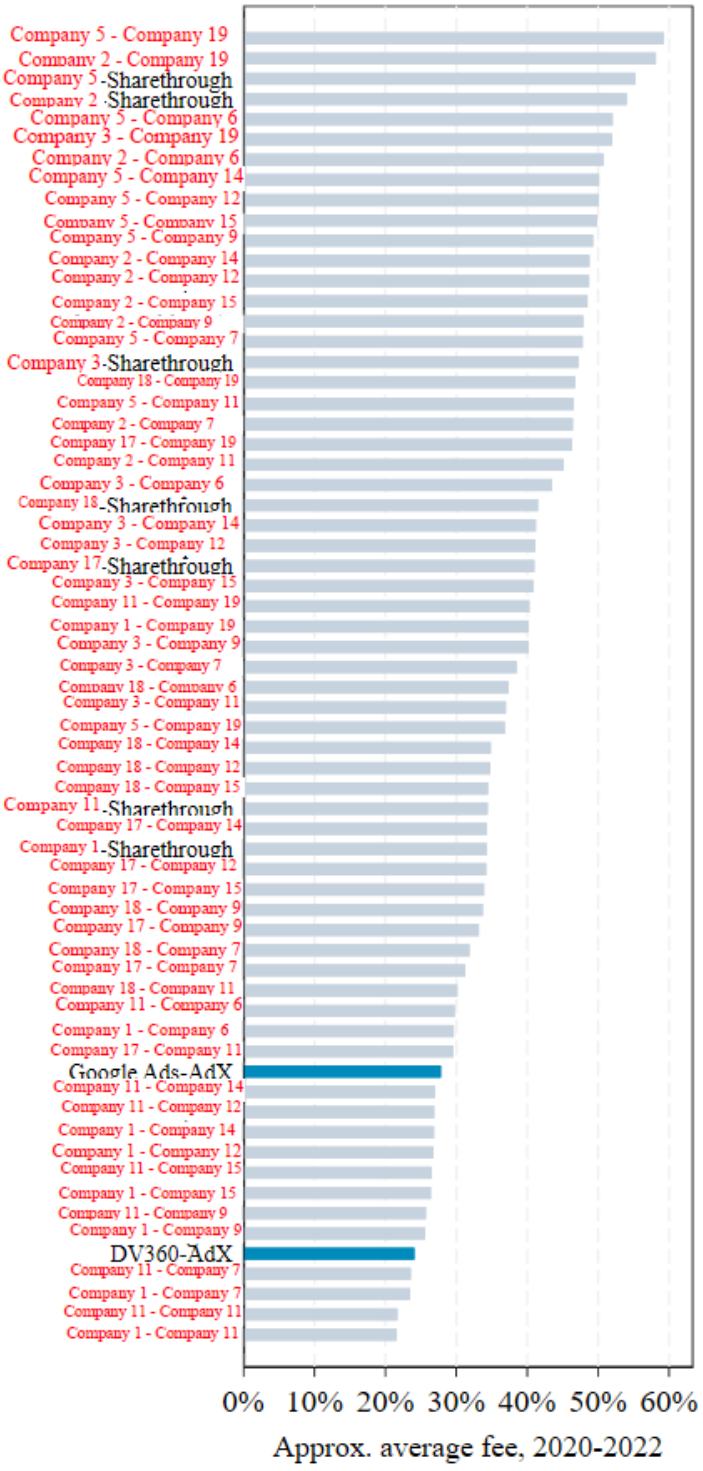
Figure 15. U.S. Comparison of Google Full-Stack Revenue Shares to Competitors Full-Stack Revenue Shares (Jan. 2019 – Mar. 2023)



Notes & Sources: Based on U.S. transactions over the period from January 2019 – March 2023. Google Buy-Side Average – AdX is the weighted average by gross revenue of the full-stack revenue shares associated with Google Ads to AdX transactions and DV360 to AdX transactions. *See* Exhibit 9.

Similarly, a comparison of the combined fees for buying tool and ad exchange pairs also shows that Google's fees are among the lowest in the market. DTX-1893A.

Figure 76: Combined Advertiser Buying Tool and Exchange Fees, 2020-2022



Note: Sharethrough is a rival ad tech provider. The other companies are anonymized pursuant to this Court's order. ECF No. 1147.

Lacking direct evidence, Plaintiffs' expert argued that market definition and power are demonstrated by Google's ability to "degrade" quality. The only examples of Google "degrading" quality he identified are the same, lawful refusals to deal he alleges are anticompetitive. 9/19/24 PM Tr. 66:7-67:11 (Lee); 9/20/24 AM Tr. 134:11-135:1 (Lee). Plaintiffs ask this Court to collapse two distinct inquiries under antitrust law to a single question: Did Google engage in "anticompetitive conduct" as defined by Plaintiffs? If so, that suffices to prove market definition, market power, and anticompetitive conduct in one fell swoop. But not only was Google's conduct here procompetitive, this is not how the law works. Plaintiffs' claim that a product did not work as rivals wanted is no rebuttal to significant evidence of substitution between products within and without Plaintiffs' product market. *It's My Party, Inc.*, 811 F.3d at 683.

All that remains is Plaintiffs' claim that Google has a high market share in the gerrymandered markets Plaintiffs put forward. *It's My Party*, *Inc.*, 811 F.3d at 683 (warning against such markets). Just as competition added back into the overall display ad transaction market shrinks Google's share, the actual competition faced by Google in the component markets shows that Google has 30% of all display advertising among ad servers, DTX-1873; 17% among ad exchanges, DTX-1868; and 19% among ad-space buying tools, DTX-1860. All well short of any threshold for market power. *Kolon*, 748 F.3d at 174.

Conduct and Consequences. From the outset, Google has sought to develop an integrated ad tech stack that serves advertiser and publisher customers end-to-end. The benefits of such integration are established, and were demonstrated at trial—operational efficiency, safety and security, user privacy, reduced latency, and lower prices—and many of Google's largest competitors pursue the same models. *E.g.*, DTX-371 at 1-2 (Google); DTX-939 at 2 (AppNexus/Xandr, now Microsoft Monetize). Even rivals acknowledge Google's products are

good quality. *E.g.*, PTX-1709 at -934 (Meta); 9/17/24 PM Tr. 48:9-16, 80:13-20 (Cadogan) (OpenX); 9/17/24 PM Tr. 129:3-12 (Helfand) (Disney).

Lawful Refusals to Deal. In building this end-to-end integrated ad tech offering, Google was not only animated by valid business reasons but also acted in a manner squarely protected by the Supreme Court's decision in *Verizon Commc'ns., Inc*. v. *Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 408 (2004), which recognized "the 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." Plaintiffs seek to upend this rule and hold Google liable under a theory that rivals lack access to Google's infrastructure, technologies, and customers that is "comparable" to what Google has. As the Court held in *Trinko*, and reaffirmed five years later, "businesses are free to choose the parties with whom they will deal, as well as the prices, terms, and conditions of that dealing." *Pac. Bell Tel. Co*. v. *linkLine Commc'ns, Inc*., 555 U.S. 438, 448 (2009). Absent such a rule, courts are put in the position of ordering "enforced sharing," which risks dampening the incentives to "invest in those economically beneficial facilities" and requires courts "to act as central planners, identifying the proper price, quantity, and other terms of dealing—a role for which they are ill suited." *Trinko*, 540 U.S. at 408.

The actions in this case illustrate well why U.S. antitrust law gives firms this latitude. Out of Google's thousands of innovations, Plaintiffs hone in on five allegedly anticompetitive acts (only three of which remain in effect). All of the acts are described in greater detail herein but each had as its purpose benefiting Google's advertiser and publisher customers. 9/24/24 PM Tr. 34:13-21 (Milgrom) (for Google's auction changes, "every one of the conducts we've described, Google's programs benefited its own customers, either advertisers or publishers or both"). Rather than "investing, innovating, or expanding," a handful of competitors are doing what now-Justice

Gorsuch warned antitrust law does not permit: to "demand the right to piggyback on its larger rival." *Novell, Inc.* v. *Microsoft Corp.*, 731 F.3d 1064, 1073 (10th Cir. 2013).

Plaintiffs' central claim is for greater access to the customers Google has carefully cultivated through its Google Ads offering, also known as "Google Ads demand." Plaintiffs insist that Google build the ability for Google Ads to bid into third-party exchanges without restrictions. That tool already exists: it is Google's DV360 (notably absent from any of Plaintiffs' purported markets). Google Ads, developed at a different time and in a different way than DV360, offers customers a different value proposition: connecting advertisers with a pool of vetted and curated publisher inventory. 9/11/24 AM Tr. 48:21-52:17 (Bender). Google has built and constantly expanded a feature on Google Ads, AwBid, that connects Google Ads advertisers to third-party exchanges when doing so does not degrade the quality of the inventory offered on Google Ads.

Compelled integration of Google Ads with third-party exchanges would not only overrule Google's business judgment about the legitimate trade-offs between expanded access to inventory and considerations like the quality of ad inventory, 9/11/24 AM Tr. 62:10-63:1, 63:19-64:22 (Bender), it would require "completely new systems" and redoing "a vast majority of the engineering," 9/17/24 AM Tr. 120:16-121:17 (Jayaram). Plaintiffs' demand would also collapse Google's two differentiated products into one, require Google to deal with rivals on their terms, reduce the incentives of Google and its rivals to invest in building their own customer bases, and reduce consumer choice—hardly the aims of U.S. antitrust law. *See Trinko*, 540 U.S. 398 at 407-408 (firms are not required to turn over the "source of their advantage").

Plaintiffs seek a similarly unjustified result by arguing AdX should deliver to rival publisher ad servers the real-time amount of bids from the advertisers that have chosen to bid into AdX. This is also the basis of their "tying" claim (even though DFP and AdX can be and are used

separately, with the vast majority of publishers not using AdX) and their objection to the Admeld acquisition (that Google should have built an Admeld feature to transmit real-time bids to rival ad servers). Plaintiffs want publishers to be able to compare real-time bid amounts from all demand sources, including AdX (and by extension Google's advertising customers, such as those using Google Ads). Google has already made that possible through Open Bidding and the Unified First Price Auction. What Plaintiffs now want is for Google to replicate the ability to compare AdX real-time bid amounts and all other real-time bid amounts on rival platforms. 9/16/24 PM Tr. 123:5-124:17 (Abrantes-Metz). They demand that Google not only build integrations with rival publisher ad servers, but reverse its design decisions and take "years" to rewrite AdX's "core code in many places" in order to make that comparison possible using rival platforms. 9/23/24 AM Tr. 47:12-48:4 (Korula). The law nowhere guarantees rivals such access, and certainly not on the "prices, terms, and conditions" a rival demands. *linkLine*, 555 U.S. at 448.

Contrary to Plaintiffs' opening statement that Google "controls" its customers, 9/9/24 AM Tr. 21:8-17 (Plaintiffs' Opening), publishers using DFP have always retained complete control over how they set up DFP, including the price floors and values assigned to particular demand sources, not to mention the choice to use it at all. 9/11/24 PM Tr. 32:3-18 (Ravi); 9/27/24 AM Tr. 97:6-8 (Wheatland); 9/23/24 AM Tr. 36:20-24 (Korula).

Dynamic Allocation (DA) was a "risk-free" feature on DFP that publishers could choose to use to maximize publisher revenue, which worked because of the close integration of AdX and DFP. DTX-117 at 117. Plaintiffs argue similar integrations should also have been built for rival exchanges. Remarkably, their own expert conceded she did not know what or how much work would have been required to build these integrations, but claimed her lack of understanding was "more or less" irrelevant to her opinion. 9/18/24 AM Tr. 78:15-79:7 (Abrantes-Metz). The law

did not require Google to undertake the "onerous" technical work required to build those integrations, 9/19/24 PM Tr. 25:23-26:11 (Levitte); 9/12/24 PM Tr. 93:8-16, 115:1-7 (Goel)—not to mention that, when it did become technologically feasible, Google did exactly what Plaintiffs seek.

Similarly, in 2019, Google launched the Unified First Price Auction and Unified Pricing Rules to simplify auctions and make them more transparent for both advertisers and publishers. DTX-705 at 7, 10; DTX-1016 at 20; 9/12/24 AM Tr. 123:10-124:5 (Srinivasan). Publishers using DFP still have the option to deprioritize AdX (or turn AdX off entirely), and the "vast majority" of DFP publishers do not use AdX. 9/10/24 AM Tr. 96:25-98:3 (Layser); 9/23/24 AM Tr. 41:15-42:1, 42:10-43:2, 43:8-24 (Korula) (demonstrating, in Korula DX 1.17, how to turn AdX off on DFP). Though a handful of large publishers now seek even greater ability to discriminate against AdX while still using Google's DFP ad server tool, the law does not require Google to recreate its products to enable that outcome.

Ultimately, what Plaintiffs want is to overturn controlling Supreme Court precedent that protects a firm's ability to choose with whom and on what terms to do business. Plaintiffs have tried to argue that this is not a broadside on *Trinko* but rather a challenge to Google unlawfully "conditioning access" for its customers. 9/19/24 PM Tr. 127:11-24 (Lee); 9/16/24 PM Tr. 116:14-22 (Abrantes-Metz). As the D.C. Circuit recently held, a claim that a firm withheld "valuable access from rivals leaving them weakened and less competitive" is still a claim challenging that lawful choice. *New York* v. *Meta Platforms, Inc.*, 66 F.4th 288, 306 (D.C. Cir. 2023) (quoting DOJ's amicus brief arguing for a distinction between an unlawful "conditioning access" for customers and a lawful refusal to deal and rejecting that argument).

Furthermore, customers and rivals remain free to do business as they wish without using any of Google's advertising products, or to use those products with ever increasing interoperability and choice. 9/10/24 PM Tr. 25:2-4, 24:12-14 (Friedman); 9/9/24 AM Tr. 78:10-79:13, 80:7-22 (Wolfe). The only limits from Google are as to what customers can do with Google's own products, which courts have upheld as lawful refusals to deal. *Meta*, 66 F.4th at 305 ("To consider Facebook's policy as a violation of § 2 would be to suppose that a dominant firm must lend its facilities to its potential competitors. That theory of antitrust law runs into problems under the Supreme Court's *Trinko* opinion."); *United States* v. *Google*, 2024 WL 3647498, at *129-*131 (D.D.C. Aug. 5, 2024) (permitting Google to have "prioritized and advantaged its own ad platform, Google Ads, over Microsoft's ad platform on SA360" under "the settled principle that firms have 'no duty to deal' with a rival").

Valid Business Reasons. Even if Google's conduct were not squarely protected by Supreme Court precedent, Plaintiffs' claims independently fail because each challenged act was motivated by a "valid business reason or concern for efficiency." *Oksanen* v. *Page Memorial Hosp.*, 945 F.2d 696, 710 (4th Cir. 1991). Across not just the five challenged acts that form the basis of Plaintiffs' case but also the thousands of other innovations introduced during the period at issue, the evidence consistently showed that Google sought to maximize value for advertisers and publishers (as well as users) by increasing return on investment for advertisers; maximizing yield for publishers; promoting safety, security, and trust in the display advertising ecosystem; and creating a fair, transparent auction system. *E.g.*, 9/16/24 AM Tr. 13:18-14:3, 73:7-24 (Mohan); DTX-37 at 5-6; DTX-59 at 3.

That is why, far from having anticompetitive effects, Google's investments and product design decisions have contributed to the exponential growth of the display advertising industry,

which has consistently outpaced industry projections. Today, display advertising customers, including Google's customers, have increased choice, decreased prices, and greater opportunities, improvements that especially benefit small businesses, *e.g.*, 9/25/24 PM Tr. 4:25-5:10, 10:12-23, 19:6-12 (Caldwell). Against this unrebutted empirical evidence, Plaintiffs would build a case on the self-described "late night jetlag ramblings" of one employee and the "wild idea" of another self-professed "engineer who knows very little about anything" with "basically zero experience in the business." PTX-367 at -463; 9/19/24 AM Tr. 155:10-156:25 (Bellack); PTX-238 at -609 to -610; 9/13/24 AM Tr. 144:20-145:9 (LaSala). The law requires more to show "proof of actual detrimental effects on competition." *Am. Express*, 585 U.S. at 542. As the Fourth Circuit has cautioned, "a desire to increase market share or even to drive a competitor out of business through vigorous competition on the merits is not sufficient." *Abcor Corp.* v. *AM Int'l, Inc.*, 916 F.2d 924, 927 (4th Cir. 1990) (citing *United States Steel Corp.* v. *Fortner Enters.* 429 U.S. 610, 612 n.1 (1977)).

The Supreme Court has warned that Section 2 findings of antitrust violations can do real damage by harming innovation and competition. That is certainly true in this case where the consequences of intervention—intended and unintended—could disrupt millions of businesses, especially small businesses, who rely on a complex advertising ecosystem that has been constantly improving to serve their needs. For 16 years, those businesses have been best served when Google and its many competitors have invested in the innovation that fueled continuous improvement and market-wide economic growth. That investment, innovation, and improvement continues apace. Rooted firmly in the distant past, Plaintiffs are seeking a judgment of liability and an injunction attempting to control a rapidly evolving and dynamic future. 9/12/24 PM Tr. 30:13-19 (Dederick);

9/9/24 PM Tr. 21:2-7 (Casale); 9/12/24 PM Tr. 150:7-13 (Goel). The antitrust laws do not permit this and the evidence does not support it.

PROPOSED FINDINGS OF FACT[1]

I. Over the Past Two Decades, Google Has Innovated and Responded to Changes in Display Advertising in Ways that Benefited the Advertising Ecosystem.

1. The industry for facilitating matches of advertisers to display ad space on digital content has been "exceptionally fluid."[2] 9/20/24 PM Tr. 62:9-17 (Sheffer). That fluidity has been driven by "innovation," which "is really at the heart of this whole business." 9/23/24 AM Tr. 48:13-20 (Korula). As Paul Milgrom, a Nobel laureate in auction economics, explained, Google's auction design choices and innovation "benefited its own customers, either advertisers or publishers or both." 9/24/24 PM Tr. 34:13-21 (Milgrom). The case Plaintiffs presented was focused on five cherry-picked forms of conduct out of thousands of Google innovations that have driven the industry. *Infra* ¶¶ 16, 715.1. Plaintiffs' case ignored how Google's products evolved, with each innovation building on prior technology to benefit its advertisers, its publishers, and its users, and ultimately the entire display advertising ecosystem. 9/24/24 AM Tr. 27:1-7 (Milgrom) ("When you evaluate auction design or auction programs and processes, you have to put them in context and understand how they work together with what's already available in the market and capabilities and processes of the existing participants.").

2. In the beginning, before even radio and television matched advertisers and publishers, newspapers provided a "one-stop shop" for sought-after content—local and national news, sports, fashion, entertainment, leisure, and weather. DTX-173 at 12. Newspaper publishers generated revenue based on a combination of subscriptions and advertising. DTX-173 at 9.

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[1] Proposed Findings of Fact relating to the witnesses who testified at trial, including proposed findings relating to witness credibility and Plaintiffs' motion for adverse inference, are included in a separate document titled Proposed Findings of Fact Relating to Trial Witnesses.

[2] With respect to quoted material, unless otherwise indicated, brackets, ellipses, footnote call numbers, internal quotations, and citations have been omitted for readability. All emphasis is added unless otherwise indicated.

3. The advent of digital content in the 1990s expanded monetization opportunities for content creators and advertisers. As subject-matter specific content on digital properties, including user generated content, became more widespread, digital content increasingly competed with traditional newspapers for users' attention and advertising dollars, with digital platforms democratizing who could be a publisher. DTX-173 at 12 (2013 Google "Publishers 101" presentation).

4. "[I]n the last 15 years, the ad industry has seen a migration from legacy media channels to digital media channels like social media, video, digital display, apps, and CTV." 9/13/24 PM Tr. 45:1-6 (Lambert); *see also* 9/12/24 PM Tr. 58:7-21 (Goel).

5. As advertising shifted from legacy media to digital media, technology—"ad tech"—developed to assist publishers who owned digital properties to sell ad space and advertisers to buy that digital ad space. 9/24/24 AM Tr. 33:24-35:3 (Milgrom).

6. The creators of digital content, called publishers,[3] designate space for digital ads, called inventory. 9/9/24 AM Tr. 66:9-16 (Wolfe). Every person who navigates to a creator's digital content—whether a website, app, TV streaming service, podcast platform, gaming console, or any other digital platform—has an opportunity to view an ad, referred to as an "impression." 9/9/24 AM Tr. 60:13-23, 65:12-18 (Wolfe).

[3] "Advertisers" refers to any entity that purchases advertising to reach "users," referring to viewers of digital content. In the two-sided display advertising market, industry participants refer to advertisers, advertising agencies, and tools that serve advertisers as the "buy-side" of the market. *E.g.*, 9/9/24 AM Tr. 131:2-19 (Casale); 9/10/24 PM Tr. 76:8-18 (Lipkovitz); 9/11/24 AM Tr. 47:12-23 (Bender).

"Publishers" refers to all entities that produce digital content, including on websites, mobile apps, Connected TV, social media feeds, and more. In the two-sided display advertising market, industry participants refer to publishers and tools that serve publishers as the "sell-side" of the market. *E.g.*, 9/9/24 AM Tr. 131:2-19 (Casale); 9/10/24 PM Tr. 76:8-18 (Lipkovitz); 9/19/24 AM Tr. 119:20-24 (Bellack).

7. The purpose of ad tech is to facilitate the match between advertisers, publishers, and users viewing advertising impressions on digital content. 9/24/24 AM Tr. 45:5-20 (Milgrom); 9/26/24 AM Tr. 37:13-38:13, 40:20-41:8 (Israel).

8. The quality of a match is a function of not only the pricing of a particular impression, but also the fit between the advertisement and the user viewing the impression. 9/16/24 PM Tr. 9:23-10:10 (Weintraub). The buyers of ad space ("advertisers")—depending on who their target audience is—place different values on impressions based on factors such as the inventory and the user associated with an impression. 9/24/24 PM Tr. 27:17-28:10 (Milgrom).

9. Because of investments in ad tech by Google and many other companies, advertising spend on digital content has grown exponentially, consistently beating industry projections. *Infra* ¶¶ 1104-1105. Throughout that time, Google has continuously invested in and improved advertiser and publisher outcomes on its tools, all while maintaining a low price across its integrated stack without increasing prices. *Infra* ¶¶ 1123-1143, 1146.

10. Today, ad tech needs to be able to find the best match—often out of millions of possibilities—to show to a particular user within a few hundred milliseconds. 9/9/24 AM Tr. 69:17-25 (Wolfe).

11. Display ads can appear in different channels and formats. Throughout these Proposed Findings, the term "ad channels" refers to the variety of devices and environments where display ads appear, including websites, apps, Connected TV, gaming consoles, digital out-of-home, and more. 9/9/24 PM Tr. 59:5-10 (Lowcock) ("channels" are "different methods in which we place advertising," such as television, website, search, and social media). The term "ad formats" refers to the various possible layouts for a display ad, such as traditional banner, native, and video.

As explained below, *infra* § III.B, advertisers and publishers shift their display advertising spend across ad channels and ad formats, often using the same ad tech tools.

12. The marketplace for ad tech tools serving display ad buyers and sellers has always been intensely competitive and rapidly evolving, with new competitors and technologies consistently emerging. Google is just one of the many participants who fiercely compete to attract and retain advertisers and publishers. *Infra* §§ II, VIII.A.

13. Central to Google's development of ad tech tools is the company's long-held, stated mission to "organize the world's information and make it universally accessible and useful." 9/23/24 AM Tr. 8:1-3 (Korula). The guiding principle of Google's sell-side business has, since before 2013, been to "fund the world's information by enabling content creators" "to grow their online businesses." DTX-506 at 1 (2017 email sent by Scott Sheffer, vice president for global partnerships sell-side monetization, to his global team sharing "our 2018 global plan"); 9/20/24 PM Tr. 102:6-103:10 (Sheffer). By helping its publisher partners monetize, Google "enables our partners to pursue their passions and create meaningful jobs," helps "to create a globally diverse and open digital ecosystem of information and viewpoints which is good for humanity," and creates "an open information ecosystem [that] is strategically important for Google" and its search business. DTX-506 at 1; 9/20/24 PM Tr. 102:13-22 (Sheffer). That mission guides Google's work across its display ads business, including its teams that fight for ad safety and security. 9/25/24 PM Tr. 115:20-116:9 (Borgia) ("In order for Google to accomplish its mission of universal access to information, we need to have a safe ecosystem.").

14. In pursuit of that mission, Google has consistently sought to provide "the best platform in the industry for publishers" as well as "the best platform in the industry for advertisers." DTX-37 at 5-6 (January 2009 email from Mohan); 9/16/24 AM Tr. 13:18-14:3 (Mohan).

15. Google's incentives are directly aligned with its customers. As Mohan explained: Google's display ads "business, which was fundamentally a revenue share business, only grew if our publishers' revenues grew. It was directly correlated with the success of our publishers. And our publishers' revenue would only grow if they could deliver high ROI to their advertisers. And so we needed to deliver better return on investment to advertisers, which would translate into higher revenue for publishers, and, as a result, our business would grow because our business was a rev share of publishers' overall revenues." 9/16/24 AM Tr. 73:7-24 (Mohan). Accordingly, Google's strategy was "straightforward. We want to grow the overall display advertising pie for everyone in the industry. By growing the pie for everyone, Google will of course continue to grow its own revenues." DTX-59 at 3 (January 2010 email from Mohan).

16. Google continually evolved its products and services to best serve the needs of its customers. The Court heard from numerous Google witnesses who described these efforts. Google's display ads business is "constantly trying to find ways to make the product better." 9/23/24 AM Tr. 48:13-20 (Korula); *see also* 9/17/24 AM Tr. 108:21-25 (Jayaram) (the "goal has always been to build good, strong advertiser products that achieve the goals and constraints that advertiser have set for us").

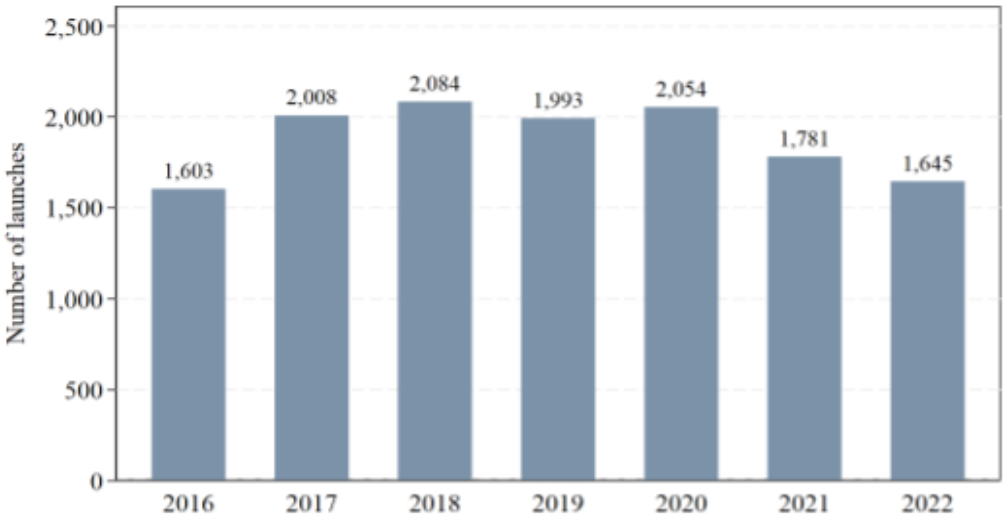
16.1. Google generates ideas for improvements to its ad tech tools both by gathering feedback from its customers and by brainstorming improvements within the team. If customers "want certain features, certain offerings, then we will build those." 9/17/24 AM Tr. 109:16-25 (Jayaram).

16.2. Internally, Google has an "ads quality team" devoted to "looking for ways to make the product better wherever they can" in order to "help publishers make more money." 9/23/24 AM Tr. 48:21-49:1 (Korula). The ads quality team is

the "backbone" of Google's display business. DTX-76 at 2 (January 2011 email from Mohan) "Pretty much every week," the display ads launch committee goes through "five or ten launches that were designed to improve the product in certain ways." 9/23/24 AM Tr. 51:5-21 (Korula). Some of those launches reduced Google's revenue in order to benefit publisher and advertiser customers. 9/17/24 AM Tr. 112:1-15 (Jayaram) ("We are, many times, willing to take a short-term revenue hit to improve advertiser performance and make the product better."). For example, Google launched "a bunch of innovations" to make sure that advertisers were not charged for ads that were never actually viewed. 9/23/24 AM Tr. 49:18-50:11 (Korula). Ultimately, Google recognizes that these measures still benefit Google's business because they benefit the display ecosystem by pulling more ad spend into display advertising. *Id.* (Korula).

16.3. As recorded by Google's internal system for tracking product launches, Google has launched thousands of products in its display ads business every year from 2016 to 2022. DTX-1883.

Figure 66: Google Display Product Launches from Ariane Launch Calendars, 2016-2022



17. In addition to Google's numerous innovations to its tools, Google offers significant benefits and support to its customers, both large and small:

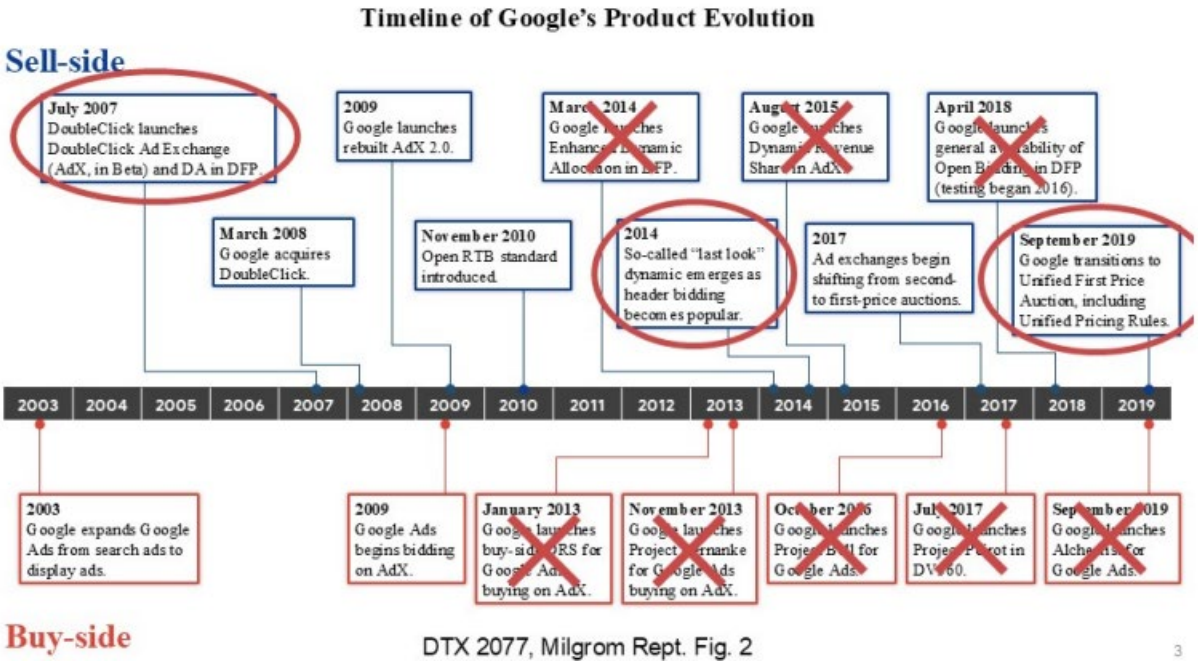
17.1. Google invests in thousands of employees to support the advertisers that buy on Google Ads, including teams that support both large customers and small and medium businesses on-demand. 9/23/24 PM Tr. 8:1-23, 9:7-18 (Stefaniu).

17.2. Courtney Caldwell, owner of a small business advertiser, testified that Google Ads has offered her a flexible, easy-to-use interface that reaches her target audience. 9/25/24 PM Tr. 4:25-5:10, 19:6-12 (Caldwell). Using Google Ads has helped her save money and human resources she would otherwise have spent on designing the ads, executing ad campaigns, tracking ad performance, and pulling together performance analytics. 9/25/24 PM Tr. 10:12-23 (Caldwell).

17.3. Google similarly offers its publisher customers "a tiered system of support and interaction," including "a robust interaction system" that serves smaller and medium sized partners. 9/20/24 PM Tr. 84:14-23 (Sheffer). Google has

a dedicated scale and insights team that helps smaller seller partners implement Google's tools, troubleshoots for those partners, provides customer support, and aggregates customer feedback that Google reviews quarterly. *Id.* at 85:11-86:8 (Sheffer).

18. Out of the many thousands of product launches and design decisions Google has made over the past 16 years, Plaintiffs argue that only a small subset of Google's product design decisions and innovations were anticompetitive—excluding, for example, even the innovations crossed out in red below, DTX-2077A, that Plaintiffs originally pursued in their complaint. 9/24/24 AM Tr. 26:21-30:25 (Milgrom); *infra* ¶ 715. Of those few forms of conduct that Plaintiffs do argue were anticompetitive, two relate to how Google has designed its integrated ad tech tools since they were launched. *Infra* ¶¶ 117, 715.1, 715.2, 790, 866. Another is based on a product design by DoubleClick, a company whose acquisition by Google was government-reviewed. *Infra* ¶ 907. And the other, Unified Pricing Rules, implemented five years ago along with the Unified First Price Auction, made auctions more simple and transparent, benefiting advertisers and most publishers. While some larger publishers complained, the changes were not unique to Google and were widely embraced. *Infra* ¶¶ 1031-1039, 1051, 105-1058.



19. The history presented below contextualizes how the products and conduct that Plaintiffs based their case on developed in the evolution of the display advertising industry. As explained below, however, *infra* ¶¶ 270-298, even that history is necessarily incomplete because Plaintiffs' case concerns only fragments of the display advertising industry. Their allegations are largely based on the designs of a subset of ad tech tools that developed in the earliest years of the industry, leaving out some of the most important ways that advertisers and publishers connect today.

A. Early Years: Direct Deals

20. Initially, display advertising was sold through "**direct deals.**" Digital content providers, through their sales teams, contracted directly with advertisers and advertising agencies to sell inventory on their websites. DTX-1165 at 9-10; 9/24/24 AM Tr. 33:24-35:3 (Milgrom); 9/20/24 PM Tr. 48:3-18 (Sheffer). Over time, tools evolved that provided new pathways for connecting publishers and advertisers.

21. These initial direct deals could be transacted on a "guaranteed" basis, which meant that the advertiser was guaranteed to receive a certain number of impressions. DTX-117 at 116 (2010 Google white paper). Since the early years of display advertising, digital content providers have sold the majority of their inventory on a guaranteed basis through these direct sales. DTX-117 at 116 (as of 2010, a "typical large publisher generates upward of 80% of its online advertising revenue from guaranteed ad sales.").

22. Publishers continue to sell inventory through direct deals today, with roughly 50% to 80% of large publishers' revenue coming from their direct sales efforts. 9/20/24 PM Tr. 48:3-18, 78:4-25 (Sheffer). Today, a large percentage of those direct sales occur programmatically, which means they are facilitated by automated ad tech tools. 9/26/24 AM Tr. 85:22-86:19 (Israel); 9/9/24 AM Tr. 63:1-9, 97:7-23 (Wolfe).

23. After publishers fulfilled their guaranteed direct deal obligations, they might still have some digital ad space that remained unsold. That leftover inventory is referred to as "remnant inventory." 9/24/24 AM Tr. 33:24-35:3 (Milgrom).

B. Early 2000s: Ad Networks Evolved to Enable Vetted Groups of Advertisers to Connect to Vetted Groups of Publishers.

24. In the early 2000s, digital advertising was "still in its infancy" and transitioning "from analog—things like print magazines or radio—to digital." 9/12/24 PM Tr. 58:14-17 (Goel).

25. **Ad networks** emerged as a tool to sell remnant or leftover inventory that was not sold through guaranteed direct deals to advertisers. The sale of remnant or leftover inventory is also referred to as "indirect monetization." 9/20/24 PM Tr. 78:4-25 (Sheffer); 9/12/24 PM Tr. 59:3-15 (Goel). These ad networks would aggregate remnant inventory from multiple digital content providers and connect that inventory with advertisers, often incorporating targeting technology to improve the connections between ads and users. 9/24/24 AM Tr. 33:24-35:3

(Milgrom); DTX-1514 at 29; 9/20/24 PM Tr. 53:15-23 (Sheffer); 9/20/24 PM Tr. 112:22-113:12 (ad networks can determine which advertiser to sell inventory to by running auctions).

26. Publishers who joined ad networks would typically agree to a fixed price for a non-guaranteed number of impressions. 9/24/24 AM Tr. 33:24-35:3 (Milgrom); DTX-117 at 116 (2010 white paper stating that, with early sales through ad networks, "the CPM is usually fixed, but the number of impressions delivered is not.").

27. Ad networks have always served both publishers and advertisers. (In other words, there is no such thing as an "advertiser ad network." *Infra* ¶ 655.) For content providers, ad networks provided a more cost-effective way to package and sell remnant inventory. For advertisers, the advent of online ad networks provided a wide selection of trusted digital content providers and the ability to target ads to particular audiences.

28. Today, Google's ad network, the Google Display Network, can be accessed by advertisers and publishers through multiple tools, both Google and non-Google, on the buy-side and on the sell-side. The digital properties that are part of the Google Display Network consist of more than two million websites, video properties, and apps, including Google owned-and-operated properties, that use Google tools—AdSense, AdMob (Google's ad network for in-app ads), and AdX (now part of Google Ad Manager)—to sell ad inventory. 9/11/24 AM Tr. 41:3-10 (Bender); 9/20/24 PM Tr. 57:15-20, 62:21-25 (Sheffer). Advertisers can access the Google Display Network properties—and more—using Google's buying tools, Google Ads and DV360, or using non-Google buying tools called Authorized Buyers. *Infra* ¶¶ 50, 128. The relevant tools are described below.

29. Google's competitors that are also major digital content providers, such as Facebook, Microsoft, and Amazon, offer tools similar to the Google Display Network. Those

tools connect advertisers to the publisher's owned-and-operated inventory, as well as to additional third-party inventory that has joined the publisher's ad network. *Infra* ¶¶ 311, 331, 342.

1. Google Ads

30. In 2000, Google launched the first tool in its ad tech ecosystem, AdWords, which has since been rebranded as Google Ads. When it was first created, Google Ads was an advertiser buying tool for placing ads on Google's search results page. 9/20/24 PM Tr. 48:19-49:10 (Sheffer).

31. At the time, "the notion of a network" was to (1) simplify the overhead and labor of advertisers reaching out to each publisher individually to negotiate the placement of ads on their sites, and (2) enable publishers to aggregate their available inventory. 9/11/24 AM Tr. 50:20-25, 51:1-4 (Bender) ("An advertiser would just have to come to a single network and say I want to buy, [for example] in your sports vertical. . . . And that represents, itself, maybe 100 sites. But instead of having to transact with 100 different sites, they could share one single tag."). From its genesis, consistent with the traditional concept of an ad network, Google Ads was intended to be a tool to provide advertisers with access to curated, high-quality inventory, 9/11/24 AM Tr. 51:25-52:17 (Bender), and to connect publishers with vetted advertisers, 9/20/24 PM Tr. 49:11-14 (Sheffer).

32. Google put in "a lot of work" in order to ensure that the publisher inventory available through its network "was safe and of high quality." 9/11/24 AM Tr. 52:6-17 (Bender). That work is constantly ongoing, as "the bad actors in the ecosystem" continue to evolve. *Id.* (Bender); *see also* 9/24/24 PM Tr. 49:15-50:6 (Bjorke) ("bad actors are continuously evolving and improving the way they try to defraud us"); DTX-214 at 1 (2014 Google strategy document: "The advertising world moves quickly," so "each new ad feature, format, platform, and monetization option needs to be analyzed" for ad fraud risks.).

33. Google has also always vetted the advertisers who use Google Ads to make sure that publishers selling to these advertisers "could rest assured that they are working with high-quality advertisers." 9/20/24 PM Tr. 49:11-14 (Sheffer); *see also* 9/16/24 AM Tr. 76:20-77:13 (Mohan); 9/25/24 PM Tr. 106:13-107:5 (Borgia).

34. Advertisers can set up an account on Google Ads at no cost to them, and Google Ads does not have a minimum spend requirement. 9/23/24 PM Tr. 27:23-28:3 (Stefaniu).

35. Advertisers pay Google Ads based on a revenue share model, which means that Google makes revenue by receiving a percentage of the advertiser's bid before it is paid to other intermediaries and, ultimately, the publisher. The revenue share paid can vary by impression but targets an internal average revenue share. 9/20/24 AM Tr. 93:2-8 (Lee); 9/27/24 AM Tr. 137:24-138:19 (Jayaram). Google Ads generally charges advertisers on a cost-per-click model. That means advertisers pay Google Ads only when the user actually clicks on the purchased ad. 9/11/24 AM Tr. 24:14-24 (Bender); 9/13/24 AM Tr. 55:22-24 (LaSala).

2. AdSense

36. Google Ads was first created to connect advertisers to Google owned-and-operated properties. "Very soon after" Google launched Google Ads, Google began opening up its systems to third-party publishers. 9/20/24 PM Tr. 49:15-22 (Sheffer).

37. Google developed a sell-side tool called AdSense for Search, which enabled third-party search engines to sell ad space on their search results pages to Google Ads advertisers. 9/20/24 PM Tr. 49:15-50:1 (Sheffer). These third-party search engines could therefore use AdSense for Search to access Google Ads advertisers. *Id.* at 50:2-5 (Sheffer).

38. After that, in 2003, Google launched AdSense for Content,[4] a sell-side tool for third-party publisher websites. These publisher websites could use AdSense for Content to access Google Ads advertisers. 9/20/24 PM Tr. 50:12-51:2, 51:12-13 (Sheffer).

39. Google decided to build AdSense for Content to benefit both advertisers and publishers:

39.1. As "Websites were proliferating," "it was a great opportunity for advertisers to reach those users" on the new non-Google websites. 9/20/24 PM Tr. 51:14-52:1 (Sheffer).

39.2. On the other side of the transaction, publishers made money from connecting to advertisers, which "enables them to create more content, thus growing the web." 9/20/24 PM Tr. 51:14-52:1 (Sheffer). Publishers thus benefited from Google's ad network because it allowed them to "monetize inventory" and has "consistently been able to provide good RPMs [revenue per thousand impressions] to publishers." DTX-37 at 4 (January 2009 Google email).

40. After the launch of AdSense, the ad network connecting advertisers using Google Ads to third-party publisher inventory on AdSense and Google owned-and-operated inventory was referred to as the Google Display Network (or GDN or GCN). 9/20/24 PM Tr. 52:17-53:5 (Sheffer).

41. Because Google had a relationship with the customers of the Google Display Network, from the inception of the Network Google Ads could better ensure that its advertisers bid on valid and safe display inventory. 9/24/24 PM Tr. 58:1-4 (Bjorke) ("there was a very clear significant benefit of being closed and only operating in a closed ecosystem.").

[4] For convenience, we use "AdSense" below as shorthand to refer to AdSense for Content.

41.1. Google has always vetted the publishers joining AdSense. 9/20/24 PM Tr. 52:2-5 (Sheffer). The vetting benefits both advertisers and publishers: advertisers can "feel comfortable with the content of the sites they were placing ads against," and publishers "feel like they [are] joining a high-quality network." *Id.* at 52:6-13 (Sheffer).

41.2. Publishers are required to meet certain criteria and agree to AdSense policies in order to be part of the network. DTX-47 at 41, 43 (2009 Google presentation); Bjorke DX 1.3; 9/24/24 PM Tr. 51:18-54:3 (Bjorke).

42. Publishers using AdSense also benefit from Google's vetting of advertisers. Only advertisers who have gone through Google's certification process, including advertisers buying through Google Ads, can buy inventory from AdSense. Publishers (and people viewing ads on their sites) are protected from inappropriate ads and from malicious actors posing as advertisers. DTX-47 at 25, 41, 46 (2009 Google presentation); *see* 9/25/24 PM Tr. 104:18-105:7 (Borgia) (threats posed by bad ads).

43. At the time that Google built AdSense and connected it to Google Ads, there were "probably dozens" of competitor ad networks. 9/20/24 PM Tr. 53:24-25 (Sheffer). Microsoft, Yahoo, and AOL were some of the most significant competitor offerings. DTX-59 at 1 (January 2010 Google email referring to Yahoo and Microsoft as GCN's "largest competitors"); PTX-44 at -913 (2009 Google email).

44. After AdSense's launch, Google continued to improve on its ad network. DTX-37 at 2 (January 2009 Google email: "90 launches creating 25%" lift in revenue and 35% improvement in cost spent on ads); DTX-59 at 2 (January 2010 Google email: "Our team launched an entirely new interface for our publisher partners" that helped to grow "the number of publishers

in our network 22% YoY to well over a million."); DTX-76 at 4 (January 2011 Google email describing launch for publishers that gave them "better insights, more controls, and increased efficiency (reporting data running up to 100X faster!"); DTX-101 at 2 (January 2012 Google email). In particular, one of the goals of Google's display ad business was to not only provide solutions for "large publishers," but also offer AdSense as "a turn-key, no worries solution for torso and small publishers." DTX-76 at 5; *see also* 9/16/24 AM Tr. 106:9-22 (Mohan) ("torso" publishers refers to "the medium and the tiny").

45. AdSense can serve many different ad formats, including traditional web banner ads, native ads, video ads, ads on web-based games, and mobile app ads. 9/23/24 AM Tr. 13:15-20 (Korula).

46. AdSense can be used by publishers of all sizes, including "less sophisticated publishers" such as "smaller, mom & pop websites, blogs," PTX-939 at -991, -993 (2018 Google presentation), that are seeking "a fast way to implement ad delivery" and "more automation for their ad solutions," PTX-1144 at 1 (Google Ad Manager Help); *see also* 9/23/24 AM Tr. 12:19-13:4 (Korula). AdSense is particularly targeted at publishers who want to monetize their inventory and sell through indirect transactions with "simpler controls." PTX-939 at -993; 9/23/24 AM Tr. 12:21-13:8 (Korula); 9/20/24 114:15-17 (Sheffer) ("a website that wants to sell indirectly" can "absolutely" use AdSense).

47. Plaintiffs' allegations are focused on web publishers' access to Google Ads demand, *infra* ¶¶ 855, 895, but do not include AdSense in any of their alleged markets even though web publishers can use AdSense to access Google Ads demand. 9/23/24 AM Tr. 13:21-14:15 (Korula) (AdSense publishers get "access to the same demand" that AdX or DFP publishers do, including

Google Ads, DV360, and non-Google buying tools); 9/20/24 PM Tr. 72:21-73:17 (Sheffer) ("effectively all of the Google Ads' demand flowing through AdSense for Content").

48. Plaintiffs attempted to justify the exclusion of AdSense on the inaccurate assumption that a website publisher that wants to manage both direct and indirect deals cannot use AdSense. 9/20/24 PM Tr. 110:14-25 (Sheffer). That was corrected by Scott Sheffer, who is the Vice President for Global Partnerships Sell-Side Monetization at Google and has 18 years of experience in Google's sell-side business—including leading the AdSense online sales team. *Id.* at 47:5-11 (Sheffer).

49. As Sheffer explained, publishers can use AdSense to sell indirectly and, if they want to manage direct deals, they can simply pair AdSense with any publisher ad server they choose. **Publisher ad servers** are tools that have existed since the 1990s to help publishers manage their ad space inventory. 9/16/24 AM Tr. 55:22-56:6 (Mohan); DTX-1016 at 12. Per Sheffer's testimony:

> Q. So let's stick with a publisher that has both direct and indirect sales.
>
> A. Okay. They can sell their indirect through AdSense.
>
> Q. And then you're saying that they would also use DFP to do their direct deals?
>
> A. They can use whatever other ad server they would want for their direct deals, yes.
>
> . . .
>
> The Court. You're saying that a website that wants to sell indirectly can use AdSense?

The Witness. Absolutely, yes.

9/20/24 PM Tr. 113:233-114:17 (Sheffer).

50. A publisher can use AdSense to sell inventory to Google Ads advertisers, DV360 advertisers, and to the non-Google buying tools, referred to as "Authorized Buyers," that sign up to purchase inventory from any of Google's sell-side tools (AdSense, AdMob, or AdX and DFP). PTX-1144 at 2; 9/23/24 AM Tr. 13:21-14:15 (Korula).

51. As Sheffer and other witnesses explained, a publisher can choose to use AdSense in conjunction with another tool, such as a third-party publisher ad server or an in-house publisher ad server. 9/23/24 AM Tr. 15:3-5 (Korula). For example, a publisher can use AdSense in conjunction with a third-party publisher ad server, like Microsoft Monetize, and use the third-party ad server to allocate inventory between direct and indirect deals while selling inventory indirectly through AdSense. 9/20/24 PM Tr. 114:1-115:6 (Sheffer) (a publisher "can use whatever other ad server they would want for their direct deals").

52. It is also "very common" for a seller to use AdSense without any publisher ad server at all. 9/23/24 AM Tr. 15:12-14 (Korula).

53. In short, by connecting AdSense to a non-Google publisher ad server, an in-house ad server, or no ad server at all, a publisher can access buyer demand from Google Ads without using Google's ad exchange, AdX, or publisher ad server, DoubleClick for Publishers ("DFP").

3. AdMob

54. In 2011, Google acquired AdMob, expanding its ad network offering in order to provide ad tech services to publishers with mobile ad inventory that wanted to use Google's network. DTX-76 at 2. AdMob is both an ad network and mediation platform, or "simplified ad server," for app ads. 9/20/24 PM Tr. 59:17-23 (Sheffer).

55. Google acquired AdMob because mobile was "a huge opportunity." DTX-76 at 2 (January 2011 Google email). After the acquisition, Google continued to grow AdMob, "with revenue and ad requests up by 100%" in six months after the acquisition. DTX-76 at 2.

56. Like AdSense, AdMob is a way to get access to advertisers who are purchasing through Google Ads without using DFP or AdX. 9/20/24 PM Tr. 62:18-25 (Sheffer); DTX-101 at 3, 6 (January 2012 Google email stating that integration of AdMob and Google Ads was a "priority").

57. Even though AdMob provides the same functionality for serving app ads as Google's other sell-side tools, DFP and AdX, Plaintiffs do not include AdMob in any of their alleged markets. 9/20/24 PM Tr. 60:2-5 (Sheffer).

C. Early 2000s: Publisher Ad Servers Evolved to Help Publishers Manage Numerous Sources of Buyers for Their Inventory.

58. As the industry evolved, publisher ad server functionality evolved to help digital content providers manage their inventory across both direct deals and indirect sales, communicate to advertisers the characteristics of their inventory, and monitor performance. DTX-1165 at 10-11; 9/9/24 AM Tr. 66:1-8 (Wolfe).

59. Publisher ad servers are complex from an engineering perspective and require significant research and development on "how best to serve ads to the right person at the right time with the right amount of budget." 9/9/24 PM Tr. at 120:11-20 (Avery).

60. The quality of publisher ad servers is "mission-critical" for publishers that manage direct sales efforts because "the ad server is the way by which they deliver against all of their advertiser agency commitments" and ensure that "they fulfill all their contractual commitments." 9/20/24 PM Tr. 78:4-25 (Sheffer).

61. In the late 1990s, Net Gravity, an early pioneer of internet advertising technology, offered a software-based ad server that publishers could install in their data centers to manage advertising on their websites. 9/16/24 AM Tr. 55:15-56:6 (Mohan).

61.1. Net Gravity merged with DoubleClick, which offered ad tech to both publishers and advertisers, including the industry leading publisher ad server. 9/16/24 AM Tr. 56:12-57:2 (Mohan).

61.2. Neal Mohan worked at both Net Gravity and DoubleClick prior to Google's acquisition of DoubleClick, and then joined Google. *Id.* at 55:12-56:2 (Mohan).

1. Early 2000s: Publishers Sold Remnant Inventory to Different Demand Sources Via a "Waterfall."

62. As discussed *supra*, in the early 2000s, the primary way digital content providers sold inventory was through direct agreements with advertisers or their advertising agencies. 9/24/24 AM Tr. 33:24-35:3 (Milgrom). To sell the remnant inventory that was not committed to a direct deal, digital content providers sold the ad space indirectly to multiple kinds of demand sources that aggregated inventory.

62.1. Initially, ad networks were the primary source of demand for remnant inventory. *Supra* ¶ 25.

62.2. Later, between 2005 and 2007, an additional form of advertising technology called **ad exchanges** emerged as another demand source. At that time, ad exchanges ran auctions based on fixed (static) prices. Because bidders had to value impressions in advance of the impression actually becoming available, they would specify to the ad exchange the amount they were willing to pay for impressions with particular characteristics. 9/24/24 AM Tr. 51:7-23

(Milgrom). These early ad exchanges enabled publishers and advertisers to transact without needing to negotiate one-on-one. DTX-7 at 3 (2007 Microsoft board presentation: "It is inevitable that exchanges develop, because they are inherently more efficient than 1-1 negotiated advertising.").

63. Because there were hundreds of different demand sources through which publishers could sell remnant inventory, including hundreds of ad networks, digital content providers set up a "waterfall" system to fill their inventory. 9/12/24 PM Tr. 60:21-61:5 (Goel); 9/9/24 AM Tr. 148:3-149:12 (Casale); 9/23/24 AM Tr. 57:25-58:11 (Korula)

64. The waterfall system was in common use across the industry and "existed before DFP and AdX came into existence." 9/24/24 AM Tr. 36:3-11 (Milgrom); *see also* 9/11/24 PM Tr. 24:9-10 (Ravi).

65. Under the "waterfall" system, which was typically run using a publisher ad server, content providers would offer any remnant inventory to ad networks and other demand sources in a sequential order. 9/24/24 AM Tr. 33:24-35:3 (Milgrom); 9/25/24 PM Tr. 169:10-17 (Hochberger).

66. When the publisher had an available impression, it would offer that impression to the first demand source in the waterfall. Publishers chose the order in which different demand sources were called in their waterfall by entering a value in a line item in their publisher ad server for each demand source. Deposition of Brian O'Kelley Tr. at 103:8-9, 103:12-104:3 (explaining that "the publisher would decide what priority to put every ad" in the waterfall).

66.1. In the earliest days of the industry, that value would typically be the negotiated fixed price from each ad network. 9/24/24 AM Tr. 37:7-18 (Milgrom).

66.2. As the industry developed, the value associated with a line item was called a "value CPM" and could be the average historical value received from that demand source, an amount negotiated with that demand source, or any other value chosen by the publisher. 9/11/24 PM Tr. 33:12-25 (Ravi) ("The publisher is choosing a value for each of those exchanges."); 9/23/24 AM Tr. 107:16-24, 172:3-8 (Korula); 9/25/24 PM Tr. 169:20-24 (Hochberger); DTX-376 at 25 (2017 Google presentation describing how publishers could optimally set their line item rates, or "Value CPM").

67. Prior to DoubleClick's development of dynamic allocation, described below, there "was no bidding going on" in the waterfall process. 9/24/24 AM Tr. 36:24-37:6 (Milgrom); *see also* 9/25/24 PM Tr. 169:25-170:5 (Hochberger) ("So the issue with the traditional waterfall setup is that you are not getting real-time bids."). Each ad network, when it was called, "would say yes, I'll take that one; or no, I won't take that one." 9/24/24 AM Tr. 33:24-35:3 (Milgrom). If the ad network did not take the impression, it would return the impression to the publisher, "who would then offer it to" the next demand source in the waterfall. *Id.* (Milgrom).

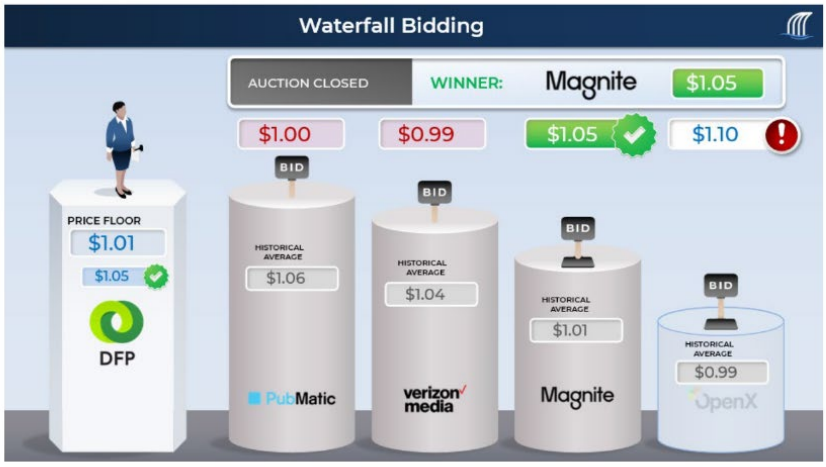
68. The "waterfall" process was inefficient. There was no guarantee that the advertiser who valued the inventory the most would have the opportunity to purchase the ad inventory. 9/12/24 PM Tr. 61:18-62:1 (Goel). For any given impression, a demand source might have an advertiser willing to bid higher than the historical price or previously agreed-upon price. As a result, the "waterfall" system based on expected bids sometimes resulted in a buyer winning an impression even though a buyer lower in the waterfall would have paid more. 9/24/24 AM Tr. 38:2-39:25 (Milgrom); *see also* Milgrom DX 1.3 (illustrating inefficiencies in the waterfall); 9/23/24 AM Tr. 61:12-23 (Korula) (a bidder might have the highest bid but still lose an impression).

An impression might therefore be purchased for a price below market value. 9/12/24 PM Tr. 61:18-62:1 (Goel).

69. Although the waterfall system was "not efficient," "it was the best technology there was at the time," when all that publishers had from various demand sources were "historical average prices" or negotiated prices, and the demand sources needed to be called in some sequence. 9/23/24 AM Tr. 58:3-11 (Korula); *see also* DTX-422 at 39 (2015 AppNexus presentation: "The Waterfall Was the BEST Option for Two Decades").

70. Plaintiffs provided a depiction of the waterfall that misrepresents the waterfall on multiple counts. Korula DX 1.19

DOJ's Depiction of the Waterfall



Korula DX 1.19

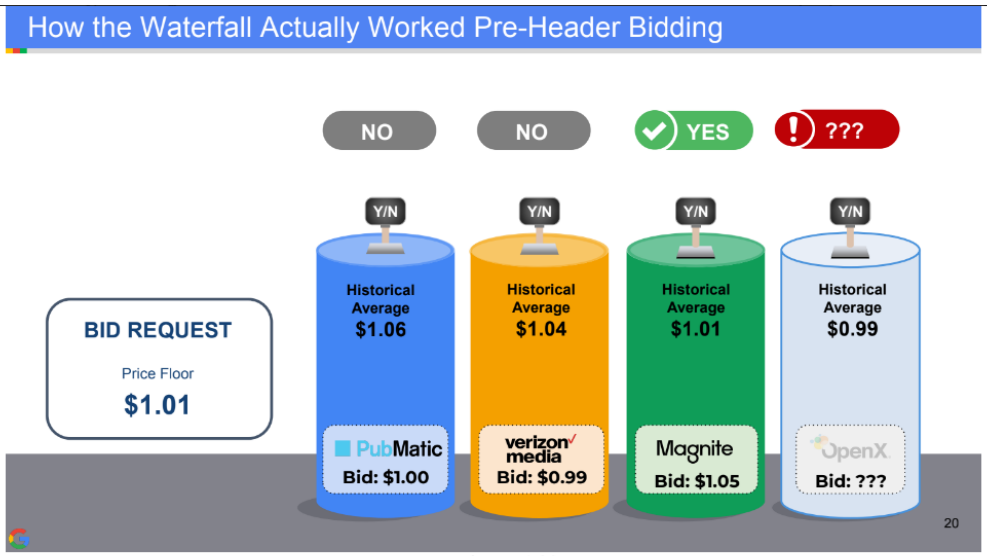
70.1. First, the graphic lists bids of $1.00, $0.99, $1.05, and $1.10 above each of the exchanges. That "seems to suggest that the publisher is getting these bids," but "that's not how it actually worked. Typically exchanges weren't giving or ad networks weren't giving publishers these prices. A call would be made to the exchange or ad network, and they would just say yes or no." 9/23/24 AM Tr. 55:4-56:16 (Korula).

REDACTED VERSION

70.2. In the early days of the waterfall, ad networks would respond "yes or no" based on whether they had an advertiser willing to pay the fixed contract price, pre-negotiated with the publisher, for a particular impression. 9/24/24 AM Tr. 33:24-35:3 (Milgrom). Later, once ad exchanges became more popular, exchanges would respond "yes or no" based on whether they had an advertiser bid that beat the publisher-set floor price. 9/23/24 AM Tr. 55:4-56:16 (Korula).

70.3. Second, the graphic lists a $1.10 "bid" above OpenX even though Magnite has won the auction. In reality, "once Magnite wins the impression," "then no call is made to OpenX at all." The price of $1.10 "doesn't really exist. Nobody knows what this price is because no call was made to OpenX, OpenX didn't call its buyers, there were no bids received. So that's just a hypothetical not actually representing a real price from anyone." 9/23/24 AM Tr. 55:4-56:16 (Korula). Professor Milgrom testified to the same fact. 9/24/24 AM Tr. 38:2-39:8 (Milgrom).

71. A correct depiction of the same waterfall setup, ordering ad exchanges, would look as follows. Korula DX 1.20.



Korula DX 1.20

71.1. As the former Engineering Director for Google's sell-side products explained: "[W]hen the call comes to PubMatic, PubMatic internally, it doesn't disclose this, perhaps has a bid of $1. And because that's below the floor price, PubMatic will respond no, and that's all that happens. You get a yes or a no. And then because you have no, you go to the next one in the sequence. That's Verizon Media. Again, internally they have 99 cents, so they respond no. The publisher gets a no. You go to the next one in the sequence, Magnite, you get a yes. And so then Magnite wins that impression. And the publisher doesn't even know the price at which Magnite has won this impression at this point. And then finally, no call to OpenX happens at all, and so we just have the question marks reflecting there's no bid here because they didn't even have an opportunity to bid." 9/23/24 AM Tr. 57:1-17 (Korula).

72. Plaintiffs' mistakes in depicting the waterfall are not just errors in a figure. They reflect a fundamental misunderstanding that is "critical to the whole reason you have a waterfall." 9/23/24 AM Tr. 56:8-10 (Korula).

73. The reason that a "sequential process"—or waterfall—was necessary in the first place was because demand sources, including ad networks and even exchanges, were incapable of providing real-time prices. Publishers needed to call demand sources one by one because each demand source only sent publishers a "yes or no." Additionally, without real-time prices, publishers necessarily had to set that sequence based on imperfect information about what a given demand source might be willing to offer for a particular impression. 9/23/24 AM Tr. 56:11-16 (Korula).

74. Plaintiffs' depiction wrongly implies that, in the early 2000s, publishers could obtain real-time bids from multiple demand sources simultaneously and thus run a head-to-head auction to compare those bids—even though the technology to do so, header bidding, would not be invented until years later (circa 2014). *Infra* ¶¶ 159-163. As explained in more detail below, *infra* ¶¶ 927-935, some of Plaintiffs' arguments relating to Google's conduct depend on this key misunderstanding, comparing the waterfall to header bidding technology that had not yet been developed.

2. 2007: DoubleClick's Dynamic Allocation Moves the Industry Toward Auctions.

75. In 2007, prior to its acquisition by Google, DoubleClick introduced a technology called Dynamic Allocation on its publisher ad server and nascent ad exchange. 9/16/24 AM Tr. 78:14-16 (Mohan); DTX-2077; 9/11/24 PM Tr. 24:22-25:5 (Ravi). Dynamic Allocation allowed publishers to configure DoubleClick's publisher ad server to maximize revenue for sales of non-guaranteed inventory by trying to allocate each impression to the advertiser who was willing to pay the most money for it, and allowed advertisers using DoubleClick's ad exchange to win an impression by paying the publisher more than the highest expected value in the publisher's waterfall. DTX-117 at 116 (2010 Google Dynamic Allocation white paper).

76. Dynamic Allocation worked by using the highest value CPM in the waterfall as the floor price, or minimum price, for an auction run in DoubleClick's ad exchange. "If the Ad Exchange can provide the publisher with a net CPM value higher than they would have gotten from delivering their directly booked, non-guaranteed ad, the Ad Exchange will deliver an ad. If the directly booked ad's CPM value is higher, it ignores any bids coming in from the Ad Exchange." DTX-117 at 117; *see also* 9/24/24 AM Tr. 40:23-41:9 (Milgrom) ("Well, it's running an auction. So instead of—instead of having a fixed contract price, it has a floor price. That's the price to beat. And then it runs an auction among its advertisers.").

77. If no bidder in DoubleClick's ad exchange beat that floor price, the impression would be offered to the first demand source (that is, the demand source with the highest value CPM) in the seller's existing waterfall setup. If that demand source said "no" to the impression, the Dynamic Allocation process would run again to see if any bidders on DoubleClick's ad exchange could beat a floor price set by the next highest value CPM in the waterfall. DTX-117 at 117 (the ad server "passes to the Ad Exchange the CPM value associated with" each ad that it is about to serve). This process would repeat at every step down the waterfall if no DoubleClick bidder could beat the floor price set by the next highest value CPM and the next demand source in the waterfall said "no." The effect was that DoubleClick's ad exchange ended up "in the right place" in the waterfall based on the amount its bidders were willing to pay and "the competing prices" in the waterfall. 9/23/24 AM Tr. 60:14-61:3 (Korula).

78. The "risk-free" nature of Dynamic Allocation was made possible by the close integration of DoubleClick's publisher ad server with its ad exchange. DTX-117 at 117 (2010 Google Dynamic Allocation white paper); DTX-80 at 7 (2010 Google white paper: "Tight integration with DFP" provides additional benefits beyond Dynamic Allocation, and "one of the

biggest overall benefits of Ad Exchange is that it is embedded in DFP, so we can easily create and manage campaigns."). In order for Dynamic Allocation to guarantee that a publisher would make the same amount of money than it expected to get from the waterfall, the ad server needed to be integrated with the ad exchange so that the ad server could pass the highest line item value from the waterfall to the ad exchange as a floor price. As Spencer explained, Dynamic Allocation was thus "a unique feature that existed between DFP and the exchange" due to their integration. 9/18/24 AM Tr. 17:14-18:16 (Spencer); DTX-117 at 117.

79. Dynamic Allocation benefited publishers and advertisers by incorporating auctions into the old waterfall system. Using an auction "creates competition among the advertisers so the advertiser with the highest value will be able to win the impression," and "when the competition is effective, generates a higher price for the publisher." 9/24/24 AM Tr. 41:10-17 (Milgrom).

80. Dynamic Allocation was a particularly valuable step in the industry's development because it was "backward compatible." In other words, Dynamic Allocation advanced the old system by introducing auctions but was still "designed to fit into the waterfall." 9/24/24 AM Tr. 54:18-55:10 (Milgrom). Instead of requiring publishers to change overnight how they were accustomed to doing business, Dynamic Allocation "just said instead of having a fixed price for us, just tell us a minimum price and we'll let the auction set the price and it won't upset the rest of the waterfall. So it's backward compatible." *Id.* (Milgrom).

81. Being backward compatible was important because changing existing processes takes "months and years," and "having something that slips right in and doesn't require such changes is—makes it much more acceptable to publishers." 9/24/24 AM Tr. 55:20-56:12 (Milgrom). As an example of the importance of backward compatibility, Rajeev Goel, founder of PubMatic, testified that early on PubMatic proposed allowing publishers to run multiple waterfalls

with the sequence changing on an hourly basis instead of the typical weekly or even monthly basis. 9/12/24 PM Tr. 64:14-19 (Goel). But many publishers would not even make that change. They would "just set it and forget it." *Id.* at 65:13-19 (Goel).

82. Prior to Google's acquisition of DoubleClick and its ad exchange, DoubleClick's ad exchange ran its auction using static bids, which bidders entered in advance by specifying the amount they would pay for impressions with certain characteristics. 9/24/24 AM Tr. 51:7-23 (Milgrom); 9/11/24 PM Tr. 24:15-21 (Ravi). In a world based on static bids entered in advance, "there was no notion of real-time bidding." 9/12/24 PM Tr. 65:1-9 (Goel).

83. Even with static bids from the ad exchange, the version of Dynamic Allocation that DoubleClick introduced made publishers more money. A 2010 Google white paper examined the first-generation version of Dynamic Allocation in the DoubleClick Ad Exchange. It concluded that "the combined effects of auction pressure and Dynamic Allocation in DoubleClick Ad Exchange resulted in an average CPM lift of 136% compared with fixed, upfront, pre-negotiated sales of non-guaranteed inventory." DTX-117 at 118; *see also* DTX-80 at 2 (2010 Google white paper); 9/24/24 AM Tr. 51:24-52:5, 57:14-23, 59:8-60:7 (Milgrom). In other words, "as a result of this Dynamic Allocation technology," even without real-time bidding on AdX, "publishers saw 136 percent more money than if they had fulfilled that demand in the way that it used to work before, which was pre-negotiated sales with ad networks." 9/16/24 AM Tr. 79:15-81:4, 81:22-82:13 (Mohan).

84. After it acquired DoubleClick, Google distributed the results of the 2010 study at the Interactive Advertising Bureau's annual flagship conference. Google was excited to share the results because "the core proposition of [its] publisher-side solutions was to help publishers generate more revenue," and from Google's perspective the study was "proof" that publishers

could make more money if they used Dynamic Allocation than if they only sold their remnant inventory through the old waterfall system. 9/16/24 AM Tr. 82:21-84:7 (Mohan). By "showcas[ing] these results," Google hoped to persuade publishers to adopt this new "watershed" technology that could "actually help publishers dramatically make more money." *Id.* at 83:8-84:7 (Mohan).

3. 2008: DoubleClick Acquisition and DoubleClick for Publishers

85. By 2007, Google had identified that it could better serve its customers if it offered a comprehensive publisher ad server. It competed against Microsoft, Yahoo, and AOL to acquire DoubleClick. 9/16/24 AM Tr. 57:10-58:3 (Mohan).

86. Google finalized its acquisition of DoubleClick in 2008 following review by the Federal Trade Commission. With the acquisition, Google acquired DoubleClick's publisher ad server (DoubleClick for Publishers (DFP)) and its nascent ad exchange, AdX. 9/20/24 PM Tr. 54:20-24 (Sheffer).

87. After the acquisition, in order to let publishers using DFP benefit from Google's technology and innovation, Google had to rebuild "from scratch" the core DoubleClick ad serving software into Google's technology stack. That required rebuilding DFP to be compatible with "multiple platforms and capabilities, programming languages," and "various types of integrations with Google technology." 9/16/24 AM Tr. 58:9-59:13 (Mohan).

87.1. Rather than being able to "cut and paste" DoubleClick code onto Google's ad tech stack, Google had to rewrite the code from scratch in order to "take advantage of all that innovation that's happening on those core base-level Google technologies," and to continue to "build ahead of where" DoubleClick "was, because publishers are demanding features and functionality constantly." 9/16/24 AM Tr. 59:14-60:9 (Mohan).

87.2. At the same time that Google was rebuilding the DFP ad server, Google also had to continue to offer and innovate upon DFP's core functionality. "These integrations sometimes can take years," and "you don't want to just be standing still in the market when all of these other competitors are innovating and offering their solutions." 9/16/24 AM Tr. 60:10-23 (Mohan); *see also id.* at 90:6-91:7 (Mohan) ("we had to not just rebuild the core functionality, we had to add new capabilities").

87.3. Neal Mohan, then director of Display Ads product management, analogized the "herculean task" of operating DFP while rebuilding it onto Google's ad tech stack to "changing the engines on a plane while continuing to fly it." 9/16/24 AM Tr. 7:3-10, 62:2-63:17 (Mohan); DTX-37 at 1 (2009 Google email: "We delivered this continuous stream of innovation for our users, advertisers and publishers while successfully integrating two companies and creating a unified display / content organization."); DTX-59 at 2 (2010 Google email analogizing to "rebuild the engine and body from the ground up, all while continue to drive faster and faster").

87.4. In February 2010, Google "launched the new DoubleClick for Publishers (DFP) after two years of hard work with a revamped workflow, better forecasting, new reporting, ad server optimization, etc." DTX-76 at 3 (January 2011 Google email).

87.5. The rebuilt server added dozens of new features to drive revenue for publishers. DTX-76 at 3. For example, in 2011 Google released over seventy-five features, including a full suite of capabilities for not just web banner ads,

but also mobile, video, and other web capabilities. DTX-101 at 2 (January 2012 Google email).

88. At the time, the newly rebuilt DFP enabled publishers to sell inventory through AdX, competitor ad exchanges, competitor ad networks, and AdSense for Content, as well as directly to advertisers through direct deals. 9/20/24 PM Tr. 55:2-9, 56:6-8 (Sheffer).

89. When Google acquired DoubleClick, there were many competitors in the industry, including many that are still competing today such as Yahoo!, Microsoft, Magnite (f/k/a Rubicon), and OpenX. PTX-22 at 11 (2008 Google presentation regarding Google Ad Exchange: "We are behind, but well positioned"). At the time, competitor ad servers could connect to AdSense for Content, competitor ad networks, and directly to advertisers through direct deals. 9/20/24 PM Tr. 55:16-22 (Sheffer).

90. When Google launched the improved version of DFP, it made clear that it was rebuilding a platform solution "for every type of publisher," large or small, with digital content in websites or app or video. As Neal Mohan wrote in his annual email summarizing the accomplishments of Google's display ads business in 2010 and presenting goals for 2011:

90.1. Google wanted to "[p]rovide the first multi-format exchange that supports not only traditional online display formats, but provides comprehensive support for in-stream video, expandable and mobile formats." DTX-76 at 8.

90.2. "By providing the most comprehensive enterprise class revenue generation solution for large publishers and a turn-key, no worries solution for torso and small publishers, we will continue to deliver on this promise in 2011." DTX-76 at 5.

91. Google incorporated DoubleClick's existing Dynamic Allocation into its relaunched publisher tools, generating significantly more revenue for publishers than they were able to attain under the old waterfall system. DTX-80 at 2 (2010 Google white paper).

92. Dynamic Allocation was a "good feature" that increased revenue for publishers and made it easier for targeted ads to be delivered. According to Plaintiffs' witness Brian Boland, Dynamic Allocation was so effective that he believed in 2010 that "it would be devastating for Microsoft." 9/13/24 PM Tr. 139:17-19 (Boland).

93. Other ad tech competitors developed features analogous to Dynamic Allocation, recognizing that it generated more revenue for publishers compared to the waterfall. For example, AppNexus offered a dynamic allocation feature as part of its publisher ad server suite. DTX-1487 at 18-20 (AppNexus presentation showing AppNexus' dynamic allocation feature increased publisher revenue by 20% compared to the waterfall).

94. Google has continued to innovate on DFP since first rebuilding it after the DoubleClick acquisition, *infra* ¶¶ 190, 209, and still offers it today as a publisher ad serving functionality. There are two versions of DFP that publishers can use: an enterprise version with all the bells and whistles that are the focus of Plaintiffs' allegations, and a version called DFP Small Business. 9/16/24 AM Tr. 94:2-14 (Mohan).

95. Only a tiny percentage of publishers ("on the order of hundreds, maybe low thousands" out of millions of Google publisher customers) use the enterprise version of DFP. 9/16/24 AM Tr. 94:5-14 (Mohan); 9/23/24 AM Tr. 21:9-18 (Korula).

96. Publishers that use the enterprise version pay very low ad serving fees, which are a fixed cost per impression served, and typically on the order of less than a penny for one thousand impressions. 9/20/24 PM Tr. 79:13-22 (Sheffer). For comparison, the publisher could make "at

least $5 or $10" for the direct sale of those thousand impressions. *Id.* (Sheffer). In addition, Google offers customers fee waivers or heavy discounts on DFP ad serving fees. *E.g.*, DTX-1169 at 1-2 (2021 proposal by Google to waive ad serving fees and offer performance bonuses to entice a publisher to sell inventory through DFP).

97. Most Google publishers—at least 16,000 publisher customers—that use DFP use a version of DFP called DFP Small Business that has serviced publishers since 2011. DTX-76 at 3; DTX-101 at 2. Plaintiffs ignore DFP Small Business.

97.1. DFP Small Business is an ad server similar to the flagship DFP product, but it is simpler and has less functionality. 9/16/24 AM Tr. 91:25-92:19 (Mohan). DFP Small Business enables small businesses to manage their inventory if they want to use direct sales to serve some ads. 9/20/24 PM Tr. 80:1-9 (Sheffer).

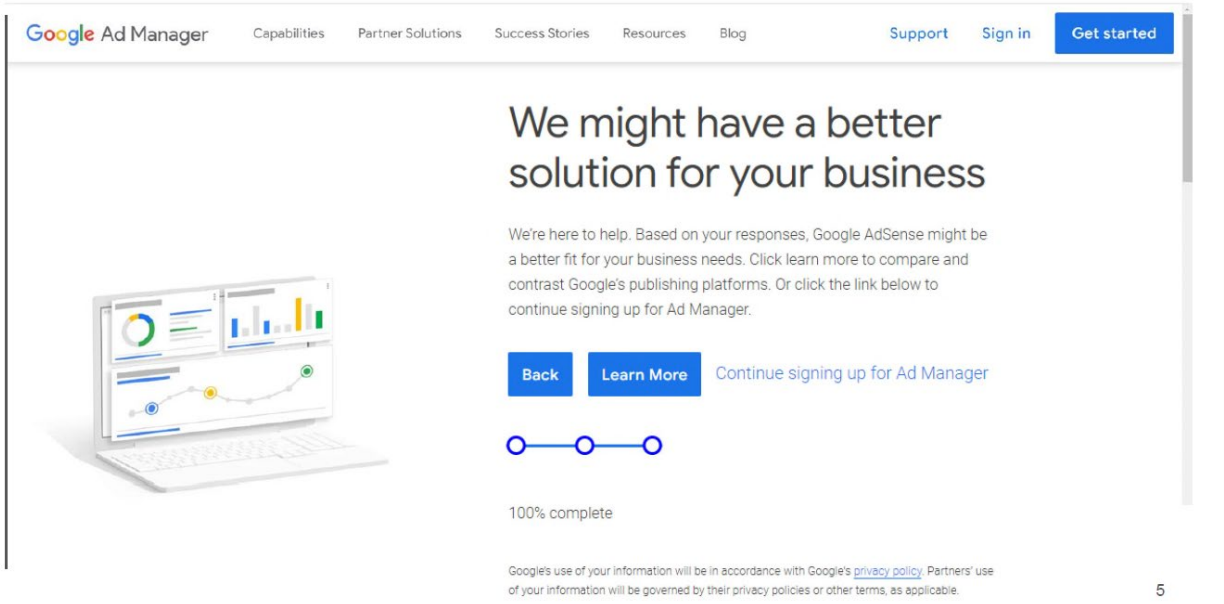
97.2. Any publisher can sign up for DFP Small Business for free. 9/20/24 PM Tr. 79:13-22, 80:10-15 (Sheffer).

98. For publishers who use DFP Small Business, Google does not charge any ad serving fees for the first 90 million non-video impressions and 800,000 video impressions in a month. 9/23/24 AM Tr. 21:22-22:1 (Korula); 9/20/24 PM Tr. 79:13-80:9 (Sheffer); 9/16/24 AM Tr. 92:20-23 (Mohan); *see also* 9/25/24 PM Tr. 164:19-25 (Hochberger) (Mediavine used DFP's "small business product that was free" until its publisher business "outgrew the free impression tier"). "No other vendor offers such a deal." 9/9/24 PM Tr. at 161:7-162:20 (Avery).

99. In 2022, over 86% of DFP publisher customers in the United States paid **zero** ad serving fees. DTX-1954; 9/26/24 AM Tr. 119:1-16 (Israel).

100. As Avery, who runs a competitor publisher ad server business testified, DFP has been widely adopted because it is "a deal" for small to medium publishers. 9/9/24 PM Tr. 161:19-22 (Avery). In addition, Kevel represents to its customers that publishers adopt DFP because it makes them more money and because it is "reliable from both an infrastructure and business perspective." 9/9/24 Tr. 161:7-162:20 (Avery).

101. For some publishers, including website-only publishers who do not need to manage a significant number of direct deals, Google suggests in the sign-up process for DFP (both the enterprise version and DFP Small Business) that they might find AdSense to be "a better solution" for their needs. 9/23/24 AM Tr. 25:8-26:4 (Korula). In other words, AdSense is the "better solution" for many of the web-only publishers that Plaintiffs' claims are focused on and connects directly to Google Ads, yet Plaintiffs exclude AdSense from their alleged markets. *Supra* ¶ 47.



Korula DX 1.5

102. While thousands of publishers use DFP and DFP Small Business, over a million publishers worldwide use one of Google's other inventory management tools, AdSense. 9/16/24 AM Tr. 93:18-21 (Mohan); *see also* 9/20/24 PM Tr. 84:9-13 (Sheffer). It is "very common" for

those publishers to use AdSense without any publisher ad server, including without DFP or DFP Small Business. 9/23/24 AM Tr. 15:12-14 (Korula).

D. 2009: Google Launched a Rebuilt Ad Exchange, AdX, with the Innovation of Real-Time Bidding.

103. When Google acquired DoubleClick, DoubleClick also had a nascent ad exchange. 9/16/24 AM Tr. 14:21-15:1 (Mohan).

104. After the acquisition, Google continued to operate the DoubleClick ad exchange it had acquired while also rebuilding the new Google version of the ad exchange—called AdX. In 2009, Google launched the rebuilt ad exchange on Google's ad tech stack. Google made two major improvements.

105. The first was integrating the ad exchange with Google's ad network customers on AdSense and Google Ads (with attendant functionality improvements). DTX-37 at 3 (January 2009 Google email); 9/16/24 AM Tr. 70:8-10 (Mohan); 9/11/24 PM Tr. 24:15-21 (Ravi); 9/20/24 PM Tr. 57:15-25 (Sheffer).

105.1. It took more than a year for Google to launch AdX because Google "needed to continue to offer the existing DoubleClick solutions in the market, so that we wouldn't lose out to our competitors while rebuilding" the technology on Google's stack. 9/16/24 AM Tr. 70:11-71:4 (Mohan).

105.2. Google "rebuilt the core yield management functionality of the nascent DoubleClick ad exchange" and "continued to innovate" at the same time that it was building the new ad exchange. 9/16/24 AM Tr. 69:13-70:6 (Mohan); DTX-59 at 3 (2010 Google email: "Deliver on our vision of building the best ad yield management platform for publishers").

105.3. As documented in a January 2010 email, Google's expectation was that AdX would be a significant step forward for display advertising: "Ad Exchange (AdX) will transform the display advertising industry by making it more open, transparent, fair and effective for everyone from ad networks to agency holding companies to large publishers." DTX-59 at 2; *see also* 9/16/24 AM Tr. 71:18-72:3 (Mohan) ("I really felt that it would really be a win-win for all the parties, publishers, as well as advertisers, and also for our business, but really be revolutionary in the space because it would do things that would solve a lot of the real challenges that the display advertising industry was facing at the time.").

106. Investing in rebuilding and improving AdX was important to Google because it would grow "the three pillars" of Google's business—"the ad network, ad exchange and platform"—"through the launch of dozens and dozens of new products, major upgrades and feature enhancements." DTX-37 at 1 (January 2009 Google email).

107. Google's three-pillared strategy recognized that, in order to provide the best offerings to publishers and advertisers, Google "needed new products and new capabilities," and "needed to upgrade our existing products that were already in market" because "our competitors were trying to do the same thing, and we needed to do all of this at a very rigorous pace to remain competitive in the market." 9/16/24 AM Tr. 64:2-16 (Mohan).

108. Google was not alone in pursuing a three-pillared strategy of offering an ad network, exchange, and publisher platform. Yahoo!, Microsoft, AOL, and OpenX all competed with similar strategies.

108.1. A Google document from 2009 noted: "Our competitors have essentially the same three-pillared strategy (platform, AdX, network) strategy as we do and have realized that the most strategic battle is about the publisher platform and so are focusing on it pretty aggressively (Yahoo APT, MSFT Pub Center, AOL Platform A are basically their DFP and AdX competitors)." PTX-41 at -005.

108.2. Another 2009 document added: "OpenX is the only relatively smaller player to offer the same three-pillared approach to the display market as us, Yahoo, MSFT, AOL—platform, exchange and network." PTX-44 at -913; 9/16/24 AM Tr. 67:24-68:11 (Mohan).

1. Google Innovated Real-Time Bidding and Added It to the Rebuilt Ad Exchange.

109. Google's second major innovation to the DoubleClick ad exchange was the addition of real-time bidding. The nascent ad exchange that Google acquired from DoubleClick did not have real-time bidding functionality and was run based on static bids. 9/16/24 AM Tr. 69:4-12 (Mohan).

110. Real-time bidding was one of the "really core innovations" Google added to AdX. 9/16/24 AM Tr. 69:13-70:6 (Mohan). Real-time bidding is a protocol that lets advertisers and publishers communicate in an auction for an ad impression that runs in a fraction of a second after the user who will view the ad has created an impression. 9/12/24 PM Tr. 68:2-5 (Goel).

111. Around the same time in 2009, a handful of other ad tech companies, including PubMatic, also developed real-time bidding. 9/11/24 PM Tr. 24:15-21, 25:6-14 (Ravi); 9/12/24 PM Tr. 68:6-10 (Goel). Real-time bidding was a significant advance in the display advertising

landscape because it solved some of the inefficiencies of the waterfall. 9/12/24 PM Tr. 68:15-22 (Goel).

111.1. Real-time bidding was an improvement over static bids because buyers were able to use information about the user viewing the impression to bid with "more information about each ad opportunity." 9/24/24 AM Tr. 61:15-25 (Milgrom).

111.2. Using this real-time information, advertisers were able to predict more accurately the most effective ad opportunities for their particular product and "get many more clicks per dollar by just buying the ad opportunities for the most interested users." 9/24/24 AM Tr. 62:8-63:5 (Milgrom). As a result, advertiser ROI increased, which also translated "into a higher yield for publishers." 9/16/24 AM Tr. 69:13-70:6 (Mohan).

111.3. Real-time bidding thus made auctions more efficient—and likely to generate higher value for publishers—by promoting competition among advertisers for a particular impression. 9/9/24 AM Tr. 73:22-25 (Wolfe); 9/24/24 AM Tr. 61:15-25 (Milgrom).

112. With real-time bidding, AdX would run an auction and, if there was a bid that beat the floor price, deliver the winning ad back to the publisher. Notably, contrary to Plaintiffs' suggestion that AdX has always exclusively provided real-time bid amounts to DFP, since its launch AdX did not inform any publisher ad server—**including DFP**—of the "winning amount of the bid" (i.e., the amount of the real-time bid for the winning bidder) in real time. 9/18/24 AM Tr. 18:25-19:12 (Spencer).

113. At the time that Google launched the rebuilt AdX, the real-time bidding protocols offered by both Google and other innovators like PubMatic were proprietary. It was only several years later that companies started to release their real-time bidding protocols as open-source computer code. 9/12/24 PM Tr. 69:16-21 (Goel).

114. Within a year of its launch, AdX went from "transacting $50K in media per day," with "only 50 buyers and no agency" doing significant spending, to "$1mm days," with "hundreds of buyers and sellers including many of the largest on the internet." DTX-76 at 1, 3 (January 2011 Google email).

115. AdX was "recognized internally and externally as fulfilling the promise of transforming the display industry by making it more open, transparent, fair and effective for everyone. AdWeek recognized AdX as one of the Top 10 innovations of 2010 along with Facebook, Twitter, Foursquare, etc." DTX-76 at 3 (January 2011 Google email); 9/16/24 AM Tr. 86:3-87:6 (Mohan).

116. Following the launch of AdX, Google continued to innovate on the real-time bidding functionality it introduced. "In 2010, not only did we keep pace with this trajectory, we accelerated it with nearly 100 product launches, increasing our presence to most geographies and developing solutions for all advertisers and publishers – large and small." DTX-76 at 1. The "constant stream of innovation" included "numerous RTB [real-time bidding] enhancements, publisher controls like category blocking and ad review toolbar, better targeting, rich media / expandable ads support, private ad slots, etc." DTX-76 at 3.

2. The Integration of AdX and DFP Benefited Publishers.

117. The introduction of real-time bidding in AdX helped publishers make even more money when paired with Dynamic Allocation in DFP. 9/23/24 AM Tr. 54:11-55:3 (Korula).

118. When paired with AdX, Dynamic Allocation allowed sellers to determine in real-time, for a particular remnant impression, whether there were AdX buyers willing to pay a higher price than what the seller expected that other demand sources in the waterfall would pay. If AdX buyers beat the highest expected price from other sources, the highest-bidding AdX buyer would win. 9/11/24 AM Tr. 96:9-14 (Ravi); 9/24/24 AM Tr. 62:13-63:5 (Milgrom).

119. The combination of Dynamic Allocation with AdX increased yield for publishers even more than Dynamic Allocation did based on static bids. DTX-80 at 2 (one study finding the combination led to a 188% increase in revenue, on average, when AdX won the auction); 9/24/24 AM Tr. 61:15-62:5 (Milgrom).

120. Today, the functionalities of DFP and AdX can be accessed from a single streamlined user interface, referred to as Google Ad Manager, that offers publishers additional benefits when the two are used together. 9/20/24 PM Tr. 60:6-15 (Sheffer); *infra* ¶¶ 868-869.

121. Google's decision to integrate the DFP and AdX functionalities into one user interface, Google Ad Manager, was made in response to feedback from publishers that they preferred a single interface to manage direct and indirect sales. 9/20/24 PM Tr. 60:6-15 (Sheffer); DTX-308 at 16 (2016 Google presentation). The integration provided publishers, among other things, "one screen," or a single user interface "to make it easier for pubs to use AdX and DFP together." DTX-308 at 5, 16.

121.1. As written in a 2014 Google internal email announcing the plan for Google Ad Manager, "On the publisher side, we have two great products—DFP and AdX—but our customers are asking us for a more unified offering." DTX-211 at 3. For example, News Corp stated that it would agree to continue with Google only if it implemented a "feature request" to create "Seamless

Functionality between DFP and AdX." 9/10/24 AM Tr. 74:18-75:11 (Layser); DTX-404 at 12.

121.2. The results of a Google publisher survey about whether to combine the functionalities showed that "publishers want the option to see their data together." DTX-213 at 26. In addition, publishers reported that the combination would save time, increase convenience, increase productivity, and eliminate discrepancies. DTX-213 at 26.

121.3. An "integrated solution" would allow Google to "bring more DFP inventory into our auction, maximizing yield" for publishers; allow customers to "execute all deal types" "as efficiently as programmatic"; and streamline the user interface and inventory management so that Google teams would have more "time to focus on strategic bets." DTX-211 at 3 (2014 mid-year check-in Google email).

122. Though the functionalities of DFP and AdX have been integrated into one user interface, publishers can still use DFP without AdX, or use AdX without DFP. *Infra* ¶¶ 871-878.

3. Google Kept the AdX Revenue Share Percentage the Same After the DoubleClick Acquisition and Until Today, Even As Google Has Continuously Invested in Improving AdX.

123. Since it was first created by DoubleClick, AdX has used a revenue share model. The revenue share is a percentage of the price that an advertiser pays when it wins an impression and is taken out before the publisher receives its payout. The "baseline" revenue share that AdX charges for auctions of remnant inventory that are available to all the buyers on the exchange ("open auctions") is 20 percent for Google and 80 percent for the publisher. 9/20/24 PM Tr. 56:18-57:5 (Sheffer).

124. When Google first acquired and relaunched AdX, it adopted the previously charged DoubleClick revenue share because 20 percent "was a market rate" that Google "thought was appropriate." 9/20/24 PM Tr. 56:1-57:14 (Sheffer). Google maintained that price even though Google had added the significant innovation of real-time bidding to DoubleClick's nascent ad exchange and connected the ad exchange to Google's advertiser and publisher customers. *Supra* ¶¶ 109-116.

125. Since the acquisition, Google has not changed the base 20% revenue share for AdX, which remains the same today. 9/20/24 PM Tr. 56:18-57:14 (Sheffer).

126. Some publishers negotiate even lower revenue shares for AdX. For example, Hearst negotiated a 15% revenue share for open auctions on AdX. PTX-453 at -192 (2017 Google email: "With Hearst's 15% revenue share in the Open Auction, if an AdX buyer spends $1 on an impression in the Open Auction, Hearst receives 85 cents.").

127. Even though the revenue share for AdX has stayed the same, Google has made numerous innovations to AdX and invested to improve the quality of inventory available. 9/20/24 PM Tr. 56:18-57:14 (Sheffer); 9/23/24 AM Tr. 77:7-9; 83:18-21, 92:17-19 (Korula) (Google did not charge publishers for innovations such as Enhanced Dynamic Allocation, Dynamic Revenue Share, and Reserve Price Optimization).

128. Plaintiffs' expert Professor Simcoe agreed that "a key dimension of quality for ad exchanges is the installed base of buyers and sellers to which they connect." 9/19/24 AM Tr. 31:19-32:9 (Simcoe). Google has continuously worked to grow the "installed base" of advertisers connected to AdX. In addition to connecting AdX to its buying tools, Google has an exchange platforms team dedicated to convincing the operators of major buying tools to purchase on AdX. 9/20/24 PM Tr. 81:3-82:1 (Sheffer). Today, there are hundreds of Authorized Buyers on Google's

AdX—all of whom are non-Google ad networks and demand-side platforms that compete with Google—that participate in the AdX auction. 9/23/24 AM Tr. 32:19-33:2 (Korula); *e.g.*, 9/11/24 PM Tr. 89:7-8 (Dederick) ("Q. Does The Trade Desk bid into Google's ad exchange, AdX? A. Yes.").

129. Professor Simcoe identified as another quality differentiator of exchanges "detecting and filtering spam, malware, and fraud." 9/19/24 AM Tr. 11:24-12:16 (Simcoe). Since AdX's launch, Google has vetted both advertiser and publisher customers of AdX to filter out bad actors before they join Google's network. For example, publishers selling on AdX have always been required to comply with Google's policies against duplicate or fraudulent accounts, fraudulent inventory or false clicks, and harmful content. 9/16/24 AM Tr. 76:1-15, 77:18-24 (Mohan); 9/23/24 AM Tr. 20:5-22 (Korula).

130. Since the relaunch of AdX, Google has continuously invested in spam, malware, and fraud protections for both advertiser and publisher customers, and those investments are baked into Google's revenue share. *Infra* ¶¶ 1126-1132; 9/25/24 PM Tr. 130:21-131:8 (Borgia) (Google continues to invest "billions of dollars" in AdSafety); 9/18/24 AM Tr. 209:5-12 (Pappu) ("There were many publisher features built in the exchange from protecting against malware, bad JavaScript."); *id.* at 209:16-19 (Pappu).

E. After 2009: Supply-Side Platforms Moved Away from Yield Management Technology in Favor of Real-Time Bidding.

131. Around the same time exchanges first gained traction, publishers also relied on supply-side platforms ("SSPs") to make their inventory available for ad placements. 9/10/24 PM Tr. 28:8-21 (Friedman).

132. One type of supply-side platform that emerged around 2009 was network yield managers such as Admeld, PubMatic, and Rubicon. These tools tried "to provide the best yield to

publishers from ad networks," just like AdX, but with "some key differences," including that they did not have Dynamic Allocation or run real-time auctions. DTX-45 at 1-2 (2009 Google email).

133. A key limitation to these traditional yield managers was that they made decisions based on historical data, which is "like trying to manage yield with imperfect information." DTX-45 at 2; 9/16/24 AM Tr. 96:4-99:9 (Mohan) (network yield managers relied on a "static evaluation process that was existing before"); PTX-44 at -913 (2009 Google email identifying as limitations of Admeld, Rubicon, and PubMatic "No true dynamic allocation," "No integration with buy-side platform," "No Real-time Bidder, No Ad Quality controls, No Inventory Quality controls"). One of the major yield managers, for example, improved on static bids by pulling pricing information "on a much more frequent basis" so that the static waterfall would be sequenced based on relatively recent information—but not real-time information. 9/12/24 PM Tr. 64:25-65:9 (Goel).

134. Notwithstanding these limitations, network yield managers were "getting traction and positioning themselves as an alternative to exchanges" because publishers were reluctant to give up their existing ad network relationships. DTX-45 at 2 (2009 Google email); 9/16/24 AM Tr. 99:10-101:3 (Mohan) (moving from network yield management to real-time bidding required publishers to take a "big leap of faith," which some publishers were more cautious about).

135. Starting from 2008 onward, Google had already invested in real-time bidding instead of traditional network yield management because, at the time, Google believed real-time bidding was where "the industry was going." 9/16/24 AM Tr. 101:4-20 (Mohan).

136. When publishers took longer than expected to transition to real-time bidding and Dynamic Allocation, Google recognized that its publisher customers still had a "pressing need" for traditional "ad network management for non-RTB deals." PTX-112 at -979 (March 2011 Google presentation); 9/16/24 AM Tr. 105:2-25 (Mohan) ("it was becoming clear at the time that

while we felt that we had the solution that was the way forward and ultimately generated more money for publishers—they wanted to get there maybe in baby steps and wanted to hold onto this older type of technology, and that's where the yield managers were getting some traction").

137. In order to provide network yield management for its publisher customers as quickly as possible, Google acquired Admeld in 2011. PTX-112 at -975, -979 (2011 Google document describing Admeld integration); 9/16/24 AM Tr. 44:13-20, 107:7-24 (Mohan). Google integrated key Admeld features into Google's tools, including Admeld's network yield management function, and incorporated Admeld's "talented engineering, service, and sales team" into Google's business so that they could continue to support publisher customers. PTX-112 at -979; DTX-126 at 10, 13; 9/16/24 AM Tr. 108:23-109:17, 112:14-113:24 (Mohan); *infra* ¶¶ 1001-1002.

138. Over time, Google's prediction proved correct: supply-side platforms like PubMatic also built their own real-time bidding functionality and shifted their focus away from optimizing among ad networks in the "waterfall" to real-time bidding. *E.g.*, 9/12/24 PM Tr. 68:1-10 (Goel). Today, the term "supply-side platform" has become synonymous with "ad exchange." 9/11/24 PM Tr. 88:14-89:2 (Dederick) ("Demand-side platforms plug into ad exchanges, supply-side platforms, which have really merged into being the same tools, typically."); 9/9/24 AM Tr. 67:8-18 (Wolfe); 9/10/24 PM Tr. 28:22-25 (Friedman); 9/12/24 AM Tr. 19:15-18 (Srinivasan).

F. After 2009: Proliferation of Ad Exchanges with Real-Time Bidding Leads to the Emergence of Demand-Side Platforms.

139. With the proliferation of ad exchanges, demand-side platforms also emerged. 9/11/24 PM Tr. 88:14-89:2 (Dederick). Demand-side platforms help advertisers manage buying across multiple channels, including across exchanges and supply-side platforms, direct deals, and

other means of reaching publishers. 9/11/24 PM Tr. 87:21-88:3 (Dederick); 9/20/24 PM Tr. 58:1-17 (Sheffer).

140. From the beginning of Google Ads, the value proposition of Google Ads has been to offer advertisers the ability to buy from higher quality publishers who have been vetted by Google. 9/19/24 PM Tr. 33:20-35:2 (Kim) (Google Ads advertisers "only buying through Google-owned exchanges or Google-owned channels" are protected from "low-quality spam traffic. . . and spammy publishers").

141. In 2010, Google acquired Invite Media, a buying tool that provided advertisers with a centralized place to manage their bidding across ad exchanges and access both the Google network and "all inventory sources" outside of the Google network. DTX-76 at 4 (2011 Google email). This tool became known as DoubleClick Bid Manager (or DBM), and was renamed DV360 in 2018.[5] 9/12/24 PM Tr. 68:23-69:15 (Goel).

142. DV360's value proposition for advertisers is to provide customers with expanded access to inventory outside of the Google network. 9/11/24 AM Tr. 27:13-18 (Bender) ("a conduit for advertisers"). Google thus markets DV360 for "its integration with third-party exchanges," 9/25/24 PM Tr. 85:7-10 (Stewart)," which enables "buying efficiencies across channels and formats" because advertisers have "broad access" to inventory, DTX-1514 at 47, 50.

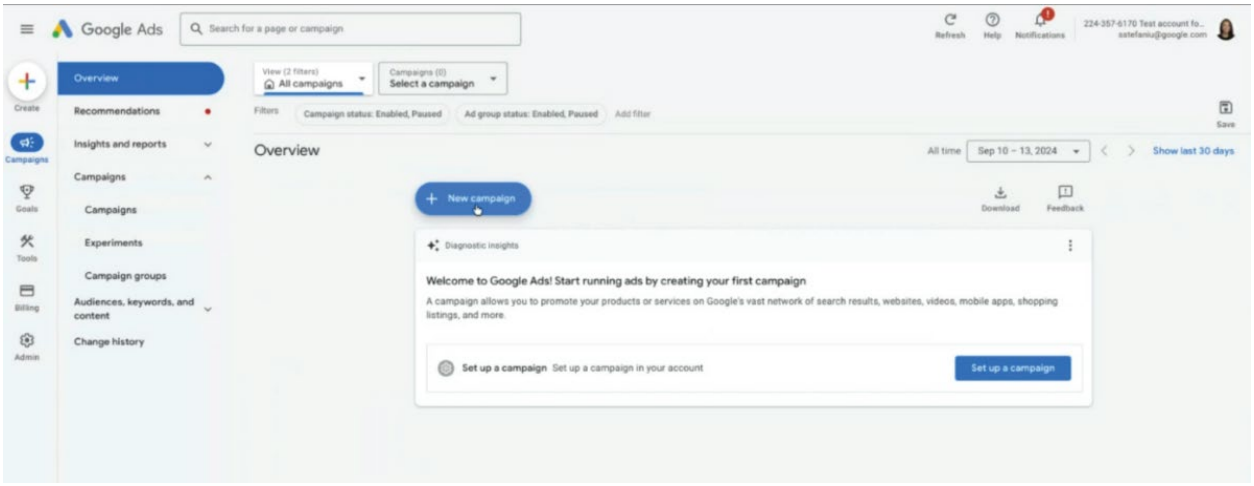
143. At the same time, since it was acquired, DV360 has had no special relationship with all of the third-party inventory sources it connects to, which means it cannot ensure inventory quality to the degree that Google Ads can. There was "an understanding there that if something fraudulent or spammy happens" when using DV360, "the onus would be on the advertiser." 9/11/24 AM Tr. 27:13-18 (Bender).

[5] For consistency, we refer to this product as "DV360" throughout.

144. Today, advertisers can use DV360 to purchase ads in a variety of formats and channels, including banner, native, and video ads that appear on websites, apps, and Connected TV, on over one hundred inventory sources. 9/9/24 PM Tr. 106:7-19 (Lowcock); 9/23/24 PM Tr. 43:5-7 (Stefaniu).

144.1. As one example, the U.S. Census Bureau uses DV360 to purchase various ad formats including display, video, and audio ads. 9/23/24 PM Tr. 97:10-18 (Oliphant). DV360 helped the 2020 Census advertising campaign reach roughly 65% of the U.S. population an average of over four times per person. DTX-903 at 1 (2020 Census presentation).

145. DV360 and Google Ads offer similar user interfaces that enable advertisers to easily start a campaign and select the inventory they want to purchase. The Google Ads, Stefaniu DX 1.1, and DV360, Stefaniu DX 1.20, interfaces to start an advertising campaign share many similarities. 9/23/24 PM Tr. 40:10-17 (Stefaniu).



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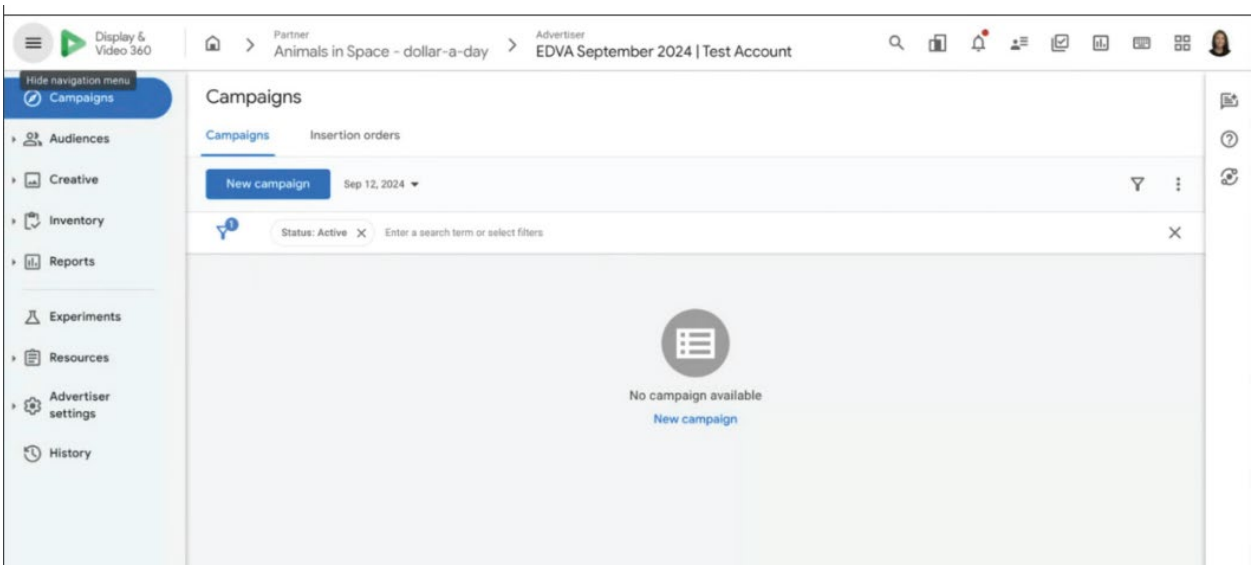
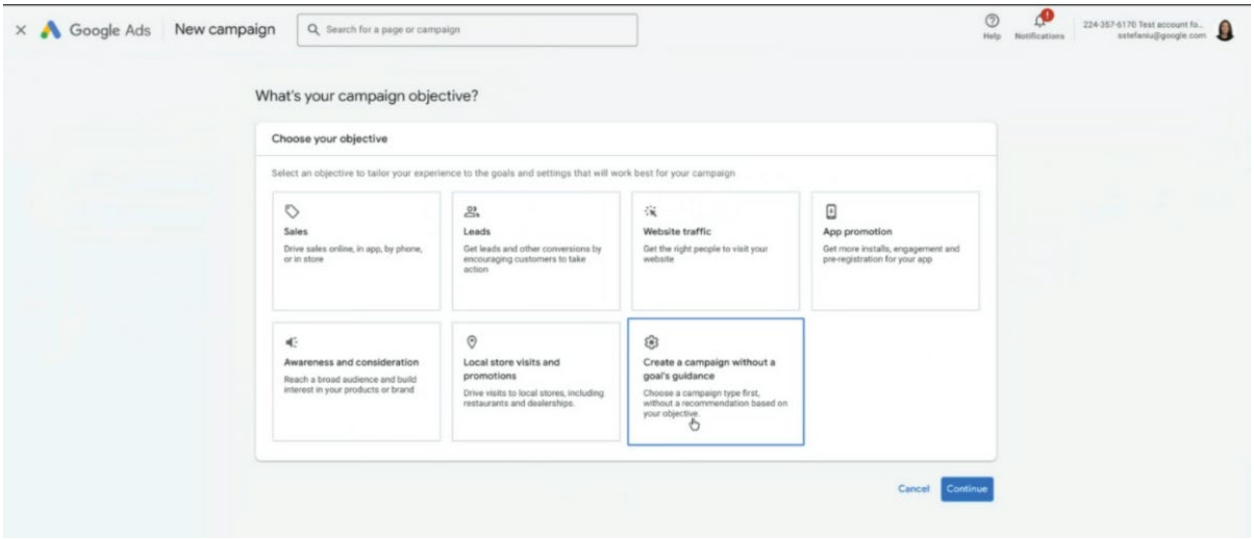
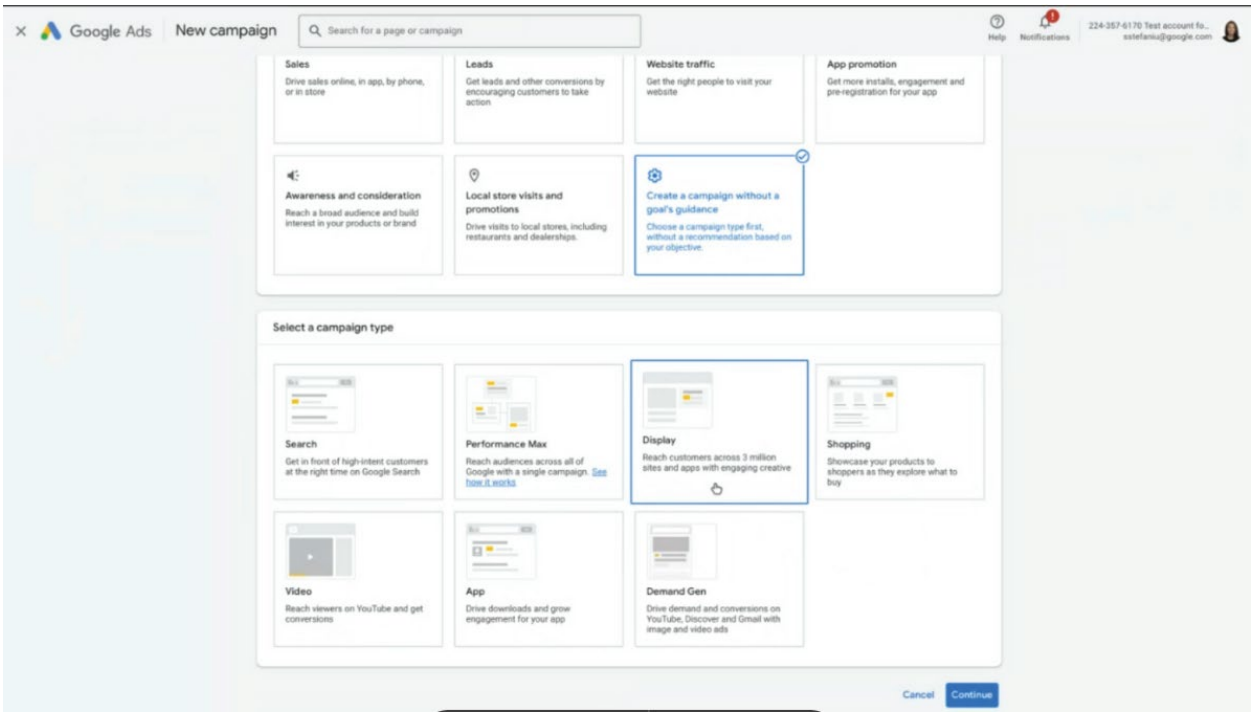
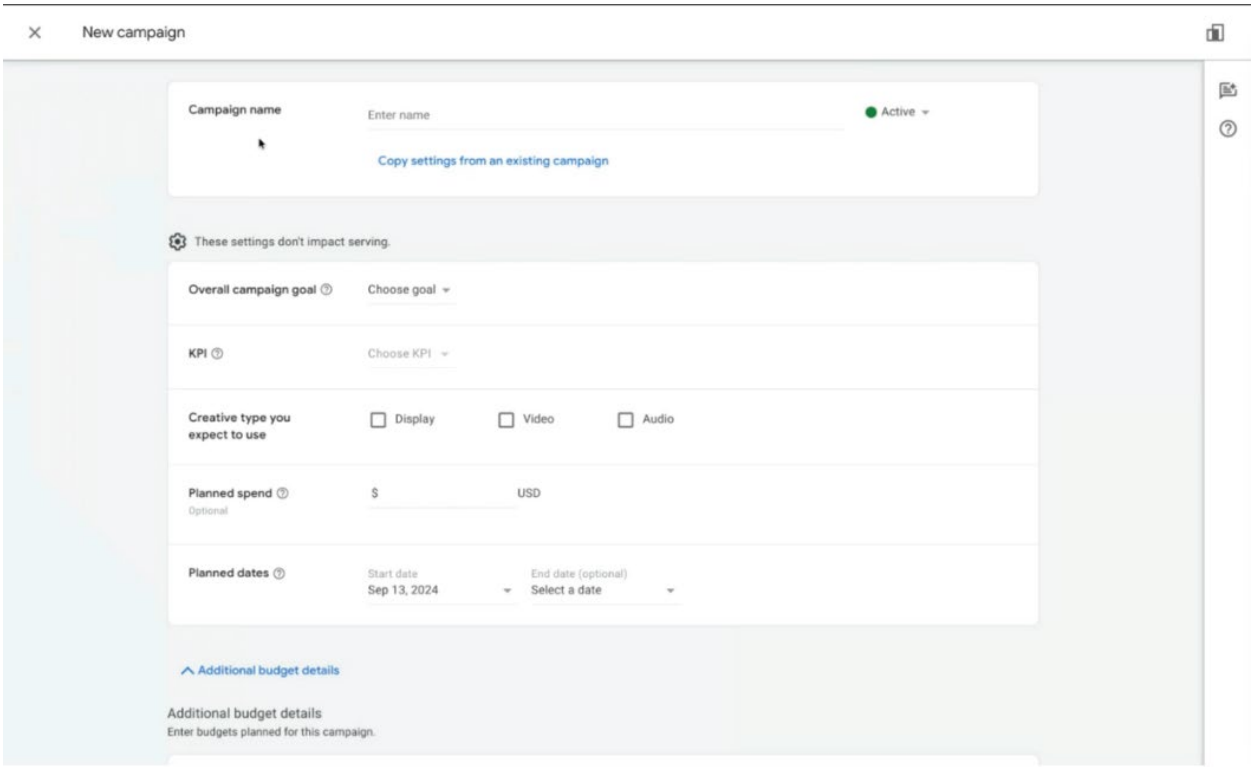


146. After an advertiser starts a campaign, in both Google Ads and DV360 the advertiser proceeds to campaign settings pages that ask the advertiser to select a campaign goal and creative types (display, video, and audio). The Google Ads, Stefaniu DX 1.2-1.3, and DV360, Stefaniu DX 1.21, interfaces for this step bear many similarities as well. 9/23/24 PM Tr. 40:18-41:24 (Stefaniu).



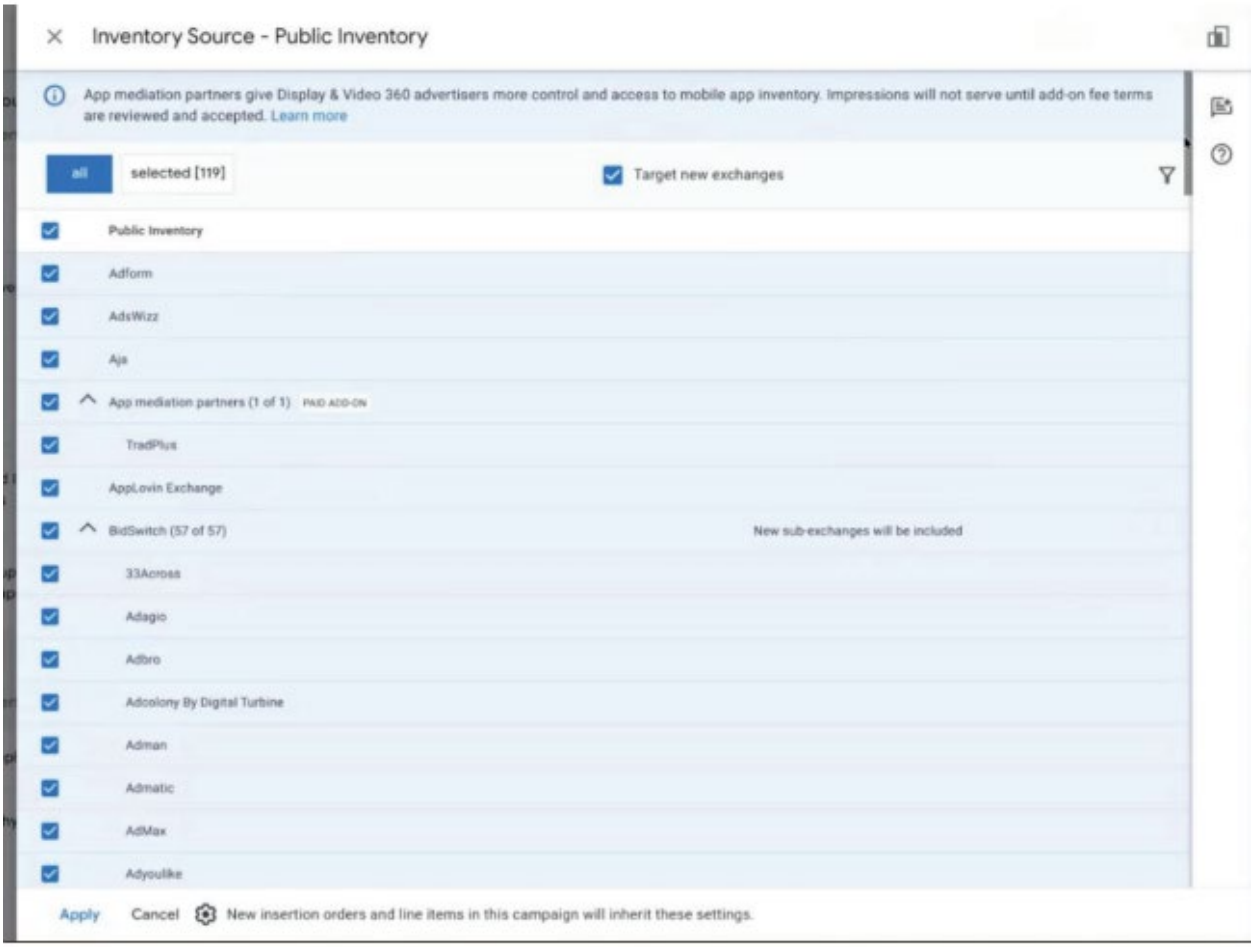




147. After a DV360 advertiser starts a campaign and sets campaign criteria, it can select whether to purchase from many inventory sources, including Google's ad exchange AdX and over

100 rival exchanges such as Index Exchange, OpenX, Magnite, PubMatic, and others. Stefaniu DX 1.25-1.26; Stefaniu DX 2 9/23/24 PM Tr. 44:21-45:25 (Stefaniu). DV360 advertisers can also buy from Google's owned and operated properties, such as YouTube. 9/23/24 PM Tr. 128:16-21 (Hardie).

148. As depicted below, Stefaniu DX 1.25, using checkboxes a DV360 advertiser can use checkboxes to select as many (all) or as few (only one) of the inventory sources as it would like, and can choose to select or deselect any of the sources. 9/23/24 PM Tr. 44:11-20 (Stefaniu). For example, an advertiser can choose to select every inventory source and unselect Google's ad exchange. *Id.* at 46:1-4 (Stefaniu). An advertiser can also purchase by bidding in auctions or by making automated direct deals with publishers. *Id.* at 49:13-17 (Stefaniu).



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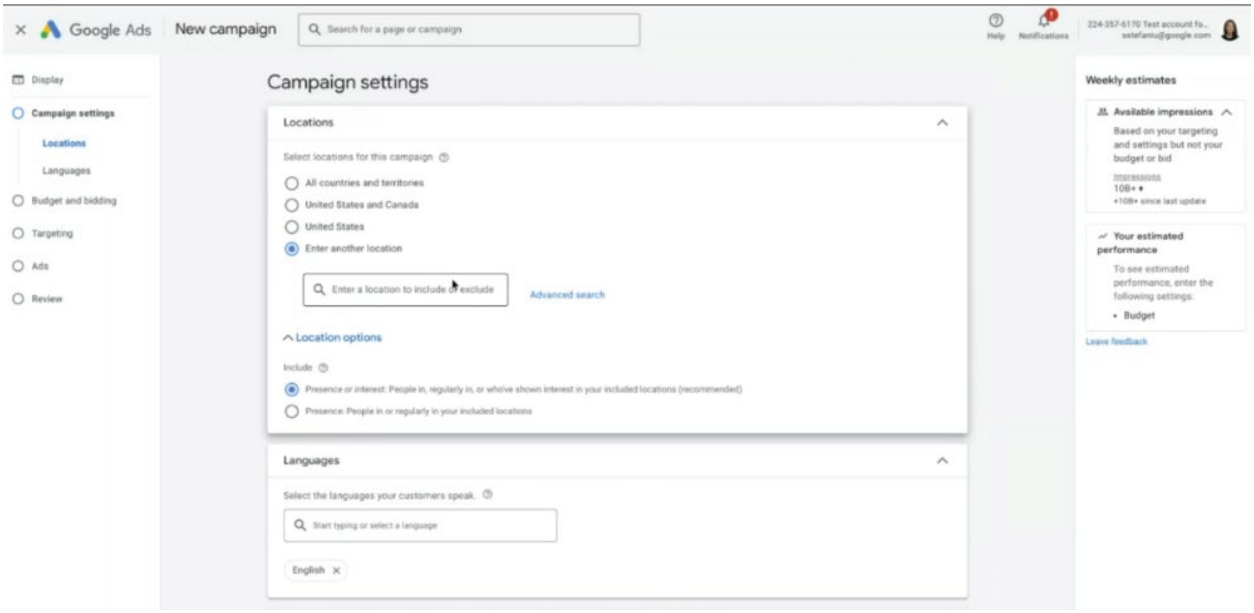
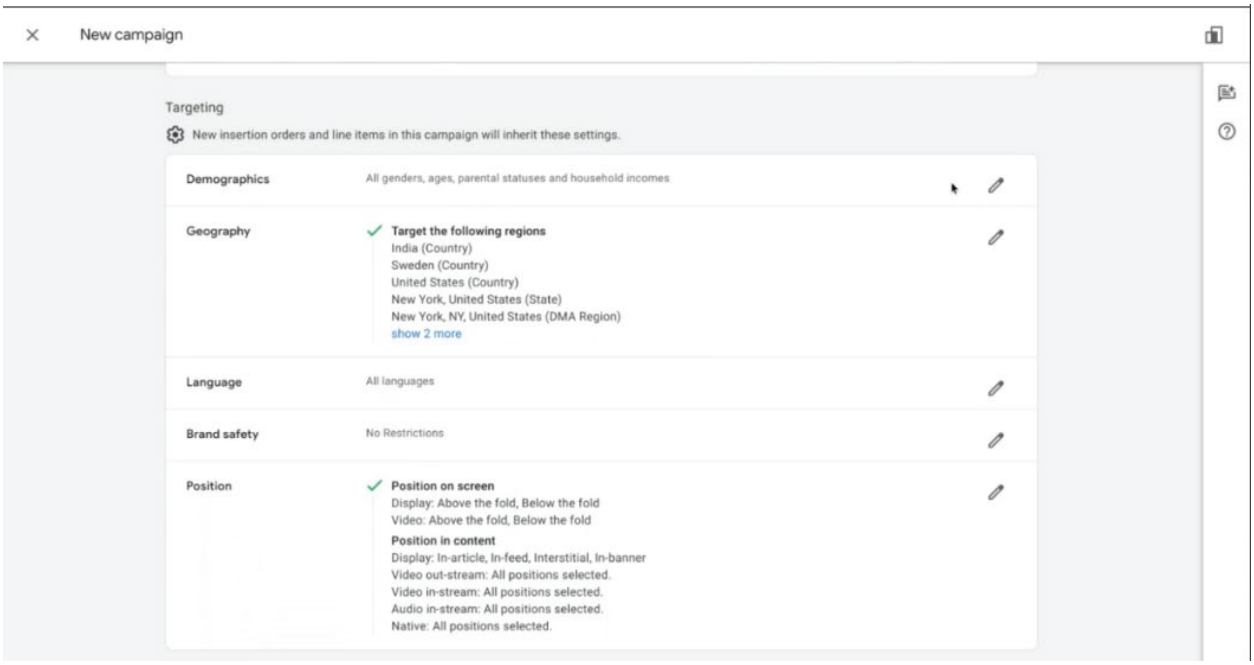
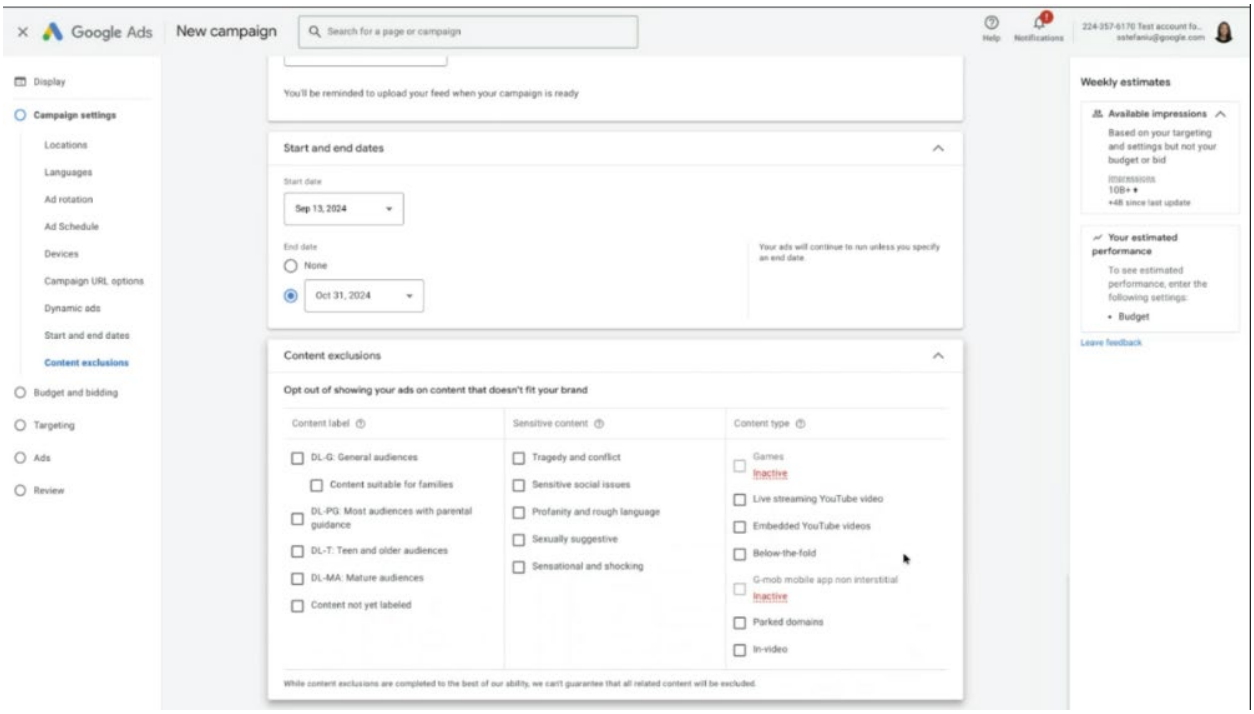
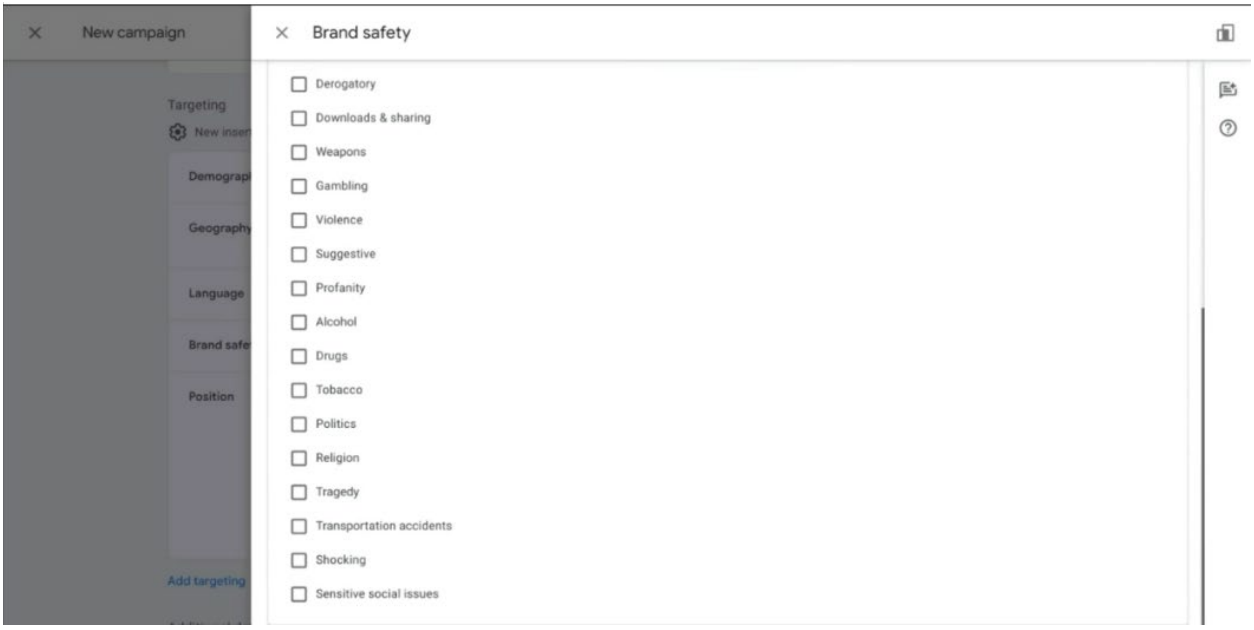
149. After selecting inventory sources, similar to in Google Ads, Stefaniu DX 1.4, a DV360 advertiser, Stefaniu DX 1.27, can easily select criteria for the users it is targeting for a given campaign, including demographic characteristics, geographic location, and language. 9/23/24 PM Tr. 46:5-47:11 (Stefaniu).





150. Both Google Ads, Stefaniu DX 1.8, and DV360, Stefaniu DX 1.28, interfaces also enable advertisers to use similar interfaces to set brand safety criteria that filter for topics like profanity, "shocking content," and sensitive social issues. 9/23/24 PM Tr. 47:13-48:2 (Stefaniu).





151. After these selections, an advertiser can use DV360 to manually set budget goals and bidding settings in a similar way that it would in Google Ads. Just like Google Ads, DV360

also gives newer, less sophisticated advertiser customers the option for Google to automate budgeting or bidding. 9/23/24 PM Tr. 49:5-12 (Stefaniu); *see also id.* at 27:12-29:8 (Stefaniu) (describing options available on Google Ads); Stefaniu DX 1.9-1.10.

152. In addition to sharing similar user interfaces, today Google Ads and DV360 also offer advertisers many of the same campaign types and features. Google has taken affirmative steps to move towards "unification" on the feature offerings of DV360 and Google Ads. PTX-417 at -757 (referred to as "Skyray"). One 2023 Google slide deck listed DV360 as achieving "full parity with Google Ads" in "bidding," "enhanced conversions," "attribution," "creatives," and "audiences" features. DTX-1514 at 74; *see also id.* at 68 ("DV360 media buys are structured very similarly to Google Ads campaigns"); 9/25/24 PM Tr. 96:23-97:2 (Stewart).

153. DV360 is used by advertisers of all sizes. More sophisticated advertisers use DV360 to optimize for "broad reach" and manage their campaigns themselves. 9/11/24 AM Tr. 48:6-12 (Bender). Smaller advertisers such as restaurant franchisees and automotive dealer groups also use DV360, including to purchase local advertising. 9/25/24 PM Tr. 45:5-23, 53:19-54:7, 92:15-93:4 (Stewart).

154. Demand-side platforms like DV360 compete in the same auctions for the same impressions. 9/11/24 PM Tr. 147:5-148:14 (Dederick) (when The Trade Desk bids into AdX auctions, it competes with Google Ads); 9/26/24 AM Tr. 147:20-149:2 (Israel); 9/20/24 AM Tr. 144:7-22 (Lee); 9/16/24 PM Tr. 45:13-21 (Weintraub) (Plaintiffs' expert agreeing that both ad networks and DSPs "compete for impressions on the advertisers' behalf").

155. Even though DV360 directly competes for impressions and customer business with Google Ads, which is included in Plaintiffs' alleged markets, Plaintiffs have excluded DV360 and

all other demand-side platforms from their product markets. Plaintiffs' Demonstrative A; *infra* ¶ 662.

156. At the same time that they excluded demand-side platforms from their market definitions, Plaintiffs presented significant testimony and evidence relating to demand-side platforms at trial.

156.1. Plaintiffs presented the testimony of Dederick, a representative of a company that offers a demand-side platform. 9/11/24 PM Tr. 87:19-22 (Dederick). They elicited testimony from Dederick about DV360's market position despite not alleging that DV360 has market power in any relevant market. *Id.* at 102:4-19 (Dederick).

156.2. Plaintiffs also presented extensive testimony, including expert witness testimony, and evidence about Project Poirot, a feature specific to DV360. *E.g.*, 9/17/24 AM Tr. 76:8-101:21 (Jayaram); 9/11/24 AM Tr. 125:24-127:17 (Ravi); 9/16/24 PM Tr. 31:16-32:17 (Weintraub); 9/11/24 PM Tr. 53:5-13 (Ravi) (agreeing that Poirot was not implemented for any of the products in Plaintiffs' alleged markets).

156.3. Plaintiffs presented witness testimony that Google demand is "unique," but those witnesses were referring to demand from both Google Ads, which is included in Plaintiffs' markets, and DV360, which is not. *Infra* ¶ 857.

G. After 2014: Header Bidding Solutions Enabled Head-to-Head, Real-Time Competition Among Ad Exchanges.

157. As explained in the next section, starting around 2014 the industry began to change because of the emergence of a new technology called header bidding. Header bidding was initially pioneered by some publishers and ad tech providers that wanted to compare real-time bids from

multiple exchanges at the same time, instead of sequentially. Header bidding soon became popular. Responding to the demand for this new technology, Google developed its own functionality for facilitating head-to-head competition between exchanges on DFP, called Open Bidding. Since its launch, Open Bidding has competed with header bidding for publisher customers. While Open Bidding has been successful, header bidding has continued to grow in popularity, and by the testimony of Plaintiffs' own witness is "alive and well" today. 9/13/24 AM Tr. 32:4-5 (Kershaw). The story of the development of header bidding, Google's competitive response, and the continued fierce competition from header bidding is one of competition, demonstrating a thriving market with innovation and evolution.

158. As explained below, header bidding places significant competitive pressure on Google. Plaintiffs' own witness Casale of Index Exchange testified multiple times that header bidding's impact has made the market "hypercompetitive." 9/9/24 AM Tr. 155:23-156:9 (Casale); 9/9/24 PM Tr. 23:3-15 (Casale). Yet Plaintiffs do not include header bidding within any of their alleged markets. 9/20/24 AM Tr. 25:25-27:15 (Lee); 9/11/24 PM Tr. 44:2-9 (Ravi) (header bidding is a competitive threat to Google's ad server and ad exchange).

1. Rise of Header Bidding

159. By about 2014, there were even more real-time bidding exchanges. Before, the industry understood exchanges as one-stop shops for auctions. If an exchange could beat a floor price, "the exchange would win and that ad would serve." 9/23/24 AM Tr. 46:23-47:6 (Korula).

160. The industry had not yet developed technology permitting ad exchanges to compete with each other in real time on price. In the old "waterfall" system, exchanges were called sequentially and won if they could beat a price floor; it did not matter whether a subsequent ad exchange might in theory have returned an ad with a higher bid if called. *Supra* ¶¶ 62-74.

161. In other words, ad tech providers had not yet built the technology to compare real-time bids from multiple exchanges, 9/23/24 AM Tr. 62:23-63:10 (Korula), which was referred to as—an "auction of auctions." Google had not done anything to prevent competing exchanges from submitting their real-time bid amounts to DFP, but at the time third-party exchanges were not providing the amount the winning advertiser would pay. *Supra* ¶¶ 70-71. It was thus impossible for Google to unilaterally create a feature to compare amounts from multiple exchanges within DFP. 9/23/24 AM Tr. 64:1-13 (Korula) ("So if [the rival exchanges] had developed that technology sooner, then DFP would have been able to integrate it sooner, right. . . . So DFP was always open to this.").

a. Header Bidding Solutions: Prebid, Amazon, Meta, and More

162. Over time, publishers sought a way not just to use Dynamic Allocation to compare AdX real-time bids against the waterfall, but compare bids from multiple competing real-time auctions in real time. A new solution—header bidding—emerged. 9/24/24 AM Tr. 73:4-22 (Milgrom); Deposition of Brian O'Kelley Tr. 110:17-20, 110:23-111:5 ("Header bidding began to get a lot of traction, I want to say, around 2014."); 9/11/24 PM Tr. 36:17-37:8 (Ravi) (header bidding emerged around 2014 as a competitive response to "first look," or dynamic allocation).

163. Header bidding allows a publisher to solicit and compare real-time bids from ad exchanges and demand partners simultaneously before sending the impression to its publisher ad server. PTX-1650 at -040, -046 (2017 The Trade Desk presentation about header bidding); 9/11/24 PM Tr. 133:9-134:5 (Dederick). Header bidding can be used for multiple kinds of ads that appear on websites, including banner, native, and video ads. 9/12/24 PM Tr. 47:25-48:7 (Dederick).

164. Initially, publishers set up header bidding by manually placing publicly available code on their websites (referred to as "client-side" header bidding). 9/20/24 PM Tr. 60:22-61:8 (Sheffer). When a user visited the publisher's website, the website browser would "read" the

header bidding code and activate the process of running an auction among other ad exchanges and demand sources. That entire process of collecting and comparing bids was handled by code on the digital content provider's website. 9/9/24 AM Tr. 74:13-23 (Wolfe); *see also* PTX-1650 at -046, -048 (2017 The Trade Desk slide deck: "Publishers insert Javascript code into webpage header" that "circumvents [the] waterfall auction.").

165. In response to publisher interest in header bidding, dedicated tools to facilitate header bidding auctions emerged.

166. One of the important ad tech providers that played a role in kicking off the rise of header bidding was Prebid. According to Casale of Index Exchange, "before the launch of Prebid, header bidding was an infant"—"barely a technology at all" with "no standard at all." 9/9/24 PM Tr. 28:19-29:4 (Casale); *see also* 9/12/24 PM Tr. 164:25-166:1 (Kershaw) ("[A]t the time header bidding was just starting, . . . it was not taking off because of the complexities of publishers to run that environment because everyone had a different solution for header bidding").

167. Launched in 2015, Prebid created a standard header bidding wrapper, agreed to by a collective organization of exchanges and publishers, that would run an auction comparing the prices of participating exchanges in real time. 9/9/24 PM Tr. 29:5-11 (Casale); 9/10/24 AM Tr. 126:25-127:3 (Layser).

167.1. Prebid.org is the name of the organization of ad tech providers and publishers that "collectively own" the header bidding technology ("wrapper") that the organization developed. 9/12/24 PM Tr. 164:2-24 (Kershaw). That wrapper technology is called Prebid.js. *Id.*; 9/13/24 AM Tr. 13:21-14:13 (Kershaw). (For convenience, we refer to both the organization and the technology below as "Prebid.")

167.2. Prebid's wrapper calls multiple exchanges simultaneously for a given impression, the exchanges submit bids into the wrapper, and Prebid "will pick a winner and push that into the [publisher] ad server." 9/9/24 PM Tr. 46:11-47:7 (Casale).

167.3. As described by the founder of Prebid, Prebid's vision was to create "one common wrapper." 9/12/24 PM Tr. 164:25-166:1 (Kershaw). The goal was not only to standardize header bidding across the industry, but also to create "an organization that governs" the code so that "it's not owned by any one company." *Id.* (Kershaw). Prebid's board of directors serves as that governance organization and consists of both publishers and ad tech providers. Today, it contains representatives from many of Google's major competitors, including OpenX, Magnite, PubMatic, The Trade Desk, Index Exchange, and Microsoft. 9/17/24 PM Tr. 96:2-97:13 (Cadogan); Cadogan DX 1; 9/12/24 PM Tr. 139:16-22 (Goel); 9/12/24 PM Tr. 164:25-166:1 (Kershaw).

167.4. Consistent with Prebid's vision of collective ownership, all of Prebid's software to solicit bids, compare them, and output the winning bid is "published in open servers so anyone can see it." 9/12/24 PM Tr. 164:10-24 (Kershaw).

168. As the founder of Prebid testified, the Prebid wrapper serves similar functions that a publisher ad server does. It takes "control over the auction process that previously had been determined by what was called the ad server." 9/12/24 PM Tr. 164:2-9 (Kershaw).

169. Because the Prebid wrapper handles the solicitation of bids and comparison logic that a publisher ad server would, Prebid's website instructs publishers on how to use Prebid to run

an auction and display the winning ad on a website—all without using a publisher ad server. 9/13/24 AM Tr. 15:10-16:3 (Kershaw) (page is titled "running Prebid.js without an ad server"); *see also* 9/25/24 PM Tr. 170:18-171:5 (Hochberger) (publisher testifying that it is possible to "render to page" header bidding ads without using an ad server). In other words, a publisher interested in soliciting bids from multiple exchanges, comparing them, and selecting a winner could do so using only Prebid's wrapper, without DFP or any other ad server.

170. Other ad tech providers also started to capitalize on the popularity of header bidding by developing their own header bidding solutions.

171. For example, Amazon offers two popular server-side header bidding wrappers, Transparent Ad Marketplace ("TAM") and Unified Ad Marketplace ("UAM"), that are built on proprietary code. DTX-879 at 8 (2018 Google competitive analysis of Amazon); 9/9/24 PM Tr. 28:12-18, 45:21-46:10 (Casale); 9/12/24 PM Tr. 140:19-141:3 (Goel); 9/13/24 AM Tr. 157:17-159:11 (LaSala).

172. Since at least 2016, Meta also started offering a header bidding solution through Meta Audience Network. According to Meta, the solution introduced "massive unique demand to the world of header bidding, enabling publishers to better monetize by accessing Facebooks' 4M advertisers." PTX-1540 at 18 (2016 Facebook slide deck about header bidding).

b. Advantages and Risks of Header Bidding

173. The industry participants that drove the rise of header bidding tools and implementations sought to increase competition for impressions by enabling simultaneous competition between exchanges. PTX-1650 at -043, -045 (2017 The Trade Desk presentation about header bidding); 9/11/24 PM Tr. 133:4-134:5 (Dederick). As a result, the simultaneous competition facilitated by header bidding provided some benefits to industry participants over the old waterfall system, including:

173.1. Increasing revenue for publishers. 9/9/24 AM Tr. 74:24-75:5 (Wolfe); 9/24/24 AM Tr. 73:23-74:9 (Milgrom); PTX-1650 at -049.

173.2. For smaller exchanges, lowering "barriers to entry" so that they could see more publisher inventory, and enabling "bids from third parties" to "compete on even footing." PTX-1650 at -046, -048; PTX-1540 at 12 (2016 Facebook header bidding analysis); PTX-1710 (2017 Facebook document)[6]; 9/12/24 PM Tr. 171:14-172:3 (Kershaw) ("header bidding started to happen to open up and democratize access to publisher inventory, especially the most valuable publisher inventory"); 9/13/24 AM Tr. 22:14-17 (Kershaw). According to Wheatland of The Daily Mail, header bidding helped "non-Google exchanges," as The Daily Mail saw "anything from 50 to 100 percent increase in revenue from exchanges when they move from the waterfall setup to a header bidding setup." 9/18/24 AM Tr. 140:4-15 (Wheatland)

173.3. For buying tools, expanding their access to more and higher quality inventory and enabling advertisers to better forecast available inventory. PTX-1650 at -049 to -052.

174. At the same time, because header bidding was initially introduced as a "hack[] to solicit bids from other exchanges," 9/12/24 AM Tr. 15:13-16 (Srinivasan), header bidding also introduced a number of new risks to be mitigated.

[6] According to this 2017 document, competitors like Facebook understood that header bidding was a competitive threat to Google and that Google's competitive response, Open Bidding, *infra* ¶¶ 188-190, needed to compete with the demand available through competitors like Facebook, Amazon, and AppNexus (now Microsoft). PTX-1710 at 1 (Open Bidding "doesn't offer demand from the big three—[Facebook] Audience Network, Amazon and Appnexus").

174.1. A Google document identified as drawbacks "increased latency, . . . [with] timeouts on HB exchanges significantly higher"; "operational complexity"; "data security/leakage"; "eventual loss of advertiser trust in RTB auctions"; "significant discrepancies between HB and DFP reports . . . and risk of bid fraud"; and "troubleshooting complexity." DTX-376 at 10 (2017 Google slide deck); *see also* DTX-371 at 2 (2017 Google strategy document) ("latency, complexity, potential for bid fraud, and data leakage"); PTX-1543 at -603 (2017 Google email identifying "latency" and "fraud risk"); PTX-367 at -464 (2016 Google email noting in the context of header bidding that "this industry has a history of loving tech that is good for short-term $ but so bad for users they have to back off later").

174.2. A presentation by The Trade Desk regarding header bidding noted that header bidding increased the infrastructure costs and lowered margins for ad exchanges, which had to compete more intensely; increased costs for ad buying tools because they had to submit multiple bids for the same impression; and increased the price advertisers had to pay per impression. PTX-1650 at -049 to -052.

175. One security risk from header bidding was increased ad fraud, which "is a broad topic that includes things like invalid traffic but also low-quality made-for-advertising sites. . . . Effectively, it's the idea that some websites will just ram more ads on a page that aren't viewable or aren't seen or they'll rotate them quickly. And advertisers will buy them. And they won't get any value, but they will never know." 9/11/24 PM Tr. 115:14-116:6 (Dederick).

176. Header bidding, as Google witnesses explained, could also introduce latency:

176.1. Header bidding "increased latency to the page for marketers" and would diminish "value to the publisher in the long term because of the poor experience." 9/13/24 AM Tr. 115:7-22 (LaSala); *see also id.* at 106:22-107:2, 154:5-21 (LaSala); 9/19/24 AM Tr. 137:14-138:5 (Bellack) (header bidding raised "significant" concerns "as it first came out" because of "the impact on page performance").

176.2. Header bidding latency resulted in a "pretty bad" user experience, including because "it would take a very long time for the page to render or you would get, like, broken links." 9/10/24 PM Tr. 88:10-90:11 (Lipkovitz).

177. Other industry participants agreed that header bidding increased latency and could affect the user experience.

177.1. According to Farber of Meta, header bidding "would make the website load slower," impacting the end user experience. 9/26/24 PM Tr. 160:11-22 (Farber). This in turn could "create churn" and turn viewers away from a publisher's digital content. *Id.* at 161:1-10 (Farber); *see also* DTX-365 at 1 (2016 Facebook email: "Header Bidding does not increase speed / decrease latency, it actually increases it!").

177.2. In the experience of a representative from The New York Times, header bidding "typically adds tax to the site performance and may slow down the page load for the end reader or user." 9/26/24 PM Tr. 137:3-7 (Glogovsky).

177.3. A representative of Goodway Group, an advertising agency, advised advertisers that header bidding "can cause increased page latency and page load times." 9/10/24 PM Tr. 39:17-21, 40:25-41:7 (Friedman).

177.4. Kershaw, founder of a major header bidding solution, agreed that latency was important to the industry and a challenge associated with header bidding. 9/13/24 AM Tr. 23:5-24 (Kershaw); *see also id.* at 33:7-21 (Kershaw) ("[L]atency will always be an issue unless you can move to a server-side environment.").

177.5. Layser, former Vice President of Advertising Technology & Operations at News Corp, agreed News Corp had to manage latency concerns when using header bidding. 9/10/24 AM Tr. 84:24-85:1 (Layser).

178. Header bidding could also create billing problems for publishers because they had less of a "paper trail" to keep track of how much they were owed. 9/10/24 PM Tr. 88:10-90:11 (Lipkovitz).

178.1. According to one former Google employee, billing and ad fraud issues were one of the downsides that made header bidding "crappy." 9/10/24 PM Tr. 88:10-90:11 (Lipkovitz); *see also* DTX-376 at 19 (2017 Google presentation); DTX-1016 at 16 (2020 Google presentation).

178.2. One Google employee observed that publishers could still find header bidding "pretty inconvenient to use" because of "latency, reporting, transparency, billing" issues. PTX-367 at -470 (2016 Google email).

179. Additionally, ad tech providers could take advantage of the fact that, for header bidding, prices were self-reported. As Jonathan Bellack, former Product Manager Leader for AdX and DFP explained, "other exchanges in the industry were playing games with their auction logic. They were misrepresenting their fee structure. They were modifying their auctions in ways that were not fair and intended to advantage their one business. And one of the huge problems I saw

with header bidding was all of the prices going into that client-side code were self-reported by these exchanges." 9/19/24 AM Tr. 137:14-138:5 (Bellack).

180. Header bidding also required nontrivial investments by both publishers and ad tech providers to set up.

180.1. As Farber of Meta explained, "this is not a turnkey or plug-and-play solution." 9/27/24 PM Tr. 161:1-10 (Farber). "It requires a significant initial set up and maintenance by engineers of the HB configuration." PTX-1540 at -579 (2016 Facebook Header Bidding 101 slide deck).

180.2. Building integrations with header bidding was a resource-intensive process that could detract from exchanges' ability to build other new features for their customers. 9/13/24 AM Tr. 24:8-26:6 (Kershaw).

181. Header bidding risked harming advertisers by artificially inflating the prices they paid for ads. Both Google and industry participants observed that header bidding might lead an advertiser to "self-compete" when it bid through multiple exchanges for the same impression. 9/24/24 AM Tr. 126:21-128:17 (Milgrom).

181.1. A presentation by The Trade Desk about header bidding stated that header bidding can lead to higher costs per thousand impressions (CPMs) for advertisers. PTX-1650 at -052.

181.2. Google noted that header bidding can cause "bid duplication due to multiple requests for the same inventory." DTX-1016 at 16 (2020 Google presentation).

181.3. AppNexus wrote: "With the advent of header bidding technology, AppNexus has seen a rise in redundant supply on our platform. . . . This dynamic harms

buyers by causing them to bid against themselves for the same impression." DTX-422 at 223 (2017 AppNexus presentation). Similarly, Xandr observed that header bidding caused DSPs to see "the same stream of impressions from many different sources," which was "highly inefficient." DTX-1091 at 6 (2021 Xandr document).

181.4. As reflected in the notes of a 2017 meeting between Google and Yahoo, Yahoo expressed concern that "another challenge with HB is that" it "may be getting the same inventory from multiple" avenues "and there is no way to flag it." PTX-470 at -293.

181.5. In 2017, Google also noted that a third party's "internal research shows that up to 28% of the impressions they see" through header bidding "are duplicates." PTX-470 at -292.

182. In a 2017 internal presentation, The Trade Desk acknowledged that downsides of header bidding included "higher CPMs" for advertisers and "higher costs from submitting multiple bids for [the] same impression" for buying tools like The Trade Desk's own DSP. PTX-1650 at -051 to -052. In evaluating "what does header bidding mean for TTD," it identified short-term effects of "duplicate bid requests" and rising transaction costs even as it projected that, in the long-term, header bidding would result in The Trade Desk gaining market share and emerging "as a stronger company at end state." PTX-1650 at -057 to -058.

183. Despite the challenges introduced by early header bidding implementations, header bidding quickly became incredibly popular.

183.1. A Meta document stated that, in 2016, 70% of U.S. publishers used header bidding. PTX-1540 at 15.

183.2. AppNexus "invested aggressively in header bidding" because it "directly attacks the connection between DFP and AdX/GDN," and AppNexus "enlisted most of the SSP companies into this effort." DTX-352 at 2 (2016 document about AppNexus-TTD Partnership).

183.3. A Google strategy document prepared for 2017: "As of Jan 2017, 50% of [Large Publisher Services] publishers (and 25% of [Online Partnership Groups Tier 1]) are using header/wrapper tags." DTX-371 at 2.

184. Though header bidding introduced risks for both publishers and advertisers, Google responded to publishers' demand for header bidding and "went out of" its "way to make" header bidding work with DFP so that publishers could use DFP to serve ads won by exchanges participating in header bidding. 9/13/24 AM Tr. 146:12-147:1 (LaSala); PTX-254 at -238 (2015 Google email). For example, Google increased the number of line items publishers could set up in DFP from thousands to tens or hundreds of thousands so that publishers could enter header bidding bids as line items. 9/13/24 AM Tr. 146:12-147:1 (LaSala).

2. Development of Open Bidding

185. As header bidding gained more traction and more publisher inventory was sold through header bidding, Google viewed the new technology as a substantial source of competition to its ad tech products. Header bidding made "third party yield more attractive, undermining the value of [AdX and DFP] as a must-call platform." PTX-611 at -801 (2018 Google presentation); 9/12/24 AM Tr. 15:20-22, 43:7-44:10 (Srinivasan).

186. AdX did not participate in header bidding, but it competed with header bidding exchanges for impressions. In addition, header bidding put pressure on DFP because advertisers could use header bidding to access more inventory than before, without needing to use DFP. PTX-308 at -243 (2016 Google email noting that header bidding yields "higher revenue for publishers

because it allows SSPs [exchanges] to compete with AdX more on an impression-by-impression basis"); PTX-1650 at -048 (2017 The Trade Desk presentation stating that when header bids are "inserted into DFP," "bids from third parties compete on even footing with AdX").

187. Internal Google documents and testimony demonstrate that Google took the competitive pressure exerted by header bidding seriously. Google particularly felt a need to innovate in response to competition from Facebook and Amazon because those companies could leverage advertiser demand for their owned-and-operated properties into their own successful header bidding products. Publishers would then make greater use of Amazon or Meta's header bidding products, reducing usage of AdX or DFP to monetize content. *E.g.*, DTX-879 at 10 (2020 Google presentation listing Amazon's "unique demand" as a "key differentiator" for Amazon's header bidding wrappers).

187.1. In July 2015, a Google employee wrote: "Team, are you amenable to having a working session on header bidding soon? This is posing a threat to not only our programmatic auction business but also DFP/Programmatic Guaranteed." PTX-234 at -237.

187.2. A January 2016 "Yield Management Overview" document described the "threat" that header bidding poses "to our business" as "huge." PTX-275 at -495.

187.3. In August 2016, Bellack, former Product Manager Leader for AdX and DFP, observed "increasing chatter about" the "use of header bidding to set up deals with preferential access," which "could grow even into a replacement ad server." PTX-367 at -469.

187.4. In October 2016, Bellack wrote: "HB has continued to grow rapidly and is measurably impacting our revenues." PTX-1543 at -604. "Major rivals FAN and Amazon have made big bets on HB, to avoid our pipes." PTX-1543 at -604.

187.5. In October 2016, a Google employee observed that "HB is growing and the use cases of HB are expanding." PTX-403 at -512. "HB solutions + price competition from emergent ad servers + SSPs pose a competitive threat to DFP's value prop of being a broad source of access to premium inventory." PTX-403 at -512.

187.6. In December 2016 LaSala, former Managing Director for Global Commercialization, described header bidding and Facebook Audience Network as a significant threat to Google's business. PTX-433 at 601; *see also* 9/13/24 AM Tr. 94:6-8 (LaSala).

187.7. In February 2017, notes from a meeting between Google and Yahoo describe a lengthy discussion between the two companies about header bidding. Google described header bidding to Yahoo as "a threat to our core business." PTX-470 at -293. In particular, Google was concerned that header bidding advocates were persuading Yahoo's advertiser customers that they were losing access to valuable publisher inventory if they purchased only through AdX. The document continued: "SSPs are telling Yahoo that the only way to access certain inventory is through header bidding." PTX-470 at -293; *see also id.* at -291.

188. In the face of this growing competitive pressure, Google began to brainstorm "competing" solutions to "meet the publishers' needs." PTX-239 at -813, -817 (2015 Google email).

188.1. Reacting to header bidding, Google employees wrote: "We need to think about this problem with a fresh perspective, answering the publishers' needs." PTX-239 at -813 (August 2015 Google email). "**This is not about don't use the other[ ] guys—this is about here's how you can do it profitably and without losing the user** . . . . We have a great opportunity to build a stronger indirect demand solution in DFP to do exactly that." PTX-239 at -818.

188.2. As Bellack explained, "because our customers were reporting that" they were finding header bidding "valuable, for us to not respond by trying to deliver value would give them more reasons to try other things." 9/19/24 AM 143:25-144:8 (Bellack).

189. After a few years of development and beta, Google widely launched Open Bidding in 2018 "in response to competition from header bidding." 9/12/24 AM Tr. at 25:17-24 (Srinivasan); 9/23/24 AM Tr. 39:10-16 (Korula).

189.1. In a 2016 internal document describing the competitive threat of header bidding, Google stated that it developed "demand syndication," an internal term for Open Bidding, in order to "counter" the "threat" of header bidding. PTX-275 at -495.

189.2. In a description of how Open Bidding began, a 2020 Google slide deck stated: "We built Open Bidding in response to changes in the aggregated bidding

landscape, recognising the need to help publishers attain a higher yield on their ad inventory without sacrificing on user experience." DTX-1016 at 23.

189.3. Tom Kershaw, Chair of the Prebid Board and former employee of Magnite, agreed that Open Bidding was Google's "competitive response to header bidding." 9/13/24 AM Tr. 31:16-23 (Kershaw).

190. Whereas header bidding called third-party exchanges directly from a publisher's webpage before sending the impression to DFP, Open Bidding was a server-side solution that enabled publishers to achieve the same goal—put third-party ad exchanges in competition—in a simultaneous auction within DFP. Moreover, Open Bidding enabled publishers also to put these third-party ad exchanges in simultaneous competition with AdX. 9/25/24 PM Tr. 173:10-13 (Hochberger); PTX-764 at -258 (2019 Google presentation). Open Bidding thus helped publishers achieve the same purpose of header bidding—head-to-head competition between real-time prices from different exchanges—using DFP.

191. Open Bidding was developed "in direct response to feedback from publishers and buyers that asked for help in overcoming key monetization and media buying challenges." DTX-1016 at 25 (2020 Google presentation). Google's goal in launching Open Bidding was to increase the attractiveness of its own sell-side tools to publishers, particularly publishers drawn to header bidding. Google's goal was "**not to directly stop HB [header bidding]**," but to "**improve platform attractiveness and increase net revenue**" in order to compete with it for customer business.[7] PTX-611 at -805 (July 2018 Google strategy review presentation); *see also* 9/12/24

[7] Google ran experiments that paused small amounts (such as 0.1 percent) of bidding on third-party exchanges in order to identify how much of the inventory purchased through header bidding was the same (in other words, not "incremental") as what was already available on Google's own tools. 9/17/24 PM Tr. 6:4-7:9 (Jayaram); *see* PTX-1545 at -142, -145. As explained above, *supra* ¶¶ 181-182, other industry participants shared the concern that header bidding could result in "the

AM Tr. 146:13-18, 153:5-7 (Srinivasan) ("The intent was not to stop header bidding."); PTX-367 at -463 (September 2016 email observing if Google made Open Bidding "attractive, fair, and transparent for ssps, key networks, and adx buyers it might be enough to keep hb in check").

192. Google first introduced Open Bidding on a trial basis in 2016 (when it was first called Exchange Bidding before it was renamed Open Bidding), and launched it fully to all publishers in 2018. 9/23/24 AM Tr. 39:10-12 (Korula).

193. Open Bidding competed successfully as an additional option for publishers, significantly improving on the operational issues present in header bidding while increasing yield for publishers. 9/23/24 AM Tr. 39:13-16 (Korula).

193.1. "We saw a market need based on publisher behavior and decided to build a product more natively that we thought was a more superior product." 9/12/24 AM Tr. 25:7-12 (Srinivasan).

193.2. Meta's corporate representative testified that Open Bidding improved on header bidding in multiple ways: "Q. Was, in Meta's view in 2017, Google's open bidding solution superior to header bidding in some of those respects

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same impression being auctioned off through different supply sources." DTX-422 at 223 (2017 AppNexus presentation). Google's experiments suggested that at least some inventory available through header bidding was incremental. PTX-1545 at -142.

As Jayaram testified, and Plaintiffs do not dispute, these experiments were run to test a hypothesis but not "follow up on in real life"—DV360 never stopped bidding on third-party exchanges. 9/17/24 PM Tr. 6:4-7:9 (Jayaram); *see also* 9/13/24 AM Tr. 82:19-83:21 (LaSala) (DV360, AwBid, Google Ads "did whatever they wanted"); *id.* at 153:19-154:4 (LaSala) ("Q. Was a suggestion that DV360 stop buying on third-party exchanges accepted? A. No."). Jayaram further testified that these experiments bore no relation to the reasons for launching Project Poirot. 9/17/24 PM Tr. 33:14-21 (Jayaram) ("Q. What you did instead at around the same time was to reduce DV360's bidding on those third-party exchanges; isn't that right? A. We launched Poirot to optimize for the advertiser.").

that you mentioned? A. To the best of my knowledge, Google's open bidding solution addressed those issues." 9/26/24 PM Tr. 161:11-17 (Farber).

193.3. As the founder of Prebid admitted, Open Bidding was "faster and more efficient" than header bidding. 9/13/24 AM Tr. 11:9-12:9 (Kershaw).

193.4. Open Bidding also came with "virtually no setup cost or operational complexity" for publishers. DTX-1016 at 25 (2020 Google presentation).

193.5. In Open Bidding, Google handled all billing, including for purchases made through third-party exchanges, so publishers could receive guaranteed net 30 day payments. DTX-1016 at 25.

193.6. Another "key advantage" of Open Bidding over header bidding was "that reporting can be done within DFP, while reporting is a key challenge when using header bidding." PTX-275 at -495 (2016 Google document).

193.7. For advertisers, Open Bidding offered tools that limited the possibility that they would bid on the same impression multiple times through different exchanges and inadvertently inflate the price of the impression. DTX-1016 at 25-26.

194. These benefits of Open Bidding succeeded in attracting customers. The New York Times, for example, chose to integrate Index Exchange via Open Bidding rather than header bidding because Open Bidding "typically has a lower impact on the site performance" and because Open Bidding is "managed within Google Ad Manager, which would limit the impact of operation burden," i.e., "the personnel and the time of those people responsible for managing that specific integration." 9/26/24 PM Tr. 138:3-140:9 (Glogovsky); *see also* DTX-997 at 3 (2020 New York Times slide deck).

195. Google charges a 5% revenue share for Open Bidding transactions. PTX-590 at -751 (2018 Google email). That fee covers Google's costs in "running the Open Bidding system, sending bid requests to all of the participating exchanges, getting their bids, handling the billing and payments, managing the publisher relationship, eliminating discrepancies, all of that stuff that we did and the exchanges no longer had to do." 9/23/24 AM Tr. 97:14-24 (Korula).

196. In exchange for that fee, Open Bidding provides "a lot of value to publishers in that it gave them a very simple unified setup that they could do in one place with unified reporting, one payment system, and so forth." 9/23/24 AM Tr. 97:14-24 (Korula); *see also* DTX-879 at 10 (2020 Google competitive analysis of Amazon: "DFP provides value that is not built into its price"). In addition, Open Bidding creates optimizations for publishers based on the bid data that flows through Open Bidding. 9/19/24 PM Tr. 21:25-22:10 (Levitte).

197. The relatively low revenue share of Open Bidding reflected that Google's "goal was to combat the threat of header bidding and free header bidding wrapper solutions." 9/13/24 AM Tr. 149:20-150:9 (LaSala).

198. Google initially marketed Open Bidding as a tool to use instead of header bidding, but that effort was short-lived because the adoption of header bidding continued in parallel with the adoption of Open Bidding. 9/9/24 PM Tr. 22:10-23:2 (Casale).

198.1. As Srinivasan, a Product Manager for Google Ad Manager, explained to publishers at an April 2019 meeting, Google initially had a vision to "build a better product that all publishers" would "opt and use," but Google soon recognized that "header bidding is not going away" and "accepted that." PTX-1854 at 58 (certified transcript of April 2019 publisher meeting); *see also* PTX-611 at -793 (2018 Google slide deck) ("Stopping HB may not be entirely

feasible; Our focus is to tolerate it"). Google's strategy was to offer "tools that help" publishers "manage sources of demand across all different channels in a way that [they] actually want to." PTX-1854 at 58.

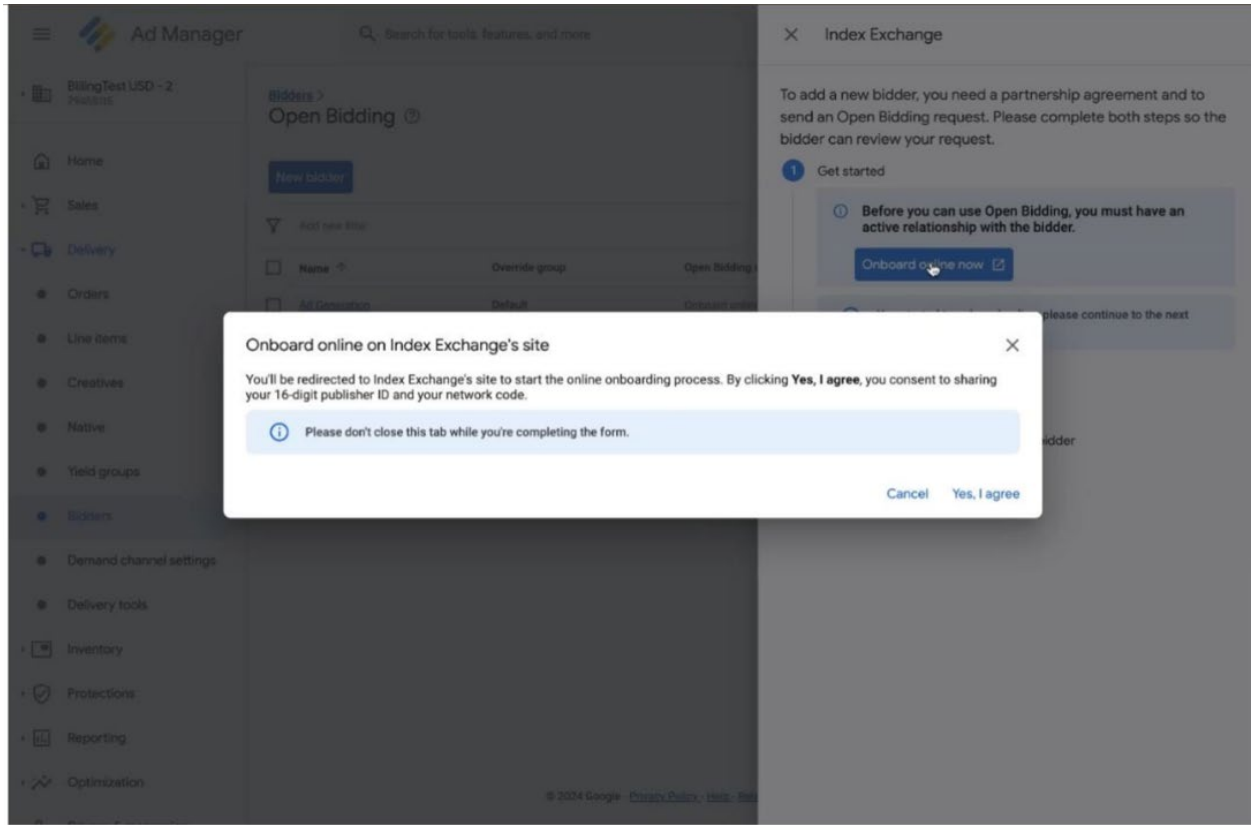
198.2. Another Google employee testified: "You know, to my knowledge, header bidding has not gone away. You know, so I don't believe the launch of exchange bidding has changed the competitive environment significantly." Deposition of Brian Rowley Tr. at 147:24-148:12.

199. Today, Open Bidding enables publishers using Google Ad Manager to sell inventory through about 25 third-party exchanges directly within Google Ad Manager, including some of AdX's biggest competitors such as Index Exchange, OpenX, Magnite, and PubMatic. 9/23/24 AM Tr. 39:13-22 (Korula).

200. Open Bidding has helped Google's rival exchanges grow by connecting to a wider pool of publisher inventory and advertiser demand. For example, [redacted]

201. Consistent with its vision to make a product that allows publishers to manage all of their inventory sources from a centralized tool, Google affirmatively helps publishers connect with competitor exchanges that are participating in Open Bidding. If a publisher does not have a pre-existing agreement with an Open Bidding exchange, as shown below, Korula DX 1.15, Google's DFP interface facilitates the agreement between the publisher and exchange so that the publisher can start selling through the exchange using Open Bidding. 9/23/24 AM Tr. 40:2-24 (Korula). Google decided to do this because it "thought that actually was better addressing publishers' needs."

9/23/24 AM Tr. 40:25-41:9 (Korula) ("We thought we would design this product in a way that made it as easy as possible for" publishers to "work with these exchanges" "effectively.").

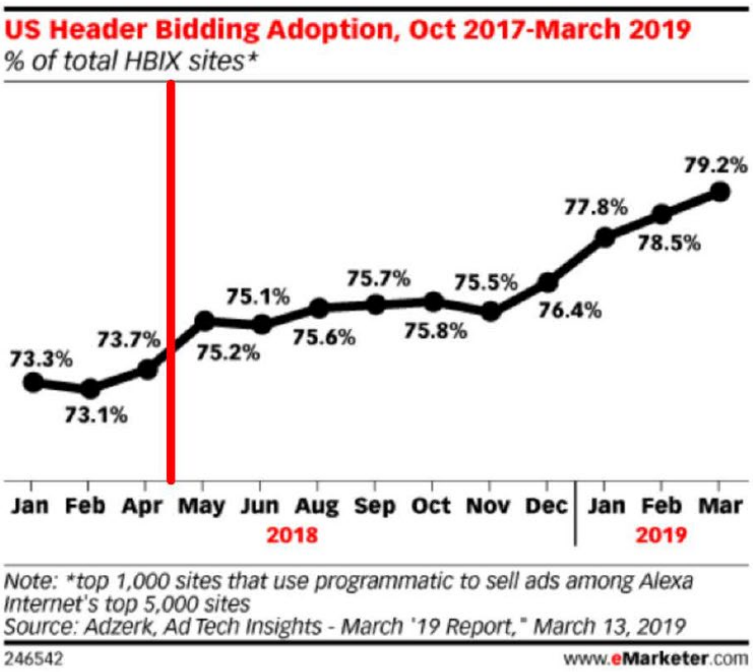


3. The Continued Popularity of Header Bidding Tools Created a "Hypercompetitive" Environment.

202. Even as Open Bidding was increasingly adopted by publishers and partnered with rival exchanges, other header bidding solutions also remained popular and continued to grow. PTX-611 at -803 (2018 Google slide deck: "HB adoption and impression share still growing. . . . We expect publishers to continue using HB [header bidding] as long as there is incremental yield to be made."); 9/12/24 AM Tr. 145:24-146:1 (Srinivasan).

203. In the figure below, which is based on third-party industry data, the red line depicts when Open Bidding became generally available. Publisher adoption of header bidding continued to increase after that date. DTX-2085A.

Figure 15: External data from eMarketer suggests that the adoption of header bidding by publishers was not negatively impacted by introduction of Open Bidding.[788]



204. As reflected in DFP data, the number of impressions won by exchanges participating in header bidding grew from about 25% of impressions in July 2018 to over 40% of impressions in October 2022. DTX-1898.

205. Open Bidding, though adopted by many publishers because it offered benefits to customers, did not stop the growth of header bidding.

205.1. As Kershaw, former employee of Magnite and Chairman of the Prebid board testified, header bidding is "alive and well today." 9/13/24 AM Tr. 32:4-5 (Kershaw).

205.2. PubMatic stated in November 2020 that "header bidding has now been adopted by over 60 percent of digital publishers in the United States." 9/12/24 PM Tr. 139:2-7 (Goel).

205.3. Casale of Index Exchange even credited Open Bidding for growing header bidding. 9/9/24 PM Tr. 23:20-24:4 (Casale). He testified that, today, almost every web publisher leverages some sort of header bidding. *Id.* at 23:16-19 (Casale); *see also id.* at 24:5-24 (Casale) (the "vast majority" of transactions on Index Exchange come through header bidding).

205.4. Plaintiffs' own witnesses contradicted the unsupported testimony, given only by The Trade Desk's Chief Revenue Officer, Jed Dederick, that Open Bidding "decimated header bidding." 9/11/24 PM Tr. 143:3-6 (Dederick).[8]

206. The continued popularity of header bidding has continued to exert competitive pressure on Google.

206.1. Header bidding "makes it easier for other players," including other exchanges or SSPs, "to compete for DFP publishers' inventory." DTX-371 at 3 (2017 Google strategy document).

206.2. The Trade Desk bids into header bidding auctions, and perceived the introduction of header bidding to be "critical to the growth of" its company. 9/11/24 PM Tr. 128:20-129:17 (Dederick). When The Trade Desk "saw header bidding arise, [it] saw increased competition among exchanges," and determined that header bidding would enable it to gain market share. *Id.* at 137:5-18 (Dederick); PTX-1650 at -058 (2017 The Trade Desk presentation).

[8] Dederick tried to explain his testimony regarding header bidding as referring to only "a very specific header bidding implementation that was popularized in 2016 and 2017"—a distinction no other witness at trial testified to and that Dederick only remembered after he was confronted with data that conflicted his testimony. 9/12/24 PM Tr. 46:15-47:3 (Dederick).

207. Ad tech providers and publishers have found ways to develop improved header bidding tools—without some of the disadvantages of the initial implementations of header bidding—by offering server-side solutions that are similar to what Google innovated in Open Bidding. 9/20/24 PM Tr. 60:22-61:8 (Sheffer). Server-side solutions, unlike client-side header bidding, conduct header bidding auctions on a server rather than all within the publisher's website.

207.1. A 2017 presentation from The Trade Desk explained that client-side header bidding was "not a long-term solution" and "Google, Amazon, OpenX, PubMatic, Rubicon Project [were] known to be developing more efficient solutions for header bidding on the server-side." PTX-1650 at -055.

207.2. A 2020 Google internal document noted that Index Exchange, Rubicon, and OpenX "continue to be stable players in the marketplace" and are "investing in their own header bidding solutions" as well as "looking to header bidding wrapper partners . . . to support their inventory acquisition efforts." DTX-801 at 8.

208. Just like Open Bidding, the server-side header bidding offerings of Google's rivals have successfully won publisher business. For example, in contemporaneous business documents, Google repeatedly identified Amazon's header bidding products as a significant source of competition for customers.

208.1. A 2017 strategy document observed that "Amazon had developed a wrapper that aggregates their own demand with other SSPs and is trying to convince DFP publishers to implement their wrapper in DFP in such a way that they gain privileged access to inventory." DTX-371 at 3.

208.2. An internal email from 2018 stated that "Amazon has experienced the fastest HB growth in the past 12 months." PTX-587 at 795.

208.3. A Google competitive analysis of Amazon described "Significant Amazon Header Bidding growth in 2017" such that Amazon was "becoming one of key monetization platforms." DTX-879 at 9. The same analysis noted that Amazon's TAM already had "many of the large" publishers as partners, including "Weather, Hearst, TripAdvisor, Turner, Warner Bros, Daily Mail, Conde, Gannett, IAC." DTX-879 at 7.

209. Amazon's wrappers market multiple competitive advantages over Open Bidding.

209.1. Amazon advertises that its wrappers access "unique demand from Amazon" and Facebook Audience Network. 9/10/24 AM Tr. 86:12-20 (Layser); 9/9/24 PM Tr. 25:4-10 (Casale); *see also* DTX-879 at 7, 10 (2020 Google competitive analysis noting that an advantage of TAM over Open Bidding is "integration to all leading ad buyers + AMZ unique" and "demand integration with A9 + FAN," and a "key differentiator" is that "Amazon provides unique demand"); DTX-754 at 15 (2019 Google competitive analysis).

209.2. Amazon also offers "very low fees for TAM." DTX-879 at 7; 9/13/24 PM 8:25-9:13 (LaSala) (referring to Amazon wrappers as "low cost" and "for free or close to free," but "without all of the protections that a really quality exchange would have").

210. Prebid, which played a seminal role in the rise of header bidding, has also continued to gain popularity.

210.1. "Even without Google's participation as part of Prebid, that organization is still thriving today." 9/13/24 AM Tr. 31:24-32:3 (Kershaw). Although Prebid is incredibly popular, Google is not the only competitor that does not bid into Prebid. For example, Amazon never bid into Prebid. 9/10/24 AM Tr. 98:20-99:4 (Layser) (agreeing there are other companies that do not bid into Prebid).

210.2. According to Kershaw, former Chairman of the Board of Prebid, in 2021 the "vast majority" of publishers used Prebid's header bidding wrapper. 9/13/24 AM Tr. 6:7-12 (Kershaw). He explained that today, "pretty much everybody is in Prebid." *Id.* at 30:22-31:8 (Kershaw).

210.3. Prebid has expanded to "thousands of participants" and is "viewed as a community asset for running large-scale advertising networks." 9/12/24 PM Tr. 164:10-24 (Kershaw).

210.4. Prebid has been "continuously improving things, bringing new options and features" and developing "solutions from video and mobile app." 9/13/24 AM Tr. 33:7-21 (Kershaw).

210.5. As Plaintiffs' witness Layser agreed, at least in 2021, Prebid had successfully "made the advertising ecosystem more competitive." 9/10/24 AM Tr. 105:24-106:1 (Layser).

211. Google's rivals can use Prebid to build their own header bidding solutions. In 2016, PubMatic developed its "own header bidding solution marketed as Open Wrap," which is built on Prebid. 9/12/24 PM Tr. 139:12-19 (Goel). Since then, according to PubMatic, there has been "a surge in the adoption of its wrapper solution" "as publishers increasingly abandon their home-

grown Prebid wrappers or alternative solutions for PubMatic's Open Wrap." *Id.* at 141:14-22 (Goel).

212. Google recognized the continued staying power of these rival header bidding products, including after the launch of Open Bidding.

212.1. A March 2018 header bidding sell–side update captured the rapid growth of header bidding adoption, with large competitors like Amazon quickly gaining share. PTX-587 at -795 (header bidding "adoption continues to grow globally, now reaching 50% and is projected to reach 66% by EOY 2018. . . . Amazon has experienced the fastest HB growth in the past 12 months.").

212.2. In August 2018, Bellack wrote: "AdX is losing third-party demand at a rapid clip. MediaMath, Turn, TTD, etc are all growing but not spending on AdX." "There is clear weaknesses in the AdX buyer segment and continued adoption of header bidding." PTX-639 at -965.

212.3. A 2019 Google document stated: "The rise of header bidding, when pubs call other competitive networks and exchanges, like AMZN, FB or Rubicon, outside of the ad server, is exacerbating this problem. . . . This is posing something of an existential risk on our sell-side business and there is a risk that DSPs, in addition to networks and exchanges, ALSO bid in header tags." PTX-764 at -258; *see also* 9/20/24 PM Tr. 116:14-117:19 (Sheffer).

213. Industry participants are free to choose to participate in header bidding and not Open Bidding. The Trade Desk, for example, has expressly decided not to use Open Bidding. 9/11/24 PM Tr. 141:10-22 (Dederick) ("Eventually The Trade Desk decided to shut off the open bidding pipe because we didn't see value for our advertisers in continuing to buy it"); 9/12/24 PM

Tr. 46:3-14 (Dederick) (explaining that The Trade Desk announced it would stop buying Google's inventory through Open Bidding in 2022 when it announced its supply path optimization tool, OpenPath).

214. As explained above, recognizing the popularity of header bidding, Google has invested in supporting interoperability with header bidding on DFP. *Supra* ¶ 184. To this day, publishers can use DFP to sell as many of their impressions as they want to header bidding exchanges. Of the publishers who testified live at this trial, all three currently use Google's tools in conjunction with both Amazon Transparent Ad Marketplace and Prebid to sell inventory. The publishers that testified via deposition stated the same. Specifically:

214.1. By 2021, Gannett was running an unified auction that offered every impression on the USA Today Network to Prebid and Amazon Transparent Ad Marketplace, and only a subset of impressions to Google's Open Bidding. 9/9/24 AM Tr. 80:2-22, 91:22-92:1 (Wolfe). USA Today Network uses DFP to connect to multiple non-Google demand sources, including more than 20 exchanges and bidding tools that compete with Google. 9/9/24 AM Tr. 75:6-17 (Wolfe) (Gannett currently works with 24 or 25 "programmatic partners participating in header bidding" plus buying tools); *see also id.* at 78:20-79:3, 81:16-82:14, 89:13-90:22, 91:4-92:1 (Wolfe); Wolfe DX 1; 9/9/24 AM Tr. 87:5-16 (Wolfe) (Wolfe DX 1 identifies authorized sellers on the USA Today Network). Gannett is moving from a combination of client-side and server-side header bidding towards its own server-side header bidding system using Prebid technology that will run a unified auction through Amazon, Prebid and Google Open Bidding. 9/9/24 AM Tr. 90:10-91:21 (Wolfe).

214.2. News Corp uses Amazon Transparent Ad Marketplace and Prebid in conjunction with Google's ad tech products. 9/10/24 AM Tr. 79:11-19, 116:20-25 (Layser).

214.3. The Daily Mail runs "client-side header bidding bids" inside Google Ad Manager. 9/18/24 AM Tr. 161:5-15 (Wheatland). The Daily Mail uses Google's Open Bidding, Amazon Transparent Ad Marketplace, and Prebid. *Id.* at 175:21-176:8 (Wheatland).

214.4. The New York Times uses a combination of Open Bidding and header bidding to put exchanges in competition for its inventory. 9/26/24 PM Tr. 132:8-135:17 (Glogovsky) (testifying that the New York Times receives bids through Xandr, Index Exchange, Magnite, OpenX, TripleLift, PubMatic, Media.net, and Yahoo using a combination of header bidding and Open Bidding); DTX-1599 (webpage listing the New York Times's authorized partners).

214.5. Buzzfeed continues to use both Google Ad Manager and header bidding. Header bidding adds value because it offers "competition and even playing field." Deposition of Ken Blom Tr. 131:8-25.

214.6. Mediavine's representative testified that Google's introduction of Open Bidding (which he referred to as Exchange Bidding) helped Mediavine use header bidding more effectively: "As a publisher, that actually gave us the option to choose whether you want to put an exchange through header bidding or through exchange bidding. So we may have moved a partner or two from header bidding off of—into exchange bidding." 9/25/24 PM Tr. 173:17-24

(Hochberger). Today, Mediavine [redacted] *see also* 9/25/24 PM Tr. at 175:16-180:3 (Hochberger); DTX-1733 (identifying Mediavine partners).

215. Plaintiffs spent significant time at trial introducing evidence concerning header bidding and Google's competitive response, including Open Bidding. This was curious because, as explained above, the rise of header bidding products as competitors to Google and Google's competitive response to create an improved solution on its own tools demonstrate competition at work. As shown by the industry testimony elicited at trial, that competition continues fiercely today.

H. 2016-2019: New "Auction of Auctions" Capabilities Fundamentally Transform the Industry.

216. The development of technology like header bidding and Open Bidding fundamentally transformed the way the industry operated. It became possible to compare the amounts that winners of different real-time auctions were willing to pay simultaneously, instead of sequentially. 9/13/24 AM Tr. 22:7-23:4 (Kershaw) (agreeing that "header bidding and open unified auctions where everybody bids at once" had "changed the entire ad tech ecosystem forever").

217. As explained in the next section, because of the changes brought by this new technology, the industry entered a period of transition in auction formats and pricing. During that period, advertisers struggled to adjust to the new auction landscape, and ad tech providers devised

new solutions—like bid-shading features—to help advertisers bid optimally. Reacting to these changes and an increasingly complex ecosystem that could lead to inefficient outcomes for everyone, in 2019 Google shifted to the Unified First Price Auction and Unified Pricing Rules. The new auction would enable publishers to put all demand sources in competition on equal footing subject to equal rules.

1. Transition in the Industry from Second-Price Auctions to First-Price Auctions

218. Since the introduction of auctions in display advertising, the second-price auction format was the industry standard. 9/24/24 AM Tr. 42:16-44:6 (Milgrom); *id.* at 50:21-51:2 (Milgrom); *see also* 9/11/24 PM Tr. 67:8-18 (Ravi) (discussing his academic paper that studied why exchanges ultimately switched from second to first-price auctions). From its initial launch until 2019, AdX was a second-price auction. 9/23/24 AM Tr. 93:11-19 (Korula); 9/24/24 AM Tr. 41:18-21 (Milgrom).

219. Because digital ad sales must be concluded in fractions of a second, a traditional ascending auction with multiple rounds of bidding is not possible. 9/24/24 AM Tr. 45:5-20 (Milgrom); 9/11/24 AM Tr. 123:20-124:22 (Ravi). A second-price auction is a type of auction that "is intended to run very fast and very simply and bring about the same outcome." 9/24/24 AM Tr. 45:5-20 (Milgrom); *id*. at 44:9-45:4 (Milgrom).

220. In a second-price auction, the bidder with the highest bid wins and pays the amount of either the second-highest bid or the price floor, whichever is larger. 9/24/24 AM Tr. 42:16-44:6 (Milgrom); *see also* Milgrom DX 1.5 (winning bidder pays $1.20, or the amount of the second-highest bid); Milgrom DX 1.6 (winning bidder pays $1.25, or the amount of the price floor); 9/11/24 AM Tr. 95:5-8 (Ravi). In the event of a tie, one bidder wins at random and pays the amount that bidders had tied at. 9/24/24 AM Tr. 53:25-54:14 (Milgrom).

221. Second-price auctions benefited advertisers because the optimal bid strategy in a second-price auction is "really simple." Every bidder should bid the maximum value they are willing to pay for the impression. 9/24/24 AM Tr. 42:16-44:6 (Milgrom); 9/11/24 AM Tr. 124:25-125:22 (Ravi) ("there's absolutely no gains in trying to shade your bid" in a second-price auction). Since the winner pays the second-price, bidding less than their maximum value would not save any money but could needlessly risk losing the impression. 9/24/24 AM Tr. 42:16-44:6 (Milgrom).

222. The second-price format did not disadvantage the seller because, if the auction rule was instead that winners paid the amount they bid, buyers would bid less and sellers would make less money. 9/24/24 AM Tr. 48:15-49:9 (Milgrom).

223. After header bidding became popular, exchanges faced the problem that "the second price that came out of" a second-price auction "was not a good bid to send in for header bidding." 9/24/24 AM Tr. 90:18-91:13 (Milgrom); *see also* 9/11/24 PM Tr. 67:12-18 (Ravi) (discussing his academic paper that examined ad exchanges' transition from second- to first-price auctions and "put forward the explanation that the cause was header bidding").

223.1. An "auction of auctions" that compares the winning bids from multiple exchanges "doesn't work when any of the [initial] auctions are second-price auctions" since "you don't get to compare the highest bid from the different auctions if only the second highest bids are being forwarded." 9/24/24 AM Tr. 122:12-123:15 (Milgrom); *see also id.* at 90:18-91:13 (Milgrom) ("Second-price auctions are wonderful when they run in isolation, but when you try to combine the clearing price from a second-price auction with anything else, it becomes a terrible mess.").

223.2. For example, a bidder who bids into Header Bidding Exchange A's second-price auction with a value of "$100, or $1,000" might win that auction but find themselves "represented by a $6 bid" (from the runner-up bidder) when Header Bidding Exchange A sends its winner into the header bidding auction. 9/24/24 AM Tr. 122:12-123:15 (Milgrom).

224. In response, industry participants started to move to a first-price auction format.

224.1. In a first-price auction, the bidder with the highest bid wins and pays the full amount that they bid. 9/11/24 AM Tr. 94:22-95:4 (Ravi); 9/24/24 AM Tr. 95:22-97:17 (Milgrom).

224.2. Unlike a second-price auction, in which a bidder should bid its maximum value for the impression, a bidder into a first-price auction should bid lower than their value, or "shade" its bid. 9/24/24 AM Tr. 95:22-97:21 (Milgrom); *see also id.* at 99:12-101:7 (Milgrom) (discussing academic work by Professor Ravi stating that bidders must shade bids into first-price auctions); 9/11/24 AM Tr. 121:25-122:18 (Ravi). If a bidder bids its maximum value, it may end up paying its maximum value, which would leave it with a "surplus" of zero, referring to the amount of value the bidder obtained from the impression. 9/24/24 AM Tr. 95:22-97:21 (Milgrom) ("You can't make any money if you bid $5 and your value is $5."); *see also* 9/11/24 AM Tr. 121:25-122:18 (Ravi) (a buyer who does not shade bids in a first-price auction "would not have any" "surplus or savings from having participated in this transaction").

225. When the industry first experimented with the first-price auction format, it took time for the prices paid in first-price auctions to stabilize. 9/24/24 AM Tr. 104:24-105:13

(Milgrom). As Professor Milgrom explained, as a mathematical matter the "average price" should be identical between a first-price auction and a second-price auction for the same impression. *Id.* at 103:24-104:23 (Milgrom). That revenue equivalence theorem only holds, however, "if everybody is bidding optimally," so when first-price auctions were first adopted price levels were not necessarily the same across first- and second-price auctions. *Id.* at 103:24-104:23 (Milgrom).

226. Bidders took time to optimize their strategies for bidding into first-price auctions. 9/24/24 AM Tr. 104:24-105:13 (Milgrom) (discussing academic work by Plaintiffs' expert Professor Weintraub showing that different price levels between first and second-price auctions dissipated over time as bidders learned to bid optimally into the first-price auction). "It's much harder to bid into a first-price auction than a second-price auction" because "you don't know how much you have to bid in order to win." *Id.* at 95:1-5, 95:22-97:17 (Milgrom). Optimizing a bid is "hard because it varies from auction to auction. It varies according to how much competition you expect, how many competitors, how strong they are, what they are likely to bid." *Id.* at 97:24-98:10 (Milgrom). Bidders must therefore "try to assess the probabilities that they'll bid different amounts in order to figure out what the risks and trade-offs are. And here, since you're bidding in millions or thousands of millions of auctions, each of which might have different answers to that question, it's hard." *Id.* at 97:24-98:10 (Milgrom).

227. During the period of transition from second-price to first-price auctions, the task of optimal bidding was made even more difficult when some exchanges experimented with auction rules that made it difficult to determine whether an auction was first-price or second-price. If "you bid 10 and pay 10, it doesn't take you long to figure out that you're bidding in a first-price auction," but if an exchange instead charged the winner "the average of their price and the second highest

price, their bid and the second highest bid, that will raise price, but it will make it a lot harder to tell from any individual bid." 9/24/24 AM Tr. 108:22-109:23 (Milgrom).

228. Non-transparent auctions, which made it difficult for bidders to figure out how to bid, were called "dirty" auctions. 9/24/24 AM Tr. 108:22-109:23 (Milgrom). Around 2016 to 2019, as more auctions adopted non-transparent pricing structures, industry participants observed that others were "playing games:"

228.1. At the time that PubMatic transitioned to a first-price auction, it wrote that there was "inconsistency across auctions and a lack of transparency into how each auction operates where that's created an environment where buyers don't have visibility into whether the auctions are being closed at first price or second price." 9/12/24 PM Tr. 119:8-16 (Goel).

228.2. An Index Exchange representative testified that "games were being played by exchanges and SSPs who were running a first-price auction but calling it a second-price auction." 9/9/24 PM Tr. 34:12-25 (Casale).

228.3. Bellack, a former Google product manager on the sell-side, testified that exchanges "were playing games with their auction logic" and "modifying their auctions in ways that were not fair and intended to advantage their own business." 9/19/24 AM Tr. 137:14-138:5 (Bellack).

2. Buying Tools Developed Bid Shading Features to Optimize Bidding into First-Price and Non-Transparent Auctions.

229. In response to the changing auction formats and challenges of "dirty" auctions, buying tools developed bid shading features that helped their advertiser customers bid optimally into new auctions. 9/24/24 AM Tr. 105:14-106:8 (Milgrom).

230. Bid shading features were necessary because, as explained above, advertisers overpaid if they bid into auctions as if they were second-price auctions but the auctions were not actually second-price.

230.1. "[I]f they're fooled, if they think it's a second-price auction and bid their value, they wind up paying too much. Their cost per impression goes up, and it's higher than it needs to be compared to optimal bidding." 9/24/24 AM Tr. 110:14-19 (Milgrom).

230.2. Put another way, "if it was actually a first-price auction under the hood, then the advertiser would have to pay the entire true value to the exchange, which means they end up with zero profits." 9/17/24 AM Tr. 148:14-23 (Jayaram); *see also id*. at 146:1-12, 147:10-148:13 (Jayaram); DTX-615 at 12 (2017 Google presentation with chart of exchanges that claimed to be second-price but ran auctions that resembled first-price auctions).

231. Bid shading tools were especially useful for smaller advertiser customers.

231.1. When faced with non-transparent auctions, advertisers have to resort to experimenting with their bidding to figure out whether an auction is first- or second-price and develop optimal bidding strategies. 9/10/24 AM Tr. 61:19-62:11 (Friedman) (advertising agency had to "mobilize very quickly during that time to manually reduce bids" into first-price auctions). The data and technical expertise required to build statistically robust bidding strategies can be challenging for small, individual advertisers to obtain. 9/11/24 PM 54:5-10 (Ravi) (buyers would typically "have to run experiments themselves trying

to figure out what's going in" if exchanges do not run clean second-price auctions).

231.2. Bidding into non-second-price auctions is particularly "hard because it varies from auction to auction. It varies according to how much competition you expect, how many competitors, how strong they are, what they are likely to bid." 9/24/24 AM Tr. 97:24-98:10 (Milgrom). Bidders must "try to assess the probabilities that they'll bid different amounts in order to figure out what the risks and trade-offs are. And here, since you're bidding in millions or thousands of millions of auctions, each of which might have different answers to that question, it's hard." *Id.* at 97:24-98:10 (Milgrom). For example, an advertising agency had to build its own "algorithm" with "a way to adjust bids to that first-price environment." 9/10/24 PM Tr. 61:19-62:11 (Friedman).

232. In order to help its advertiser customers "win the same impressions at lower prices" as exchanges transitioned their auction formats, DTX-615 at 14, 21 (2017 Google presentation about Project Poirot), Google introduced bid shading features into its buying tools: Project Poirot for DV360, and Project Marple for Google Ads. 9/24/24 AM Tr. 107:6-108:3 (Milgrom); Deposition of Eisar Lipkovitz Tr. 169:12-170:3; DTX-372 at 19, 26 (2017 Google presentation describing Projects Poirot and Marple).

233. Project Poirot was implemented only for DV360, a Google buying tool that Plaintiffs exclude from their alleged markets. 9/17/24 AM Tr. 85:8-10 (Jayaram). Project Poirot was not launched on Google Ads, the Google buying tool that is included in Plaintiffs' markets. 9/24/24 AM Tr. 107:6-107:13 (Milgrom).

234. Project Poirot tried to detect auctions that deviated from traditional second-price auctions by running daily exploration experiments on a small subset of an advertiser's bids into a particular exchange. 9/24/24 AM Tr. 107:14-108:3, 111:4-112:9 (Milgrom); *see also* DTX-615 at 13-14 (2017 Google presentation: "Objective: win the same impressions at lowest price"); 9/17/24 AM Tr. 146:1-12, 149:21-150:15 (Jayaram).

235. The experiments asked whether bidding the advertiser's true value for an impression in a particular exchange would maximize the advertiser's profit (or surplus). 9/17/24 AM Tr. 149:21-150:15 (Jayaram); 9/24/24 AM Tr. 111:4-112:9 (Milgrom); DTX-615 at 16. "[I]f the answer was yes, then they treated it like a second-price auction and set bids equal to the value. And if the answer was no, then they used the experimental results to figure out how much shading led to the highest profits, and they bid that way on the next day." 9/24/24 AM Tr. 111:4-112:9 (Milgrom); s*ee also* 9/11/24 PM 54:22-55:3 (Ravi).

236. Project Poirot created tangible benefits for the entire display advertising ecosystem. 9/11/24 PM 84:20-23 (Ravi).

237. Project Poirot benefited DV360's advertisers by helping them win the same impressions at lower prices, increasing advertiser surplus.

237.1. According to the results of some experiments, Poirot increased advertiser surplus by 6% and advertisers' conversions per dollar by 7%. DTX-615 at 21 (2017 Google presentation); *see also* 9/11/24 PM 53:17-20 (Ravi); 9/17/24 AM Tr. 151:3-18 (Jayaram) ("6 percent surplus increase" refers to the difference between the advertiser's "true value and the amount of money that they had to pay").

237.2. According to a Google experiment relied on by Plaintiffs' expert, Professor Weintraub, Project Poirot increased surplus for DV360 advertisers on third-party exchanges by 11.48%. 9/16/24 PM Tr. 89:21-90:6, 91:13-16 (Weintraub); PTX-518 at 3-4 (2017 Google spreadsheet reporting experiment results).

237.3. Another experiment Plaintiffs' expert relied on demonstrated increases of 8.8%. 9/16/24 PM Tr. 93:18-21, 94:15-23 (Weintraub) (another experiment relied on by Plaintiffs' expert showing increased DV360 advertiser surplus); PTX-860 at -683 (2018 Google document).

238. Advertisers were free to opt out of Project Poirot, but fewer than 1 percent chose to do so. DTX-615 at 21 (2017 Google presentation); 9/17/21 AM Tr. 151:19-152:14 (Jayaram) ("This percentage has continued to remain really small over the years, showing to us that advertisers truly value this feature."). As Professor Milgrom explained, determining the correct amount to shade bids "is really hard for customers to deal with." 9/24/24 AM Tr. 114:17-115:2 (Milgrom). Project Poirot is valuable because it "says we'll figure out for you which exchanges you need to adjust your bids, and we'll adjust your bids to maximize profits, and this is—and customers said, well, that was really hard, I'll let Google do that for me. Yes, very few customers opted out." 9/24/24 AM Tr. 114:17-115:2 (Milgrom).

239. Project Poirot also benefited publishers because, when advertiser surplus increases, "advertisers will spend more if they have more budget dollars; so [publishers] . . . probably get more budget dollars in the long run for the same inventory." 9/20/24 PM Tr. 125:17-23 (John); *see also* 9/24/24 AM Tr. 114:3-15 (Milgrom) ("One would expect over the longer term that, of course, this wouldn't be spend neutral, that if you're resulting in better performance for your

advertisers, they would increase the spending"); DTX-615 at 14 (2017 Google presentation stating "savings will buy additional similar impressions").

240. The impact of Project Poirot on rival exchanges varied.

240.1. Exchanges running clean second-price auctions, in addition to AdX, experienced increased spending after Project Poirot launched. DTX-615 at 21 (2017 Google presentation noting spend on dirty auction exchanges dropped by approximately 10% while spend on clean second-price auctions increased by 6%); *see also* 9/11/24 PM Tr. 55:4-22 (Ravi).

240.2. In contrast, exchanges on which advertisers gained surplus from shading bids were negatively impacted. 9/17/24 AM Tr. 155:9-17 (Jayaram) ("They're actually correlated. We were able to win the value for advertisers at a lower price, which is why you see the revenue going down, but the surplus went up as a result."). Exchanges that were "extracting a lot of advertiser surplus by running close to first-price auctions" had "the biggest negative impact." 9/17/24 AM Tr. 152:20-154:15 (Jayaram); *see also* DTX-615 at 12, 21 (OpenX and PubMatic had the highest cost/bid ratios).

241. Google invested resources in continuing to improve Poirot. Subsequent versions, including Poirot 2.0 in 2018, further benefited advertisers by increasing advertiser surplus even more. PTX-860 at -682 (2018 Google document showing surplus increase of 8.8%); 9/17/24 AM Tr. 154:14-155:17 (Jayaram).

242. Like the initial version of Poirot, Poirot 2.0 also had varying effects on rival exchanges. PTX-860 at -683-84. The figure created by Plaintiffs' expert, Professor Weintraub, that depicts DV360 spending before and after both versions of Project Poirot demonstrates that

DV360 spending on third-party exchanges continued to grow after both versions of Project Poirot were implemented. 9/16/24 PM Tr. 96:1-4 (Weintraub); PTX-1466.

243. Other buying tools, including The Trade Desk, Microsoft's Xandr, and AppNexus (before it was acquired) designed similar bid-shading features. 9/11/24 PM Tr. 56:22-57:1 (Ravi).

243.1. According to Microsoft, which offers a bid shading feature, bid shading is good for advertisers and for publishers. 9/20/24 PM Tr. 147:23-149:14 (John); *see also* DTX-1091 at 4 (2021 Microsoft document).

243.2. The Trade Desk's bid shading feature is called Predictive Clearing. 9/11/24 PM Tr. 120:4-11 (Dederick).

243.3. AppNexus also built a bid shading feature. DTX-422 at 222-23 (2017 AppNexus presentation); Deposition of Brian O'Kelley Tr. at 292:3-293:6.

244. Unlike Google, The Trade Desk charged for a feature analogous to Poirot. 9/17/24 AM Tr. 155:25-156:7 (Jayaram); PTX-734 at -596 (2019 Google document observing that "TTD takes a cut" of the savings generated by their bid-shading feature); 9/20/24 PM Tr. 149:11-20 (John).

245. Although Plaintiffs discussed Project Poirot at trial, Plaintiffs' experts did not opine that Poirot was anticompetitive. 9/20/24 AM Tr. 18:19-22 (Lee); 9/16/24 PM 116:14-22 (Abrantes-Metz); 9/16/24 PM Tr. 41:5-9 (Weintraub) (Professor Weintraub discussed Project Poirot but was not opining on any harm to competition).

246. Contrary to Plaintiffs' arguments, Project Poirot was not an attempt to attack header bidding by reducing DV360 bids into rival exchanges, but rather "the obvious thing to do" when the industry transitioned from second- to first-price auctions. 9/24/24 AM Tr. 115:16-25 (Milgrom) ("Q. Now, finally, Professor Milgrom, you've heard plaintiffs' experts opine in this case that Poirot

was pretextual and its actual purpose was to damage header bidding; do you agree? A. I think that's ridiculous. I'm sorry. Q. And why do you disagree? A. I mean, it's just the obvious thing that if you are serving advertisers and providing technology to help them to bid, this is the obvious thing to do. Everybody would do it if they were—any good business person would do that."). Plaintiffs' own expert Professor Ravi agreed that in a "first-price auction, it's a reasonable strategy to bid shade," 9/11/24 AM Tr. 122:5-18 (Ravi), and that "bid shading programs like Poirot are needed when facing auctions that don't run clean second-price auctions," 9/11/24 PM 53:25-54:4 (Ravi).

247. Plaintiffs also argued that the rationale for Project Poirot was pretextual because it did not shade bids into AdX. Plaintiffs' expert testified that Project Poirot should have shaded bids into AdX because, he claimed, Reserve Price Optimization ("RPO") and sell-side Dynamic Revenue Sharing ("DRS") caused AdX to deviate from a second-price auction. 9/11/24 AM 127:4-17 (Ravi).

248. Plaintiffs' argument does not make sense because Project Poirot was an algorithm that applied equally to all exchanges, including AdX.

248.1. Plaintiffs' expert conceded that Project Poirot determined whether and how much to shade bids based on empirical experiments, not based on reviewing exchange features. 9/11/24 PM Tr. 54:22-55:3 (Ravi). When Poirot ran experiments, it did not take into account whether an ad exchange was a competitor or whether an exchange participated in header bidding. 9/24/24 AM Tr. 112:10-19 (Milgrom); 9/17/24 AM Tr. 150:16-19 (Jayaram); 9/17/24 PM Tr. 42:5-43:4 (Jayaram).

248.2. Plaintiffs' expert also conceded that Project Poirot operated with respect to all exchanges the same way as of September 2017, that Project Poirot did not shade bids into AdX because experiments showed that shading bids into AdX would not increase advertiser surplus, and that Project Poirot likewise did not shade bids into other exchanges when its experiments showed that doing so would not increase advertiser surplus. 9/11/24 PM Tr. 54:11-55:22 (Ravi); *see also* 9/17/24 AM Tr. 150:16-22 (Jayaram) (Poirot applied "the same algorithmic framework" to "AdX as well as all of the third-party exchanges").

249. Moreover, neither RPO nor sell-side DRS caused AdX to deviate from a second-price auction.

249.1. The definition of a second-price auction is one in which (1) "the high bidder wins and [(2)] pays the higher of the floor price or the second highest bid." 9/24/24 PM Tr. 29:7-30:7 (Milgrom); *see also id.* at 30:8-12 (Milgrom) ("never heard anyone else use any other definition, actually"); 9/11/24 AM 95:5-8 (Ravi) (Plaintiffs' expert agreeing to definition).

249.2. By that universal definition, neither RPO nor DRS affected whether AdX is a second-price auction. RPO assisted publishers in setting optimal floor prices based on historical bidding data, 9/11/24 AM Tr. 127:18-128:8 (Ravi), and sell-side DRS varied AdX's revenue share to facilitate auctions where no bid would otherwise exceed the floor price. 9/11/24 PM Tr. 78:2-9 (Ravi). Neither of those optimizations changed the rules of (1) which bidder wins an AdX auction or (2) the amount paid by the winning bidder.

3. Unified First Price Auction

250. By 2019, the ad tech landscape was "evolving from (relative) chaos," with "multiple auctioneers, multiple calls, multiple layers of overlap—and above all that, the prices for the same inventory are different through different channels." DTX-705 at 7 (2019 Google presentation). Publishers had many sources of demand competing for the same impression through multiple pathways: direct deals (including Programmatic Guaranteed), Open Bidding, header bidding, AdX's second-price auction, and "dirty" or first-price auctions run by other exchanges. The complexity made it difficult to create a true "auction of auctions" in which all kinds of bids could compete against each other on equal footing, so that the advertiser that valued an impression most would win. DTX-705 at 7, 25-29 (2019 Google presentation depicting multiple ways the complex bidding landscape produced inefficient outcomes).

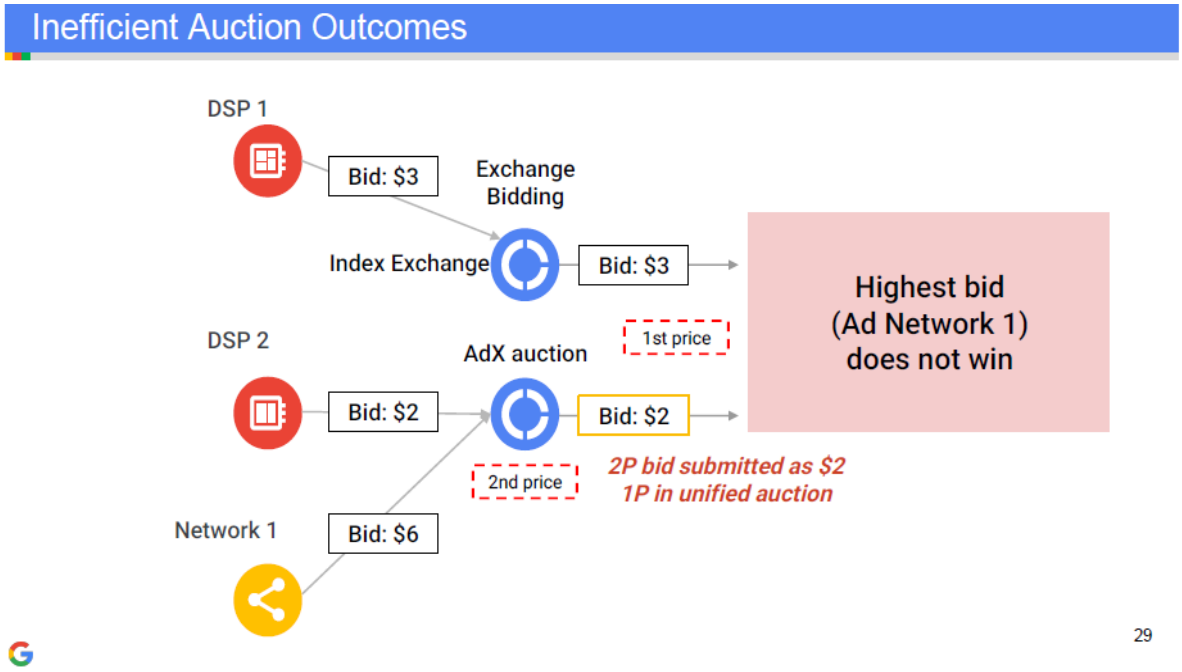
251. Advertisers and publishers were subject to a "cascading set of auctions," which "led to a lot of inefficiencies" that in turn "compromised publisher yield." 9/12/24 AM Tr. 111:21-112:10 (Srinivasan). Each auction would be subject to different rules regarding "auction dynamics, floors, information access," and more, making it difficult for all channels to compete on equal footing for the same inventory. DTX-701 at 11 (2019 Google presentation).

252. Further complicating the landscape, as explained above, different exchanges and tools ran different types of auctions, and the type of auction was not always transparent to the buyer. By 2019, AdX was "one of the few SSPs that were still operating in a second price world." 9/12/24 AM Tr. 113:20-114:9 (Srinivasan); *see also* 9/23/24 AM Tr. 94:13-17 (Korula).

253. This combination of auctions "was extremely confusing for buyers and for publishers in some cases." Because of auction dynamics, "[i]t was not necessarily the case that the highest bidder would win an auction because of the complex and interconnected auction

mechanics." 9/23/24 AM Tr. 93:24-94:9, 95:14-96:16 (Korula); *see also* Korula DX 1.29; 9/17/24 AM Tr. 158:18-159:7 (Jayaram).

254. Just some of the complexity, and the inefficient auction outcomes that would result from the combination of first-price and second-price auctions, is depicted below, Korula DX 1.29 The highest bid would not win because it was submitted into a second-price auction and competed against a bid from a first-price auction based on the second highest bid amount. 9/23/24 AM Tr. 95:14-96:16 (Korula).



Korula DX 1.29

255. In addition, in the pre-2019 landscape, some advertisers were forced to "throttle" queries—in other words, "essentially ignore a bunch of queries because they could not handle it"—because they were receiving up to billions of queries on a daily basis through duplicated channels. 9/12/24 AM Tr. 116:10-117:13, 117:9-13 (Srinivasan); *see also* PTX-1650 at -057 (2017 The Trade Desk presentation stating header bidding increased "QPS," or queries per second, for The Trade Desk). As a consequence, advertisers submitted fewer bids into auctions, which

would in turn reduce publisher revenues. 9/12/24 AM Tr. 118:5-11 (Srinivasan); *see also* DTX-701 at 13 (2019 Google presentation).

256. Exacerbating this complexity, one of the tactics publishers used to optimize revenue in this fragmented world was setting variable price floors. Publishers would separately set price floors—the minimum price to beat at auction—for each of the exchanges to which they sold inventory in an effort to "fish" for a higher price for the same impression. 9/24/24 AM Tr. 126:21-127:14 (Milgrom).

257. Variable price floors created complications for both advertisers and publishers.

257.1. Advertisers "struggle[d] to optimize when bidding across different channels due to lack of symmetry." DTX-1016 at 21 (2020 Google presentation); 9/24/24 AM Tr. 127:15-128:3 (Milgrom). Because "different floor prices could apply for the same impression," buyers were forced to adopt more involved bidding strategies in order to optimize their likelihood of winning desirable impressions at the lowest price possible. DTX-1016 at 21. In addition, because the same impression might be valued differently depending on the bidding channel, buyers struggled to "understand how to value the impression." DTX-1016 at 22. As an advertising agency representative testified, as a buyer he did not like variable price floors because "as a buyer, we want everything as low priced as possible." 9/10/24 PM Tr. 39:2-9 (Friedman).

257.2. Publishers, who had to manually set these price floors, adopted "complex monetization strategies" for gaming variable pricing floors that were "hard to maintain in the long term." DTX-1016 at 21. Because the market was so

complex, publishers also found it difficult to "understand which intermediary and yield strategies are adding true unique/incremental value" and whether they were at a "global optimum" of yield. DTX-701 at 12 (2019 Google presentation).

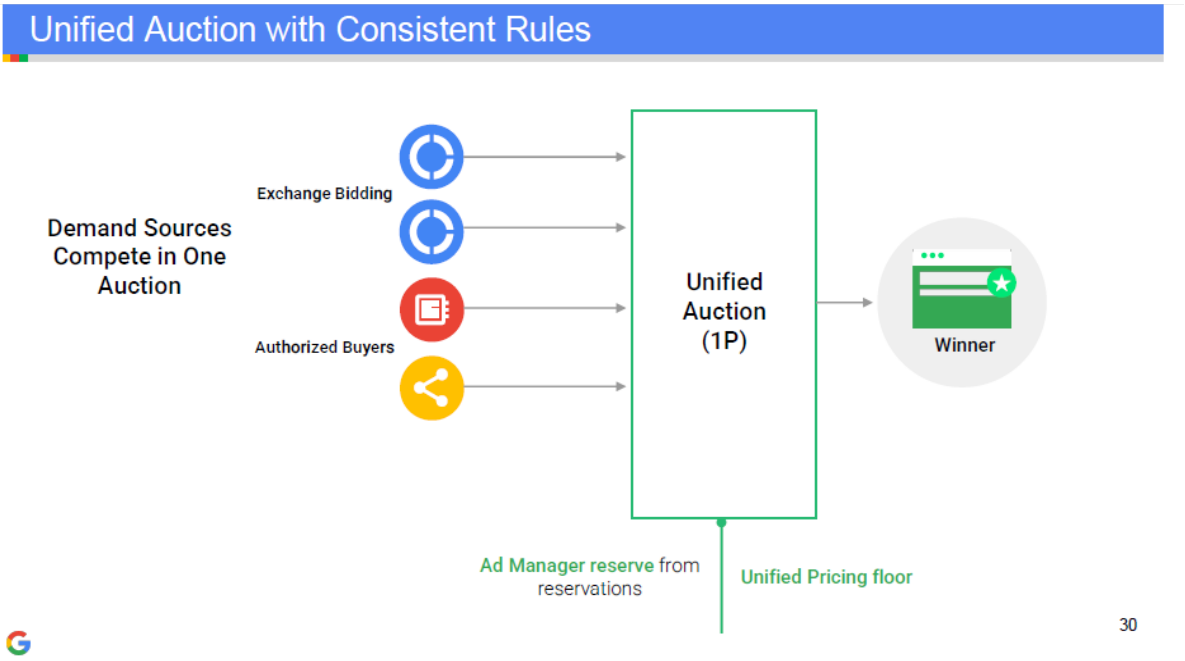
258. Given these challenges, Google sought to make changes to its products that would "establish a level playing field" for "buyers and sellers," and by extension, create a "more sustainable programmatic ecosystem." DTX-1016 at 20. Google believed that the increased market efficiency would "ultimately lead to greater ecosystem surplus and improved pub yield." DTX-701 at 20 (2019 Google presentation).

259. In 2019, in furtherance of those objectives, Google made four changes to GAM: (1) the adoption of the Unified First Price Auction; (2) the adoption of Unified Pricing Rules; (3) the removal of "last look" (which referred to a way that sellers could set up Dynamic Allocation to work with header bidding, *infra* ¶¶ 937, 941); and (4) "increased transparency into the auction" 9/12/24 AM Tr. 71:15-24, 113:20-115:9 (Srinivasan).

260. At a broad level, the "goal" of this package of changes "was to clean up, or rather improve the quality of the ecosystem" so that Google could "attract more ad dollars into additional advertising more broadly, because the current ecosystem was not sustainable." 9/12/24 AM Tr. 123:25-124:5 (Srinivasan). Google anticipated that the changes would improve "understanding and transparency into the auction and not allow publishers to treat it as a black box that they do not understand." *Id.* at 123:10-123:24 (Srinivasan). In addition, the changes would "increase publisher revenue" and benefit buyers on Google's exchange. *Id.* at 123:10-24 (Srinivasan).

261. The first of the changes, the Unified First Price Auction, compares all bids for a seller's inventory that have come in through a range of different channels simultaneously on a

first-price basis, including bids from Google Ads, DV360, other AdX bidders (Authorized Buyers), Open Bidding, and other non-guaranteed demand sources such as bids from third-party exchanges submitted via header bidding. 9/23/24 AM Tr. 96:17-24 (Korula). "[E]verybody was competing in the same auction with the same mechanics," so "there was no advantage for Google or anyone else." *Id.* at 96:25-97:6 (Korula); Korula DX 1.30.



Korula DX 1.30

262. At the same time, to move to a "simpler and more consistent auction," Google also adopted the Unified Pricing Rules ("UPR"). 9/12/24 AM Tr. 113:20-115:9 (Srinivasan). UPR extended the ability of publishers to configure pricing rules across all demand sources—not just AdX—and, at the same time, simplified the dimensions along which publishers set price floors. Publishers could set price floors that vary by the properties of the impression and characteristics or identity of the buyer but not price floors that vary by the identity of the exchange or demand source. *Id.* at 113:20-115:9 (Srinivasan).

263. As part of this bundle of changes, Google also increased transparency by sharing additional auction information with publishers and buyers. Google implemented these changes in

response to publisher feedback that they "wanted increased visibility into how many bids were eligible in each auction for the impressions that they were selling." 9/12/24 AM Tr. 127:4-12 (Srinivasan). Google gave publishers transparency into all the bids into an auction. Google also provided buyers with, for the winning bid, the next highest bid "what the other next highest bid in the auction was" and what the winning bid was, or "minimum bid to win." *Id.* at 125:9-24 (Srinivasan). This auction information was useful to sellers because it provided information about bid density, and to buyers because it provided data to "inform their bidding strategies." *Id.* at 125:9-24 (Srinivasan); *see also* DTX-829 at 2 (2019 Google document).

264. Even though Google had no means to provide the minimum bid to win data with header bidding competitors because it did not have a direct relationship with those competitors, Google did "provide the information to publishers in a form they can then use to pass to the header bidding partners because they can work with header bidding partners [Google does not] work with ourselves." 9/23/24 AM Tr. 99:8–100:12 (Korula).

265. Following extensive engagement with publisher and advertiser customers, *infra* ¶¶ 1049-1054, Google fully launched the bundle of changes consisting of the Unified First Price Auction, UPR, removing last look, and sharing auction information in September 2019. The effort was "a massive technical undertaking across dozens of engineers." DTX-829 at 2 (2019 Google document); *see also* 9/12/24 AM Tr. 143:21-144:2 (Srinivasan) (referring to DTX-829).

266. The ultimate launch of a Unified First Price Auction, along with UPR, "resulted in a simpler, fairer, and more transparent auction for publisher and demand partners." DTX-829 at 1. As Google explained in a contemporaneous document, "for Google, these changes reduce the complexity of our products and improve market competitiveness through greater consistency of rules among the auction participants." *Id.* at 2.

266.1. Layser, formerly at News Corp, testified that she agreed that "the change to the first-price auction" generally made the auction "more fair." 9/10/24 AM Tr. 68:6-10 (Layser).

266.2. Plaintiffs' own expert agreed that the Unified First Price Auction was "the best way" "to get the highest revenue for the publishers." 9/11/24 PM Tr. 76:13-20 (Ravi).

267. The new auction was more transparent, "with no clearing price games," for all parties. DTX-1016 at 22 (2020 Google presentation). Buyers would "pay what they bid" and could "better understand the value of the inventory and bid more confidently." DTX-1016 at 21-22. Sellers could adopt a "simpler floor pricing strategy" that no longer required them to "constantly optimize floors." DTX-1016 at 21.

268. Plaintiffs have argued that Google should have reached the functionality of the Unified First Price Auction, which compares real-time bid amounts from all demand sources simultaneously, earlier. *See, e.g.*, 9/11/24 PM Tr. 41:10-23 (Ravi) ("last look" was "not the most efficient system" because it did not increase publisher revenue "as much as a unified first-price auction that came later"); *id.* at 76:13-20 (Ravi) (the best way "to get the highest revenue for the publishers" was "the unified first-price auction"). As an initial matter, Plaintiffs' experts have not accounted for the considerable technical work that was required to launch the Unified First Price Auction once Google decided to build it. DTX-829 at 1 (November 2019 Google email) ; 9/11/24 PM Tr. 43:22-24 (Ravi) ("Q. Do you know how much technological work went into building unified first auction? A. No, I don't.").

269. Even more importantly, "when you evaluate auction design or auction programs and processes, you have to put them in context and understand how they work together with what's

already available in the market and capabilities and processes of the existing participants." 9/24/24 AM Tr. 27:1-7 (Milgrom). Plaintiffs ignore the long history of the display advertising ecosystem and the technological progress that was needed to get to the Unified First Price Auction. The industry needed to transition away from second-price auctions, develop tools to optimally bid into first-price auctions, and develop standards for real-time competition between demand sources. 9/24/24 AM Tr. 124:18-125:25 (Milgrom); 9/24/24 PM Tr. 33:22-34:12 (Milgrom) (not until five years after the introduction of Dynamic Allocation did header bidding develop to allow multiple exchanges to bid against each other). Once all of that had developed, Google implemented the Unified First Price Auction.

I. The Continuing Evolution of Ad Tech Tools

270. As promised in Google's opening statement, the ad tech market is "rapidly changing." 9/9/24 AM Tr. 46:11-21. The definitions and categories of ad tech tools do not stay fixed. In the last two decades, Google's and rivals' tools have "changed and morphed" and "shown up in multiple different places across this ecosystem." 9/20/24 PM Tr. 62:9-17 (Sheffer). The industry witnesses who testified at trial all agreed that display advertising has already changed considerably in two decades and will continue to be unpredictable in the future. *Infra* ¶¶ 1206-1207.

271. The history described above captures only a segment of the innovations that have shaped display advertising because it is focused on Plaintiffs' allegations and the products Plaintiffs presented evidence about. Plaintiffs' case highlighted one set of tools (publisher ad servers, ad exchanges, and third-party buying tools) that were first developed in the first decade of display advertising. Plaintiffs omitted some of the most significant developments in how advertisers and publishers connect, including in-house ad tech tools, supply path optimization, programmatic direct deals, and artificial intelligence.

1. Supply Path Optimization

272. One important development in the evolution of ad tech is supply path optimization, a push to improve return on investment for advertising spend by, among other things, eliminating the number of third-party intermediaries involved in an ad transaction. Through supply path optimization, advertisers and publishers are seeking "greater control" and to "cut[] clutter between media buyers and publishers." 9/10/24 PM Tr. 43:3-19 (Friedman).

273. Industry testimony and business documents agree on the popularity of supply path optimization initiatives.

273.1. A Google employee observed in a 2019 email: "Agencies and DSPs are also using supply path optimization to find the best performing route to a particular publisher, and that's often the exchange with the lowest fees." PTX-719 at -004-005.

273.2. A 2021 Xandr document stated that "the industry is trying to solve for" supply path optimization "in a myriad of ways." DTX-1091A at 6. Explaining the need for supply path optimization, Xandr wrote: "For example, if Xandr and Rubicon have access to the same inventory from The Wall Street Journal, but Xandr charges an 8.5% SSP revenue fee (SASC) whereas Rubicon charges a 12% revenue fee, Xandr provides more efficient path that puts more working media in the hands of the publisher." DTX-1091A at 6. Supply path optimization initiatives could vary from manually blocking certain exchanges in buying tools to build proprietary technology to assess supply paths. DTX-1091A at 6.

273.3. PubMatic expects "potential" for its supply path optimization offering to be "75 percent of PubMatic's total buyer activity." 9/12/24 PM Tr. 145:7-16 (Goel).

273.4. A 2023 product proposal and planning document from BidSwitch, a tool that facilitates connections between buy-side and sell-side tools and has been acquired by Criteo,[9] observed that both buy-side and sell-side tools "are moving from partners to competitors" because they are no longer transacting in a single pathway, but creating new pathways directly to advertisers and publishers. DTX-1544A at 7. [redacted] As examples, the document listed The Trade Desk and Criteo integrating directly with publishers, as well as Index Exchange and PubMatic "cutting deals with [advertising] agencies directly." DTX-1544A at 7.

274. The Trade Desk now has a major supply path optimization offering, OpenPath, that creates "a more direct supply path … on behalf of advertisers and agencies" by bypassing exchanges, including Google's ad exchange, and enabling advertisers buying on The Trade Desk's demand-side platform to plug directly into the publisher's ad server. 9/11/24 PM Tr. 152:5-21

[9] DTX-1544A is a "Product Proposals: 2-YR Forward Planning" document that was produced in this litigation by Criteo but created by BidSwitch, an ad tech provider that serves as "a passthrough between SSPs and DSPs," before it was acquired by Criteo. DTX-1544A at 2; Deposition of Todd Parsons Tr. 140:23-141:3, 142:20-24. BidSwitch builds connectivity, standardization, and optimization between ad tech tools, and the tool handles "many technical, tedious, or otherwise undesirable tasks associated with programmatic trading" on behalf of other ad tech providers. DTX-1544A at 3-5 BidSwitch also helps demand-side platforms manage "lower-priority" relationships with smaller supply-side platforms. DTX-1544A at 5.

(Dederick) (describing how The Trade Desk's supply path optimization tool, OpenPath, can bypass the exchange); *see also* 9/12/24 PM Tr. 40:4-9, 41:6-13, 46:3-11 (Dederick); 9/11/24 AM Tr. 116:14-117:4 (Dederick).

274.1. OpenPath can be used across multiple formats and channels, including across the web, connected TV, and in apps. 9/12/24 PM Tr. 45:1-6 (Dederick).

274.2. When an advertiser purchases from a publisher, like Disney, that uses their own in-house ad server, OpenPath bypasses not only the exchange, but also any fees that would be taken out by a third-party publisher ad server. 9/12/24 PM Tr. 43:9-44:6 (Dederick).

274.3. Even though The Trade Desk is adamant that it is a company that "explicitly sits on the buy side of the advertising industry," 9/11/24 PM Tr. 87:23-88:6 (Dederick), as part of its OpenPath feature The Trade Desk has entered into supply partnerships directly with publishers, 9/12/24 PM Tr. 45:11-17 (Dederick). The Trade Desk has announced in recent press releases that, through OpenPath, The Trade Desk is partnering with major digital content providers such as Reuters, The Washington Post, Gannett, USA Today, Conde Nast, BuzzFeed, the Los Angeles Times, and Forbes. 9/12/24 PM Tr. 45:18-24 (Dederick).

275. Goodway Group, an advertising agency, has entered into a "supply path optimization" arrangement with PubMatic. PubMatic lowers its fees to Goodway Group in exchange for Goodway Group directing the DSPs it bids into to bid higher on PubMatic inventory. 9/10/24 PM Tr. 44:1-25 (Friedman); *see also id.* at 46:11-17 (Friedman) (Goodway Group is trying to help PubMatic "win every auction they can").

276. Mediavine, a publisher that both sells its owned and operated inventory and assists other small publishers in monetizing their inventory, has created proprietary ad tech to facilitate "direct integrations" between its publisher inventory and buying tools. 9/25/24 PM Tr. 165:16-20 (Hochberger). Mediavine's tool bypasses exchanges by providing "direct connections to demand-side partners" so that "bidders are able to bid into the inventory." *Id.* at 178:1-10 (Hochberger) (these "direct connection[s]" are "an alternative to going through an SSP"). Mediavine's sell-side tools are directly integrated with buying tools such as Basis Technologies, Criteo, and The Trade Desk. *Id.* at 177:16-180:3 (Hochberger).

277. Publishers and advertisers are seeking to optimize supply paths not only to reduce costs, but also because additional intermediaries in supply paths can increase exposure to bad actors and create latency, safety and security risks, a lack of transparency, and more. DTX-1016 at 7, 8 (2020 Google presentation listing benefits of supply path optimization such as "[r]educing fraud and brand safety issues," as well as improving key performance indicators and buying power).

278. Supply path optimization initiatives create competitive pressure when they bypass certain ad tech tools.

278.1. For example, Jay Friedman, a long-time advertising agency employee, testified that supply path optimization agreements like the one his advertising agency entered into with PubMatic would create "healthy competition among [most] top exchanges." 9/10/24 PM Tr. 45:6-10 (Friedman). He further testified: "if other agencies and exchanges follow this model" of supply path optimization, "the industry will end up with—will eliminate the hangers-on that don't provide real value." *Id.* at 45:11-20 (Friedman). In other words, if

supply path optimization efforts continued to grow, exchanges would have to compete more fiercely.

[redacted]

279. Supply path optimization initiatives demonstrate that the display advertising landscape is constantly evolving. Historical categories of tools such as "advertiser ad networks," "ad exchanges," and "publisher ad servers" no longer capture the world of competitive pressures within ad tech.

2. In-House Ad Tech Tools

280. Many publishers, including the largest household name digital publishers today, can and do build proprietary ad tech tools to sell their owned-and-operated inventory—just like Google Ads existed to sell Google's owned-and-operated inventory before Google made additional tools to connect its advertisers to non-Google publishers, *supra* ¶¶ 30-32, 39. 9/9/24 PM Tr. 152:4-9, 154:17-24, 160:10-19 (Avery); 9/20/24 PM Tr. 72:9-2 (Sheffer).

281. Publishers that build their own ad tech tools can choose what functionalities in the ad tech stack they want to take in-house. When a publisher builds an in-house tool, that tool replaces a third-party tool the publisher would otherwise rely on. For example, after Disney built its own ad server it switched from Google Ad Manager to its proprietary ad server. 9/17/24 PM Tr. 123:9-11 (Helfand).

281.1. A publisher can choose to build proprietary ad tech that facilitates a transaction from end-to-end between advertiser and publisher. These tools are one form of supply path optimization because they reduce the number of intermediaries by facilitating the entire transaction in-house. 9/26/24 AM Tr.

105:9-21 (Israel). A publisher's integrated tool would include proprietary ad tech to manage its inventory sales (in-house publisher ad servers), conduct auctions (in-house auction tools), and sell directly to advertisers (self-service platforms, self-serve platforms, or integrated buying tools). 9/20/24 AM Tr. 32:8-33:11 (Lee); 9/26/24 AM Tr. 105:24-106:20 (Israel). The companies that now rely on integrated proprietary ad tech tools, such as Facebook, Amazon, SnapChat, and TikTok, are some of the largest publishers that account for large amounts of digital ad spend. *Infra* ¶¶ 337, 344, 351; 9/17/24 PM Tr. 119:8-20, 121:14-122:2 (Helfand); 9/26/24 AM Tr. 49:23-50:6, 60:24-61:7 (Israel).

281.2. A publisher can also choose to build proprietary ad tech for certain functionalities, but still rely on third-party ad tech to facilitate a match. For example, Disney has built a proprietary ad server, real-time ad exchange, and self-serve platform. 9/17/24 PM Tr. 116:13-117:7, 119:3-7 (Helfand). But it also relies on third-party ad tech tools, like the Magnite exchange or Amazon's SSP, to run auctions and submit the winning bids into Disney's tools. *Id.* at 124:18-125:13 (Helfand). Disney is also supplied with advertiser demand from The Trade Desk's demand-side platform. *Id.* at 125:19-23 (Helfand).

281.3. Or a publisher can choose to build proprietary ad tech that serves certain ads on its inventory and rely on third-party ad tech tools to serve other ads. For example, Disney's proprietary ad server serves video ads but not banner ads, and Disney relies on Google Ad Manager as the publisher ad server for some

of its properties and to sell non-video ads. 9/17/24 PM Tr. 131:24-132:11, 133:11-13 (Helfand).

3. Programmatic Direct Deals

282. Another way that the display advertising industry has continued to evolve is the increasing popularity of transacting direct deals through programmatic ad tech tools. 9/26/24 AM Tr. 85:22-86:19 (Israel); 9/9/24 AM Tr. 97:7-23 (Wolfe); DTX-308 at 6 (2016 Google presentation identifying as a product priority for Google's sell-side tools to "extend the benefits of programmatic" to direct deals to "capture high-value inventory").

283. By 2014, over 70% of display ad dollars were still spent through direct deals, but the process for setting up these deals remained manual and time intensive. DTX-428 at 3 (2014 Google document); *see also* DTX-308 at 8 (2016 Google product priority presentation: "80% of DFP media under management is directly sold").

284. Enabling advertisers and publishers to transact direct deals using programmatic tools would help both sides of the transaction "save time and money," "reduce waste and increase yield," and "save time/reduce bad debt." DTX-428 at 3 (2014 Google product design document).

285. "Programmatic guaranteed," or "programmatic direct," refers to the sale of display advertising inventory using programmatic tools that can facilitate direct transactions. 9/10/24 AM Tr. 146:13-20 (Friedman); 9/10/24 PM Tr. 21:21-22:1 (Friedman); 9/23/24 PM Tr. 51:16-21 (Stefaniu) (advertisers can use DV360 to enter into a deal with a publisher for "a guarantee for the delivery of a certain set of impressions and a certain set of criteria"); 9/25/24 PM Tr. 183:19-25 (Hochberger).

286. Google has developed Programmatic Guaranteed capabilities on its ad tech tools—DV360, AdX, and DFP—so that sellers and buyers can more efficiently negotiate and execute

direct deals. 9/18/24 AM Tr. 229:22-230:10 (Pappu); DTX-428 at 6 (2014 Google product design document).

286.1. On DFP, Google's Programmatic Guaranteed feature combines "some features of direct sold guaranteed ads but also some features that come from the programmatic or the real-time bidding world." 9/23/24 AM Tr. 17:8-18:16 (Korula). Publishers can use DFP to manage and serve all of their ad inventory, including ads sold through Programmatic Guaranteed transactions. 9/27/24 AM Tr. 77:19-25 (Wheatland).

286.2. In DV360, advertisers can select, for any given publisher, whether to purchase "guaranteed" or "non-guaranteed" inventory. 9/23/24 PM Tr. 51:1-15 (Stefaniu).

286.3. After the DV360 advertiser fills in all of the relevant selection criteria, Google transmits the RFP corresponding to the Programmatic Guaranteed deal to the publisher. The publisher can either agree to the terms and conditions, transacting a direct deal, or negotiate the terms and conditions using Google's interface before agreeing. 9/23/24 PM Tr. 51:22-52:10 (Stefaniu).

287. Google's Programmatic Guaranteed functionalities offer both advertisers and publishers benefits that they would not have in ordinary direct deals.

287.1. DFP publishers have access to a streamlined, centralized interface to manage direct and indirect transactions; receive guaranteed payments powered by Google; outsource invoicing and collection of payments to Google; and have a built-in digital process for negotiating and agreeing to direct deals. DTX-428 at 4.

287.2. DV360 buyers access increased controls; receive a single bill for indirect and direct transactions; and experience improved frequency control across transactions because DV360 manages the frequency with which the same ad is shown to the same user. DTX-428 at 4.

4. Artificial Intelligence

288. Artificial intelligence has become increasingly important to ad tech tools. *E.g.*, 9/11/24 PM Tr. 95:18-96:7 (Dederick) (testifying that The Trade Desk was "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.").

289. One way artificial intelligence has driven innovation is automated ad buying. Advertisers can submit their goals to a buying tool and instruct the buying tool to make decisions about ad buying on behalf of the advertiser in a "fast, accurate and cost-effective" way that provides better pricing "on an impression-by-impression basis." DTX-1484 at 8 (2022 The Trade Desk 10-K identifying "automation of ad buying" as a "trend in the advertising industry").

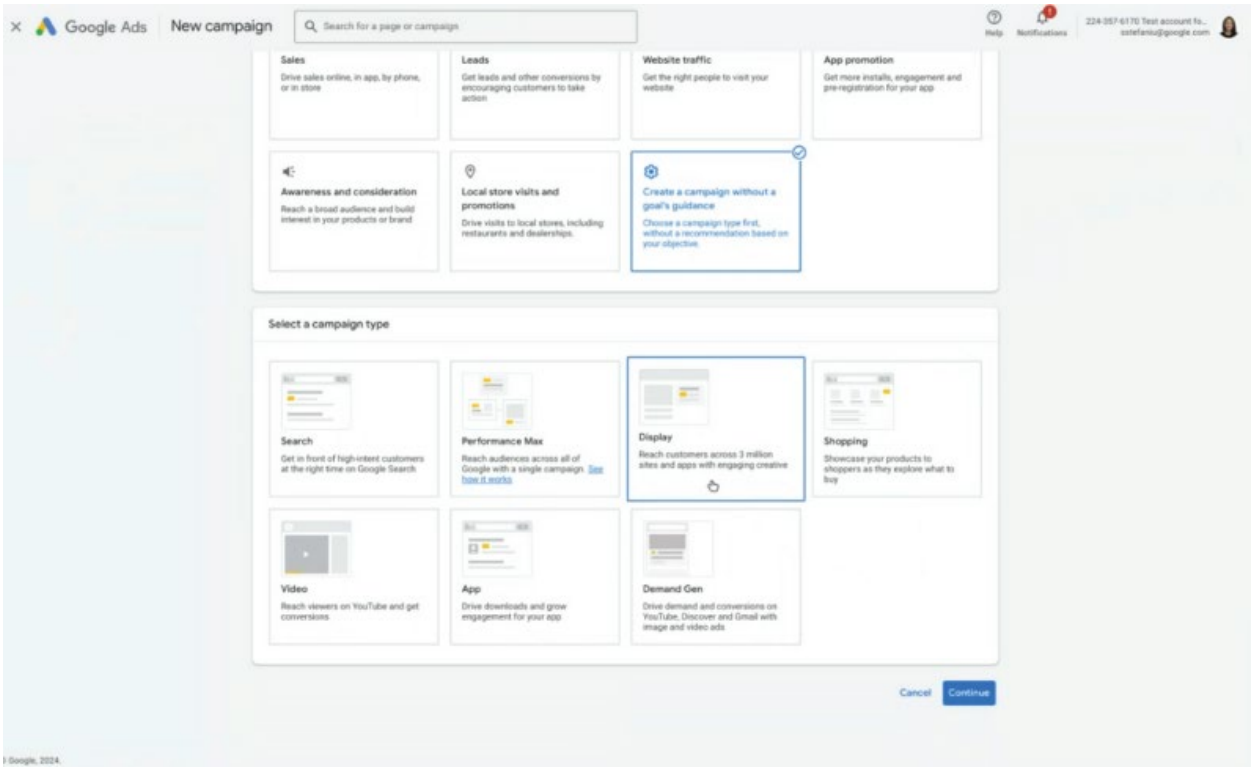
290. For example, Google created a feature called Performance Max on Google Ads that is powered by artificial intelligence and automates selection among ad channels and formats on behalf of advertisers in order to maximize their return on investment. 9/25/24 PM Tr. 34:12-22 (Stewart); DTX-1248N at 6.

291. Performance Max uses artificial intelligence to automatically create ads and purchase ad inventory across all the channels and formats that Google Ads can serve: YouTube, Google's other owned-and-operated properties, traditional banner ads on third-party websites or apps, native ads, Google Search ads, and more. DTX-1248N at 7; 9/25/24 PM Tr. 36:16-25 (Stewart).

292. Google does not charge for Performance Max. An advertiser who opts to use a Performance Max campaign in Google Ads pays the same rate that it would to run any other kind of Google Ads campaign. 9/25/24 PM Tr. 37:1-9 (Stewart).

293. Advertisers who upgraded their Smart Shopping campaigns to Google's Performance Max experienced an average of 12% conversion value increase. DTX-1248N at 9 (2022 Google Performance Max presentation). A 2022 Google deck announcing the launch of Performance Max described the feature as "the future of Ad's." DTX-1248N at 9.

294. When advertisers set up Google Ads and start a new campaign, as shown below in the Google Ads demonstration, Stefaniu DX 1.3, they can choose from a variety of campaign formats, including the AI-powered automated bidding through Performance Max. If an advertiser selects Performance Max, Google Ads will automatically optimize ad placement across display, video, and app ads on the advertiser's behalf. 9/23/24 PM Tr. 19:9-24 (Stefaniu).



REDACTED VERSION

295. The markets that Plaintiffs have concocted for this case do not account for any of these important developments that are shaping display advertising. Their asserted categories of tools—"advertiser ad networks," "ad exchanges," and "publisher ad servers"—do not capture the world of competitive pressures within ad tech. 9/20/24 PM Tr. 62:9-17 (Sheffer) ("A lot of the companies that are operating across this entire ecosystem have changed and morphed their offerings and have shown up in multiple different places across this ecosystem."). Plaintiffs exclude from their markets header bidding, all proprietary ad tech tools, supply path optimization, and (from some markets) programmatic guaranteed deals. *Infra* ¶¶ 377, 497, 561, 569. By defining markets in tools that transact one particular form of advertising, Plaintiffs also ignore the impact of artificial intelligence. *Infra* ¶¶ 421, 430.

* * *

296. Plaintiffs have not only excluded much of the innovation and evolution in display advertising, but also selectively focused their case on only a set of products in that broader history.

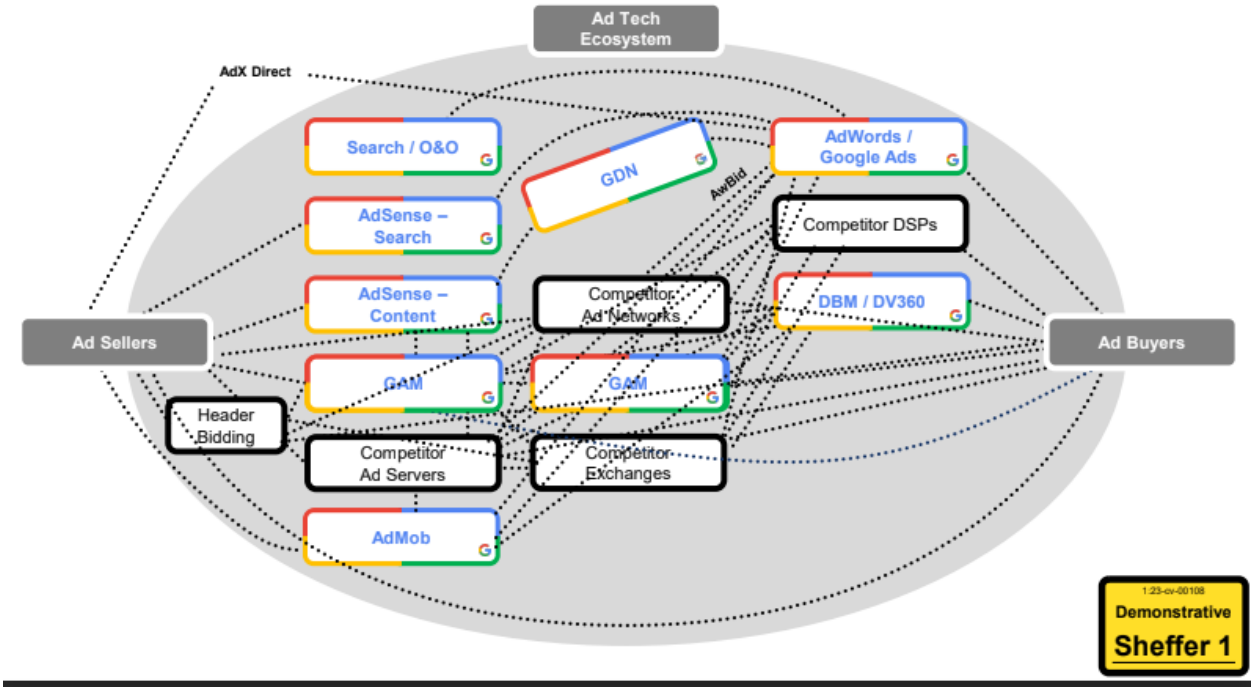
297. Sheffer, a Google sell-side executive with 18 years of experience in the industry, prepared a demonstrative, Sheffer DX1, that showed some of the components of the ad tech ecosystem (without even accounting for developments like supply path optimization and proprietary tools). 9/20/24 PM Tr. 45:23-45:4, 47:12-15 (Sheffer) (the "spaghetti football").

297.1. As depicted below, that ecosystem is made up of numerous connections that convey data or signals, money, and advertisements between software. Sheffer DX 1[10]; 9/20/24 PM Tr. 50:6-11, 62:9-17, 67:2-6 (Sheffer).

[10] Plaintiffs' counsel tried to argue that certain Google tools, including AdMob, AdSense for Search, AdSense for Content, and AdX Direct, should be removed from the depiction of the ad tech ecosystem for various reasons. 9/20/24 PM Tr. 109:3-112:23 (Sheffer). But all of those removals perceive the ecosystem only from the publishers' perspective and ignore that the tools in Plaintiffs' alleged markets connect to the tools they seek to exclude. For example, Google's ad

297.2. Each connection requires "a significant amount of technical work," regardless of whether the connection is between two proprietary pieces of software or Google software and third-party software. 9/20/24 PM Tr. 67:7-15 (Sheffer); *see also* 9/13/24 AM Tr. 25:18-26:1 (Kershaw) (explaining that "certainly every time you have to do an integration with another piece of technology, there's testing involved, there's lots of work that's involved, and that was a resource sucker").

297.3. Google has built numerous connections between Google tools and competitor tools, all shown below by lines connecting Google's products to its competitors' and all of which represent considerable time and resources expended. 9/20/24 PM Tr. 67:7-15 (Sheffer).



buying tool in one of Plaintiffs' defined markets—Google Ads—connects with the very tools that Plaintiffs tried to remove. Sheffer DX 1.

298. Even on Plaintiffs' own terms, focusing only on the components that are the subject of their allegations, Plaintiffs conveniently omit products and connections that do not fit into their narrative. Of Google's tools, Plaintiffs' markets in this case include only Google Ads, AdX, and DFP. Plaintiffs are purportedly concerned about the ability of publishers to access Google Ads demand without AdX or DFP. *Infra* ¶¶ 843, 895. However, Plaintiffs have excluded from their markets AdSense, AdMob, and DV360—even though publishers can use AdSense or AdMob to connect to Google Ads advertisers without AdX or DFP, and even though DV360 advertisers purchase through over 100 exchanges that are not AdX. *Supra* ¶¶ 47, 56-57, 155. Plaintiffs also discount the existence of AdX Direct, which connects publishers to Google Ads demand without DFP, and AwBid, which enables Google Ads advertisers to purchase from competitor exchanges. *Infra* ¶¶ 795, 871.

II. The Number of Participants in the Ad Tech Industry Keeps Growing, and the Competitors that Are Successfully Competing Keep Changing, Creating Dynamic and Rigorous Competition.

299. The history of the ad tech industry, only parts of which are captured above, is characterized by dynamic and fierce competition. Competitors must keep up with creative innovations—like yield management, Dynamic Allocation, real-time bidding, header bidding, first-price auctions, and unified auctions. The section below describes just a few examples of competitors that have successfully won market share from Google, including multiple that offer integrated ad tech stacks like Google, by bringing their own competitive advantages to the ad tech business.

300. Google's internal documents and employee testimony describe the significant pressures Google has felt from competition throughout time:

300.1. In 2015, Google performed a competitive assessment of a representative sample of competitors "because the competitive space in display and video

advertising is very large." 9/11/24 AM Tr. 58:10-23 (Bender). As the assessment noted, the competitive space was "highly saturated," and the analysis was "not meant to be entirely comprehensive." DTX-259 at 4.

300.2. In 2017, Google wrote: "Competition in the display space is strong and increasing," discussing Facebook, Amazon, and Criteo. DTX-486N at 38.

300.3. In 2019, Google wrote: "The Ads ecosystem is becoming increasingly complex and even more competitive." DTX-670 at 2.

300.4. In 2020, Google wrote: "Programmatic advertising has grown more complex, with multiple access points to inventory for Buyers and multiple demand sources for Publishers." DTX-1016 at 10.

300.5. A former Google executive who worked in Google's display ads business for 14 years testified that there was never a point in which "the competitive landscape felt less competitive and not more competitive." 9/11/24 AM Tr. 60:1-60:5 (Bender).

300.6. A Google sell-side executive who worked in the display ads business for 18 years, 9/20/24 PM Tr. 45:23-45:4 (Sheffer), testified that Google faces "fierce competition" from a wide variety of competitors including Microsoft, which "is a huge one"; Meta, another "huge competitor in terms of just ad dollars"; Amazon; Kevel; Equativ; Adzerk; AppLovin; IronSource; Unity; Tapjoy; Pangle; Chartboost; Media.net; Criteo; Magnite; and PubMatic. 9/20/24 PM Tr. 86:9-24, 87:19-88:18 (Sheffer).

301. To keep up with intense competition, Google must continuously invest in innovating and improving its products. Google's engineering expenditures investing in its display

ads business totaled $7.6 billion for the period 2017 to 2022—over $1 billion each year. DTX-1881 at 1; 9/26/24 AM Tr. 162:15-163:5 (Israel). Google's privacy and safety expenditures for the same time period totaled $604 million. DTX-1827 at 1; 9/26/24 AM Tr. 163:9-163:19 (Israel).

302. The documents and testimony from some of Google's biggest competitors likewise describe the ad tech industry as highly competitive, with disruptive new technologies developing, new products and services emerging, and competition expected to intensify.

302.1. AppNexus:

302.1.1. "This is an ideal time to make a big play. The battle lines are being drawn to determine the major winners of the upcoming cycle. [Amazon] is stealthy aggressive and winning. Google is a bit on the ropes and is surprisingly vulnerable. Facebook and Apple have retrenched but have the resources to come back with a new push sometime over the next 12-14 months." DTX-379 at 2 (2017 outline of AppNexus presentation to Microsoft's CEO); 9/20/24 PM Tr. 130:22-132:21 (John).

302.1.2. "Over the past three years, AppNexus has invested hundreds of millions of dollars (seriously) to create a publisher ad serv[er] that is a viable alternative to DFP. With the success of the first few migrations, Google is treating this as an existential threat." The AppNexus memo concluded: "Google is vulnerable on the sell-side," and AppNexus could compete by partnering with buy-side provider The Trade Desk. DTX-352 at 2-3 (2016 AppNexus-The Trade Desk partnership document).

302.2. Microsoft: "Q. But at this point, as you just said, there are multiple competitors, do you know how many at this point in 2021? A. It's the same list that I mentioned before, Amazon, Google, Facebook, Trade Desk, Magnite, PubMatic." 9/20/24 PM Tr. 142:8-13 (John); *id.* at 142:24-143:13 (John) (also identifying Yahoo, Freewheel, Index Exchange, and Criteo as competitors).

302.3. Meta: "Our business is highly competitive. Competition presents an ongoing threat to the success of our business. We compete with . . . companies that sell advertising to businesses looking to reach consumers and/or develop tools and systems for managing and optimizing advertising campaigns." DTX-1480 at 26 (2022 Meta 10-K).

302.4. Criteo: "We compete in the commerce media market and in the broader market for digital marketing and media monetization, primarily through Display Advertising. Our market is complex, rapidly evolving, highly competitive, still fragmented, and yet rapidly consolidating. We face significant competition in this market, which we expect to intensify in the future, partially as a result of potential new entrants in our market, including but not limited to large, well-established internet publishers and players." DTX-1420 at 29 (2022 Criteo 10-K); *see also* Deposition of Todd Parsons Tr. 89:13-90:16 (Criteo competes "vigorously" with Google, Amazon, and Facebook).

302.5. The Trade Desk:

302.5.1. "The market in which we participate is intensely competitive, and we may not be able to compete successfully with our current or future competitors." DTX-1484 at 5 (2022 10-K); *see also* 9/12/24 PM Tr. 26:4-27:10 (Dederick).

302.5.2. "We operate in a highly competitive and rapidly changing industry. We expect competition to persist and intensify in the future . . . . We may also face competition from new companies entering the market, including large established companies and companies that we do not yet know about or do not yet exist." DTX-1484 at 19 (2022 10-K).

302.6. Index Exchange: "Businesses are entering and leaving the business all the time," and "there's a lot of change in the individual businesses these days." 9/9/24 PM Tr. 41:8-21 (Casale).

302.7. Goodway Group: "Parts of digital advertising are fiercely competitive." 9/10/24 PM Tr. 47:21-48:5 (Friedman).

302.8. PubMatic: Competition with Google keeps PubMatic "on our toes in terms of pace of innovation, speed, nimbleness, customer service." 9/12/24 PM Tr. 84:6-15 (Goel). In SEC disclosures year after year, PubMatic has stated that "the digital advertising ecosystem is competitive and complex due to a variety of factors" and that PubMatic faces "intense competition in the marketplace and [is] confronted by rapidly changing technology, evolving industry standards, and consumer preferences." 9/12/24 PM Tr. 134:9-135:12 (Goel).

303. The competition described by the industry and experienced by Google bears the hallmarks of a healthy market, not one dominated by a single firm.

A. Microsoft

304. Microsoft has a long history in the ad tech landscape that has been driven, in part, by a series of strategic acquisitions and deals. Microsoft's current suite of ad tech tools combines the ad tech that Microsoft itself developed with ad tech that it acquired, including (but not limited to) the Xandr suite of tools formerly known as AppNexus tools.[11] Microsoft, and previously AppNexus (later rebranded as Xandr), have been competing with Google via their integrated ad tech offerings for the past two decades.

305. Microsoft is a publisher that owns many digital properties, ranging from its own search engine, Bing; to a news site, MSN; an email service, Outlook; an internet browser, Edge; a gaming console, Xbox; a social media platform, LinkedIn; and a video call platform, Skype. 9/20/24 PM Tr. 123:22-123:2, 130:16-21, 135:3-15 (John).

306. Microsoft launched MSN adCenter, its first digital advertising platform, in 2006 and expanded it in 2010 through a joint venture on Yahoo Search and Bing. Israel DX 1; 9/26/24 AM Tr. 161:7-162:10 (Israel).

307. In 2007, Microsoft competed against Google to acquire DoubleClick, in furtherance of Microsoft's goal "to become the leading ad platform for all media." DTX-7 at 2, 9 (Apr. 2007 Microsoft presentation); 9/20/24 PM Tr. 121:21-123:6 (John). After Microsoft learned that its

[11] Benneaser John, current VP of engineering at Microsoft, testified as the corporate representative of Microsoft, including about topics relating to Xandr, which was acquired by Microsoft in 2022, and AppNexus, the predecessor to Xandr that was acquired by AT&T in 2018 and integrated into AT&T's new tech offering, branded as Xandr. 9/20/24 PM Tr. 121:2-8 (John).

efforts to outbid Google for DoubleClick had failed, Microsoft tried to persuade the Federal Trade Commission to block Google's acquisition. 9/20/24 PM Tr. 122:23-123:14 (John).

308. Before it was acquired by Microsoft, AppNexus, which was founded in 2007, was an ad tech company that offered both buy- and sell-side tools. 9/20/24 PM Tr. 121:9-14 (John); Deposition of Brian O'Kelley Tr. 57:22-23.

308.1. AppNexus had an end-to-end ad tech stack, with a demand-side platform, supply-side platform (i.e., an exchange), and a publisher ad server. 9/20/24 PM Tr. 129:12-17 (John); DTX-1487 at 5 (AppNexus document describing the "AppNexus Publisher Suite" as an "end-to-end platform future-built for all channels, screens, and formats").

308.2. Microsoft and AppNexus had a long history of working together to compete against ad tech companies like Google, Facebook, and Amazon.

308.2.1. A 2017 document on behalf of Brian O'Kelley, AppNexus CEO and co-founder, bore the title "satya outline" (referring to Satya Nadella, CEO of Microsoft) and stated: "It seems to be in Microsoft's interests . . . to have a advertising ecosystem that isn't dependent on Google/FB/Amazon." "AppNexus and Microsoft have the combined assets to create a third digital advertising platform/ecosystem," which would provide "opportunities" such as the ability to "create [the] third end-to-end digital advertising platform to compete with Google and Facebook." DTX-379 at 1-3.

308.2.2. Microsoft and AppNexus also partnered to "route all Microsoft proprietary demand and O&O supply through AppNexus to anchor an alternative exchange/marketplace to Google and Facebook," reaching "exclusive agreement" to route at least 95% of Microsoft's remnant inventory through AppNexus. 9/20/24 PM Tr. 129:18-130:8, 134:9-135:25 (John). The partnership was "a strong success." *Id.* (John).

308.3. As of 2017, AppNexus perceived Google—particularly its publisher ad server—as being "on the ropes" and "surprisingly vulnerable." DTX-379 at 2 (2017 outline of AppNexus presentation to Microsoft's CEO). According to AppNexus, as a "market leader" it had found an opportunity to "push based on how Google and AppNexus was playing in the market on the publisher side, as well as the demand side." 9/20/24 PM Tr. 130:22-131:21 (John). Specifically, AppNexus saw that "publishers were looking for open, better monetization, and they were looking for optionality," so AppNexus "built [its] own ad server and used that as an opportunity to help [its] publisher ecosystem." 9/20/24 PM Tr. 130:22-131:21 (John).

308.4. AppNexus believed that it could—and did—win full-stack ad serving deals against DFP. DTX-379 at 2 (2017 outline of AppNexus presentation to Microsoft CEO); 9/20/24 PM Tr. 133:1-21 (John) ("Axel Springer was one of our customers we migrated off Google. Schipsted was another customer we migrated off of Google.").

308.5. Further competing against Google, AppNexus also fueled the "growth of header bidding to undermine AdX." DTX-379 at 2 (2017 outline of AppNexus presentation to Microsoft CEO); 9/20/24 PM Tr. 133:22-134:8 (John) ("Header bidding was our solution to empower the publishers to make better monetization, and Google was—Google saw the down slow or slowdown after we launched header bidding. So we wanted to leverage that growth to win the deals….").

308.6. AppNexus viewed Amazon as a competitor in ad tech as well. A 2017 document observed that Amazon was "stealthy aggressive and winning." DTX-379 at 2 (2017 outline of presentation to Microsoft CEO). Amazon had "both retail dollars, as well as buyers," and its advertising platform was "growing aggressively" and "taking the demand dollars that would go to the open web into the closed Amazon ecosystem." 9/20/24 PM Tr. 131:22-132:11 (John).

308.7. AppNexus also viewed Facebook, The Trade Desk, Magnite (formerly known as Rubicon), PubMatic, and Index Exchange as competitors, and perceived Apple as a notable new market entrant. DTX-379 at 2 (2017 outline of AppNexus presentation to Microsoft's CEO); 9/20/24 PM Tr. 132:12-21 (John) ("There were multiple competitors on the buy-side and sell-side.").

309. Returning to Microsoft, in 2015 Microsoft entered into a deal with AOL for AOL to manage sales of Microsoft's inventory across various Microsoft products. Israel DX 1; 9/26/24 AM Tr. 161:7-162:10 (Israel).

310. In 2016, Microsoft acquired LinkedIn, a major business and employment-focused social media platform. Israel DX 1; 9/26/24 AM Tr. 161:7-162:10 (Israel); 9/20/24 PM Tr. 86:25-87:18 (Sheffer) (Microsoft's purchase of LinkedIn "gave them user data that they're certainly using to create an advertising business"); 9/20/24 PM Tr. 130:16-21 (John).

311. In 2018, as part of its Microsoft Advertising offering, Microsoft launched the Microsoft Audience Network. Israel DX 1; 9/26/24 AM Tr. 161:7-162:10 (Israel).

311.1. Microsoft Audience Network was built on the "advertising demand" offered by Microsoft's "search business." 9/20/24 PM Tr. 86:25-87:18 (Sheffer). The buying tool enables Bing search advertisers to extend their campaigns to purchase display ads on both Microsoft's owned-and-operated properties (like MSN, Outlook, and Xbox) and third-party publisher properties that cover "most other publishers," such as CNN, Bloomberg, Wall Street Journal, and New York Times. 9/20/24 PM Tr. 123:19-124:15, 126:5-21 (John); DTX-847 at 9, 14-16 (2019 "Why Microsoft Advertising" presentation).

311.2. Microsoft Audience Network is similar to Google Ads in that both permit advertisers to buy search ads and display ads on both owned-and-operated and third-party properties. 9/20/24 PM Tr. 124:16-19 (John); *id.* at 144:11-19 (John) ("Q. And just so I make sure I understand this, those are the same advertisers who sometimes advertise on search are now advertising in nonsearch placements, right ? A. Yes, it is."); 9/26/24 AM Tr. 152:18-154:18 (Israel).

311.3. Microsoft recognizes Google Ads as a competitor to Microsoft Audience Network, yet Microsoft Audience Network is excluded from Plaintiffs'

alleged market for "advertiser ad networks." 9/20/24 PM Tr. 124:20-23 (John) (Microsoft Audience Network competes with Google Ads); 9/26/24 AM Tr. 152:18-154:18 (Israel) (Plaintiffs omit Microsoft Audience Network from their asserted market that Google Ads competes in).

311.4. Microsoft also acknowledges the ad buying tools operated by Facebook, Amazon, and The Trade Desk as competitors to Microsoft Audience Network. Those tools are similarly excluded from Plaintiffs' alleged market for "advertiser ad networks." 9/20/24 PM Tr. 124:24-125:16 (John); 9/26/24 AM Tr. 38:19-40:19 (Israel).

311.5. The Microsoft Audience Network experienced significant revenue growth, even prior to Microsoft's acquisition and integration of Xandr. DTX-847 at 22 (2019 "Why Microsoft Advertising" presentation); DTX-1840 (Israel Report Figure 19: Microsoft Audience Network U.S. Spending, Apr 2020-2022); 9/20/24 PM Tr. 126:22-127:12 (John); 9/26/24 AM Tr. 153:16-154:18 (Israel).

312. Google competes with Microsoft Audience Network, but Google has also created a feature to help Google Ads advertisers easily import their Google advertising campaign settings directly into Microsoft Audience Network so that advertisers can use both tools without having to choose just one. DTX-1129 (2021 Microsoft presentation titled "Google Import Feature Guide"). The Microsoft representative explained how this "feature of Google" helps advertisers: "[A]s an advertiser, you can go to Google and create a campaign, set up the target audience, set up the keywords, set up the budget, all of those things, and those campaigns run on Google. And if the same advertisers don't want to come and set up all the metadata in Microsoft, Google has a feature

that exposes only the metadata to Microsoft Advertising. An advertiser can log in to Microsoft Advertising, click 'Google import' as it shows on the screen, and the metadata will come into the server. . . . And all the bidding happens within the Microsoft platform." 9/20/24 PM Tr. 127:13-128:22 (John).

313. In 2019, Microsoft also acquired Promote IQ, a retail media ad platform that facilitates buying and selling targeted ads on retail websites like Kroger, Office Depot, Kohl's, and Dick's Sporting Goods. 9/20/24 PM Tr. 143:23-144:10 (John); DTX-1288 at 4 (2022 "Advertising at Microsoft" presentation); Israel DX 1; 9/26/24 AM Tr. 161:7-162:10 (Israel).

314. In 2018, AT&T had acquired AppNexus "for its end-to-end tech" and integrated the AppNexus tools into its new ad tech offering, branded as Xandr. DTX-939 at 1 (2020 Xandr document, explaining that, "as AT&T sought to launch its advertising business, the acquisition of an ad tech platform was central to the strategy, with AppNexus selected in part due to having both buy-side and sell-side capabilities"). Following that acquisition, in 2019 Google referred to AppNexus as its "primary full-stack competition."[12] DTX-801 at 5.

315. In 2022 (a little over a year before Plaintiffs filed this action), Microsoft acquired Xandr from AT&T for $900 million. DTX-1203 at 3 (2021 Microsoft document); 9/20/24 PM Tr. 121:2-11, 129:1-8, 136:10-12, 140:21-22 (John).

315.1. Even before the acquisition, Microsoft and Xandr had been successful partners in display advertising partners. 9/20/24 PM Tr. 143:14-22 (John).

315.2. Prior to the Xandr acquisition, Microsoft Advertising was already "a [redacted] digital advertising business, primarily built on Search (Bing) with the

[12] Even after AppNexus was acquired and rebranded as Xandr, industry participants in many instances continue to refer to it as AppNexus. *See, e.g.,* 9/26/24 PM Tr. 143:17-24 (Glogovsky).

Microsoft Audience Network (MSAN) as a more recent and fast-growing solution for non-Search advertising." DTX-1203 at 4 (2021 Microsoft document).

315.3. When considering the acquisition, the Microsoft Board of Directors was informed that the acquisition would help Microsoft continue to compete against Amazon, Google, Facebook, The Trade Desk, Magnite, PubMatic, Yahoo, FreeWheel, Index Exchange, Criteo, and others because Xandr offered "(1) A globally-deployed DSP that will expand Microsoft data and demand across the Open Web, (2) An SSP used by over 2,200 premium publishers to manage and optimize advertising against their supply, (3) Strong video and Connected TV assets and investments, and (4) A media platform which enables advertisers, publishers, and retail clients to buy and sell media in secure marketplaces and across the internet." DTX-1203 at 4 (2021 Microsoft document); 9/20/24 PM Tr. 140:23-143:13 (John).

315.4. The Microsoft Board was also told that "[redacted] DTX-1203 at 4 (2021 Microsoft document).

315.5. Microsoft acquired "Xandr Invest," a "buying platform that offers cross-screen buying (TV, Video, and Digital), targeting, measurement, and forecasting"; "Xandr Monetize," a "selling platform that includes ad server

capabilities, yield analytics, monetization tools across channels and formats, and linear TV sell-side optimization"; and "Xandr Curate," a "data marketplace that enables customers to create custom packages of supply & data across multiple publishers to sell programmatically to buyers on any DSP." DTX-1203 at 5 (2021 Microsoft document).

315.6. As Sheffer testified, Microsoft's Xandr Monetize ad server is "a very strong piece of technology." 9/20/24 PM Tr. 86:25-87:18 (Sheffer). The Xandr ad server partners with the header bidding wrapper Prebid to connect publishers to even more demand from header bidding. DTX-1083 at 15-16 (2021 Xandr presentation).

315.7. At the time of the acquisition, Microsoft strategy included integrating "[redacted]" DTX-1203 at 7 (2021 Microsoft document).

316. Following the acquisition, Microsoft integrated Xandr's products with its other offerings. Internal documents observed that the combination of Xandr's and Microsoft's ad tech tools offered a significant competitive advantage.

316.1. For publishers, the "integrated platform advantage provides an optimized path to demand through [Xandr] Invest DSP, maximizing revenue that reaches" them. DTX-1524A at 16 (2023 "Welcome to Microsoft Advertising" presentation).

316.2. Additionally, Microsoft expanded the advertiser demand available on Xandr's supply-side tools by increasing bidding by Microsoft Audience Network on Xandr, and, for advertisers, Microsoft provided Microsoft user data for

targeting. DTX-1376 at 2-3 (Nov. 2022 Xandr synergies document); 9/20/24 PM Tr. 149:21-150:7 (John) (Xandr has access to first-party data).

317. Plaintiffs allege that competition in their asserted ad exchange and publisher ad server markets are foreclosed because Google Ads has access to "unique demand" that competitors need access to in order to compete effectively. *E.g.*, 9/19/24 PM Tr. 89:8-12 (Lee); *infra* ¶¶ 843, 895. But, after the Xandr acquisition, Microsoft recognized that it too could offer publishers "Unique Demand," "Unique Data," and "Unique Inventory." DTX-1376 at 2-4 (2022 Xandr synergies document). Microsoft even began "working on a project to unify Microsoft's first-party data and Xandr's third-party data" in order "to join the data to scale the audience." 9/23/24 PM Tr. 139:7-140:15 (John); DTX-1376 at 2-4 (2022 Xandr synergies document).

318. Microsoft has described its integrated ad tech stack as offering unique benefits to advertisers and publishers that a non-integrated stack would lack.

318.1. As its corporate representative testified: "When you run a marketplace, connecting the buyers and sellers through the underlying same platform, will yield better results for advertisers and that—and avoid errors; and those are the efficiencies when you run a marketplace both buy and sell in the same ecosystem." 9/20/24 PM Tr. 137:3-9 (John). The "linkage between buy and sell side" (1) enables advertisers to make better matches because user data is in the same underlying infrastructure; (2) reduces errors; and (3) enables advertisers to have more visibility into the supply available through Microsoft's ecosystem. 9/20/24 PM Tr. 137:3-21 (John).

318.2. A 2019 Microsoft presentation to advertisers touted "massive reach you can trust," highlighting the importance of vetted inventory because advertisers

view their brands as "precious assets" and do not want their "ads showing next to shady content and tragic current events." DTX-847 at 16; 9/24/24 PM Tr. 141:4-6 (John) (an integrated platform helps prevent fraud).

318.3. A 2022 Microsoft deck identified "benefits of an end-to-end solution" that include "more value from media spend," "seamless deals troubleshooting," and "streamlined transactions." DTX-1524 at 16.

318.4. Before it was acquired by Microsoft, Xandr perceived the same benefits of integration. Xandr's integrated platform helped it "increase its" revenue share, "increase value for customers," create "tech efficiencies," and "ensure its high-value data stays within its platform." DTX-939 at 2 (2020 Xandr presentation); *see also id.* at 1-2 ("Why our DSP and SSP together offer greater advantages" included "Increased value for customers" in the form of "visibility into path of spend"; "Tech efficiencies / access: The combination of Invest [Xandr's DSP] and Monetize [Xandr's SSP] offers unique value for agencies and advertisers, with more direct supply access, a 100% match rate and 0% discrepancy between platforms"; a "Programmatic 'Flywheel'" because "The majority of programmatic spend that reaches our Monetize supply comes from Invest"; and "Brand safety / data compliance").

319. Microsoft has described its new combined offering as "one of the world's largest marketplaces," with an "expansive" advertising ecosystem that reaches over one billion users "across different audiences and different formats" that include "display, audio, video," "CTV, as well as "gaming, shopper marketing and native." DTX-1756 at 2 (Microsoft webpage); *see also*

DTX-1384 at 2 (2022 outline for Xandr synergies presentation); 9/23/24 PM Tr. 140:16-143:3 (John).

319.1. Microsoft plans to develop what it calls a "Meta DSP," or a "fully integrated Omnichannel DSP that provides an easy way to run omnichannel campaigns using premium inventory and exclusive data" across search, display, native, video, CTV, digital out-of-home, traditional TV, gaming, audio, and social ads. DTX-1288 at 11 (2022 "Advertising at Microsoft" presentation); *see also* 9/23/24 PM Tr. 143:15-144:24 (John) ("An omnichannel DSP or campaign is where a buyer can buy multiple formats through one DSP.").

320. In 2022, Microsoft beat Google to win a deal to become Netflix's ad tech provider. 9/20/24 PM Tr. 144:20-23 (John); 9/20/24 PM Tr. 99:1-21 (Sheffer). Netflix, a video streaming service, had been "looking for a partner for both ad technology, ad serving in particular, as well as a partner that would sell their streaming video inventory for advertisements on a global basis." 9/20/24 PM Tr. 99:1-16 (Sheffer).

321. Microsoft's ownership of Xandr was a "critical element" in Netflix choosing Microsoft. 9/20/24 PM Tr. 145:6-18 (John). Google had made concessions in an attempt to win the deal, such as by agreeing to do development work for Netflix's specific ad tech requirements, providing Google's sales team to "represent their streaming inventory against all their videos that they put ads against," and offering a "financial guarantee" for the sale of Netflix inventory. 9/20/24 PM Tr. 100:14-20 (Sheffer). Even those concessions were not enough to win the deal. Microsoft was more willing than Google to offer Netflix specific development for Netflix's ad tech stack and a "revenue guarantee for the inventory" that would be sold. *Id.* at 99:24-100:13 (Sheffer).

322. Winning the Netflix business was "a big deal" for Microsoft because "Netflix is one of the premium publishers" that was launching an ad supported business for the first time, and "has a good target audience that advertisers are looking to reach." 9/20/24 PM Tr. 145:6-18 (John).

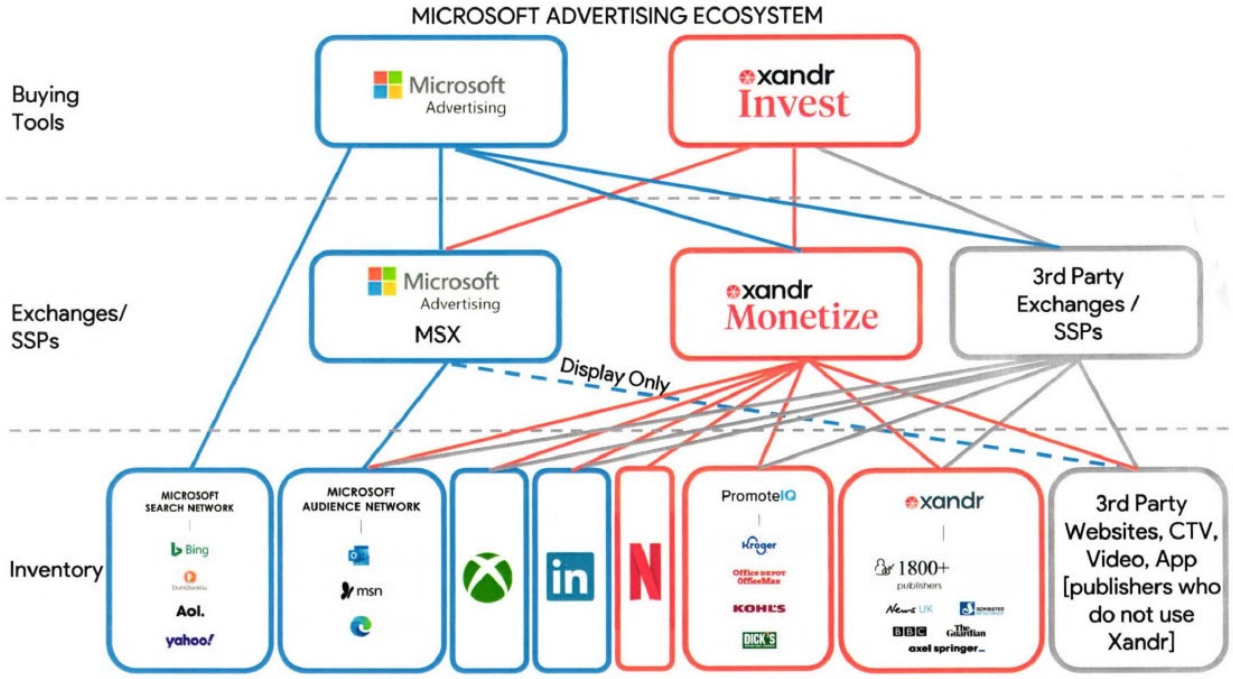
322.1. Microsoft winning the Netflix deal created a "halo effect" because "the reason that Netflix chose Microsoft and Xandr is now going to be publicly known, and that will bring additional value and additional opportunities for Microsoft." 9/20/24 PM Tr. 145:19-146:14 (John).

322.2. In connection with this "halo effect," "major CTV platforms and publishers have reached out for more information on Microsoft Advertising solutions including—[redacted]," and "DSPs and technology partners including [redacted] all reached out for more engagement on advertising solutions." DTX-1367A at 2 (2022 Microsoft presentation about Netflix deal); 9/20/24 PM Tr. 146:9-147:5 (John); Deposition of Benneaser John Tr. 109:8-110:8 (sealed testimony referenced at 9/20/24 PM Tr. 146:9-147:5 (John)).

323. In 2022, Microsoft also announced that it would start offering display ads on its gaming platform, Xbox, which Microsoft planned to grow by acquiring the major gaming company Activision Blizzard. 9/20/24 PM Tr. 150:12-22 (John); Israel DX 1; 9/26/24 AM Tr. 161:7-162:10 (Israel); 9/20/24 PM Tr. 86:25-87:18 (Sheffer) (Microsoft's purchase of Activision Blizzard "gives them a strong connection to a new interaction with users").

324. The consequence of Microsoft's development of proprietary ad tech and its acquisitions, as shown below, DTX-1757, is an ad tech ecosystem that includes many tools

connecting advertisers with publishers in a variety of ad formats and channels, including connecting advertisers to third-party publishers and to Microsoft's owned-and-operated inventory. DTX-1288 at 3-4 (2022 "Advertising at Microsoft" presentation); DTX-1755 (depiction of Microsoft ad tech stack) 9/26/24 AM Tr. 161:7-162:10 (Israel) ("Microsoft is now in the position of having first owned-and-operated properties, a buying tool, and a full ad stack very similar to Google").



325. Google acknowledges and treats Microsoft as a significant competitor in display ads for a number of reasons, including because "they are creating an ad technology and ad monetization system that will enable them to utilize both their own demand and deliver ad monetization and ad technology to publisher partners around the world." 9/20/24 PM Tr. 86:25-87:18 (Sheffer).

326. Microsoft views itself as a competitor not just to Google, but also other ad tech providers such as Facebook, Amazon, The Trade Desk, Yahoo, Magnite, PubMatic, Index Exchange, FreeWheel, Criteo and others. 9/20/24 PM Tr. 124:20-125:16, 130:22-132:21, 142:8-

143:13 (when asked whether there were others, John testified, "I'm sure there is plenty because the ecosystem has a lot").

327. Prior to Plaintiffs' filing of this lawsuit against Google, the many steps Microsoft had taken—successfully—to compete by acquiring and building a full ad tech stack like Google's were publicly known:

327.1. It was publicly known that, in 2019, Microsoft "had acquired PromoteIQ, which gave advertisers access to retail." 9/20/24 PM Tr. 151:1-3 (John). Google does not have any offering like PromoteIQ. 9/20/24 PM Tr. 143:23-144:10 (John).

327.2. It was publicly known that, by acquiring Xandr in 2022, Microsoft had acquired a full stack: "buy-side tools, sell-side tools, and an exchange." 9/20/24 PM Tr. 150:8-11 (John).

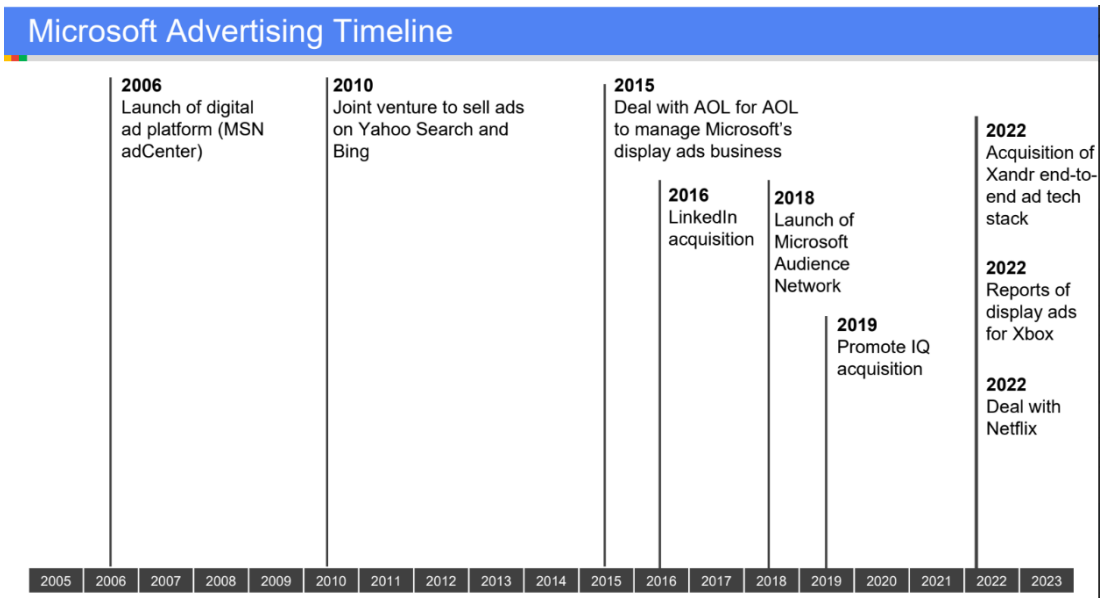
327.3. "It was publicly known that Microsoft had access to first-party data," and that Xandr advertisers could access that first-party data. 9/20/24 PM Tr. 149:21-150:7 (John).

327.4. "It was publicly known that Microsoft had AI technology." 9/20/24 PM Tr. 150:12-15 (John).

327.5. "It was publicly known that Microsoft had Xbox," its gaming platform, and in 2022 was trying to grow Xbox by acquiring Activision Blizzard. 9/20/24 PM Tr. 150:16-22 (John).

327.6. It was publicly known that, in 2022, Microsoft had won an "exclusive arrangement with Netflix." 9/20/24 PM Tr. 150:23-25 (John).

327.7. Depicting the information publicly known to Plaintiffs when this suit was filed, below are just some of the acquisitions and product launches that were critical to Microsoft building its display ads business today. Israel DX 1; 9/26/24 AM Tr. 161:15-162:10 (Israel).



328. Even based on only the information Plaintiffs had about Microsoft's display ads business prior to the filing of this lawsuit, Plaintiffs' allegations that Google has engaged in unique, anticompetitive conduct that has excluded competition in display advertising must fail. Microsoft, like Google, has acquired companies to build its business, owns tools on both the buy-side and sell-side, and touts access to its first-party data as a competitive advantage. And, as demonstrated by the Netflix deal and resulting "halo effects," Microsoft is competing against Google for customer business—and winning.

B. Meta

329. Meta is a publisher and an ad tech provider that owns and operates its own social media properties, including Facebook and Instagram, that are accessible through both websites and mobile apps. 9/9/24 PM Tr. 81:2-82:2 (Lowcock); 9/10/24 AM Tr. 136:25-137:15 (Friedman).

330. Meta has built its own integrated ad tech that includes a proprietary publisher ad server, auction functionality, and buying tool. Advertisers using Meta's buying tool can purchase ads on Meta's owned-and-operated properties and on non-Meta properties. 9/20/24 AM Tr. 32:8-32:21 (Lee); 9/26/24 AM Tr. 105:24-106:20 (Israel).

331. In 2014, Meta launched the Facebook Audience Network (now called the Meta Audience Network). As initially launched, the Facebook Audience Network connected Meta's properties and third-party website sellers with advertisers. 9/26/24 PM Tr. 147:15-24, 148:1-25 (Farber); 9/13/24 PM Tr. 98:5-17 (Boland).

332. In 2020, consistent with increased advertiser investment in mobile app advertising, Meta made a "strategic move to better serve customers seeking mobile app ads" by transitioning Facebook Audience Network away from selling third-party website inventory to selling third-party app inventory. 9/13/24 PM Tr. 97:10-19, 114:8-145:17 (Boland).

333. As explained by Farber, now lead Product Manager at Meta Audience Network, Meta Audience Network "provided better value for advertisers because they were no longer supply constrained," and "they could reach more people across different times" and "across different places." 9/26/24 PM Tr. 146:20-22, 148:3-25 (Farber); *see also id.* at 150:13-151:5 (Farber) (Meta Audience Network is attractive to advertiser customers because it "increases the reach as it allows them to serve ads and fulfill marketing objectives across more opportunities, across more impressions through serving those ads with more apps").

334. As of 2023, Meta Audience Network served between 14,000 and 16,000 publisher customers, and a "few million" advertiser customers. 9/26/24 PM Tr. 149:1-13 (Farber).

335. Meta charges a revenue share to place ads through the Meta Audience Network. 9/26/24 PM Tr. 151:16-24 (Farber). In 2022 and 2023, Meta Audience Network's average revenue

share was [redacted]. Deposition of Omri Farber Tr. 42:8-42:10, 42:11-42:16 (sealed testimony referenced at 9/26/24 PM Tr. 151:25-152:4 (Farber)).

336. Google estimates that the Meta Audience Network attracted between $4.5 and $5 billion of ad spending in 2018. DTX-801 at 7. By 2022, Meta Audience Network's annual gross revenue (revenue that accrued to Meta Audience Network out of total ad spend) was [redacted]. Deposition of Omri Farber Tr. 50:20-22 (sealed testimony referenced at 9/26/24 PM Tr. 153:8 (Farber)).

337. Meta's total display advertising revenue in the United States has grown exponentially, starting at $200 million in 2008 and reaching $50 billion in 2022. DTX-1925. During that time period, Meta's percentage of U.S. display ad revenue grew from 3% in 2008 to 37% in 2022. DTX-1925.

338. Plaintiffs exclude almost all of Meta's display ads business from their asserted markets because Meta's ad tech is proprietary (and therefore "closed web"), and because Meta Audience Network now serves third-party app ads, not website ads. *Infra* ¶¶ 650, 687. However, as shown in Google's internal documents and reflected in trial testimony, since as early as 2014 Google has considered Meta a significant competitive threat to its display advertising business. According to Google's own documents, Google has been losing market share to Meta and growing more slowly than Meta's display ad business.

338.1. In 2014, Google expressed concern that Facebook's recent growth was "worrisome" for Google's ads business "for a number of reasons." "Given 1B+ users, with significant daily user time spent on FB (approximately 20% of time on mobile devices is spent on FB app alone), there is a risk that FB becomes the 'starting point' of the Internet." DTX-184 at 1.

338.2. According to Mohan, Facebook's growth was "worrisome for Google" as early as 2014 because Facebook had been "growing as a formidable competitor in the display space even at that time," particularly for display ads on mobile phones given that "mobile web, all of that was basically display advertising." 9/16/24 AM Tr. 88:11-89:20 (Mohan).

338.3. Bellack testified that around September 2016, "Facebook was building its own ad network and was rumored to be working on other kinds of sell-side products." 9/19/24 AM Tr. 155:10-156:12 (Bellack). He was particularly concerned that Meta would invest in header bidding. 9/19/24 AM Tr. 156:13-19; *see also* PTX-367 at -461 (2016 Google email about header bidding: "That is the concern about FAN or Amazon investing in HB—they could persuade publishers to say something like 'if we can pay you $10+, don't even bother checking with Google, just give it to us right away.").

338.4. In 2017, Google observed that "Facebook has taken the leadership position from Google over the last four years, capturing a significant share of display market growth." DTX-486N at 6. "Google has fallen from 106% of Facebook's display+video revenue in 2013 to 43% in 2017." DTX-486N at 4.

338.5. Again in 2017, Google noted that "Facebook (FB) and Amazon (AMZN) have been winning more mind and market share from our top partners due to their growing array of publisher solutions," and advertisers have shifted their budgets to both competitors. DTX-463 at 2, 4.

338.6. A January 2018 internal Google document stated: "Facebook has become the dominant player and is expected to continue to grow faster than the market through 2020." DTX-695 at 3. Google viewed itself as occupying "second place" compared to Facebook "since 2014." DTX-695 at 3. Google produced a chart of estimated market shares in the "display and video market" by buying door, with Facebook's estimated share in blue rapidly outgrowing Google's estimated share in green. DTX-695 at 3. In the same analysis, Google also estimated that its "share in display is expected to stay largely flat," as Meta was "poised to outpace the market" and grow "to a 50% share by 2020." DTX-695 at 4.

338.7. As Google again observed in 2019, "Facebook's ad business continues to strengthen (in spite of their PR issues). They are building deeper capabilities that are being integrated to 4 of the largest mobile properties in the world." DTX-670 at 2.

338.8. Google further described Meta as one of its "largest and diverse competitors" because they "compete directly with and presents a threat to Google." DTX-758 at 3 (2019 Google competitive intelligence presentation about Facebook). Meta brought unique advantages to display advertising. It "aims to provide solutions . . . with a closed ad eco-system offering similar scale and cost efficiencies, coupled with zero fraud, full transparency and robust ROI tracking, introducing new ad formats for top-of-funnel brand objectives, all while not forcing marketers to deal with multiple middlemen." DTX-758 at

27; *see also* DTX-758 at 31 (2019 Google presentation discussing Meta's advantage from "Facebook targeting data").

338.9. In 2020, Google described Meta Audience Network in particular as "an established monetization partner for publishers" worth "between $4.5B and $5B in 2018." DTX-801 at 7. Google observed that Meta "understands what users like and has developed some of the most sophisticated targeting capabilities in the industry." DTX-801 at 7.

338.10. LaSala, former Managing Director for Global Commercialization, testified that Meta posed a significant competitive threat to Google because of its valuable user audience data. He explained: "My feel[ing] was that the companies with the best data and the companies with the best technology would be the companies that would sort of prevail in this long-term game. And Facebook knows what you're doing and has really good audience data." 9/13/24 AM Tr. 38:11-22, 152:2-13 AM (LaSala); *see also id.* at 82:19-83:21, 153:3-10 (LaSala); PTX-612 at -035 (2018 Google comment thread stating that "it is reasonable to assume that Amazon and Facebook actually have better data" and have the ability to "fill at high rates").

338.11. Google continued to view Meta as a significant competitive threat after Meta Audience Network shifted to third-party app inventory in 2020. 9/13/24 AM Tr. 147:19-148:11 (LaSala) ("Q. Was there some point where you thought while you were at Google that FAN was no longer an existential threat? A. No.").

338.12. In a 2021 presentation, Google noted that "Facebook Ads are still growing faster than Google Ads, despite narrowed gap." DTX-1132N at 9. Data from 2019 to 2021 showed that Facebook's growth rate was consistently higher than Google's. DTX-1132N at 9.

339. Meta views itself as competing with both ad tech providers that own and operate properties, such as Google, Amazon, Apple, and TikTok, and those that do not, such as The Trade Desk, AppLovin, and Unity. 9/13/24 PM Tr. 145:20-146:4 (Boland) ("Facebook Ads" and Google competed to provide the "full funnel" of outcomes to advertisers); 9/26/24 PM Tr. 152:5-153:7, 153:21-154:8, 154:9-17 (Farber).

339.1. As Farber explained, Meta competes with all players that consolidate "digital demand that advertisers will buy supply for online." 9/26/24 PM Tr. 152:14-153:7 (Farber). "Demand is demand. Advertiser outcomes are advertiser outcomes." *Id.* (Farber). "If you're an advertiser and you want to get people to, for example, download your app," "you would take a dollar and would put it into any and all demand side platform, ad network, etc.," "that will allow you to promote your app effectively. This is the scope of competition." *Id.* at 152:14-153:7 (Farber).

340. Other ad tech providers included in Plaintiffs' alleged markets also regard Meta as a competitor. *E.g.*, 9/9/24 PM Tr. 15:10-21, 18:16-19:1 (Casale) (Index Exchange testifying Facebook is a competitor to Index Exchange and "everyone's main competitor, us included").

C. Amazon

341. Like Meta, Amazon is both a publisher and an ad tech provider. Amazon sells owned-and-operated inventory on its website and apps. 9/9/24 PM Tr. 26:24-27:8 (Casale). Amazon also offers both buy-side and sell-side tools that serve ads on not only its owned-and-

operated properties but also third-party publisher properties, all of which compete with Google. 9/10/24 AM Tr. 64:21-65:4 (Layser); DTX-801 at 6.

342. On the buy side, advertisers can use Amazon's proprietary "integrated" ad tech tools to purchase Amazon owned-and-operated inventory and third-party inventory. DTX-754 at 5; 9/20/24 AM Tr. 32:22-33:11 (Lee).

343. Amazon's sell-side products include two popular header bidding wrappers, Transparent Ad Marketplace (TAM) and Unified Ad Marketplace (UAM). *Supra* ¶¶ 171, 208-209. Exchanges such as Index Exchange work with TAM to submit bids. 9/9/24 PM Tr. 25:4-7 (Casale).

344. Amazon's display advertising revenue in the United States has grown significantly in just a few years, starting at $830 million in 2017 and reaching $8.3 billion in 2022. DTX-1926. During that time period, Amazon's percentage of U.S. display ad revenue grew from 1.8% in 2017 to 6.1% in 2022. DTX-1926.

345. Plaintiffs exclude from their markets many of the transactions facilitated by Amazon's buy-side ad tech because it is proprietary ad tech to used to purchase owned-and-operated inventory, and they exclude Amazon's sell-side ad tech because it is a header bidding wrapper. 9/26/24 AM Tr. 39:12-40:19 (Israel); 9/20/24 PM Tr. 50:4-9 (Lee). But Google documents, surveys, and former employees identify Amazon's ads business as a key competitive threat to the Google products that are included in Plaintiffs' markets, particularly because Amazon has developed an integrated ad tech stack with tools for both advertisers and publishers. *E.g.*, DTX-879 at 24 (2020 competitive analysis deck dedicated to Amazon stating "Risk: Potential for full stack offering").

345.1. As early as 2015, a Google slide deck described Amazon as posing "one of the largest potential threats to our programmatic advertising business" because "Amazon is actively building a walled garden to compete with the DoubleClick stack, and this should not be underestimated." DTX-278 at 3. As would be a theme in Google's competitive analyses, Google was particularly concerned that Amazon could build an integrated ad tech stack: "Amazon has developed key pillars of an advertising ecosystem that can compete with DoubleClick stack" including owned-and-operated inventory, a buy-side ad server, a demand-side platform, a mobile ad network and desktop display network, and a proprietary ad server. DTX-278 at 11, 14-18; *see also* DTX-406 at 6-7 (2017 Google deck containing similar language).

345.2. In a 2017 competitive analysis, Google depicted Amazon as now in third place after Facebook in first and Google in second. DTX-435 at 7. Amazon's header bidding wrapper created an "'Amazon Prime' for Publishers." DTX-435 at 17.

345.3. In February 2019, Google highlighted Amazon as "scaling their ads business in multiple ways—geographically, going deeper for on-Amazon ads . . . , scaling ad-supported offerings . . . , and growing their [demand-side platform] / ad-network." DTX-670 at 2.

345.4. In 2019, Google also described Amazon as a "different type of competitor," posing "business risks to Google." DTX-754 at 4. Google observed that major advertisers such as Procter & Gamble were "shifting budgets" and spending more on Amazon than Google. DTX-754 at 4. On the sell-side,

Amazon offered a "header bidding wrapper to pubs which gives them a direct pipeline to Amazon's demand with a lower 'ad tech tax." DTX-754 at 4. "This all poses a significant risk to Google's display business." DTX-754 at 4.

345.5. Similarly, Google also noted in 2019 that Amazon continued to "gain traction as a key monetization source for publishers thanks to its low cost solutions, unique demand and effective targeting." DTX-801 at 6. Google expected "Amazon's presence to continue to grow" because "they bring unique Amazon demand as well as" Meta Audience Network "demand at virtually no cost." DTX-801 at 6. Google noted that "Amazon is also a competitor that has the ability to build a full-stack solution to compete with Google Ad Manager." DTX-801 at 6.

345.6. A 2020 competitive analysis and strategy document was dedicated to Amazon because "Amazon's growth is strong, their suite of ad solutions increasingly encroaches upon Google's core business." DTX-879 at 2. "Amazon has all the building blocks to compete at Google/Facebook scale; it also has the unique advantage of closing the loop through conversion." DTX-879 at 19; *see also id.* at 22 (comparing Amazon's full-stack offering to Google's and noting "Amazon suite of ad solutions is increasingly encroaching on Google's core business"); *id.* at 24 ("Key differentiation factors) for Amazon's ad stack include "unique demand and data").

345.7. LaSala, former Managing Director for Global Commercialization, testified that he believed when he was at Google that Amazon posed a major

competitive threat. 9/13/24 AM Tr. 38:11-22 (LaSala). As he stated, "frankly," when Amazon "started to get into this business" it "scared me even more than Facebook because they have such great commercial intent data." 9/13/24 AM Tr. 151:14-152:13 (LaSala). LaSala's "paranoia kicked up" "when Amazon created their ad network and their DSP using their own data." *Id.* (LaSala); *see also id.* At 82:19-83:21 (LaSala) (Google was seeing "real competition from Amazon" because "the power of the data plus the power of the—of what you do with the data really drives long-term value for advertisers and publishers"). Contemporaneous statements by LaSala corroborate that he took the competitive threat posed by Amazon very seriously. *See, e.g.*, PTX-864 at -223 (2019 email stating "Amazon will put the biggest pressure on us over time . . . . They have the resources to be a fully functioning SSP via TAM and could suck out all 3rd party demand from our auction over time."); PTX-612 at -035 (2018 comment thread explaining that "it is reasonable to assume that Amazon and Facebook actually have better data" and the ability to "fill at high rates").

345.8. Rowley, another Google employee, agreed that Amazon is a "competitor to Google in the ad space" because "it developed its own header bidding technology" and is "a major aggregator of demand." Deposition of Brian Rowley Tr. 138:12-138:23. He further explained that Amazon's "monetization of inventory and the aggregation of demand covers most of ad tech." *Id.* at 138:24-139:8 (Rowley).

346. Other ad tech providers included in Plaintiffs' alleged markets also consider Amazon a significant competitor. *E.g.*, 9/9/24 PM Tr. 15:10-21, 19:7-21:11(Casale).

D. TikTok

347. TikTok is a major social media video platform that relies on artificial intelligence to show users short-form videos based on their interests. DTX-1045 at 13 (2021 GroupM media landscape presentation).

348. The popularity of TikTok has soared in recent years. 9/26/24 AM Tr. 60:24-61:7 (Israel) (TikTok is the most recent "big growth stor[y]"); *see also* 9/9/24 PM Tr. 88:11-17 (Lowcock) (TikTok went from "no advertising at all" a few years ago to growing ad spend); 9/25/24 PM Tr. 9:12-18 (Caldwell) (small business advertiser interested in advertising on TikTok because "that's where the eyeballs are"); DTX-1045 at 15 (2021 GroupM media landscape presentation). According to a 2022 Google competitive analysis document, TikTok is the fastest social media company ever to reach one billion monthly active users. DTX-1188 at 3.

349. TikTok offers advertisers a self-service ad platform, TikTok Ads Manager, that enables buyers "with various degrees of savviness" to advertise content on the app. DTX-1188 at 15 (2022 Google competitive analysis of TikTok stating that the self-service platform offers both more sophisticated customers the option to take "full control of their advertising strategy" and "non-savvy advertisers" the ability to "create powerful performance campaigns").

350. Of the top 50 U.S. Google Ads advertisers, in 2022 [redacted] spent over $1 million on TikTok advertising. DTX-1974; 9/26/24 AM Tr. 62:8-63:11 (Israel). A number of those advertisers increased their ad spending on TikTok significantly between 2021 and 2022, including by up to [redacted]. DTX-1974.

351. TikTok's display ad revenue in the United States grew from $173 million in 2019 to over $5 billion in 2022, and is projected to grow to $9.5 billion in 2025. DTX-1927; 9/26/24

AM Tr. 60:18-61:7 (Israel) (TikTok is the "next iteration" of growth in a "dynamically competitive market"). As a percent of U.S. display ad spending, TikTok has grown from 0.2% in 2019 to 3.7% in 2022, and is projected to reach 5.2% by 2025. DTX-1927.

352. Plaintiffs exclude TikTok's ad tech tools from their markets because they are proprietary, 9/26/24 AM Tr. 38:19-40:19 (Israel), but internal Google documents demonstrate that Google's display ads business was "paying attention and reacting to" the "important competition" coming from TikTok. 9/26/24 AM Tr. 61:17-22 (Israel).

352.1. Google has identified TikTok's in-house ad tech stack as competing with Google's display ads business. 9/20/24 PM Tr. 87:23-88:14 (Sheffer) (Vice President of Global Partnerships Sell-Side Monetization at Google looks at marketing materials and sales pitches for TikTok "to get a sense of where they're headed with their strategy and their technology development"); 9/25/24 PM Tr. 63:14-22 (Stewart) (competitive analysis considered "continued growth happening with companies like TikTok, Snap, Pinterest, and Twitter").

352.2. One 2022 Google document described TikTok's growth as the "fastest ever." DTX-1188 at 2, 3. Google noted that TikTok's "advertising strategy replicates Facebook's," including because TikTok has replicated a usable user interface and workflows that "allow easy campaign creation" for small- and medium-sized businesses ("SMBs"). DTX-1188 at 2; *see also id.* at 10 ("TikTok provides resources like help center pages, chat support and partners to help SMB advertisers"); *id.* at 14 ("TikTok replicates FB's Ad [user interface] to reduce campaign creation friction").

352.3. A 2021 Google strategy document compared Google's "share of non-Search ads" to those of other major social media sites that use their own proprietary ad tech, observing: "Share in Non-Search Ads has gone to TikTok, Snap, Pinterest, and Twitter." DTX-1132N at 9; *see also id.* at 14 (evaluating "social network ad spend" and observing that "TikTok is growing the fastest, with 87% user growth in 2020 and 18.3% in 2021").

E. Criteo

353. Criteo, a publicly-traded company, started as an ad tech provider focused on the buy-side and has since expanded to offering both buy-side and sell-side tools. DTX-1420 at 12 (2022 Criteo 10-K); DTX-1257 at 11 (2022 Criteo investor presentation).

354. Criteo first launched a buying tool that differentiated itself based on access to curated remarketing inventory. *See* DTX-376 at 39 (2017 Google competitive update). The strength of Criteo's advantage in remarketing has continuously exerted competitive pressure on Google's buy-side tools.

354.1. A Google 2012 Product Requirements Document noted that Google Ads had "recently been hurting in a very competitive remarketing field," and stated that new features on Google Ads were needed to "close competitive gap to Criteo." DTX-129 at 1-2.

354.2. A 2017 Google strategy document expressed concern that Criteo was still "growing faster than GDN in remarketing." DTX-371 at 3.

355. Criteo's buying tool charges a high revenue share of 35% to 40%. PTX-737 at -160 (Google's buy-side personnel discussing that Criteo "had a reported gross margin of 35-40%" in March 2019); [redacted]

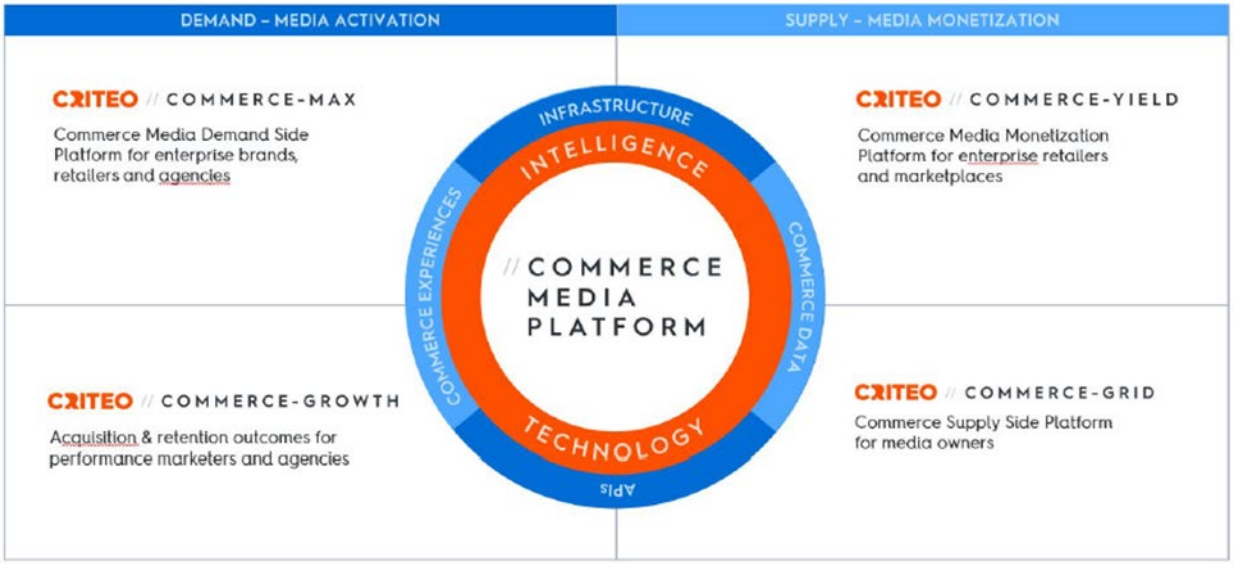
356. Even when it offered only a buy-side tool, Criteo has negotiated directly with publishers for preferred access and thus competed with Google's sell-side products for publisher inventory. DTX-376 at 39 (2017 Google header bidding presentation); PTX-234 at -236 (2015 Google email about header bidding expressing concern that publishers often placed Criteo line items at a higher priority "reservation band"). In particular, Criteo was a threat to Google because it could leverage its status as a "specialized demand player" to "cherry-pick impressions" from DFP publishers' inventory. DTX-371 at 3; *see also* DTX-376 at 39 (2017 Google competitive update noting risk that Criteo was "locking in access to first look inventory, removing opportunity for other buyers to compete").

357. The advertiser demand for Criteo's buying tool built was so attractive to publishers that Google and Microsoft competitive documents described Criteo as a competitor with "new/unique demand," DTX-371 at 2 (2017 Google competitive update), and a "large demand pool," DTX-379 at 4 (2017 outline of presentation to Microsoft's CEO). As AppNexus observed, Criteo's strength in advertiser demand meant that it could effectively build a "publisher network" even if it was not the "publisher decisioning platform." DTX-379 at 4.

358. After header bidding emerged, in 2017 Criteo launched Criteo Direct Bidder to directly integrate Criteo's buying tool with publishers' header bidding wrappers and thus bypass exchanges entirely. DTX-376 at 39; Deposition of Todd Parsons Tr. 38:14-23 (direct integrations mean that "we're not using an intermediary SSP to access the inventories of that publisher"); 9/26/24 AM Tr. 105:9-23 (Israel).

359. "Since 2018, and accelerating since 2020, Criteo has deeply transformed itself from a single-product (retargeting) to a multi-solution Commerce Media platform provider, fast diversifying the business." DTX-1420 at 12 (2022 Criteo 10-K). Criteo created the "Commerce

Media Platform," which contains both buy-side and sell-side products that are depicted below in Criteo's 10-K SEC filing. DTX-1420 at 12-13 (2022 Criteo 10K).



360. Criteo's Commerce Media Platform currently includes a publisher ad server (Commerce Yield), ad exchange (Commerce Grid), and demand-side platform (Commerce Max), as well as an additional optimization tool for advertisers called Commerce Growth. DTX-1420 at 12 (2022 Criteo 10-K); *see also* Deposition of Todd Parsons Tr. 60:20-24.

361. In addition, Criteo continues to market its direct integrations with publishers as part of its "1P Media Network," with access to "~60% of web [Daily Active Users] addressable through" the "thousands of publishers" in its publisher network. DTX-1257 at 3-4 (2022 Criteo investor presentation).

362. Since launching its Commerce Media Platform, Criteo has also diversified its business by expanding beyond its traditional focus on remarketing and adding features designed to appeal to retail media publishers. DTX-1257 at 13 (May 2022 Criteo investor presentation documenting year-over-year results for Q1 2022 showing 42% growth in "Acquisition" targeting and 48% growth in retail media).

363. Criteo's integrated product now transacts ads on web browsers, apps, Connected TV, and screens in physical retail stores in formats such as display (defined as "including social and native"), video, and Connected TV. DTX-1420 at 13 (2022 Criteo 10-K).

364. Another unique competitive advantage of Criteo's tools is Criteo's access to proprietary user commerce data. According to Criteo, it has access to proprietary data from "over $1 trillion in online sales" annually, reflecting approximately "$2.7 billion worth of transactions per day on average" and daily data for over 750 million active consumers each day. DTX-1420 at 13 (2022 Criteo 10-K); DTX-1257 at 3 (2022 Criteo investor presentation). Criteo has used this proprietary data to develop AI tools that improve user targeting. DTX-1179 at 2 (2022 Criteo competitive analysis identifying Criteo's "AI-built audiences" as an advantage).

364.1. Criteo considers its targeting abilities based on its proprietary data to be a competitive advantage, or "How Criteo Wins," against Meta, Google Ads, and other competitors. DTX-1179 at 2-5 (2022 Criteo competitive analysis); *see also* Deposition of Criteo (Todd Parsons) Tr. at 91:9-17, 92:02-92:03.

364.2. Google documents also described Criteo's data and targeting ability as a unique competitive advantage. A 2020 Google competitive overview of Criteo noted that Criteo offers numerous ways to target audiences and described Criteo's "extensive cross-device graph" as part of its value proposition. DTX-961 at 8, 10.

365. Demonstrating the success Criteo has had in winning both publisher and advertiser business, many of the witnesses who testified at trial partner with Criteo.

365.1. Gannett integrates with Criteo using header bidding. 9/9/24 AM Tr. 89:13-15 (Wolfe).

365.2. In his work for the advertising agency Universal McCann, Joshua Lowcock used Criteo's buying tool. 9/9/24 PM Tr. 108:8-19 (Lowcock).

365.3. News Corp receives bids from Criteo. 9/10/24 AM Tr. 80:11-12 (Layser).

365.4. Cadogan testified that Criteo was "a customer of" OpenX and "bought significant amounts of inventory through the OpenX ad exchange." 9/17/24 PM Tr. 60:13-17 (Cadogan).

365.5. Mediavine, a publisher, has a direct connection with Criteo's demand-side platform and uses Criteo's ad exchange. 9/25/24 PM Tr. 179:1-9 (Hochberger).

365.6. Vox receives bids from Criteo via header bidding. 9/27/24 AM Tr. 19:24-20:1 (Pauley).

365.7. Zulily uses Criteo as a buying tool to place ads. 9/27/24 AM Tr. 27:8-14, 28:14-19 (Bumpers).

F. The Trade Desk

366. The Trade Desk offers a demand-side platform that advertisers use to purchase advertising. 9/11/24 PM Tr. 87:21-88:6 (Dederick).

367. In 2022, The Trade Desk also launched a supply-path optimization tool known as "OpenPath."

367.1. The Trade Desk enters into direct agreements with publishers in order to provide a "direct line" from an advertiser to a publisher ad server that creates "a more efficient supply chain for advertisers." 9/11/24 PM Tr. 116:11-117:4 (Dederick); 9/12/24 PM Tr. 46:3-14 (Dederick).

367.2. Advertisers using OpenPath can therefore "bypass an exchange." 9/11/24 PM Tr. 116:11-117:4 (Dederick); *see also* 9/12/24 PM Tr. 40:4-9 (Dederick)

("OpenPath is the Trade Desk's capability to plug directly into, typically, a publisher ad server, bypassing an exchange.").

367.3. The Trade Desk has direct partnerships with several publishers through OpenPath, including Reuters, The Washington Post, Gannett, USA Today, Condé Nast, Buzzfeed, the L.A. Times, and Forbes. 9/12/24 PM Tr. 45:11-24 (Dederick).

368. According to The Trade Desk's Chief Revenue Officer, The Trade Desk is one of the "two most commonly used demand-side platforms" today. 9/11/24 PM Tr. 96:8-12 (Dederick); *see also* 9/9/24 AM Tr. 131:24-132:7 (Casale).

369. In recent years, The Trade Desk has experienced significant growth. Between 2020 and 2021, The Trade Desk's stock "more than tripled" in value. DTX-1053N at 2 (2021 Google competitive analysis). In its 2022 10-K filing, The Trade Desk reported a revenue increase of $381 million, or 32%, from 2021. DTX-1484 at 49. As recently as August 2024, The Trade Desk reported comparable revenue gains. 9/12/24 AM Tr. 163:3-17 (Dederick).

370. The Trade Desk attributes its growth to its investments in rising ad formats and channels, such as Connected TV and digital audio ads. 9/12/24 AM Tr. 165:23-166:9 (Dederick) ("Our investments in these separate channels are driving top-line revenue growth."); *see also* 9/12/24 AM Tr. 163:11-165:22 (Dederick) (The Trade Desk told investors that it "will continue to outpace the market in the years to come led by areas such as Connected TV" and that "connected television has been a key growth driver for our company"); DTX-1053N at 7 (2021 Google competitive analysis noting that "TTD has an advanced CTV offering for reach and measurement, including access to some exclusive inventory").

371. In pitch documents, the Trade Desk positions itself as a scaled, global industry leader in display advertising. DTX-319A at 11 (2016 The Trade Desk response to a Request for Proposal); *see also* 9/12/24 PM Tr. 21:15-22:9 (Dederick) ("Q. And so one of the things that you emphasize in your pitch document is the scale of your company, correct? A. Yes."). The Trade Desk touts "over 20,000" advertiser partners "extending throughout North America, South America, Europe, Australia, the Middle East, North Africa and Asia." DTX-319A at 11. It describes itself as the "fastest growing demand-side platform in the industry" offering "best-in class technology to manage cross channel advertising campaigns in display, video, social and mobile." DTX-319A at 11.

372. Further demonstrating The Trade Desk's success, multiple advertisers, advertising agencies, and publishers testified at trial about their partnerships with The Trade Desk and the importance of The Trade Desk as a source of advertiser demand.

372.1. The e-commerce retailer Zulily partners with The Trade Desk to purchase advertising. 9/27/24 AM Tr. 27:8-14 (Bumpers).

372.2. Federal agency advertisers, including the U.S. Navy and the U.S. Postal Service, use the Trade Desk to purchase ads programmatically. DTX-2532; 9/19/24 AM Tr. 26:5-11 (Simcoe).

372.3. The Goodway Group, an advertising agency, has a certified partnership with The Trade Desk through which small- and medium-sized businesses can use The Trade Desk's demand-side platform. 9/10/24 PM Tr. 36:8-20, 37:13-39:12 (Friedman).

372.4. The advertising agency Universal McCann used The Trade Desk's buying tool to purchase Connected TV, banner, native, social media, and video ads. 9/9/24 PM Tr. 107:10-19, 107:22-108:7 (Lowcock).

372.5. The Trade Desk and DV360 "are the two largest buyers of Mediavine inventory." 9/25/24 PM Tr. 174:3-7 (Hochberger). Advertisers can also use OpenPath to place ads on Mediavine's owned-and-operated inventory and on inventory owned by the third-party publishers that partner with Mediavine. 9/25/24 PM Tr. 179:16-180:3 (Hochberger).

372.6. Buzzfeed works directly with demand-side platforms and considers the Trade Desk a "big partner." Deposition of Ken Blom Tr. at 123:10-24. Buzzfeed tries to sell as much ad inventory to the Trade Desk as it can. *Id.* (Blom).

372.7. The Trade Desk is "one of" the Disney ad exchange's "largest sources of demand." 9/17/24 PM Tr. 125:16-23 (Helfand).

372.8. The retailer giant Walmart partners with the Trade Desk to power a demand-side platform in conjunction with Walmart's retail media network "Walmart Connect." 9/25/24 PM Tr. 54:24-55:20 (Stewart).

373. Plaintiffs exclude The Trade Desk from their alleged markets because it offers a demand-side platform, 9/26/24 AM Tr. 39:12-40:19 (Israel), but The Trade Desk views both of Google's buying tools—DV360 and Google Ads—as among its primary competitors. DTX-1484 at 13 (2022 The Trade Desk 10-K stating that "we compete with other demand-side platform providers," such as "Google and Adobe"); 9/11/24 PM Tr. 165:4-6 (Dederick). The Trade Desk has, for example, conducted competitive analyses of Google Ads and its features. 9/12/24 PM Tr. 14:3-24 (Dederick). And, as The Trade Desk representative was forced to acknowledge, The Trade

Desk directly competes with Google Ads when they submit bids into AdX for the same auctions. 9/11/24 PM Tr. 107:13-15, 146:22-148:14 (Dederick).

374. Internal Google documents and Google witness testimony identified The Trade Desk as a significant competitor to Google's buy-side business, including to Google Ads.

374.1. When Stewart, a Vice President at Google responsible for many of Google's advertising partnerships, was asked about Google's competition from "companies that offer buying tools for display ads," he named The Trade Desk first. 9/25/24 PM Tr. 26:16-18, 66:3-10 (Stewart). Stewart described The Trade Desk as "a very big DSP" that works "with a lot of partners" such as many retail media networks like Walmart's. *Id.* at 54:24-55:15, 66:3-20 (Stewart). Google prepares competitive analyses of The Trade Desk. *Id.* at 66:21-23 (Stewart).

374.2. Sheffer, Google's Vice President for Global Partnerships Sell-Side Monetization, testified that even his sell-side team routinely tracks The Trade Desk's earnings calls to understand "their strategic" and "technical direction," which gives Google a sense of where to "focus" or "double" its "efforts." 9/20/24 PM Tr. 87:23-89:8 (Sheffer). After the CEO of The Trade Desk made comments about Google as a competitor on a recent earnings call, Sheffer instructed his team to "find a way to show up better in the marketplace to compete more effectively with The Trade Desk" and used the comments as a "vehicle to try to get more resources" from Google's senior leadership. *Id.* at 92:3-13 (Sheffer).

374.3. An internal Google presentation from June 2019 named The Trade Desk as one of the primary reasons Google Ads was losing market share. Google believed it was "Losing share in US Display market overall and to key competitors" Meta and "TTD," "primarily driven by GDA" (Google Ads). DTX-733 at 3, 5; *see also* 9/25/24 PM Tr. 59:19-60:6 (Stewart) ("we recognized we were losing share to Facebook and to the Trade Desk" and "the losses were primarily coming from" Google Ads).

374.4. A 2021 "Competitive Overview" deck of The Trade Desk noted that, in 2020, Google "lost $510M to" The Trade Desk, "with another $1.4B at risk." DTX-1053N at 3. Google estimated that post 2020, an additional "[redacted] is at risk." DTX-1053N at 3. Google observed that customers choose The Trade Desk over Google because of The Trade Desk's Connected TV offerings and Google's more stringent "targeting limits," such as pharmaceutical and gambling. DTX-1053N at 4; *see also* 9/25/24 PM Tr. 67:20-69:2 (Stewart).

375. Other ad tech providers also recognize The Trade Desk as a competitor with unique advantages that competes with the products included in Plaintiffs' asserted "advertiser ad network" market.

375.1. In public filings, Criteo—which, according to Plaintiffs, offers an "advertiser ad network"—represents that it competes with The Trade Desk. DTX-1420 at 29 (2022 Criteo 10-K: "We currently compete with large, well-established companies, such as Amazon, Meta Platforms, Google, and Microsoft, pure play Demand-Side Platforms ('DSPs')," such as The Trade Desk); Deposition of Todd Parsons Tr. 75:11-75:13, 75:15, 92:4-9 ("Q. And does it remain true

today that Criteo competes with demand-side platforms, including the Trade Desk? A. Yes, that is true.").

375.2. In a 2022 "Future of Advertising" slide deck depicting the "buy-side competitive landscape," Microsoft noted that Google's "share is being threatened by" The Trade Desk. DTX-1282A at 47. According to Microsoft, The Trade Desk is "digitally-focused with success as alternative to walled gardens based on CTV capabilities and leading service" and "positioned for growth through priority access to leading CTV inventory from Amazon, social video from TikTok, and preferred treatment from a number of publishers / media owners." DTX-1282A at 47.

375.3. Meta Audience Network competes with The Trade Desk for advertising spend. 9/26/24 PM Tr. 153:25-154:8 (Farber) (an "advertiser will go and put their dollar either into the Trade Desk" "or to Audience Network").

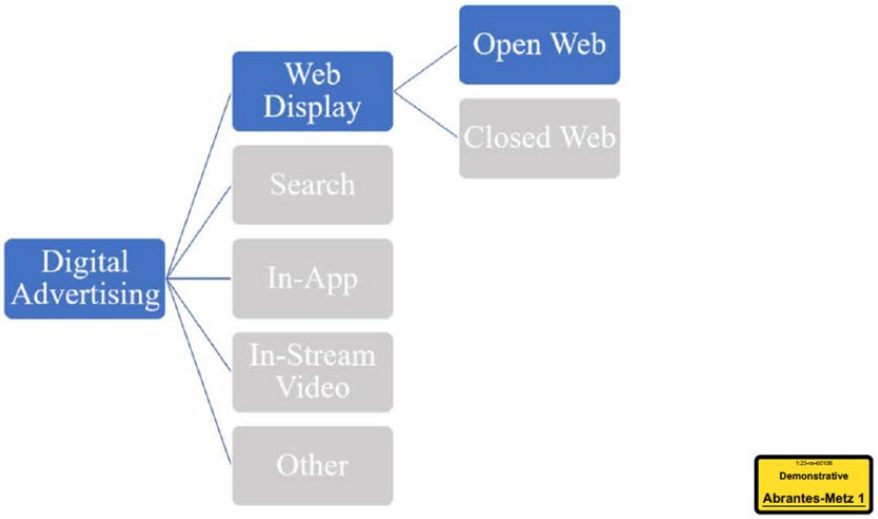
III. Plaintiffs' Market Definitions Ignore the Commercial Reality that Ad Tech Tools Match Advertisers to Users Viewing Ads on Publishers' Digital Properties; As a Result, Plaintiffs Fail to Account for the Effective Area of Competition.

376. Plaintiffs allege that Google has monopolized three separate markets for ad tech tools that were tailor-made for this case: (1) "publisher ad servers for open-web display advertising"; (2) "ad exchanges for indirect open-web display advertising"; and (3) "advertiser ad networks for open-web display advertising." First Am. Compl., ECF No. 120 ("FAC") ¶¶ 282, 290, 297, 310-335. According to Plaintiffs, of Google's ad tech tools, only DFP is in the first market, only AdX is in the second, and only Google Ads is in the third. Plaintiffs' Demonstrative I.

377. Plaintiffs define these made-for-litigation markets based on whether the products within them transact "open-web display advertising." 9/19/24 PM Tr. 45:13-46:1 (Lee). Plaintiffs' market definition expert, Professor Lee, defined "open-web display advertising" specifically for this case: (1) traditional banner ads (not "native" ads or "instream video" ads); (2) that appear on websites (not in apps or on Connected TV); (3) operated by publishers that use third-party ad tech tools, i.e., tools that are not owned by the publisher itself (not ad tech operated by major competitors like Meta (f/k/a Facebook), Amazon, and TikTok). 9/19/24 PM Tr. 51:11-52:2 (Lee); 9/20/24 AM Tr. 48:5-25, 77:22-78:6 (Lee). This gerrymandered definition and its exclusions, laid out below in Abrantes-Metz DX 1, carve out many of the channels where users primarily view digital content in the real world.

40. This report addresses the category of advertising referred to as *open web display advertising*, meaning web display advertising sold through third-party intermediating products, as reflected in Figure 6 below.

Figure 6: Open Web Display Advertising is a Constituent of Web Display Advertising



378. Professor Lee expressed no opinion as to "whether there are antitrust markets for publisher ad servers, ad exchanges, and advertiser ad networks generally without" the limitation that they can transact "open-web display ads." 9/20/24 AM Tr. 62:4-24 (Lee).

379. Nor has Professor Lee defined a market for "open-web display advertising" itself. 9/19/24 PM Tr. 52:3-11 (Lee); 9/20/24 AM Tr. 31:16-21 (Lee) ("I'm not expressing an opinion on a relevant market comprising advertisements themselves.").

380. Professor Lee defined markets only for specific ad tech tools that are "capable of transacting open-web display ads." 9/20/24 AM Tr. 62:10-19 (Lee). But, as explained below, no tool transacts solely "open-web display advertising." All ad tech tools are multi-functional, transacting in multiple ad formats and channels that industry participants view as reasonable substitutes. Plaintiffs ignore those other functions.

381. By defining their markets in this artificial way, Plaintiffs exclude channels and formats for display advertising, and the tools used to transact them, that impose significant competitive constraints on Google's ad tech. In particular, Plaintiffs exclude the channels where digital content consumers now spend most of their time: social media, retail media, mobile apps, and Connected TV. 9/26/24 AM Tr. 43:20-44:19 (Israel); DX-1833 (Israel Figure 12: U.S. Adult Internet Users' Fraction of Time Spent with Non-Social, Non-Video Content Accessed via a Desktop, Laptop, or Mobile Browser, 2010-2022). Those exclusions leave out the most vibrant competition happening in the ad tech industry. 9/26/24 AM Tr. 39:12-40:19 (Israel). Plaintiffs also exclude ad formats that appear on "open-web" websites but are not traditional banner ads, such as instream video and native ads. *Id.* at 38:19-39:11, 82:3-21 (Israel).

382. Professor Lee's market share calculations do not conform to his market definitions. Professor Lee says that the markets are for tools (not ads or transactions), but his market share calculations are based on the number of impressions or associated fees for "open-web display ad" transactions. 9/19/24 PM Tr. 90:14-91:11, 119:15-20 (Lee); PTX-1243A; 9/20/24 AM Tr. 31:22-32:7, 41:13-42:3, 71:16-23 (Lee); PTX-1237A; PTX-1265A. Professor Lee's market share calculations are thus based on distinguishing types of advertisements, but Professor Lee declined to opine on substitution between types of advertisements by saying that his markets are defined based not on ads or transactions, but ad tech tools. 9/20/24 AM Tr. 31:22-32:7, 33:12-20 (Lee).

383. For their ad exchange and "advertiser ad network" markets, Plaintiffs also exclude from their market share calculations any direct transactions between advertisers and publishers, even though, as explained below, both advertisers and publishers substitute between direct and indirect transactions. 9/26/24 AM Tr. 88:24-89:12 (Israel).

A. Ad Tech Tools Are Multi-Functional and Do Not Solely Serve and Transact "Open-Web Display Ads."

384. Plaintiffs' experts acknowledge that all of the tools in Plaintiffs' proposed markets transact in more than "open-web display advertising," including in different channels such as mobile apps and Connected TV and in different formats such as instream video and native.

384.1. Professor Lee acknowledged that publisher ad servers, including DFP, can serve display ads other than "open-web display ads," including video and in-app ads. 9/19/24 PM Tr. 62:20-24 (Lee).

384.2. Professor Weintraub, who has significant experience teaching about and advising in the display advertising industry, is not aware of any tools exclusive to "open-web display advertising." 9/16/24 PM Tr. 5:12-24, 46:17-20, 47:6-10 (Weintraub); PTX-1779 at 5.

385. Plaintiffs even exclude from their relevant markets competing tools that are more focused on serving "open web" inventory, such as Google's AdSense and header bidding tools like Amazon TAM, Amazon UAM, and Prebid. 9/20/24 AM Tr. 27:1-24, 44:13-19 (Lee); *see* 9/20/24 PM Tr. 65:2-10 (Sheffer) (these tools are "dominantly web-focused").

386. Google's ad tech tools, including the ones at issue in this case, transact in many ad formats and channels, including banner, native, and instream and outstream video ads on "open web" and "closed web" websites, apps, and Connected TV. 9/20/24 PM Tr. 64:22-66:25 (Sheffer) (tools are "definitely multi-functional" as they transact banner, video, audio, digital out-of-home, Connected TV).

386.1. DV360 and Google Ads purchase ads in multiple channels and formats. DTX-1514 at 39, 50 (2023 Google presentation: "DV360 access is available over multiple formats, including . . . display, native, in-app ads, CTV, video, . . .

and audio."); 9/9/24 PM Tr. 106:7-24 (Lowcock); 9/10/24 PM Tr. 24:15-23 (Friedman); 9/23/24 PM Tr. 128:16-129:8 (Hardie); 9/11/24 AM Tr. 43:10-16 (Bender); 9/17/24 AM Tr. 106:17-107:1 (Jayaram). Both buying tools can also be used to purchase ads on Google's "closed web" properties, such as YouTube. 9/20/24 PM Tr. 64:17-20 (Lee); 9/11/24 PM Tr. 97:25-98:5 (Dederick).

386.2. Google Ad Manager supports text, banner, native, instream and outstream video, and audio ads appearing on the web, in-app, on Connected TV, and in digital out-of-home. 9/20/24 PM Tr. 65:11-24, 66:13-23 (Sheffer); 9/10/24 PM Tr. 25:9-11 (Friedman). DFP is not "just about ads on web pages." It also serves ads "into mobile environments," "video ads," "rich media ads," and more. 9/16/24 AM Tr. 91:8-24 (Mohan); 9/20/24 PM Tr. 60:2-5, 65:11-24 (Sheffer).

386.3. For example, Google Ad Manager serves in-app ads and thus competes for customers against sell-side tools that serve only in-app advertising. *E.g.*, DTX-1169 at 2 (2021 Google document describing effort to win the business of a publisher that used GAM only for video and audio ads, and was considering shifting its "display business" from MoPub, an in-app sell-side platform, to GAM).

1. The Industry Recognizes the Value of Offering Multi-Functional Ad Tech Tools.

387. From the beginning of its display advertising business, Google has built multi-functional ad tech tools to meet customer demands.

387.1. As Neal Mohan testified, as early as the DoubleClick acquisition, Google's ad tech solutions "had to work seamlessly across" different ad formats and channels because those ads "were interchangeable in the minds of advertisers, and therefore, had to be capabilities that publishers were able to offer to their advertiser clients." 9/16/24 AM Tr. 72:10-73:1 (Mohan).

387.2. As early as January 2009, Google's stated goal was thus to "Support all formats." DTX-37 at 6 (email from Mohan stating that "we need to be able to deliver on this platform, exchange, network vision across all formats").

388. The multi-functionality of tools is a competitive advantage because advertisers and publishers derive unique benefits from multi-functionality.

388.1. The Microsoft corporate representative explained that ad tech providers need to offer advertisers "a diverse set of publishers, of inventory, of formats" because advertisers are looking for multiple types of supply to reach their target audience. 9/20/24 PM Tr. 159:10-160:12 (John).

388.2. One benefit of a multi-functional buying tool for advertisers is cross-channel frequency capping. Frequency capping limits the number of times an ad is shown to the same user across multiple screens and formats, which makes advertising more efficient and saves advertisers money. DTX-1214 at 20 (2022 Google business partnership presentation explaining how cross-channel frequency capping in DV360 helped the Army save $2.4M annually and increase reach efficiency by 23%); DTX-1429N at 10 (2022 Google business partnership presentation identifying $100K savings from two weeks of

frequency capping); DTX-1499 at 30 (2023 GroupM advertising agency recommendation describing benefits of frequency capping).

388.3. A 2023 deck produced by an advertising agency recommended that advertisers consolidate ad buying into The Trade Desk in order to "increase channel connectivity," "driving benefits across multiple channels" such as Connected TV, audio, display, and digital out-of-home advertising. DTX-1499 at 16. The benefits to advertisers of buying across channels from one tool include "more comprehensive frequency control," "greater reach," and "more fluidity in budget allocation." DTX-1499 at 16.

388.4. Likewise, publishers "don't want only one specific type of demand" to place ads on their property. 9/20/24 PM Tr. 159:10-160:12 (John). Publishers can own properties in many digital environments and want tools that enable them "to offer all of these different types of display inventories to their advertisers." 9/16/24 AM Tr. 91:8-24 (Mohan). For example, Google Ad Manager advertises that it is a suitable solution for publishers that are seeking "a central place to monetize all of your inventory types (websites, mobile apps, videos, or games)." PTX-1144 at -001 (Google Ad Manager help page). BidSwitch, an ad tech provider now owned by Criteo, planned to integrate its ad tech "across multiple apps and sites" precisely because publishers want to "cross-promote their titles" across channels. DTX-1544A at 17 (2023 future planning document).

389. Multi-functionality is also important to ad tech tools seeking to interoperate with other tools. According to a representative of The Trade Desk, AdX "has to have functionality with

respect to" multiple ad formats and channels, including static banner ads, outstream video ads, instream video ads, and native ads, "in order to receive the bids from The Trade Desk." 9/11/24 PM Tr. 149:21-150:4, 150:24-151:4 (Dederick). When it bids on AdX, The Trade Desk bids on website ads, app ads, Connected TV ads, static banner ads, native ads, instream video ads, and outstream video ads. *Id.* at 148:15-149:3, 149:21-150:4 (Dederick).

390. Consistent with the value of multi-functional tools, no buy-side witness testified that they use ad tech tools to purchase only "open-web display advertising" or that they consider which tools to use based only on their ability to transact in "open-web display advertising."

390.1. While at Universal McCann, Lowcock used buying tools such as The Trade Desk and Criteo, which transact Connected TV, banner, native, social media, and video ads. 9/9/24 AM Tr. 107:10-108:19 (Lowcock).

390.2. To reach all Americans for the first digital census, the Census Bureau used programmatic tools to transact in video ads, search ads, in-app ads, and other ad channels and formats not included in Plaintiffs' definition of "open-web display advertising." 9/23/24 AM Tr. 128:16-129:8 (Hardie); DTX-1030 at 3 (2020 Google business partnership document regarding the 2020 Census); 9/23/24 PM Tr. 81:12-19, 97:10-18 (Oliphant) (the Census Bureau used programmatic advertising for video, rich media, and banner ads); DTX-629 at 37 (2018 Census Media Strategy presentation).

390.3. Caldwell, the owner of a small business advertiser, testified that her business uses Google Ads to run banner ads, native ads, and instream video ads. 9/25/24 PM Tr. 5:19-6:11 (Caldwell). She uses the different ad channels and

formats available in Google Ads because "they allow us to reach the broadest audience as possible." 9/25/24 PM Tr. 5:19-6:2 (Caldwell).

2. Ad Tech Tools Compete Based on Their Multiple Functionalities.

391. Contemporaneous documents show that, for years, Google has competed by building functionality for ads other than traditional website banner ads on the very same products Plaintiffs include in their asserted markets.

391.1. By 2010, Google had expanded beyond "a network that served text ads and a few types of display banners to one that supports nearly every format relevant for users—graphical ads, video formats, rich media, mobile, feeds, expandables, and even online streaming audio ads." DTX-59 at 2 (2010 Mohan email describing goals for display ads business in the new year); *id.* at 3 ("Make sure we do for video what we have done for the rest of display advertising. Video is one of the fastest growing parts of the display ad industry.").

391.2. In 2011, Google was working to "provide the first multi-format exchange that supports not only traditional online display formats, but provides comprehensive support for in-stream video, expandable, and mobile formats." DTX-76 at 8 (2011 Mohan email describing goals for the new year); *id.* at 5 ("Display does not just mean graphical ads for our publishers—it includes mobile and video.").

391.3. In 2012, Google described AdX as a "huge win for [Google's] publishers and advertisers" because it is a "cross-channel offering in the market—supporting desktop, mobile and video." DTX-101 at 3 (2012 Mohan email describing goals for the new year). Another of Google's goals was to offer "an integrated

platform to maximize publishers' advertising revenue," including to "support all channels and formats seamlessly," including "mobile and video." DTX-101 at 5.

391.4. "At the outset of 2014," one of Google's "key big bets" in the display ads business was to "build for the always-connected consumer (multi-screen, local, mobile apps)." DTX-211 at 1 (2014 Mohan mid-year check in email).

391.5. In 2014, an AdSpam strategy document stated that "the advertising world moves quickly, and we are racing to offer new ad formats and new ad solutions that can cater to the important opportunities that lie ahead in mobile, display, and video." DTX-214 at 1.

391.6. An April 2016 product prioritization document stated that the mission of Google's sell-side products (DFP and AdX, or "DRX") was to "give publishers one platform for all screens," including "mobile app and web made easy" and helping "publishers navigate TV's shift to digital." DTX-308 at 5.

391.7. A document titled Programmatic Big Bet 2017 Product and Business Strategy stated that Google was working to "drive adoption of native and outstream formats across all screens." DTX-371 at 1.

391.8. A competition strategy document from 2017 indicated that, to compete effectively against AppNexus, Google's messaging should be that "DoubleClick is the proven solution in market that can seamlessly support ad serving and yield management across mApp [mobile apps] and desktop." DTX-406 at 22.

392. Google's tools are also competitively advantaged by offering ads excluded from Plaintiffs' markets because they appear on Google's owned-and-operated properties. A representative of The Trade Desk acknowledged that the various advertising formats supported by Google's tools—including ads that appear on Google's "closed web" properties, such as YouTube and Search—offer unique benefits to Google's customers. 9/11/24 PM Tr. 99:11-100:5; *see also id.* at 102:9-19 (Dederick) ("The combination of having all of the associated metadata from the publisher side, from the search side, and having the placement as the publisher ad server and ad exchange, it just—it gives tremendous advantage to buying and placing online display ads if you're working directly with Google.").

393. In addition to supporting multiple channels and formats, Google's tools also enable advertisers to automatically change the size and format of their creatives, such as the words and text that appear in an ad, so that advertisers can easily shift the same creatives across ad formats at little to no cost.

393.1. For example, Google can help an advertiser "turn their video essentially from being horizontal to vertical," from a traditional banner ad to a video ad, or from a video ad to a banner ad. 9/25/24 PM Tr. 37:19-24 (Stewart).

393.2. Google Ads also offers Performance Max, an AI tool that automatically creates ads and optimizes ad buying channels and formats on behalf of advertisers. *Supra* ¶¶ 289-294.

394. Similarly, Google's competitors not only support different ad formats and channels, but recognize that multi-functional tools add particular value for customers who want to manage "omnichannel," or "cross-channel," advertising using one centralized tool. 9/23/24 PM Tr. 143:25-144:24 (John) ("An omnichannel DSP or campaign is where a buyer can buy multiple

formats through one DSP."); 9/10/24 PM Tr. 26:15-27:6 (Friedman); 9/19/24 AM Tr. 126:24-127:9 (Bellack) (publishers were "increasingly looking for solutions that could help them across" web, apps, video, and "many different technology platforms"). In other words, part of the competitive advantage of multi-functional ad tech tools is their ability to transact ads other than "open-web display ads."

394.1. The Trade Desk:

394.1.1. The Trade Desk's DSP "tries to plug into all available ad formats." 9/11/24 PM Tr. 121:14-22 (Dederick) ("So connected television is a major channel for The Trade Desk. Digital audio, digital out-of-home, mobile display ads, mobile video, online video are some of the channels that we operate in.").

394.1.2. When The Trade Desk pitches against other companies in the market, it talks "frequently about being able to buy across multiple channels," including display and Connected TV. 9/12/24 PM Tr. 19:18-20:1 (Dederick).

394.1.3. A 2016 pitch made by The Trade Desk to a large global brand highlighted its offering of "technology to manage cross channel advertising campaigns in display, video, social and mobile," not just campaigns focused on only one form of advertising. DTX-319 at 11. As The Trade Desk stated, the breadth of ad channels and formats it serves has driven "massive success in the US and Canada for paid media across

display, video, mobile, cross-device, and Connected TV." In particular, "our ability to buy inventory across multiple channels at scale, and all over the globe positions us as a leader in the space and an ideal DSP for large global brands." DTX-319 at 11; 9/12/24 PM Tr. 20:19-22:14 (Dederick).

394.1.4. The Trade Desk's 2022 10-K filing stated: "Our platform allows clients to execute integrated campaigns across ad formats and channels, including video (which includes connected TV ('CTV')), display, audio, digital out-of-home, native and social, on a multitude of devices, such as computers, mobile devices, televisions and streaming devices." DTX-1484 at 7; *see also* 9/10/24 PM Tr. 35:7-36:7 (Friedman) (The Trade Desk provides complete access through "comprehensive cross channel digital buys," such as digital out of home, audio, native, Connected TV, mobile, and display). "What this means is, if a client has creative assets available across different channels, they can use them in the same platform." 9/12/24 PM Tr. 27:12-28:13 (Dederick).

394.2. Microsoft (including AppNexus and Xandr):

394.2.1. A Google competitive analysis deck from 2017 noted that one of AppNexus's strengths is that it will "shift resources and focus between features at any given moment," including

among traditional banner, mobile, and video functionalities. DTX-406 at 14.

394.2.2. An AppNexus slide deck described as a competitive advantage of its ad server "efficient campaign management across screens" that manages "desktop, mobile, and video ad serving seamlessly in one platform." DTX-1487 at 25.

394.2.3. Microsoft describes its integrated ad tech stack as "one of the world's largest marketplaces," with an "expansive" advertising ecosystem that reaches over one billion users "across different audiences and different formats," including through "display, audio, video," "CTV, gaming, shopper marketing and native." DTX-1756 at 2 (Xandr webpage describing its ad tech offerings); DTX-1384 at 2 (2022 "Xandr in Microsoft Product Synergy Slides"); 9/23/24 PM Tr. 140:10-142:3 (John).

394.2.4. Microsoft highlights that its publisher ad server, Xandr, serves "all channels and ad formats (Display, Mobile, Native, Video)." DTX-1524 at 14 (2022 "Welcome to Microsoft Advertising" slide deck). Xandr's "full publisher suite" enables it "to holistically serve publisher needs for monetization and technology across inventory types." DTX-939 at 1 (June 2020 document describing Xandr's ad tech products).

394.2.5. Post Xandr acquisition, Microsoft developed a "Meta DSP." *Supra* ¶ 319. Microsoft advertises that the Meta DSP

"provides an easy way to run omnichannel campaigns using premium inventory and exclusive data," across search, display, native, video, CTV, digital out-of-home, traditional TV, gaming, audio, and social ads. DTX-1288 at 11.

394.3. Criteo:

394.3.1. Criteo's 2022 10-K filing emphasized that Criteo's solutions support much more than just "open-web display advertising": "Criteo's solutions work seamlessly across digital devices (desktops, laptops, smartphones and tablets), commerce and advertising environments (browsers, apps, connected TV, and physical retail stores), . . . advertising channels and formats (display, including social and native, online video, connected TV and ads on retailers' properties), and media environments (retail media, thousands of direct publishers and mobile app developers in the open Internet, and all major real-time bidding exchanges)." DTX-1420 at 13.

394.3.2. A 2023 BidSwitch (now part of Criteo) forward planning document stated that Criteo's "omnichannel performance agenda" was a competitive advantage and reason to "align as closely as possible to Criteo's plans and strategy." DTX-1544A at 8.

394.4. OpenX: In a 2017 competitive analysis document, OpenX listed the devices and ad formats that various competitors, including Google, Rubicon, Index

Exchange, PubMatic, AppNexus, and One by AOL, support. DTX-384 at 9. According to OpenX's analysis, those competitors "compete across devices, screens, and formats." 9/17/24 PM Tr 98:13-14, 98:21-99:4 (Cadogan). In addition, OpenX's analysis was not limited to competitors that can support desktop ads. OpenX also evaluated MoPub as a competitor, even though MoPub only transacts mobile ads. DTX-384 at 9.

394.5. PubMatic: PubMatic represented in an investor earnings call that it transacts banner, native, and video ads in desktop and mobile web, in apps, and on Connected TV. 9/12/24 PM Tr. 124:17-125:5 (Goel); Goel DX 1. In addition, PubMatic wrote in its 10-K filing that it has "global omni channel scale," using the word "omni channel" to highlight the fact that PubMatic is able to transact across many different ad formats and channels. 9/12/24 PM Tr. 136:12-23 (Goel).

394.6. Kevel: Kevel represents to its publisher customers and potential customers that they can use Kevel's ad server to serve many different types of ads, including banner, video, and native ads appearing on websites, in mobile apps, and in digital-out-of-home environments. 9/9/24 PM Tr. 156:5-23 (Avery).

394.7. Index Exchange: Publishers can use Index Exchange to sell web ads, in-app ads (including video ads), and Connected TV ads. 9/9/24 PM Tr. 40:12-24 (Casale).

394.8. Equativ: Equativ advertises that its integrated stack enables "any format," including display, video, native, and rich media, and "any environment,"

including desktop, mobile web, mobile app, and Connected TV (OTT). PTX-1674 at -015 (2023 Equativ presentation of its products).

3. Plaintiffs' Market Definition Expert Has Not Analyzed Competition Among Ad Tech Tools Taking Into Account the Multi-Functional Nature or Quality of the Tools.

395. Although any markets based on ad tech tools involve competition among multi-functional tools, Plaintiffs' expert Professor Lee did not analyze that competition. Professor Lee's testimony was devoid of any consideration of how multi-functional ad tech tools compete for publishers or advertisers based on the totality of their offerings.

396. Professor Lee admitted that the same ad tech tools in his product markets are capable of transacting in-app ads, Connected TV apps, and ads on owned-and-operated properties, as well as native and instream video ads. 9/20/24 AM Tr. 63:11-15, 64:17-20 (Lee) (tools "have those additional functions"). Yet Professor Lee did not analyze the ability of ad tech tools to monetize inventory other than "open-web display ads." *Id.* at 65:22-66:5 (Lee). Nor did Professor Lee know what advertisers considered—including whether they considered the different functionalities of a tool—when choosing among ad exchanges. *Id.* at 68:4-9 (Lee) ("it's hard to definitely state everything they consider or don't consider").

397. Professor Lee's sole justification for his failure to analyze competition among the full range of ad tech functionality was to compare transactions in "open-web display ads" and, as an example, in-app ads to a gas station's sale of gasoline and potato chips. 9/20/24 AM Tr. 68:16-69:4 (Lee). Professor Lee's analogy was not grounded in any actual analysis or economic principles regarding how publishers and advertisers make their choices among ad tech tools based on the functionalities they offer. Moreover, the analogy of in-app ads, Connected TV ads, and ads on owned-and-operated properties, as well as native and instream video ads, to chips at a gas

station is wildly implausible given the importance and economic significance of those types of ads and, as explained below, substitution among them. *Infra* ¶¶ 417-419.

B. "Open-Web Display Advertising" as a Basis for Market Definition Was Created for This Litigation.

1. Industry Participants Do Not Recognize "Open-Web Display Ads" as Defined by Plaintiffs.

398. All industry participants who testified to a definition of the term "open-web display advertising"—or, more often component parts of that term (because witnesses had never before heard those four words strung together)—defined it differently than Plaintiffs do.

398.1. Index Exchange: Casale testified that "open-web display advertising" is "not a well-understood defined category. It's usually 'open web,' and then 'display is separate. Putting them together is just not a common way we speak in ad tech." 9/9/24 PM Tr. 13:1-14:1 (Casale).

398.2. Omnicom: Lambert testified that "display" and "open web display" are just "semantics" because "they're the same thing." 9/13/24 PM Tr. 56:24-57:6 (Lambert). As he explained, when Omnicom included the word "digital display" in certain documents, the term "display" included ads that Plaintiffs do not consider "open-web display," such as native ads and ads on owned-and-operated properties like YouTube, Amazon, and social media properties. 9/13/24 PM Tr. 51:8-52:1, 55:4-21, (Lambert) (describing DTX-1151 and DTX-1172).

398.3. Universal McCann: After testifying that he was familiar with the term and had been for decades based on his work in the advertising industry, Lowcock defined "open-web display advertising" as "advertising that can appear effectively anywhere on the internet" that is not a "walled garden," but did not

exclude ad formats such as native and instream video ads. 9/9/24 PM Tr. 59:25-60:20 (Lowcock).

398.4. The Trade Desk: Dederick testified that "open-web display" refers to "a standardized series of ad formats that many of the sort of web publishers rely on." 9/11/24 PM Tr. 94:19-95:3 (Dederick). Consistent with The Trade Desk's testimony, Sheffer explained that the industry delivers ads in "industry-standard formats" and sizes, but those formats and sizes are not restricted to "open-web display ads." 9/20/24 PM Tr. 66:13-67:1 (Sheffer). For example, both native and video ads can also be placed in those "industry-standard formats" and sizes. *Id.* (Sheffer).

398.5. PubMatic: When asked to define a "display ad," Goel testified that "display ad" refers to a "type of ad that is shown to consumers, typically a banner or graphical ad of some sort"—implying that other, non-banner "graphical" ads like native ads are included. 9/12/24 PM Tr. 70:25-71:14 (Goel).

398.6. Goodway Group: Friedman testified that "open-web display advertising" is "a very common term in the industry." 9/10/24 AM 157:5-14 (Friedman). He then defined "display advertising" as the "squares and rectangles or whatever it may be on web pages, potentially in mobile apps," reiterating that they are "fixed slots on web pages or apps." 9/10/24 AM Tr. 133:15-22 (Friedman). Friedman's definition thus includes native ads and in-app ads, both of which are excluded from Plaintiffs' definition. When asked how he approaches display advertising "across the web," Friedman again referred to "websites or apps." *Id.* at 135:15-136:2 (Friedman).

398.7. Census Bureau: Oliphant confirmed she does not understand what "open-web display" advertising means and first heard of the term through this lawsuit. 9/23/24 PM Tr. 98:10-99:6 (Oliphant) (agreeing "it was not a terminology you used in the course of what you do for your work").

398.8. GroupM: Schiekofer testified that her advertising agency, GroupM, does not use the words "open web," and interpreted that phrase to refer to "exchanges." 9/17/24 PM Tr. 140:24-141:3 (Schiekofer).

398.9. Disney: A Disney business document defined "display" as including "animated or video, image units within articles and stories," as well as "sponsored logos, pause, and marquee ads" on streaming TV (which Plaintiffs would exclude as instream videos). 9/17/24 PM Tr. 124:1-13 (Helfand).

398.10. Criteo: Parsons testified that the "open Internet" includes "mobile apps." Deposition of Todd Parsons Tr. 38:24-39:05. Display advertising consists of: "Visual ads placed on websites, social media networks or apps. They're typically image, text, or video banner acts that, when clicked on, take a consumer to a website or landing page." *Id.* at 64:15-65:9 (agreeing with this definition in a Criteo glossary that includes as "display ads" video ads, native ads, social media ads, and in-app ads, all of which are excluded by Plaintiffs); *see also* DTX-1700 at 14 (Criteo digital advertising glossary). Parsons also testified that display ads can appear on websites, in mobile apps, on social media including Meta and TikTok, and on Connected TV. *Id.* at 67:11-19, 68:2-25 (Parsons).

398.11. Microsoft: John testified that "open-web" refers to "taking the demand and openly making it available for all publishers." 9/20/24 PM Tr. 146:1-3 (John). That distinction has no relation to whether an ad is served by third-party ad tech.

398.12. Google:

398.12.1. Sheffer, with 18 years of experience on the sell-side, never heard the term "open-web display advertising" used in the industry. 9/20/24 PM Tr. 65:25-66:3 (Sheffer).

398.12.2. Jayaram, with 12 years of experience on the buy-side first heard "those four words strung together in exactly that way" was "while preparing for trial." 9/17/24 AM Tr. 107:7-13 (Jayaram); *see also id.* at 107:16-108:3 (Jayaram) (understanding of "open web" is "where people have free access to the content," as opposed to "paid access or a subscription access").

399. Some of Plaintiffs' witnesses testified to differences they perceive between display advertising on "open web" websites and so-called "walled gardens," which by Plaintiffs' definition includes social media and Google's own properties. Each of the distinctions identified demonstrates that different forms of advertising can have particular advantages or disadvantages, but not that "open-web display ads" are a "distinct" form of ad for purposes of evaluating competition or supporting Plaintiffs' market definition.

399.1. One advertising agency representative testified that Google's ad tech tools provide distinct value from social media advertising because "the value of

Google's data" is "applied to either Google's properties or the open Internet." 9/10/24 AM Tr. 136:18-137:15 (Friedman). But Plaintiffs exclude from their markets the owned-and-operated sites from which Google purportedly obtains data unique to Google's tools.

399.2. Another advertising agency representative testified that placing social media ads can require distinct assets, such as "short form or video content," that is not required to place other forms of display advertising. 9/9/24 PM Tr. 66:9-67:9, 67:16-24 (Lowcock). A 2017 Google competitive analysis document shows, however, that the same image can be used to create ads on Facebook and Google Ads. DTX-399 at 28. Demonstrating that the same assets can be used across channels, the advertisements placed by the Census Bureau on Facebook as compared to a general banner ad are nearly identical. DTX-1074 at 36-37 (2021 Census report).

2. Plaintiffs' Experts' Efforts to Define Markets Based Only on the Capability to Transact in "Open-Web Display Advertising" Are Inconsistent with Commercial Realities.

400. Nor did Plaintiffs' experts recognize the term "open-web display advertising" as commonly used in the industry.

400.1. Professor Lee did not "recall hearing those four words in that order prior to my work on this case." 9/19/24 PM Tr. 51:22-52:2 (Lee).

400.2. Plaintiffs' expert, Dr. Abrantes-Metz, testified that she did not recall hearing the term "open-web display advertising" before this case, and that the term is "a name that was given to the relevant antitrust market that Professor Lee delineated for this case." 9/18/24 AM Tr. 70:5-14 (Abrantes-Metz).

400.3. Professor Ravi testified that "open web" referred to "open auction impressions sold on the web," as distinguished from impressions sold in "closed auctions" that are "closed to a set of private buyers"—a distinction that has no relation to Plaintiffs' allegations in this case. 9/11/24 PM Tr. 16:18-18:1 (Ravi).

401. Despite all the work he performed for this case, Professor Lee offered no evidence of industry recognition of ad tech markets for "open-web display advertising."

401.1. Professor Lee testified that he did not recall seeing any industry documents—from Google or any third-party—that used the term "open-web display ads," much less reported market shares for any market using the term "open-web display ad." 9/20/24 AM Tr. 69:15-70:9, 71:24-72:2 (Lee).

401.2. Professor Lee further testified that he did not know whether, before this case, anyone has ever tried to compute market shares for markets that use the term "open-web display ads." 9/20/24 AM Tr. 70:5-19 (Lee).

401.3. Professor Lee could not recall there being any industry recognition of a market using the term "open-web display advertising." 9/20/24 AM Tr. 71:24-72:2 (Lee).

402. Third-party industry and market reports do not refer to markets for "open-web display advertising" or provide data for such proposed markets. The market research company, eMarketer, a leading source of industry data and analysis on which Plaintiffs' experts and industry participants heavily rely, defines "display ads" far more broadly than Plaintiffs and their experts do. eMarketer defines "display ads" to include video, banners, and other rich media ads, and specifies that "banners and other" includes "ads such as Facebook's News Feed Ads and Twitter's Promoted Tweets." DTX-847 at 18.

403. Contrary to Plaintiffs' argument, a Google document describing certain inventory served with in-house tools as "unaddressable" does not establish a market in "open-web display ads." PTX-657 at -350. The document explicitly included both addressable ads and unaddressable ads (such as ads served using proprietary ad tech, including Facebook and Amazon ads) as part of the same "market." PTX-657 at -350 (Google is running ads on "22% of all market, and 51% of addressable"); *see also* 9/20/24 AM Tr. 72:3-73:14 (Lee) (agreeing the "market" being discussed includes Facebook and Amazon).

C. The Criteria Plaintiffs Presented to Define Their Markets Did Not Support the Alleged Markets.

404. Professor Lee identified three factors as supporting his market definition analysis: direct evidence of market power, distinct features, and industry recognition. Plaintiffs' Demonstrative O.

405. Professor Lee's "direct evidence" of market power for each of his alleged markets is discussed further below.

405.1. As a general matter, with respect to prices, Professor Lee did no pricing analysis of his own for two of his alleged markets (publisher ad servers and ad networks). 9/20/24 AM Tr. 129:17-130:3, 134:11-135:5 (Lee).

405.2. As to the ad exchange market, Professor Lee's only price analysis was a comparison of the AdX nominal take rate to other exchanges' nominal take rates showing that AdX's was higher than some, but not all exchanges'. *Infra* ¶¶ 627, 1160, 1162-1163. Professor Lee's analysis of AdX pricing would imply that anytime a firm charges a price higher than the average price of a group of firms, there is direct evidence supporting market definition.

405.3. Other than pricing, Professor Lee's only other "direct" evidence was the conduct he alleged was anticompetitive: Google not sharing its customers or technology with competitors, which he considered to diminish product quality. 9/20/24 AM Tr. 129:17-130:3, 134:11-135:5 (Lee).

406. With respect to "distinct products" supporting his market definition analysis, Professor Lee relied on product distinctions to exclude certain tools from his markets no matter how much evidence there was that an excluded tool posed a competitive threat to publisher ad servers, ad exchanges, or "advertiser ad networks." For example, Professor Lee agreed that header bidding was ad tech that enabled publishers to receive real-time bids from one or more exchanges running auctions, and that it affects competition in the alleged markets. *Infra* ¶¶ 555-558. Even though, according to Plaintiffs' witnesses and Google documents, header bidding made Plaintiffs' markets "hyper-competitive" and posed a significant threat to products in Plaintiffs' markets, 9/9/24 AM Tr. 155:23-156:9 (Casale); *supra* ¶¶ 202-215; *infra* ¶¶ 551, 560, Professor Lee excluded header bidding from his markets because header bidding was a "different product, different functionality than those other products." 9/20/24 AM Tr. 25:25-26:15 (Lee).

407. Professor Lee also claimed that defining markets based on "open-web display advertising" was appropriate because "open-web display advertising" is "distinct from other forms of advertising." 9/19/24 PM Tr. 52:12-19 (Lee). According to Professor Lee, when assessing whether alternative tools should be included in an antitrust market, whether the ads are "distinct" is also relevant because it explains why customers would be willing to pay more than competitive prices for the tools used to transact" only those "distinct" ads. Plaintiffs' Demonstrative O; 9/20/24 AM Tr. 57:17-24 (Lee); 9/19/24 PM Tr. 52:12-19 (Lee).

408. Professor Lee agreed, however, that products being "distinct" in the minds of consumers is insufficient on its own to require that the products be in separate markets. 9/20/24 AM Tr. 58:4-60:4 (Lee). Professor Lee also agreed that differentiated products can be included in the same market. *Id.* at 60:5-15 (Lee). Professor Lee never explained in his testimony why distinctions between the ad tech products here are sufficient to define separate markets. Professor Lee did not even study the differences between ad tech products other than isolating whether they could transact "open-web display ads."

409. In any event, the evidence presented in this case does not demonstrate that "open-web display ads" are "distinct." Industry participants, including Plaintiffs' witnesses, rely on a concept called the "marketing funnel" to describe how different "media channels and media tactics" can serve different purposes in marketing. 9/9/24 PM Tr. 57:11-20 (Lowcock). As Plaintiffs' advertising agency witness explained, "at the high end of the funnel, you're trying to drive awareness"; moving down the funnel, "you're trying to get interest, consideration, and finally a decision or a purchase action at the end of it." *Id.* (Lowcock).

410. Industry participants' descriptions of the funnel confirm that—aside from search ads—other ads can and do serve the same purpose that "open-web display ads" do because they are placed in the same places in the funnel.

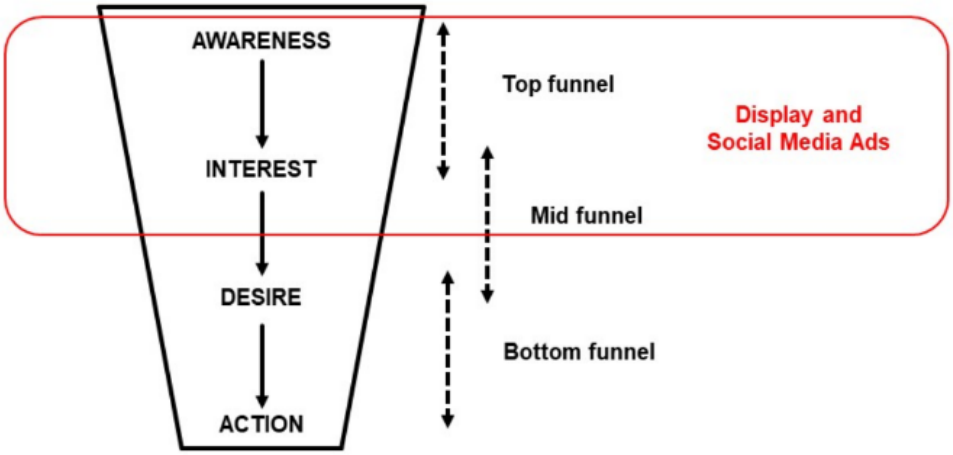
410.1. Media plan recommendations to the Army listed "digital display" as both "mid/lower funnel" and "upper funnel." Also contained in those categories in the funnel were "online video" and "paid social." DTX-1151A at 10 (2021 Omnicom recommendation to Army); DTX-1172 at 18 (2021 Omnicom recommendation to Army listing "programmatic display" and "paid social" as both "mid funnel" and "low funnel").

410.2. In its advertising campaign, the Census used multiple ad formats and channels for the "awareness and motivation phase" of its campaign: in-app ads, website ads, and video ads. 9/23/24 PM Tr. 128:22-129:8 (Hardie); DTX-1030 at 3 (2020 Google slide deck prepared for Census Bureau).

410.3. Farber, lead Product Manager for Meta's Audience Network testified that social media ads on Meta's properties serve advertisers across all parts of the funnel. 9/26/24 PM Tr. 149:23-150:12 (Farber).

410.4. Omnicom, an advertising agency, testified that "a channel can live in any position in the funnel. They're not exclusive to one or the other." 9/13/24 PM Tr. 35:22-36:6 (Lambert).

410.5. Lowcock testified that, as depicted below, Lowcock DX 2, display and social media serve the same upper-funnel goals of creating awareness and interest or consideration. 9/9/24 AM Tr. 90:1-91:12 (Lowcock) (volunteering without a question pending that they are "imperfect substitutes," but agreeing that they serve the same goals). Lowcock agreed that native advertising is also an upper funnel advertising tactic. *Id.* at 103:8-10 (Lowcock).



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410.6. Friedman testified that display, advanced TV, online video, and cross-device display all can "support upper funnel goals" of awareness. 9/10/24 PM Tr. 12:14-22 (Friedman). He further testified that "there's no channel that will sit exclusively in one area of the funnel necessarily"; for example, "even connected TV, which is traditionally viewed as upper funnel, can be used as lower funnel, it just depends on the message and the application." *Id.* at 132:5-17 (Friedman).

410.7. Bumpers testified that advertisers "can use the different—different channels to—at the top of the funnel and the bottom of the funnel." 9/27/24 AM Tr. 35:9-16 (Bumpers).

411. In the recent *Search* trial, the United States relied heavily on the marketing funnel to establish that "search ads" are a distinct market because advertisers use search ads to accomplish different goals than non-search ads. *United States* v. *Google LLC*, 2024 WL 3647498, at *36–38 (D.D.C. Aug. 5, 2024). In this case, Professor Lee did not refer to the funnel in his direct testimony or cite it in support of his market definition other than to distinguish display ads from search ads. On cross examination, Professor Lee admitted that his reports stated that marketing research and industry participants recognize the marketing funnel. 9/20/24 AM Tr. 52:8-16 (Lee). In his reports, he had even relied on—as evidence that "open-web display ads" are "distinct"—a chart from a Google document that placed display ads in a different part of the "funnel" (upper funnel) than search ads (bottom funnel). Lee DX 2; 9/20/24 AM Tr. 51:25-54:14 (Lee). Yet, at trial, Professor Lee refused to give an opinion on the standard representation of the funnel found in documents he cited, or to give an opinion on where display ads fall in the funnel. 9/20/24 AM Tr. 53:3-54:14 (Lee) ("I'm not expressing an opinion generally on where display is.").

412. If anything, Professor Lee's own analysis undermines his suggestion that "display ads" are distinguishable from other types of ads based on the funnel. A chart that Professor Lee prepared outlining the "differences" between ad formats and channels shows that web display, instream video, native content recommendation, native social, native sponsored listing, in-app display, and in-app instream video ads all have similar characteristics: they can all target users based on interests and demographics, and they can all be sold using a CPC cost model. Lee DX 3 (Lee Figure 79: Summary of key differences between digital advertising types of advertisers); 9/20/24 AM Tr. 54:23-55:21 (Lee).

413. With respect to "industry recognition," Professor Lee agreed that industry recognition is relevant to how a market should be defined and considers evidence like Google documents, other industry documents, and public industry sources. 9/20/24 AM Tr. 57:25-58:3 (Lee). As explained above, there is no industry recognition of "open-web display ads," as defined by Plaintiffs or as identifying a market. *Supra* ¶ 398.

D. Economic Principles Require Examining Evidence of Substitution to Define Product Markets, But Plaintiffs' Markets Ignore Real-World Substitution to Exclude the Most Significant Sources of Display Advertising Competition.

414. Plaintiffs' market definitions are flawed for the additional reason that display ad spend is substituting away from tools used to transact "open-web display ads" to tools and functionalities that are excluded from Plaintiffs' markets, including tools used to transact in ads appearing in apps, on social media, on Connected TV, and on owned-and-operated properties, as well as video ads (instream) and native ads.

415. To define a relevant product market, economists start from the product at issue—here, certain Google ad tech tools—and identify the key competitors that constrain the product's pricing or other business strategies. 9/26/24 AM Tr. 45:23-47:8 (Israel). In order to define the universe of key competitors, economists ask: if the firm at issue tries to make its products not work

as well, or tries to exercise monopoly power more broadly, with what, if anything, would customers—here, advertisers and publishers—substitute. *Id.* at 47:9-48:4 (Israel).

416. The evidence, including real-world data and common sense, shows that advertisers and publishers shift their ad spending to follow user attention. 9/26/24 AM Tr. 49:23-50:6 (Israel). As explained below, the goal of advertisers is to reach their target users as efficiently as possible, and the goal of publishers is to effectively obtain and monetize user attention. Both of those goals result in ad spend shifting to where users spend their time consuming digital content.

417. The industry has seen user attention shift to the channels and formats excluded from Plaintiffs' proposed markets, and away from the "open-web" and "open-web display ad" inventory.

417.1. The fraction of time that adult users spend viewing non-video content on the open web has precipitously declined from 73 percent in 2010 to 23 percent in 2022, and the last time users spent more time on traditional non-video websites than on other digital properties, such as mobile apps, social media, or Connected TV, was in 2012. DTX-1833 (based on eMarketer data[13]); 9/26/24 AM Tr. 43:18-44:19 (Israel); DTX-629 at 36 (2018 Census strategy: "One of the biggest content consumption trends is the increase in time spent per day with digital video"); DTX-1343 at 46 (2022 Census deck stating video consumption grew from 47% to 69.8% amongst Americans between 2010 and 2018).

[13] eMarketer is a standard industry resource that tracks and publishes data on the industry. 9/26/24 AM Tr. 44:5-10 (Israel); 9/20/24 AM Tr. 36:7-13 (Lee). All cites to Dr. Israel's figures based on eMarketer data that refer to "display" use the eMarketer definition of display ads, which includes any banner, native, or video (instream and outstream) ads appearing on the web, on social media, on retail media, in apps, and on connected TV. 9/26/24 AM Tr. 96:1-4 (Israel); 9/26/24 PM Tr. 57:13-19 (Israel); 9/20/24 AM Tr. 36:14-18 (Lee).

417.2. Users are spending a significant amount of time on mobile apps rather than on the web. Compared to 2010, when the amount of time users spent in their mobile browsers was double the amount of time spent using apps, today, the amount of time users spend in apps is nearly quadruple the amount of time spent in mobile browsers. DTX-1869 (based on eMarketer data); 9/26/24 AM Tr. 44:25-45:22 (Israel) (Time spent on the mobile web has been "pretty flat," "but the growth has been on apps. So, again, if you're an advertiser thinking about alternative places to make connections with users and impressions, apps are a predominant place to find them").

418. As users have shifted their time from the "open web" to mobile apps, social media, and video platforms, the industry has also seen significant shifts in display ad spend. 9/26/24 AM Tr. 46:5-47:8 (Israel). Accordingly, the functionality to transact in these other formats and channels is an important competitive constraint on tools that enable "open-web display advertising." As a concrete example, in 2013, 81% of display ad spend was on "open web" advertising, 18% on in-app advertising, and 0% on Connected TV advertising. By 2022, at most 29% of display ad spend was on "open web" advertising, 55% was on in-app advertising, and 15% was on Connected TV advertising. DTX-1831; 9/26/24 AM Tr. 46:5-47:8 (Israel).

419. Industry participants agree that, as user attention has shifted, spending in the industry has also shifted away from "open-web" ads:

419.1. Google: A 2022 Google planning slide deck stated: "share in Non-Search ads has gone to TikTok, Snap, Pinterest, and Twitter"—social media companies that own apps and websites. DTX-1132N at 9; 9/25/24 PM Tr. 63:14-25 (Stewart).

419.2. The Trade Desk: "Media consumption habits, particularly in television, accelerated toward digital- and internet-connected streaming." 9/12/24 AM Tr. 168:13-20 (Dederick); *see also* 9/12/24 PM Tr. 6:4-16 (Dederick) (The Trade Desk CEO told investors and analysts that "the massive shift over the last four years in terms of where consumers are spending their digital time was the global pandemic").

419.3. Small business: Caldwell, owner of a small business, testified that she has never chosen to target her advertising campaigns toward "users only using computers" because "our users don't hang out on computers all the time." 9/25/24 PM Tr. 6:19-7:1 (Caldwell).

419.4. PubMatic: In a recent earnings presentation, PubMatic stated that, as viewers move to mobile apps, "mobile app continues to drive revenue growth and differentiation" in advertising. PubMatic's mobile app revenue increased 20 percent year over year up to the second quarter of 2024. Goel DX 2; 9/12/24 PM Tr. 125:16-126:20 (Goel). Similarly, Goel agreed that advertising spend had shifted to Connected TV advertising, so that PubMatic's CTV revenue was up 50 percent year over year. 9/12/24 PM Tr. 132:1-14, 133:18-134:8 (Goel). By the end of fiscal year 2021, mobile and video represented 67 percent—well over half—of PubMatic's revenue. *Id.* (Goel).

419.5. Index Exchange: Casale testified that "one of the transformational events impacting ad tech is the growth in video and streaming TV": user attention in that channel is growing, "and it's evolving ad tech as a result." 9/9/24 PM Tr. 21:2-22:9 (Casale). Connected TV spend had increased from 0 percent of

Index Exchange's revenue in 2021 to approximately 10 percent of the ads transacted on index Exchange by 2023. *Id.* (Casale).

419.6. Brian Boland, formerly employed at Facebook, testified that "over the last ten years, users increasingly have spent time accessing content on mobile devices." 9/13/24 PM Tr. 143:18-24 (Boland). As a result, advertiser spend has shifted to mobile app ads, and Facebook Audience Network saw growing demand for mobile app ads. *Id.* at 143:21-144:21 (Boland).

419.7. Criteo (including BidSwitch): According to a 2023 forward planning document, display advertising is experiencing "changing & emerging formats," with a "slow but steady decline in web display." DTX-1544A at 7; *see also id.* at 4 ("a gradual move from web display towards app and news formats").

420. Professor Lee failed to analyze this shift in spend away from "open-web display ads" and the tools and functionality used to transact in them.[14] He therefore failed to consider the significant competitive constraints placed on Google's ad tech tools by ad tech used to transact ads appearing on other channels and in other formats. 9/26/24 AM Tr. 48:5-17 (Israel). Professor Lee offered no principled reason for these significant exclusions other than—as demonstrated otherwise above, *supra* ¶¶ 406-411—his inaccurate claim that "open-web display ads" are recognized as "distinct."

[14] Plaintiffs may argue that because Google in some instances tracks these different formats and channels separately, it is proper to define markets based on functionality in "open-web display ads." The relevant inquiry, however, is whether advertisers and publishers substitute between these other channels and formats, not whether Google tracks certain segments of ad inventory separately because they are an "emerging product area" or are served by "different products." 9/20/24 PM Tr. 106:14-108:13 (Sheffer).

1. Advertisers and Publishers Shift Spend Between Ad Tech Tools and Their Functionalities to Serve Different Ad Channels and Formats.

421. As demonstrated in the next section, advertisers and publishers shift ad spend between different ad formats and channels. As they do, advertisers and publishers necessarily also shift their spend between ad tech tools and their functionalities. 9/26/24 AM Tr. 49:6-22 (Israel) ("So if the tech gets more expensive, then, as I said, we're going to look for where people will substitute, and they'll substitute to other places that have different tech.").

422. Professor Lee agreed this conclusion was true by necessity. For example, if an advertiser switches ad spend away from "open-web display ads" to ads on social media sites such as Facebook that rely on proprietary ad tech, the advertiser must use different ad tech tools to serve the ads. 9/20/24 AM Tr. 34:6-35:15 (Lee). There was no dispute from Plaintiffs' experts that display ads outside of the "open-web" are also purchased by advertisers, facilitated through auctions, and served using ad tech tools. 9/20/24 AM Tr. 32:9-33:11 (Lee).

a. Advertisers

423. "Ultimately, advertisers are following eyeballs. They are trying to reach people wherever they are." 9/23/24 PM 117:25-119:8 (Hardie); *see also* 9/9/24 PM Tr. 56:5-22 (Lowcock); Deposition of Todd Parsons Tr. 93:14-22 ("We look at audiences because advertisers want to reach the right person with the right message at the right time.").

424. Accordingly, as user attention shifts, the distribution of spend on display ads—and the tools to purchase those ads—also changes. Advertisers can be "agnostic" as to "the particular platform at any given time" because they seek to reach users at the right time, without attention to what platform is used to do it. 9/23/24 PM Tr. 118:15-119:21 (Hardie); *see also* 9/25/24 PM Tr. 64:9-19 (Stewart) (advertisers and their chief marketing officers "are always looking for the most cost-effective and efficient platforms"); DTX-1132N at 10 (2021 Google slide deck stating chief

marketing officers "will prioritize high ROI tools and activities . . . to make the most of growing ad budgets"). For example, to run its advertising campaign the Census Bureau considered digital advertising as a whole—the method or specific ad format by which the ad was served "didn't matter," "as long as the audience was responding to the ad." 9/23/24 PM Tr. 83:11-84:7, 85:3-17, 85:24-86:8, 92:6-10 (Oliphant).

425. Plaintiffs' witnesses agreed that advertisers shift spend in order to achieve their goals of reaching users:

425.1. Lowcock defined substitution as "a shift of budget from one ad format to another based on the purpose you are trying to achieve." 9/9/24 PM Tr. 93:1-5 (Lowcock). While at Universal McCann, he trained employees to move funds between channels to optimize for performance. *Id.* at 93:10-21 (Lowcock) (the "goal" for advertisers is "to shift or substitute one ad type with another in order to try to achieve the best possible ROI [return on investment]").

425.2. Friedman explained "all media is just media": "All media must work toward a marketer's goal . . . each have different purposes and serve different purposes, but from a marketer's standpoint, they should not be biased toward one medium or another based on the performance as long as performance is considered." 9/10/24 PM Tr. 6:11-7:7 (Friedman). As an ad agency, Friedman advises advertisers "to focus on the audience, the return on investment, and not on price." *Id.* at 8:2-14 (Friedman).

426. Even for advertisers that have "distinct budgets" dedicated to "particular ad formats or channels," those budgets are not fixed. Advertisers still "make allocation changes" across

channels and formats based on measurements of return on investment. 9/25/24 PM Tr. 30:6-31:1 (Stewart).

427. Over time, industry innovations have enabled advertisers to shift spend even more effectively than they did before.

427.1. For example, digital advertising has shifted to performance-based marketing. DTX-371 at 2 (2017 Google strategy document).

427.2. Because of technological improvements in measurement capabilities, advertisers are increasingly outcome-driven. 9/25/24 PM Tr. 28:6-22 (Stewart) (one of the most significant changes in digital advertising is the ability to measure outcomes); *id.* at 30:18-31:1 (Stewart) (advertisers buy ads based on where they get the highest return on investment).

428. Advertisers gather data about exactly what ads are providing better returns on their investment or ad spend, reaching the right audience, and achieving the desired goals of the ad campaign, so they make choices driven by returns and consumer engagement—not a particular type of ad format or channel. *E.g.*, 9/27/24 AM Tr. 29:21-23 (Bumpers) ("Q. Does Zulily allocate ad spend between different intermediaries based on their performance? A. Yes.").

428.1. Stewart, a buy-side executive at Google who works closely with customers, testified that the rise of measurement forces companies to put forth their most ROI-enhancing products. 9/25/24 PM Tr. 28:6-22, 29:13-30:1 (Stewart).

428.2. Criteo, which offers a buying tool, testified that it helps advertisers "measure their return on investment" and "shift their investments" to achieve desired outcomes). Deposition of Todd Parsons Tr. 108:10-209:24, 110:5-21.

429. Advancements in measurement capabilities also enable advertisers to understand where to invest their ad dollars in order to maximize their returns. 9/25/24 PM Tr. 28:16-29:8 (Stewart).

429.1. For example, ad analytics technology helps advertisers more nimbly and seamlessly shift ad spend. *E.g.*, DTX-439 at 107 (2017 Census Bureau document explaining that "digital placements can be altered quickly, and many will be continuously and automatically optimized for best performance by ad platforms"); DTX-994 at 1 (USPS's ad agency noting recommendation in 2020 to "shift funds from Display into Social for Political Mail" campaign "based on projected under spend"); DTX-1340 at 1-2 (USPS's ad agency recommending a campaign "optimization" in 2022—"shift some funds from Social to Display").

430. One measurement tool is "media mix modeling," which refers to measuring return on ad spend across different channels such as "search, linear, television, and on" and adjusting ad spend decisions accordingly. 9/25/24 PM Tr. 29:1-12 (Stewart) ("Most of the customers I work with are using—we call them MMMs in their marketing."); DTX-1214 at 17 (2022 Google deck partnering with Army explaining use of MMM).

430.1. Advertisers make decisions about how to allocate their spend "among advertising channels or formats based on media mix modeling." 9/25/24 PM Tr. 30:2-5 (Stewart). As a result, ad tech providers "need[] to put forth the best product they have" in order to "provide return on investment for their customer" because it does not matter whether the provider is selling "display

or video or whatever product you have." *Id.* at 29:13-30:1 (Stewart). What matters is the performance of a channel.

430.2. For example, the e-commerce company Zulily monitors the performance of its email ads, mobile app ads, Connected TV ads, and online ads using metrics such as "cost-per-million clicks," "click-through rates," "conversions," the amount of money customers spend on Zulily's website, and the number of customer sign-ups received. 9/27/24 AM Tr. 24:21-25:15, 29:14-20 (Bumpers). Each week, Zulily reviews its performance metrics and decides whether to test out new ad channels or formats in order "to find the most efficient way to spend our money" and "get a better return on investment." *Id.* at 25:18-27:7 (Bumpers). Following some weekly reviews, Zulily has shifted money from Google to Facebook in order to try to obtain better return on investment for its ad spend. *Id.* at 25:18-27:7 (Bumpers).

430.3. The Census Bureau and 2020 Census also rely on media mix modeling. The Census needed to reach everyone in the United States to encourage completion of the Census questionnaire. 9/23/24 Tr. PM 68:9-68:18, 68:24-69:5 (Oliphant). In order to achieve its goal, the Bureau used programmatic advertising to purchase streaming video, rich media, and banner ads for the 2020 Census campaign. *Id.* at 81:12-19 (Oliphant). Google developed for the Census a tool that evaluated consumption habits in different regions of the country and assessed, among all ad channels, "how to allocate resources in order to reach the audience" the Census needed to encourage completion of the 2020 Census. 9/23/24 PM Tr. 120:9-131:10 (Stewart); DTX-1030 at 4

(2020 Google slide deck prepared for Census Bureau). That tool allocated resources across not just display ads, but digital out-of-home ads, radio ads, TV ads, podcast ads, and more. 9/23/24 PM Tr. 120:9-131:10 (Stewart); DTX-1030 at 4.

431. Artificial intelligence can now facilitate ad spend shift automatically—without the advertiser making any decisions about particular ad formats or channels.

431.1. Google Ads' Performance Max tool, for example, utilizes AI to buy across different ad formats and channels—including both "open-web display ads" and ads that are excluded from that definition like "closed-web" ads on Google's owned-and-operated properties, in-app ads, and instream video ads—based on the expected return on investment calculated by Google Ads' AI-powered technology. DTX-1248N at 6-7, 20 (2022 Google Performance Max presentation). The advertiser plays no manual role in deciding the channels where ads will be placed, so when it bids through Performance Max it does not purchase a particular ad format or channel. DTX-1248N at 6-7, 20 ("Limiting a channel will limit performance.").

431.2. Facebook has developed a similar tool that automatically optimizes where to place an ad on Facebook's inventory—including websites and apps—based on the advertiser's goals. DTX-498 at 5 (2017 Meta document). According to Facebook, campaign that optimized ad placement outperformed campaigns targeting only one particular property or channel. DTX-498 at 6.

432. Aided by all these developments, buyers dynamically adjust their spending strategies depending on the audience they want to reach and where they can find them. Reflecting

that reality, every industry participant agreed that advertisers shift ad spend between different ad channels or formats in order to better maximize return on investment.

432.1. Advertising agency: Lowcock testified that his ad agency uses an "optimization engine" that recommends reallocating budget between channels based on "business outcomes" and return on investment. 9/9/24 PM Tr. 94:10-19 (Lowcock). For example, Lowcock's ad agency advised the United States Postal Service, and the USPS agreed, to shift ad spend between "display" and social media advertising based on performance. *Id.* at 97:5-8 (Lowcock); *see also* DTX-994 at 1 ("Hi, USPS . . . . As you may recall, a few weeks ago we made the recommendation to shift funds from Display into Social for Political Mail."); DTX-1340 at 1 (for another campaign, "Hi, Laura, let's make the shift into display").

432.2. Criteo: A Criteo representative testified that, when "Criteo is dealing with advertiser customers," it has observed that advertisers "shift their spend across inventory types" such as in-app, video, and Connected TV. Deposition of Todd Parsons Tr. at 108:10-15; *see also id*. 109:21-24 (Parsons) ("We would shift investment to help the advertiser measure return on investment as perceive it.").

432.3. Zulily: "At Zulily or any marketing, you're trying to optimize your spend" "because we have a constrained amount—a limited amount of resources." 9/27/24 AM Tr. 31:7-19 (Bumpers). "I believe we—and we've reduced spending and—at the Google ad network and we increased spending at . . . the Facebook ad network. . . . We've had shifting priorities on the way we target

our audiences since I have been there. So we have had a new CMO—previously we had a different CMO—and he was focused on a different population, and we went to Facebook to bring those people in." *Id.* at 31:7-19, 32:5-22 (Bumpers). Between 2016 and 2017, Zulily reduced its spending on Google Ads between $25 and $30 million and simultaneously increased its ad spending on Facebook and Instagram by $30 million. *Id.* at 31:4-6, 30:24-31:6 (Bumpers). Since 2021, Zulily has continued to reduce its spend on Google Ads and repurpose that spend on Facebook and Instagram. *Id.* at 32:5-22 (Bumpers).

432.4. Omnicom: "Advertisers seek to target an audience through multiple channels" and if "one channel is performing worse than another channel, Omnicom, on behalf of [its] client, can shift spend to a better-performing channel." 9/13/24 PM Tr. 47:19-48:4 (Lambert). Omnicom markets its ability to "fluidly reallocate its clients' budgets to the channels and tactics that are delivering." *Id.* at 49:16-22 (Lambert). Omnicom can and does "shift spend from a channel that costs more, where there's more spend" and not a lot of benefit "to a more efficient channel." *Id.* at 48:14-18 (Lambert); *see also id.* at 52:2-53:1 (Lambert) (recommending reducing Army's digital display budget from $16.2M to $5.2M and shifting spend to other channels like paid social based on performance); DTX-1172 at 6 (2021 Army presentation).

432.5. United States Census Bureau: The U.S. Census Bureau optimized its media spend during the 2020 Census Campaign to ensure the "best performance." 9/23/24 PM Tr. 92:20-93:23 (Oliphant) (discussing DTX-439 at 107); *see also*

DTX-1335 at 2 (Census Bureau's ad agency would shift "money between media types if opportunities became available"). For example, the Census Bureau adjusted its digital media strategy across formats in response to the COVID-19 pandemic. 9/23/24 PM Tr. 91:5-17 (Oliphant). The pandemic caused a shift in "media consumption" as people began to consume "more digital news, streaming audio, interacting on social networks, and using more apps on their mobile devices." DTX-929 at 4, 6. Oliphant testified that the Census Bureau "adjusted its digital media mix" in response to these changed consumption habits. 9/23/24 PM Tr. 91:13-17 (Oliphant). Census documents indicate the same. DTX-929 at 4, 6 ("shifting programming and media consumption patterns necessitated rapid adjustment in media planning and tactics"); DTX-1403 at 2 (given "the speed with which this industry changes," the Census directed its advertising agency to optimize for performance). The Census Bureau also shifted some of its display advertising towards Facebook in response to Facebook ads' better performance. 9/23/24 PM Tr. 96:10-13 (Oliphant) ("Q. And was it accurate that after testing these tactics, including display, investment was shifted to job boards, Facebook, and keyword search based on performance, correct? A. Correct."); *see also* DTX-1074 at 40.

432.6. GSD&M: Bo Bradbury testified that there are "times on a given campaign where it's necessary for an advertiser to shift from one channel to another," or "within the channel," "based on what they're seeing in terms of campaign success and key performance indicators." 9/19/24 PM Tr. 11:17-22 (Bradbury).

432.7. Buzzfeed: A Buzzfeed representative testified that advertisers optimize "spending toward the environment providing the best rate of return." Deposition of Ken Blom Tr. 81:2-4, 81:6-11. As he explained, advertisers can run ads on Buzzfeed's desktop web ad inventory, mobile web ad inventory, or in-app ad inventory. *Id.* at 80:8-23 (Blom). Buzzfeed helps advertisers optimize across these channels because "some advertisers don't care about environment, they care about results." *Id.* at 81:2-4, 81:6-11 (Blom). An advertiser might, for example, "take budget from, you know, entirely mobile and move it to desktop if they're seeing that desktop click-out rates are working more." *Id.* at 84:5-23 (Blom). An advertiser might even shift spend between ad channels or formats mid-campaign based on weekly campaign reports about performance. *Id.* at 88:19-89:8 (Blom).

432.8. Kevel: Plaintiff witness Avery testified that if Kevel did not get a good return on its investment from Google's advertising tools, Kevel would shift its spend to a different supplier of advertising. 9/9/24 PM Tr. 166:9-16 (Avery).

432.9. Small business owner advertiser: Caldwell, a small business owner who uses Google Ads, testified that she shifted her advertising spend year to year between Google Ads and tools excluded from Plaintiffs' markets. For example, in 2022, her digital budget was allocated 70 percent to Google Ads, which is in Plaintiffs' markets, and 30 percent to Instagram, which is not. In 2023, she shifted to 65 percent on Google Ads and 35 percent on Instagram. That decision was based on monitoring engagement and campaign performance. 9/25/24 PM Tr. 9:9-10:11 (Caldwell).

433. Plaintiffs' only response to the reality that advertisers' goals drive them to shift ad spend is that "open-web display ads" serve a "distinct" purpose in targeting users that cannot be accomplished with other ad formats and channels. 9/19/24 PM Tr. 52:12-19 (Lee).[15] As explained above, *supra* ¶¶ 406-411, evidence based on the very same marketing funnel relied on by the United States in the recent *Search* trial contradicts their argument here. Other ad formats and channels that are not "open-web display" can help advertisers achieve the same goals as "open-web display," and advertisers will shift spend accordingly to reach their target audiences and achieve their desired results.

b. Publishers

434. Digital content providers also adjust their monetization efforts to follow user attention and advertising spend.

435. Because ad tech tools match advertisers and publishers, substitution by one side of the matching transaction (advertisers) can cause substitution on the other side (publishers). For example, if advertisers using Google's ad tech see their return on investment go down or prices go up, they may substitute away from Google Ads to Facebook or Amazon. If these advertisers shift, then publishers using DFP will make less money selling web ad space through Google's ad tech tools to advertisers using Google Ads, leading publishers to shift to alternative ad tech tools or move their content to apps and use app-specific inventory management tools. 9/26/24 AM Tr. 77:12-78:11 (Israel). Advertiser substitution therefore causes feedback effects: if advertisers

[15] The only explanation that Professor Lee provided as to why there is "distinct" value for advertisers in "open-web display ads" is that they enable them "to advertise on open-web publisher sites, target users across a range of websites." 9/19/24 PM Tr. 76:21-77:11 (Lee). Professor Lee did not otherwise explain how this type of ad is distinct from other types of ads he excludes, including display ads appearing in apps and on Connected TV and on social media and retail media properties run by publishers with in-house ad tech.

switch to Facebook, the alleged benefits Google provides as a result of what Plaintiffs have referred to as "unique demand" go away. Publishers perceive Google's platform as less attractive and substitute to alternative ad tech, move their content off of the "open web," or even change to a subscription model. *Id.* at 77:12-78:11 (Israel) ("Those two effects start feeding back on each other through these network effects.").

435.1. As one example of publishers shifting spend from ad tech functionality for serving "open-web display ads" to ad tech functionality for serving in-app ads, the New York Times allows its "ads to deliver across both web, mobile web, and desktop web and our apps equally as where there is supply." 9/26/24 PM Tr. 145:24-146:6 (Glogovsky). As a result, as the readers of the New York Times shift from web to app, a "natural shift" in display advertising impressions from web to app follows. *Id.* at 123:10-124:20, 145:24-146:6 (Glogovsky) (New York Times monetizes content "across our many surfaces, both web and app base," during its podcasts, and over email).

436. One primary way that publishers like the New York Times are shifting their ad tech spend is by focusing attention on developing in-app content. DTX-406 at 22 (2017 Google competitive analysis: "Mobile is critical for many publishers as desktop growth slows down."). For example:

436.1. A representative of Gannett testified that "many" of the local newspapers in the Gannett network have an app, as does USA Today. 9/9/24 AM Tr. 95:1-6 (Wolfe).

436.2. The Daily Mail publishes its content on a number of social media offerings, including on their apps. 9/18/24 AM Tr. 155:4-8 (Wheatland) (The Daily

Mail claims that it "has become the biggest news publisher on TikTok"); *id.* at 155:17-156:2 (noting The Daily Mail's plan to publish "top" content to social media sites like Facebook and Snapchat).

436.3. Buzzfeed sells in-app ad inventory and finds that "advertisers move their spending toward the environment providing the best rate of return." Deposition of Ken Blom Tr. at 80:8-81:11. Thus, Buzzfeed as a publisher may even optimize for the advertisers and spend on in-app advertising because "some advertisers don't care about environment, they care about results." *Id.* at 81:2-11 (Blom).

437. Publishers can even offer inventory that shifts between different ad formats for the same impression, depending on which format will make the publisher more revenue.

437.1. For example, a Mediavine Ad Capabilities page touts that Mediavine can run a "super auction" that "allows multiple formats to compete within the same ad slot." DTX-1734 at 2.

437.2. A Mediavine representative explained that these multi-format slots provide "increased yield. If a bidder is willing to pay more money for a banner ad than a video ad, we will show the banner ad. The same concept with native or video. Our sole goal is to increase yield." 9/25/24 PM Tr. 181:8-17 (Hochberger); *see also id.* at 180:25-181:11, 181:21-182:2 (Hochberger) ("At the time of auction, whatever the highest bid is what we take, whatever the format.").

438. Publishers particularly value ad tech tools that support serving multiple forms of inventory across devices and ad formats so that they can centrally manage their inventory using

one tool. As a former Product Manager Leader for AdX and DFP explained, "publishers were involved in a wide range of creating and sharing content across many different technology platforms. So the web, apps, video were all highly interchangeable, and publishers, in my view, were increasingly looking for solutions that could help them across all" formats. 9/19/24 AM Tr. 126:24-127:9 (Bellack).

439. Ad tech providers, including Google, therefore build and market their sell-side functionalities based on the multiple advertising channels and formats they facilitate. For example, Google has lauded the abilities of DoubleClick to serve publishers across channels:

439.1. "We cemented [DFP's] standing as the best cross-channel revenue platform by adding a full suite of mobile and video capabilities." DTX-101 at 2 (2012 Google email).

439.2. "Goal: Reduce complexity and increase transparency for pubs and Google . . . Better cross-channel visibility and revenue transparency for publishers." DTX-213 at 17 (2014 Google slide deck).

439.3. "DoubleClick is the proven solution in market that can seamlessly support ad serving and yield management across [apps] and desktop." DTX-406 at 22 (2017 Google competitive analysis).

2. Ad Spend Has Shifted Away from the "Open Web" to Ads on "Closed" Digital Properties that Use In-House Ad Tech Like Social Media and Retail Media.

440. Shifting spend by both advertisers and publishers between "open-web display ads" and non-"open-web display ads" is concretely demonstrated by the significant shift over time in

ad spend from what Plaintiffs call "open" digital properties to what they call "closed" digital properties.[16]

441. Industry data show that display ad spend has been shifting away—i.e., substituting—from Google, and towards "closed" competitors with in-house tech like Meta, TikTok, and Amazon for the past decade. DTX-1874; DTX-1969; 9/26/24 AM Tr. 70:14-71:16 (Israel).

442. Professor Lee did not dispute Dr. Israel's data and agreed both that display ads on "closed" digital properties like Meta and Amazon "compete with display ads on the open web" "to some degree," and that when advertisers shift their spend from buying "open-web display ads" to buying ads on Facebook and Amazon, they must also shift their spend to Facebook's and Amazon's tools.[17] 9/20/24 AM Tr. 33:12-34:5 (Lee) ("for advertiser spending, there's some degree of substitution"); *id*. at 34:13-19 ("Different tools are used to buy this walled-garden inventory.").

443. Even though ad spend on the "open web" competes with ad spend on "closed" properties, Plaintiffs distinguish between "open" and "closed" digital properties in a way that leads to nonsensical results relating to the same publisher's inventory.

[16] Here, the terms "open" and "closed" are used as shorthand to distinguish between what Plaintiffs refer to as the "open web," i.e., websites operated by publishers who use third party ad tech, and the non-"open web," i.e., websites operated by publishers who use proprietary ad tech to sell their ad inventory. The use of Plaintiffs' terms does not reflect agreement that these terms, or Plaintiffs' definitions, are recognized by the industry.

[17] Amazon also offers tools, such as its very popular header bidding wrappers, *supra* ¶¶ 171, 208-209, that connect advertisers with non-Amazon publishers. Plaintiffs would consider ads facilitated by Amazon's tools on non-Amazon properties to be "open-web" ads. For purposes of the discussion below, we refer to the "closed-web" ads that Amazon's tools facilitate on its owned-and-operated properties, but Amazon's "open-web" capabilities are an important part of the reason Google views Amazon as a serious competitive threat in display advertising. *Supra* ¶¶ 208, 345.

444. *First*, because Plaintiffs define "open-web publisher" based on whether the publisher uses third-party ad tech tools to serve ads, transactions of ads appearing on the same exact digital properties move in and out of Plaintiffs' markets—even though the ads are otherwise the same and serve the same needs of the same advertisers by reaching the same users—simply because they are being transacted by different tools.

444.1. For example, the New York Times previously used its own ad server, so its proprietary ad server was not a "publisher ad server for open-web display advertising" under Plaintiffs' definition. But in 2015, it started using DFP. 9/26/24 PM Tr. 140:10-25 (Glogovsky). According to Plaintiffs, that means ads served on the New York Times website used to be "closed-web display ads" but are now "open-web display" ads (even though New York Times' content has not changed and is generally not accessible unless the reader is a paying subscriber who is logged in on its website or app).

444.2. Other publishers—including Amazon, Reddit, Disney, and Snapchat—have gone the other way. They have switched from Google's "publisher ad server for open-web display advertising" to in-house proprietary ad servers excluded from Plaintiffs' definition. 9/26/24 AM Tr. 126:17-25 (Israel); 9/17/24 PM Tr. 123:9-11 (Helfand).

445. *Second*, providers of owned-and-operated inventory sell their inventory using both proprietary ad tech and ad tech that transacts ads appearing on the "open web." That makes it difficult to determine whether a particular impression is an "open-web display ad."

446. For example, as of October 2023, Disney has created proprietary ad tech that it uses to serve ads on its owned-and-operated inventory, including an ad exchange and an ad server.

9/17/24 PM Tr. 115:25-116:12 (Helfand) (Disney invested in the creation of its own ad tech tools to be able to "deploy them into—into market with a sufficient amount of speed"); *id.* at 116:15-117:7 (tools Disney created include the Disney Ad Server, the Disney Real-Time Exchange, Hulu Ad Manager, Disney Ad Manager, and Disney XP, which is a cross-platform product across multiple inventory sources). Some of the impressions transacted by Disney's proprietary ad server and ad exchange, however, are facilitated by third-party demand-side platforms, like The Trade Desk, so they are sold using a combination of both proprietary ("closed") and third-party ("open") ad tech. *Id.* at 125:16-23 (Helfand).

447. The experience of industry participants is that "open web" ads compete with ads on "owned-and-operated" properties, and that advertisers shift spend between both based on the rate of return.

447.1. The Trade Desk considers its buying tool, which purchases "open web" ads as defined by Plaintiffs, to compete with tools that serve and transact ads that appear on owned-and-operated properties. 9/11/24 PM Tr. 97:9-19, 98:8-99:7 (Dederick) (The Trade Desk is unable to secure the entirety of advertiser budgets because it does not "have access to major pools of inventory that advertisers really need to show up on" like YouTube, Google Search, and Amazon).

447.2. A Buzzfeed representative testified that, "if the rate of return for advertising on Facebook went down and open websites went up," he would "expect advertisers to move advertising toward open-web websites." Deposition of Ken Blom Tr. at 157:20-158:4.

447.3. Google's competitor, AppNexus, also explicitly described ad spend in "closed" systems as competition to ad spend on "open web" ad tech when it analyzed competition between Amazon and AppNexus's third-party ad tech tools. "Q. Why did AppNexus consider Amazon to be winning in 2017? A. Amazon has the retail dollars and also launched sponsored ads. So Amazon has both retail dollars, as well as buyers. And their advertising grew from, if I remember, like, 1 billion to 3 billion to—you know, growing aggressively. And Amazon was also taking the demand dollars that would go into the open web into the closed Amazon ecosystem." 9/20/24 PM Tr. 131:22-132:7 (John); *see also id.* at 132:8-15 (John) (Facebook, Amazon, Apple all competitors to AppNexus in 2017).

a. Ad Spend Shifts to and from Social Media.

448. Social media sites, including Facebook, Instagram, and TikTok have attracted increasing amounts of user attention.

448.1. "Social media usage has increased dramatically across all audiences." DTX-629 at 34 (2018 Census Bureau presentation).

448.2. As a demonstration of social media's growth, in 2010, Twitter had 14.3 million U.S. users. In 2020, Twitter was estimated to have 56.10 million U.S. users. DTX-1343 at 57 (2022 Census presentation). In 2010, Instagram had .3 million U.S. users, and by 2020 was estimated to have 120.30 million U.S. users. DTX-1343 at 57. In that same decade, new social media companies emerged like Snapchat, Pinterest, Tumblr, and Tiktok. 9/23/24 PM Tr. 77:24-78:16 (Oliphant).

449. Annual display ad spending in the United States on ads, including those defined by Plaintiffs as "native ads," appearing on social media properties like Facebook, Instagram, LinkedIn, Pinterest, Reddit, Snapchat, TikTok, and Twitter has increased from $1.2 billion a year (16% of U.S. display ad spend) in 2008 to at least $65.3 billion (48% of U.S. display ad spend) as of 2022. DTX-1915 (based on eMarketer data); 9/26/24 AM Tr. 50:12-51:14 (Israel).

450. Consistent with the dramatic increase in social media ad spend, buy-side witnesses testified that social media advertising is very important to advertisers.

450.1. Lowcock testified that while at Universal McCann, he had "no clients" that did not purchase social ads. 9/9/24 PM Tr. 86:5-19 (Lowcock). He also testified that "the vast majority of advertising on social media is display" and that "advertising that is inserted on a social media page is similar to display advertising." *Id.* at 82:15-20, 84:23-85:14 (Lowcock).

450.2. Caldwell, owner of a small business, testified that she advertises on social media such as Instagram and TikTok because "that's where the eyeballs are." 9/25/24 PM Tr. 7:5-10 9:12-18 (Caldwell).

451. As Dr. Israel explained, advertisers would substitute to ads on social media properties in response to an increase in the price of the ad tech used to transact "open-web display ads." 9/26/24 AM Tr. 49:6-22 (Israel). When advertisers substitute social media ads for "open-web display ads," they also substitute the ad tech used to run ads on social media for ad tech like Google's that serves "open-web display ads." *Id.* at 49:23-50:6 (Israel); 9/20/24 AM Tr. 34:6-35:15 (Lee).

452. Comparing annual spend on these social media properties to spend on non-social display ads demonstrates that there is substitution and active competition between the two ad

channels. DTX-1829 (Israel Figure 8: U.S. Display Ad Spending by Social vs. Non-Social Advertising, 2008-2022, based on eMarketer data); 9/26/24 AM Tr. 51:20-52:17 (Israel).

452.1. As further evidence of substitution between non-social media and social media ad tech, data from Omnicom, a large advertising agency that helps advertisers evaluate on a regular basis what formats and channels are generating the best return on investment, show that between 2021 and 2022 their top advertiser clients moved dollars into social and out of other ad tech tools. DTX-1972; 9/26/24 AM Tr. 52:23-54:17 (Israel).

452.2. The growth of ad spend through Meta's ad tech, which includes spend on social media sites Facebook and Instagram, further demonstrates the significant shift in spend to social media. Annual spend on these properties has grown from $0.2 billion (3% of U.S. display ad spend) in 2008 to $50 billion (37% of display ad spend) in 2022. DTX-1925; 9/26/24 AM Tr. 54:18-55:15 (Israel).

453. Data from Google Ads and Meta show that in 2022 [redacted]% of the advertisers that use Meta also uses Google Ads. DTX-1853. This multi-homing demonstrates that there would be little cost to advertisers already using both Google Ads and Meta to shift ad spend between the tools. DTX-1853; 9/26/24 AM Tr. 56:12-57:14 (Israel) (multi-homing is "an important indicator" of substitution because "if advertisers are actively using both," they can "substitute because they're there and they're regularly evaluating how much to put into each").

454. Meta has attracted significant user attention on its social media properties, and, as reflected in numerous internal business documents and testimony, Google viewed Meta as a

significant competitor for display advertising business. *Supra* ¶ 338; 9/26/24 AM Tr. 58:25-60:10 (Israel).

455. In addition to viewing Meta as a competitor, Google has explicitly referred to Meta's display ads business as part of the market opportunity available to Google.

455.1. A 2017 competitive analysis, for example, noted that 48% of Google's "untapped opportunity" in "display+video," corresponding to $16 billion, "reflects Facebook's share." DTX-486N at 5.

455.2. Another 2017 Google internal document stated that "Facebook and (to a lesser extent) Amazon have diverted significant spend from 3rd party publishers to their O&O inventory." DTX-371 at 2.

455.3. Sheffer, a sell-side executive at Google for 18 years, explained that, from Google's perspective, proprietary ad tech, like Meta or Amazon competes with Google because "advertising money that's flowing through a Meta" is "revenue that our publishers aren't receiving." 9/20/24 PM Tr. 82:16-83:3 (Sheffer) ("So I see that as a massive amount of dollars that we should be competing for.").

456. The reverse is true as well: Meta views itself as competing in the display advertising industry against all other competitors, like Google, that offers ad tech tools.

456.1. Meta wrote in its 2022 10-K that its display ads business competes with all "companies that sell advertising to businesses looking to reach consumers and/or develop tools and systems for managing and optimizing advertising campaigns." DTX-1480 at 26. Meta did not limit the companies it identified as its competitors to display ads businesses that operate proprietary ad tech

tools, or exclude as competitors display ad businesses that offer third-party tools.

456.2. When asked who Meta competes with in display advertising, the Meta corporate representative identified as competitors all providers that consolidate "digital demand that advertisers will buy supply for online." 9/26/24 PM Tr. 152:14-153:7 (Farber). The "scope of competition" was anywhere that an advertiser would be willing to put its dollar, including Meta's tools, "all demand side platform, ad network, etc." *Id.* at 152:14-153:7 (Farber).

457. TikTok is another social media site that is attracting significant ad spend in recent years. TikTok has grown from $173 million in display ad revenue (0.2% of U.S. display ad spend) in 2019 to over $5 billion (3.7% of U.S. display ad spend) in 2022, and is forecasted to continue growing rapidly. DTX-1927; 9/26/24 AM Tr. 60:16-61:7 (Israel).

458. Data show that Google Ads' largest advertisers are spending significant amounts on TikTok ads, and that spend on TikTok is growing rapidly year-over-year. This data show that multi-homing advertisers can easily "move money back and forth in response to even small differences in performance." DTX-1974 (Israel Table 5: Advertisers With At Least $1 Million in 2022 TikTok Advertising Spending Among the Top 50 2022 U.S. Google Ads Advertisers); 9/26/24 AM Tr. 62:2-63:11 (Israel).

459. Contrary to the data showing that advertisers shift spend between "open-web display ads" and social media ads, one of Plaintiffs' witnesses testified that social media and display ads are not reasonable substitutes for advertisers because, among other reasons, "social media advertising is accessible to anyone . . . you can buy social media advertising with a credit

card." 9/9/24 PM Tr. 67:25-68:11 (Lowcock). In contrast, according to Lowcock, "display advertising requires a little bit more sophistication because you need to both create display assets. You need to find a way to buy display advertising." *Id.* (Lowcock).

460. Lowcock's testimony is inconsistent with the data showing that there has been, for at least many advertisers, significant and growing substitution over many years between "display ads" and social media ads. Moreover, Stefaniu's demonstration of Google Ads makes clear that the distinctions Lowcock described are overstated. Google Ads, like social media advertising, is accessible to any advertiser. Even if an advertiser does not have an ad creative prepared, Google Ads can make the display asset—whether for a static image, video, or native ad—for the advertiser in just a few clicks. 9/23/24 PM Tr. 33:2-6, 33:17-20, 34:8-15 (Stefaniu); Stefaniu DX 1 at 1.5.

461. Notwithstanding the increasing spend on social media ads and advertisers substituting between "open web" and social media ads, Professor Lee excludes social media ads from his markets on the ground that they are served by "closed" ad tech. In addition, Professor Lee also tried to distinguish social media ads from "open-web display ads" on the basis that social media ads are "native ads" (which he excludes from "display ads"). 9/20/24 AM Tr. 40:3-18 (Lee).

462. Again, Professor Lee's distinctions are not responsive to the data on significant substitution that Dr. Israel presented.

463. In addition, the distinction between display ads and native ads drawn by Professor Lee does not make sense. Native ads are text and image ads that are intended to blend in with the digital content surrounding them, but they are otherwise the same as other text and image display ads. 9/9/24 PM Tr. at 127:23-128:19 (Avery) (an example of a native ad as an ad on Instagram that is "blended well into the experience of Instagram"); *id.* at 157:13-158:11 (Avery) (represents

to customers that "more and more advertisers are looking to innovative native display ads rather than standard banners"); Wolfe DX 2.

464. Industry participants do not distinguish between display ads and native ads, and Professor Lee offered no principled explanation for why they should nonetheless be treated as distinct.

464.1. eMarketer: eMarketer does not recognize the distinction, and many in the industry find it difficult to even delineate the distinction. 9/20/24 AM Tr. 40:3-18 (Lee) (agreeing display ads are sometimes defined to include native ads); 9/26/24 AM Tr. 82:3-21 (Israel). Rather, industry participants recognize both banner and native ads to be "display" ads, with ad tech providers marketing their ability to transact across both kinds of ads.

464.2. Criteo: In Criteo's 2022 10-K securities filing, it defined "display" as "including social and native," and highlighted that "Criteo's solutions work seamlessly across" these ad formats. DTX-1420 at 13.

464.3. New York Times: The New York Times testified that native ads "would fall within the display category." 9/26/24 PM Tr. 130:12-1 (Glogovsky); *see also* DTX-1824 at 3 (New York Times presentation identifying display as a category and not distinguishing native).

464.4. Buzzfeed: Buzzfeed testified that individual advertisers on Buzzfeed "usually" purchase multiple formats of ads, including standard display and native ads. Deposition of Ken Blom Tr. 86:16-87:25, 88:5-9.

b. Ad Spend Has Shifted to Ads on Retail Sites.

465. Retail media is a fast-growing channel for display ads, with display ad spend on ecommerce sites growing from $3.3 billion (5% of U.S. display ad spend) in 2018 to $12.7 billion (9% of display ad spend) in 2022, moving away from "open-web display ads." DTX-1916.

465.1. Criteo: As Criteo testified, "commerce media, retail media is becoming a very popular way for brands to advertise to consumers." Deposition of Todd Parsons Tr. 70:11-23; *see also* DTX-1544A at 20 (2023 BidSwitch document noting that retail media is a "key vertical of interest to Criteo").

465.2. Kevel: Kevel, which offers a publisher ad server, agreed that retail media, which involves major companies such as Amazon, Walmart, Instacart, eBay, and Etsy, is an area of growth and the "next wave" in digital advertising. 9/9/24 PM Tr. 159:1-6, 159:19-160:19 (Avery).

465.3. Google: A 2021 Google competitive analysis observed that "eCommerce remains a dynamic space with rapid growth and increased competition in response to shifting consumer behavior." DTX-1132N at 12. "Traditional marketplaces," such as Walmart, CVS, Target, and The Home Depot, are "emerging as eCommerce destinations." DTX-1132N at 12.

466. As an example of the recent explosion in growth of retail media ad spend, display ad spend on Amazon has grown from less than a billion dollars a year between 2008 and 2017 (and less than 1% of U.S. display ad spend through 2016) to $8.3 billion in 2022 (6.1% of U.S. display ad spend)—900% growth in just five years. DTX-1926.

467. Internal Google documents confirm that, since as early as 2015, Google has tracked Amazon as a major competitor for display ad spend, including because of Amazon's strength as a retail media property. *Supra* ¶ 345; 9/26/24 AM Tr. 67:6-68:22 (Israel). In addition, Amazon

offers an integrated ad tech stack and tools that connect advertisers not just to Amazon's owned-and-operated properties, but also third-party publisher properties. *Supra* ¶¶ 341-343.

467.1. As just one example, a 2019 competitive analysis described Google's advertiser customers, including large advertisers such as Procter & Gamble spending over $100 million, "shifting budgets" from Google to Amazon. DTX-754 at 4; *see also id.* at 8 (Amazon "winning brand budgets otherwise won by Google," including from Coke, Unilever, and Whirlpool).

468. Notwithstanding the growth of ad spend on retail sites such as Amazon, Plaintiffs exclude this ad spend from their markets.

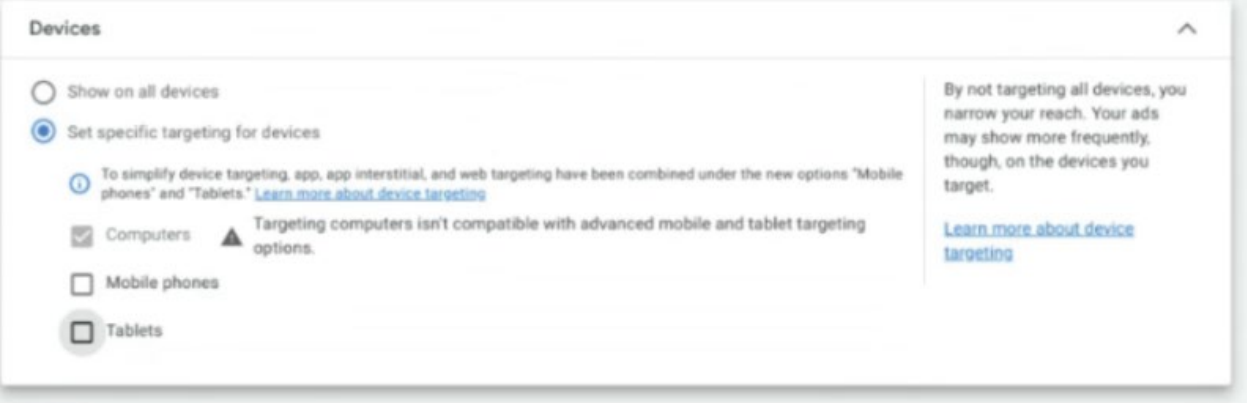
3. Ad Spend Has Shifted Away from Display Ads Appearing on the Web.

469. "Closed" web properties like Facebook.com and Amazon.com are not the only place online where ad spend is shifting significantly. Consistent with advertisers' goal to maximize return on investment and publishers' goals to maximize revenue and reach users, ad spend is also shifting away from websites to other channels.

470. Users are moving away from viewing the web on computers, so ad dollars are following where the users are going, including to ads in mobile apps and on Connected TV. 9/26/24 AM Tr. 69:25-70:8 (Israel) ("if you're looking for places to make these matches and find users, many of the best substitutes are now going to be off the laptop and desktop and on mobile"). In 2013, display ad spend on desktop and laptop computers accounted for 71% of all U.S. display ad spend, but almost a decade later in 2022, it accounted for only 17%. DTX-1918.

471. User attention on desktop computers has become so insignificant that Google Ads specifically warns advertisers against running an ad campaign that targets only computers. If a user creates a campaign in Google Ads and tries to target computers only, "a universal warning sign for danger icon pops up," with the language: "Targeting computers isn't compatible with

advanced mobile and tablet targeting options." 9/23/24 PM Tr. 24:24-25:11 (Stefaniu); Stefaniu DX 1.7.



472. As Stefaniu explained, Google provides that warning to advertisers because, with a computer-only campaign, the advertiser "may not be reaching the full breadth of users they can likely reach with this particular campaign if they were only targeting computers." 9/23/24 PM Tr. 24:24-25:11 (Stefaniu). In contrast, Google Ads does not provide the same warning for campaigns focused only on mobile phones or tablets because "most individuals today are using mobile phones and/or tablets to consume information online." *Id*. at 25:12-20 (Stefaniu). In other words, in today's world an advertiser who relies solely on the kinds of ads Plaintiffs are focused on is not acting efficiently from an economic standpoint and would be handicapping its own campaign.

473. Consistent with the significant shift in user attention and ad spend away from computers, in her entire time as an account manager for Google Ads, Stefaniu never encountered an advertiser seeking to run a campaign only on computers. 9/23/24 PM Tr. 25:25-26:4 (Stefaniu).

a. Ad Spend Has Shifted to Ads in Apps.

474. Mobile has become "the preferred way for users to view digital content." DTX-1343 at 54 (2018 Census "Paid Media Kickoff Media 101" presentation); *see also id.* at 41 (showing share of time spent on digital mobile as 27.5% vs. desktop/laptop time spent as 22.1% in 2017). Internal Google documents confirm the same, noting that the shift to mobile comes at a

cost to the growth of web ads. DTX-801 at 4 (2019 Google product and business strategy document: "Time spent by users continues to shift away from desktop/tablet consumption to mobile."); PTX-764 at -252 (2019 Google business finance metrics document: "We should expect to face headwinds as user preferences change (web to app).").

475. "Within the mobile world, users are shifting more dramatically to apps over the mobile web." DTX-801 at 4 (2019 Google strategy document).

475.1. Demonstrating substitution in ad spend, U.S. display ad spend on in-app ads has increased from $3.4 billion in 2013 (18% of U.S. display ad spend) in 2013 to over $75 billion (55% of U.S. display ad spend) in 2022. DTX-1920 (based on eMarketer data); 9/26/24 AM Tr. 82:25-83:13 (Israel).

475.2. More than 50 percent of Google's Display business profits from January 2020 to August 2023 were from in-app ads. 9/26/24 AM Tr. 19:3-11 (Mok); *see also* DTX-1343 at 130 (2018 Census "Paid Media Kickoff Media 101" presentation).

475.3. For one of Google's competitors, PubMatic, its mobile app ad business has grown year over year by more than 20%. 9/12/24 PM Tr. 125:20-126:6 (Goel).

475.4. A 2023 forward planning document created by BidSwitch (now part of Criteo) observed that, since 2016, "app traffic has grown rapidly" with "more than 2X growth over 5 years." DTX-1544A at 4. "Web traffic, in comparison," has decreased." DTX-1544A at 4; *see also* Deposition of Todd Parsons Tr. 148:14-23 (discussing DTX-1544A at 4).

476. As reflected in data from Google Ads, nearly 90% of Google Ads advertisers buy both in-app ads and web ads. Because they already purchase both ad formats using the same tool,

those advertisers can easily substitute between app ads and website ads. DTX-1855 (Israel Figure 34: Distribution of Google Ads U.S. Non-Video Display Ad Spending by Advertiser Use of App and Web Advertising); 9/26/24 AM Tr. 83:17-84:6 (Israel).

477. Data from Google Ads provide direct evidence that advertisers have been substituting from web ads to in-app ads. Google Ads advertiser in-app ad spend has increased from 0% of ad spend in 2012 to 38% in 2022, with the percentage of spend on website ads decreasing during the same time period. DTX-1854; 9/26/24 AM Tr. 84:10-85:5 (Israel).

478. Notwithstanding the exponential growth of apps, Plaintiffs exclude all in-app ads from the definition of "open-web display ads." *Supra* ¶ 377. As a result, they exclude ad tech used to transact in-app ads from the relevant markets and exclude all transactions of in-app ads by multi-functional ad tech tools from their market share calculations.

479. Professor Lee acknowledged that an advertiser could place the exact same ad using the exact same tool on the *Washington Post* website and in the *Washington Post* app, and the website ad would be included in his market share calculations but the app ad would not. 9/20/24 AM Tr. 76:13-24 (Lee). He had no principled explanation for why this makes sense.

480. Plaintiffs' witness Dederick testified that in-app advertising is distinct from web advertising because "the experience for a consumer seeing an in-app ad" is different from seeing an ad "on a desktop computer or a laptop." 9/11/24 PM Tr. 124:4-12 (Dederick). This makes no sense because mobile web advertising is also viewed on a phone as opposed to a desktop computer or a laptop, and is excluded from Plaintiffs' market. In any event, Dederick's distinction between user experiences is not responsive to and does not undermine the data demonstrating significant substitution between display ads on websites and on apps.

481. Even though the vast majority of large publishers have mobile apps, *infra* ¶ 601, and The Daily Mail is "one of the largest English language newspaper websites in the world," 9/18/24 AM Tr. 124:10-16, 125:13-18 (Wheatland), the representative of The Daily Mail claimed that The Daily Mail has difficulty directing its users to its mobile app because users have to take more steps to use an app than they do to visit a website. 9/27/24 AM Tr. 65:24-66:21, 87:23-88:1 (Wheatland). Yet Wheatland admitted on cross examination that downloading The Daily Mail app requires the exact same number of steps—three—as visiting a website. *Id.* at 88:2-89:6 (Wheatland). And once a user downloads the app, the app is on that user's phone "permanently," after which it would be "really easy" to simply open the app. *Id.* at 89:7-17 (Wheatland).

482. Plaintiffs' exclusion of the technology used to place in-app display ads from their market is a "fundamental omission" because apps are "where a lot of the [action] is." 9/26/24 AM Tr. 85:6-15 (Israel). Plaintiffs "are missing what is now the predominant place to make these connections." *Id.* (Israel).

b. Ad Spend Has Shifted to Video Ads, Including on Connected TV.

483. Video advertising is an increasingly important form of display advertising. 9/23/24 PM Tr. 144:20-24 (John); DTX-1045 at 46 (2021 GroupM presentation); DTX-1132N at 13 (2021 Google presentation). According to internal documents from the Census Bureau, digital video consumption grew from 47% to 69.8% between 2010 and 2018. DTX-1343 at 46; *see also* DTX-629 at 36 ("One of the biggest content consumption trends is the increase in time spent per day with digital video.").

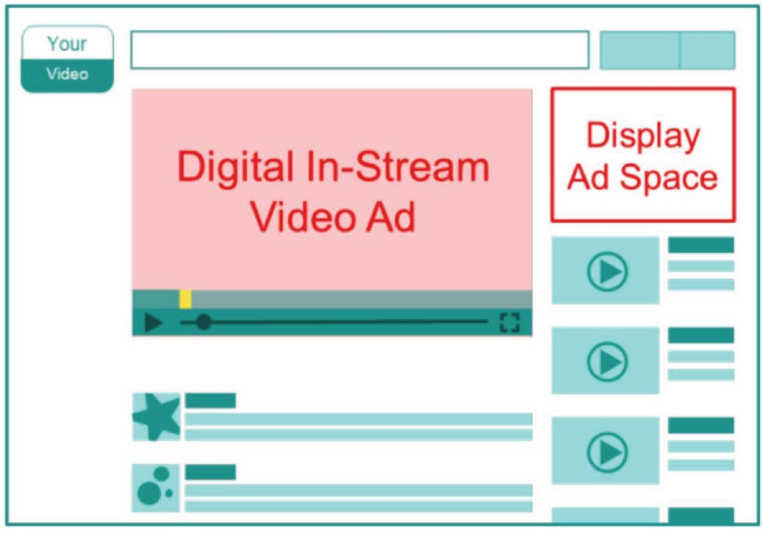
484. Video advertising includes two formats: instream and outstream. Instream video ads are played on a website's or app's own video player before, during, or after the video that the user sought to watch. 9/10/24 AM Tr. 134:13-21 (Friedman). Outstream video ads are video ads

placed elsewhere on the website or app, including to the side of or next to the content the user is viewing, in ad slots that could also be filled by traditional banner ads. *Id.* (Friedman).

485. Both are types of video advertising, often placed using the same tools, including Google Ad Manager, and used to target the same users. The Daily Mail, for example, displays both instream and outstream videos on its website. 9/18/24 AM Tr. at 189:7-191:14 (Wheatland). The exact same video ad might be categorized as either instream video or outstream video depending on where it appears.

486. Plaintiffs define display ads to include outstream video ads but to exclude instream video ads. Plaintiffs have offered no principled reason to distinguish between the two types of video ads. Professor Lee admitted that, based on his demonstrative, Lee Demonstrative 4, a video ad run on a website in an "outstream" spot would be included in his market share calculations, but the very same video ad run on the same website using the same tools in an "instream" spot would be excluded. 9/20/24 AM Tr. 77:4-78:6 (Lee).

Figure 8. Example of digital instream video ad formats as specified by the Internet Advertising Bureau



Source: IAB, "Digital Video In-Stream Ad Format Guidelines,",IAB, January 2016, p. 7, https://www.iab.com/wp-content/uploads/2016/01/DVAFG_2015-01-08.pdf.

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487. Plaintiffs' exclusion of instream ads ignores the commercial reality that advertisers have been shifting a greater percentage of their ad spend to video advertising, with most of that spend on instream video advertising. Based on eMarketer data, spend on video ads accounted for less than $1 billion and only 9% of U.S. display ad spend in 2008; by 2022, it accounted for $73.8 billion and 54% of U.S. display ad spend.[18] DTX-1917. Between just 2015 and 2022, spend on video ads increased by 950%. DTX-1917. Today, "about 57 percent of video spending is instream." DTX-1917; 9/26/24 AM Tr. 78:16-79:2 (Israel).

488. In addition to the eMarketer data, Google Ads data also demonstrate that advertisers have been substituting ad spend on other ad formats for instream video ads. In 2013, only 14% of Google Ads U.S. display ad spend was on instream video ads; by 2022 that percentage increased to 31%, as the proportion of ad spend on other display ads declined in parallel. DTX-1857; 9/26/24 AM Tr. 81:15-82:2 (Israel) (Google Ads advertisers are increasingly substituting to instream video away from other display ad formats).

489. As reflected in data from Google Ads, just under two-thirds of Google Ads advertisers buy both "open-web display" ads and instream video ads. Because they already use the same tool to purchase both, these advertisers have easily substituted between the two ad formats. DTX-1858; 9/26/24 AM Tr. 80:21-81:11 (Israel).

490. In particular, advertisers have been shifting spend to video ads that appear on Connected TV. Connected TV ("CTV") devices are smart devices that stream videos, such as Apple TV, Roku, and Amazon Fire TV.[19] 9/27/24 AM Tr. 24:3-11 (Bumpers) (Zulily advertises

[18] Prior to 2017, eMarketer's video ad spending estimates did not include outstream video, and by 2016, instream video ad spend alone had grown from less than $1 billion and only 9% of U.S. display ad spend in 2008 to nearly $10 billion and 28% of U.S. display ad spend. DTX-1917.

[19] Ads appearing on Connected TV are excluded from Plaintiffs' definition of "open-web display ads" on the basis that they are usually instream video ads appearing in Connected TV rather than

on various CTV services including Tubi, FuboTV, and Hulu); Deposition of Todd Parsons Tr. 47:11-48:11.

490.1. CTV devices are a growing source of user attention that draws advertisers. Deposition of Todd Parsons Tr. at 47:11-48:11; DTX-1045 at 47-48, 52, 54 (2021 GroupM presentation).

490.2. All major publishers "are available in a CTV environment." 9/13/24 PM Tr. 45:19-24 (Lambert). The Census Bureau's ad agency reported that between 2010 and 2018, Connected TV penetration in U.S. households increased by 208%. DTX-1343 at 45; DTX-629 at 36; *see also* 9/23/24 PM Tr. 77:4-6 (Oliphant) (CTV became "much more prominent" between 2010 and 2020).

491. CTV display ad spending in the United States has grown from $2.8 billion (6% of U.S. display ad spend) in 2017 to $20.4 billion (15% of U.S. display ad spend) in 2022. DTX-1922; 9/26/24 AM Tr. 79:3-19, 79:25-80:16 (Israel).

492. Industry participants have observed that Connected TV has driven growth in display ad spend on their properties.

492.1. For Index Exchange, CTV grew from 0 percent to 10 percent of ads in a span of less than three years. 9/9/24 PM Tr. 22:5-9 (Casale); *id*. at 21:2-12 (Casale) (growth in video and streaming TV is a transformational event impacting ad tech).

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on websites. They are also often excluded for the reason that most CTV providers have in-house ad tech and are therefore "closed" publishers according to Plaintiffs.

492.2. For PubMatic, CTV revenue increased by 50% in one year. It estimated that, by 2023, CTV would become a $65 billion market. 9/12/24 PM Tr. 132:1-14, 133:18-25 (Goel).

493. Internal Google documents describe the buying tools that have sought a competitive advantage by building and investing in their ability to facilitate CTV ads, such as The Trade Desk, Roku, Amazon, and Verizon, as exerting significant pressure on Google's buying tools. For example, one 2021 competitive analysis stated that "DV360 is significantly behind competitor" tools in the third-party CTV space. DTX-1053N at 3 ("In 2020, Google has already lost $510M to TTD, with another $1.4B at risk. Post 2020, there is [redacted] at risk.").

494. The Trade Desk has had particular success competing against Google's tools for advertiser business in video and Connected TV formats.

494.1. As it has said to investors and analysts, The Trade Desk's success is due in large part to the fact that over the last four years, there has been a massive shift in terms of where consumers are spending their digital time towards Connected TV and digital audio. 9/12/24 PM Tr. 5:6-6:20 (Dederick). The Trade Desk's CEO has further stated that Google's reduced focus on the open internet has created opportunities for The Trade Desk. *Id.* at 9:1-8 (Dederick).

494.2. According to the Chief Revenue Officer of The Trade Desk, it "sounds right" that The Trade Desk told investors that The Trade Desk "will continue to outpace the market in the years to come led by areas such as Connected TV" given that "connected television has been a key growth driver for our company." 9/12/24 AM Tr. 163:11-165:22 (Dederick); *id.* at 165:23-166:9

(Dederick) (investments in connected TV and digital audio are driving The Trade Desk's "top-line revenue growth").

494.3. Plaintiffs' market share analysis ignores all of The Trade Desk's success in instream video and CTV, thereby calculating a market share for Google's buy-side ad tech tools that does not take into account this competition.

4. Ad Spend Shifts Between Indirect Transactions and Direct Transactions.

495. Direct transactions remain an important way to match advertisers and publishers for publishers' most valuable inventory, and are used as substitutes for indirect transactions by both advertisers and publishers.

496. Since 2013, direct transactions have accounted for at least 70% of U.S. display ad spend. In 2022, direct transactions accounted for 77% of U.S. display ad spend. DTX-1923 (based on eMarketer data); 9/26/24 AM Tr. 85:20-86:11 (Israel); *see also* DTX-1544A at 9 (2023 BidSwitch forward planning document stating "deals trading makes up a significant portion of total trading and is expected to grow").

497. Professor Lee included direct transactions in his alleged publisher ad server market share calculations. For Plaintiffs' alleged "advertiser ad network" and ad exchange markets, however, Professor Lee excluded direct transactions from his market share calculations. 9/26/24 AM Tr. 88:24-89:12 (Israel); 9/19/24 PM Tr. 90:14-91:2 (Lee) (restricted ad exchange share calculations to "indirect open-web display transactions"); *id.* at 119:15-20 (Lee) (market shares for "advertiser ad networks" use "only indirect open-web display transactions). Professor Lee offered no principled basis for why direct deals are allegedly a competitive constraint in the publisher ad server market, but not in the ad exchange or "advertiser ad network" markets. *See*

9/19/24 AM Tr. 77:12-78:13 (Lee) (testifying only to his opinion that direct deals do not constrain the ad exchange market).

498. Plaintiffs make this exclusion even though direct and indirect transactions can use the same ad tech tools and the same ad creatives to reach the same users. For example, the Army bought ad space both directly from publishers and indirectly through buying tools like DV360 to reach "the same recruits with the same advertising." 9/25/24 PM Tr. 48:15-50:12 (Stewart).

499. The exclusion of direct deals is significant because, as the percentage of U.S. display ad spend on direct deals has increased, the percentage of U.S. display ad spend on indirect deals has decreased. These data demonstrate substitution between the two types of transactions. *Compare* DTX-1923 (Israel Figure 110: U.S. Direct Display Ad Spending, 2013-2022, based on eMarketer data), *with* DTX-1924 (Israel Figure 111: U.S. Indirect Display Ad Spending, 2013-2022, based on eMarketer data); *see also* 9/26/24 AM Tr. 86:24-87:11 (Israel).

500. Advertisers shift spend between direct transactions and indirect transactions.

500.1. [redacted] 9/26/24 AM Tr. 90:19-91:18 (Israel).

500.2. Facebook: According to Boland, former Vice President at Facebook, advertisers "substituted away from Google's open auctions to programmatic direct deals." 9/13/24 PM Tr. 135:23-136:1 (Boland).

500.3. OpenX: According to a 2017 OpenX competitive intelligence deck, "Programmatic Direct spend is growing at a faster pace in comparison with RTB." DTX-384 at 3.

500.4. GroupM: Schiekofer, Chief Digital Investment Officer for an advertising agency, testified that her agency (GroupM) shifts between open auction and direct deals based on evaluation of return on investment. 9/17/24 PM Tr. 151:3-17 (Schiekofer).

500.5. Buzzfeed: A Buzzfeed representative testified that advertisers "switch their budget" between various transaction types—such as manual direct deals, programmatic guaranteed, private marketplaces, and open auction—based on return on investment. Deposition of Ken Blom Tr. 91:7-20, 92:15-93:16, 93:18-19.

501. For publishers, direct transactions are an important source of revenue. "For most publishers, a rough rule of thumb is that 50 to 80 percent of their revenue comes from their direct sales efforts." 9/20/24 PM Tr. 78:9-11 (Sheffer).

501.1. For example, the New York Times testified that the "majority of revenue comes from direct sales." 9/26/24 PM Tr. 129:15-17 (Glogovsky); *see also id.* at 128:14-25 (Glogovsky) (New York Times's "direct business creates a larger share" of its display ads business); DTX-1824A at 6 (New York Times presentation estimating New York Times quarterly display revenue from "Direct Banners & PG" as $24.5 million and from "Programmatic - Open/PMP" as $9.8 million).

501.2. The Daily Mail testified that it has "a preference to sell advertising directly because we can get higher prices." 9/18/24 PM Tr. 159:8-12 (Wheatland).

502. From the publisher perspective, direct transactions compete with other transactions.

502.1. Gannett: Wolfe, Senior Vice President of revenue operations at Gannett, testified that, on the USA Today network, direct sales fluctuate from 25% to 45% of ad sales each year. As direct sales go up, indirect sales go down. 9/9/24 AM Tr. 97:24-99:4 (Wolfe).

502.2. New York Times: "Programmatic bids that have been solicited" from exchanges in an ad call "compete with [the New York Times's] direct business to elicit higher CPMs and drive incremental revenue." 9/26/24 PM Tr. 135:25-136:14 (Glogovsky).

502.3. An advertising agency witness agreed that digital content providers can strategically prioritize or deprioritize direct transactions for sales of certain inventory. 9/10/24 PM Tr. 22:11-19 (Friedman) ("programmatic direct deals and open auction deals" can be "mixed together," with programmatic direct deals offering "some priority over premium ad inventory in an open auction before that ad inventory is offered publicly").

502.4. As Dr. Israel explained, publishers have control over their substitution between direct and indirect deals. To the extent indirect ad tech does not work well or becomes more expensive, the publisher can invest more money in making more direct deals. 9/26/24 AM Tr. 87:12-19 (Israel) ("So nobody's going 100 or zero, but if the tech doesn't work as well, you substitute more effort on getting the last five or ten direct deals. And, again, that means dollars flow out of the ad tech provider's pocket.").

503. Demonstrating that direct and indirect transactions are direct substitutes, in 2014 Google introduced a feature in DFP, Enhanced Dynamic Allocation, that dynamically optimizes

for publishers—in real time—whether to place an ad in a given impression from a guaranteed direct deal or an indirect transaction.

503.1. Before Enhanced Dynamic Allocation, guaranteed direct deals received the highest priority above the waterfall. Ads purchased through guaranteed direct deals were always served (without looking to other demand sources) if there was a direct guaranteed ad available to fill an impression. Indirect demand was only able to compete for the remnant impressions that remained after sufficient impressions were set aside to satisfy the publisher's guaranteed direct deals. 9/24/24 AM Tr. 67:18-68:9 (Milgrom).

503.2. Because indirect demand could not compete for the ad slots dedicated to guaranteed deals, publishers were missing out on the opportunity to make extra revenue because they were "not delivering a high value ad from AdX when it is available." DTX-125 at 2 (2012 Google product design document).

503.3. Enhanced Dynamic Allocation put guaranteed direct deals in head-to-head competition, in real-time, with indirect demand, which increased publishers' revenue by allowing them to sell impressions to an advertiser who valued the impression most while still fulfilling their direct deals. 9/24/24 AM Tr. 69:23-70:25 (Milgrom).

503.4. Google launched Enhanced Dynamic Allocation to "expand competition between ads among priorities," and sellers benefited from increased revenues as a result. DTX-125 at 2; *see also* DTX-371 at 2 (2017 Google strategy document stating Enhanced Dynamic Allocation "optimizes competition on

every impression"); DTX-1083A at 11 (2021 Xandr presentation describing Microsoft Xandr's feature similar to Enhanced Dynamic Allocation).

503.5. Before launch, Google found in experiments that Enhanced Dynamic Allocation could increase publishers' AdX revenue by up to 150%. DTX-125 at 2.

504. When Enhanced Dynamic Allocation is running, direct and indirect transactions are literally competing for each individual impression. 9/24/24 AM Tr. 72:21-73:3 (Milgrom) (with Enhanced Dynamic Allocation, programmatic auction-based buyers were competing with direct sales "on an impression-by-impression basis").

504.1. Plaintiffs' advertising agency witness agreed that EDA enabled real-time bidding to "play in the same space" with direct deal buyers. 9/10/24 PM Tr. 42:11-18 (Friedman).

504.2. A 2017 Google document described Enhanced Dynamic Allocation as pushing "the industry in the direction of allowing programmatic / auction-based buyers to compete with direct sales." DTX-405 at 3.

505. Disney has developed a functionality similar to Enhanced Dynamic Allocation that makes the same inventory available for "direct buys" available in auctions to bid on. 9/17/24 PM Tr. 126:18-127:9 (Helfand). According to Disney, that functionality benefits advertisers because advertisers are "buying both ways" and benefits Disney, the publisher, because it wants to "maximize fill of all of our available inventory." *Id.* at 127:10-19 (Helfand).

506. According to DFP data, a majority of DFP publishers sell through both direct and indirect transactions. Those publishers can easily substitute between the two transaction types, including using Enhanced Dynamic Allocation. DTX-1865 (Israel Figure 45: Distribution of U.S.

DFP Impressions by Publisher Use of Direct and Indirect Sales, 2022); 9/26/24 AM Tr. 89:16-90:19 (Israel).

507. Professor Lee testified that direct deals and indirect deals are nonetheless insufficient substitutes because of differences in pricing of the underlying ads. 9/19/24 PM Tr. 77:12-78:21 (Lee) (price difference between direct deals and indirect deals is "evidence that these are significantly differentiated products and publishers aren't able to easily substitute").

508. Differences in pricing of the underlying ad do not prevent substitution. An advertiser's goal is not solely to pay less for one underlying ad, but to get return on ad spend across ads; a publisher's goal is not just to maximize the money made from an individual impression, but to strategically generate revenue across its properties. *Supra* ¶¶ 8, 423-425; *e.g.*, 9/10/24 PM Tr. 8:2-14 (Friedman) (advertising agency advises advertisers "to focus on the audience, the return on investment, and not on price"); 9/26/24 PM Tr. 135:25-136:14 (Glogovsky) (competition between direct and indirect transactions drives overall revenue for publishers). The evidence thus shows that advertisers and publishers shift between the two kinds of transactions in order to fulfill their goals. *Supra* ¶¶ 500, 502. Accordingly, industry participants describe ad spend as literally substituting between direct and indirect transactions:

508.1. [redacted]

508.2. A 2017 OpenX slide deck observed that "growth in programmatic direct may threaten RTB revenue." DTX-384 at 4. As the deck explained, "if buyers dedicate a fixed programmatic budget, there would be an inverse relationship between spend in RTB and spend in Programmatic Direct"—in other words, advertisers substitute between direct and indirect spend. DTX-384 at 4.

509. A witness for Plaintiffs testified that "programmatic" advertising is distinct from direct deals because direct deals are negotiated "direct with the publishers," including price and number of impressions, whereas programmatic advertising is automated without direct negotiation. 9/9/24 PM Tr. 62:11-63:2 (Lowcock). Another testified that direct deals require negotiation and sending "the advertising code back and forth," whereas indirect deals can be "done in one place." 9/10/24 AM Tr. 147:12-148:3 (Friedman); *see also id.* at 146:21-147:11 (Friedman) (complaining that "labor and human energy" "has to be expended" to negotiate direct deals).

510. The distinction drawn by Plaintiffs' witnesses is long outdated. As Stefaniu's demonstration showed, incredibly popular programmatic direct features in a programmatic tool like DV360 allow advertisers to negotiate directly with a publisher and to contract what is effectively a direct deal without the support or assistance of any sales team. 9/23/24 PM Tr. 49:25-52:10 (Stefaniu); Stefaniu DX 1.31-1.33.

510.1. Programmatic Guaranteed deals on Google's tools automate and simplify the process of negotiating direct deals. DTX-428 at 4; *supra* ¶¶ 286-287.

510.2. Moreover, as Plaintiffs' witness also admitted, programmatic indirect buying also requires "a lot of parameters" "from a human perspective." 9/10/24 AM Tr. 136:3-17 (Friedman). Neither direct nor indirect transactions are devoid of human input.

510.3. Programmatic direct advertising has become incredibly popular, which means that advertisers and publishers are taking advantage of more automated tools to facilitate direct transactions. According to a 2022 Microsoft blog post, "over 85% of digital advertising is sold programmatically, and 67% of programmatic advertising is direct." DTX-1303 at 2; *see also* DTX-384 at 3

(2017 OpenX competitive analysis observing that "Programmatic Direct spend is growing at a faster pace in comparison with" real-time bidding, and social media publishers like Instagram and Snapchat are selling through Programmatic Direct).

511. That direct deals compete with indirect deals is also important because direct deals can bypass or combine the functions of the third-party "advertiser ad networks," ad exchanges for "indirect" transactions, and publisher ad servers that are in Plaintiffs' defined markets.

511.1. For example, Google offers automated direct deals through both its publisher ad server for publishers, DFP, and its demand-side platform for advertisers, DV360, that flow through the AdX pipes. *Supra* ¶ 286.

511.2. Even though advertisers interested in shifting spending from indirect to direct deals might shift more spend to DV360 to take advantage of its programmatic direct offerings, Plaintiffs exclude DV360 from the market that Google Ads is in.

511.3. Plaintiffs also exclude any Programmatic Direct transactions from their market share calculations for their alleged ad exchange market.

512. On the sell-side, Plaintiffs exclude in-house ad servers from their "publisher ad servers" market even though publishers can and do manage their direct deals (and other inventory) using in-house ad servers. That includes managing automated direct deals made with advertisers using third-party buy-side tools like DV360. *E.g.*, [redacted]

E. Real-World Data Show Substitution Between Tools Included in and Excluded from Plaintiffs' Markets.

513. By excluding key areas of growth in display advertising (including ads appearing on owned-and-operated websites, in apps, and on Connected TV), Plaintiffs' markets exclude transactions in the overwhelming majority of display ads across other channels and formats. In 2022, in-app and Connected TV display ads alone accounted for 70 percent of display ads, while display ads on the "open web" accounted for only 29 percent, continuing a steep decline from 2013. DTX-1831; 9/26/24 AM Tr. 46:5-47:8 (Israel).

514. As spend has shifted among ad formats and channels, spending on ad tech tools has also shifted between ad tech tools that serve and transact "open-web display advertising" (included in Plaintiffs' markets) and tools that do not (not included in Plaintiffs' markets).[20] All ad tech tools compete for the same pool of display advertising spend. 9/26/24 PM Tr. 109:2-18 (Israel); 9/27/24 AM Tr. 31:7-19 (Bumpers) (advertisers have "a limited amount of resources," so if "you spend all your money in one place, you will not get the same return that you can by shifting money to another place").

515. For example, Comcast is a major advertiser that shifts its advertising spend across ad tech tools from year to year.

515.1. Between 2015 and 2022, Comcast's spending on display ads through DV360, a tool Plaintiffs would consider to serve and transact "open-web display," varied from as low as 12% to as high as 30%; its spending through direct deals

[20] Even for multi-functional tools that serve and transact "open-web display advertising" and therefore are included in Plaintiffs' markets, ad spend has shifted from using those tools for their "open-web display ad" functionality, for which transactions are included in Plaintiffs' market share calculations, to their other functionalities (i.e., ability to transact in-app and CTV ads), for which transactions are excluded from Plaintiffs' market share calculations.

varied between 4% and 9%; its share of spending on social media—which is facilitated by tools that are excluded from Plaintiffs' markets—varied between 7% and 20%; and its spend also changed across ad format, with share of spending on video ads (including instream video ads) ranging between 16% and 28%. DTX-1848; 9/26/24 AM Tr. 93:23-94:14 (Israel).

516. Google is also an advertiser. It purchases advertising to market its own products, and its spending patterns as an advertiser demonstrate the same substitution between tools.

516.1. One product Google advertises is Fitbit, a wearable fitness activity tracker. In a year-and-a-half period, the share of display spending through Google Ads to advertise Fitbit fluctuated between 1% and 21%; the share of spending through direct deals fluctuated between 0% and 19%; and the share of spending on social media fluctuated between 2% and 31%. DTX-1847; 9/26/24 AM Tr. 91:24-92:19 (Israel). In other words, in quarters in which Google spent more to advertise on social media, it had substituted spend from other channels, including Google Ads and DV360 purchasing. 9/26/24 AM Tr. 91:24-92:19 (Israel) (discussing DTX-1847 and stating "what we see is if you look across Google Ads, DV360, putting it on YouTube, putting it in social media or direct buys, the dollars are just moving around a lot," which is consistent with "companies again evaluating the relative performance of these different types of advertising and shifting money around").

516.2. Similar trends apply to Google's advertising of Pixel Phones and its Play Store. For example, advertising on YouTube would not be accounted for in Plaintiffs' market share calculations because YouTube is a Google owned-and-operated

property and is not served by third-party ad tech tools. But Google's advertising spend through YouTube to market the Play Store varied widely between quarters—from 27% in the first quarter of 2022 to 83% in the second quarter of 2022 and back to 25% in the third quarter of 2022. DTX-1932; 9/26/24 AM Tr. 93:14-21 (Israel). As to social media spend, between the second and third quarters of 2022 Google's advertising spend on social media to market Pixel Phones declined from 44% to 8%. DTX-1931; 9/26/24 AM Tr. 92:23-93:8 (Israel).

517. If advertisers and publishers did not substitute away from or toward tools that serve or facilitate "open-web display advertising," the division of display ad spend between categories would remain relatively stable across time. Instead, these spending patterns demonstrate that advertisers (and, as a result, their transactions with publishers) substitute between tools that facilitate various ad channels, ad formats, and sales channels.

518. Because ad spend has shifted, providers of ad tech tools that are excluded from Plaintiffs' markets have won display advertising spend from Google.

519. The percentage of U.S. display ad spending that accrues to various ad tech providers has consistently changed year-to-year between 2008 and 2022. DTX-1874 (Israel Figure 54: The Percentage of U.S. Display Ad Spend Accruing to Selected Industry Participants, 2008-2022); *see also* DTX-1969 (Israel Figure 156: U.S. Display Ad Revenue by Company, 2010-2022).

519.1. The percentage accruing to Google started at 5% in 2008, increased to 15% around 2012 and 2013, and then has steadily decreased back to 10% from 2018 to 2022. DTX-1874.

519.2. At the same time, the proportion of display ad dollars accruing to other industry participants has changed dramatically. For example, Meta's share has grown from 3% in 2008 to 37% in 2022 (and 41% at its peak, in 2018 to 2020). DTX-1874. Amazon's share grew from one percent in the mid-2010s to 6% by 2022, and TikTok is up from almost nothing in 2018 to 4% in 2022. DTX-1874. The very same share that Google is losing is moving to participants like Meta, Amazon, and TikTok. DTX-1874.

520. By defining their markets based on whether tools serve and transact "open-web display ads," Plaintiffs have not accounted for any of this substitution. Plaintiffs' expert Professor Lee responded to this real-world substitution data by citing the cellophane fallacy, arguing that substitution only exists because Google's products are not priced competitively. 9/19/24 PM Tr. 58:24-60:3 (Lee).

521. In some cases, the cellophane fallacy suggests that substitution away from one product to another may not be reflective of whether the two products are reasonable substitutes. For example, consumers may only be switching if prices are prohibitively high in one market. 9/26/24 AM Tr. 71:17-72:19 (Israel).

522. To determine whether the cellophane fallacy applies, the appropriate question to ask is whether "we are only seeing substitution because Google's prices are inflated, and therefore that's the only thing driving substitution." 9/26/24 AM Tr. 73:25-74:20 (Israel). In the eponymous example, if the price of cellophane is prohibitively high, people may wrap their sandwiches in newspapers even though newspapers are not reasonable substitutes for cellophane. 9/26/24 AM

Tr. 71:17-72:19 (Israel) (noting Professor Lee's example that if the price of gas gets high enough, people will walk[21]).

523. Here, the cellophane fallacy does not apply or, in any event, does not justify disregarding real-world evidence and data demonstrating substitution. Professor Lee only testified that Google's prices are inflated in the alleged ad exchange market, not others, and Google's AdX prices were not higher than some of its competitors'. *Supra* ¶ 405; *infra* ¶ 1160, 1162. And real-world data show substitution, not to inferior options such as newspaper wrappings in lieu of cellophane or walking in lieu of driving, but to "extremely strong competitors" with display ad offerings like Facebook, Amazon, and TikTok. 9/26/24 AM Tr. 71:17-73:11, 73:12-74:20 (Israel).

523.1. Not a single witness who testified about advertiser substitution between ad formats and channels testified that advertisers are substituting away from "open-web display" even though other ads are "inferior." To the contrary, industry participants consistently testified that advertisers shift spend in order to maximize return on investment, *supra* ¶ 432—in other words, because the ads they are shifting to offer superior performance.

523.2. Plaintiffs attempted to argue that ads on social media, apps, and CTV, and the ad tech used to transact them, are inferior substitutes for "open-web display ads" and the related ad tech by analogizing "open-web display ads" and other ad channels and formats to stoves and to microwaves. 9/26/24 PM Tr. 33:11-35:9 (Israel). The extensive data on substitution undermine the analogy that

[21] Plaintiffs' expert Professor Lee has declined to use the term "reasonable substitute," instead agreeing only that he evaluated "close substitutes." 9/20/24 AM Tr. 61:20-62:3 (Lee).

display ads on social media, apps, Connected TV, and other channels are like a microwave oven compared to an open-web display ad as a stove.

523.3. As Dr. Israel explained, the better analogy to different ad formats and channels is "two stoves" with differentiated characteristics. "We see active ongoing evaluation of these options against each other, and we see they can provide exactly the same ad in exactly the same way." 9/26/24 PM Tr. 113:15-114:1 (Israel).

524. More to the point, significant substitution to create a competitive constraint does not require that every single advertiser be willing to abandon "open-web display ads." 9/26/24 AM Tr. 74:21-75:17 (Israel); *id.* at 77:1-11 (Israel) ("So if the tech isn't working as well or it's too expensive, your return's going to go down, you're going to look for places with better tech."). What matters is that customers "on the margin," including every advertiser and advertising agency witness to testify in this case and the advertisers reflected in real-world substitution data, *supra* ¶¶ 432, 513-519, are actually "moving dollars back and forth" between different forms of advertising. 9/26/24 AM Tr. 75:12-76:4 (Israel) ("We have all these buyers, for example, who use both Google Ads and Facebook and are moving dollars back and forth. We have agencies building models, the purpose of which is to help people move dollars back and forth. That's the kind of marginal substitution that we look for."); *see, e.g.*, 9/10/24 PM Tr. 6:11-7:7, 8:2-14 (Friedman); 9/9/24 AM Tr. 94:10-19, 97:5-8 (Lowcock); 9/13/24 PM Tr. 47:19-48:4, 48:14-18 (Lambert); 9/23/24 PM Tr. 91:13-17, 95:24-96:13 (Oliphant); 9/25/24 PM Tr. 9:9-10:11 (Caldwell); 9/27/24 AM Tr. 31:7-32:22 (Bumpers).

525. When those advertisers shift between advertising, they also shift spend between ad tech tools, thus creating significant competitive constraints on the tools in Plaintiffs' asserted markets. 9/20/24 AM Tr. 32:9-33:11, 34:6-35:15 (Lee); 9/26/24 AM Tr. 49:23-50:6 (Israel).

IV. Plaintiffs' Component-Based Market Definitions Are Improper Because Ad Tech Should Be Analyzed as a Single Two-Sided Market.

526. Plaintiffs have defined markets for three components of an ad tech stack, but ad tech tools must be evaluated as a single, two-sided market. Slicing and dicing the tools used to achieve a match excludes significant competition from alternate pathways that accomplish the same match.

A. Economic Principles Require Ad Tech To Be Analyzed as a Single Two-Sided Market.

527. The purpose of ad tech is to "facilitate matches" between advertisers and the individuals viewing advertising impressions on digital content. As explained by the witnesses at trial:

527.1. Dr. Israel: "The ad tech business sits there in the middle" between the advertiser, the impression created when a user visits digital content, and the digital content provider "trying to facilitate those connections." 9/26/24 AM Tr. 37:13-38:13 (Israel); *id.* at 40:20-41:7; 9/20/24 AM Tr. 62:25-63:10 (Lee) (ad tech capable of transacting "open-web display ads" enables transactions between advertisers and publishers).

527.2. Korula: "A large part of what Google does is to facilitate matches" between publishers and advertisers; "we offer programmatic solutions that allow effective matching so that we can serve the right ad to the right user." 9/23/24 AM Tr. 10:11-11:5 (Korula).

527.3. Scott Sheffer: The ad tech ecosystem "exists to connect advertisers or ad buyers with publishers who are ad sellers in order to connect messaging and advertisements with users." 9/20/24 PM Tr. 47:24-48:2 (Sheffer).

527.4. Professor Chevalier: "The crux of an ad transaction" is therefore "a transaction between an advertiser and a publisher." 9/25/24 AM Tr. 14:1-8 (Chevalier).

527.5. Professor Weintraub: The "quality of the match" is an important goal of ad tech products. For example, "I would think that the match between the vegan restaurant and the vegetarian recipe would be a high quality match because the vegan restaurant will presumably reach the users it wants to reach. It presumably would be a higher quality match than say a steakhouse in that same vegetarian recipe page." 9/16/24 PM Tr. 9:23-10:10 (Weintraub).

527.6. Professor Simcoe: Professor Simcoe testified that scale is an important feature of ad tech tools because it "represents the ability of publishers to match to advertisers and advertisers to match to publishers, which is the core functionality of the product." 9/19/24 AM Tr. 91:13-20 (Simcoe).

528. Any analysis of competition must therefore assess the match—that is, as a single two-sided market that connects advertisers on one side with impressions created when users visit digital properties on the other side. 9/26/24 AM Tr. 37:13-38:18 (Israel). Plaintiffs' proposed markets view ad tech tools in isolation, even though all tools have as their purpose facilitating matches.[22] 9/26/24 PM Tr. 45:11-46:22 (Israel). As a result, Plaintiffs leave out ad tech tools that

[22] Plaintiffs may argue that the component parts of the ad tech stack are complements and therefore cannot be substitutes in the same market. That misses the mark: the component parts are inputs into forming a product that are complements for each other, but that does not mean that the

place significant competitive constraints on the tools they allege to be anticompetitive.[23] 9/26/24 AM Tr. 38:19-39:11, 41:8-42:10 (Israel).

529. Given that ad tech is "trying to connect two sides of the market," the success of serving each side of the display advertising ecosystem is inextricably tied to the success of serving the other. 9/26/24 AM Tr. 41:8-42:10 (Israel). For example, when advertisers experience a strong return on investment, they buy more ads, which results in higher revenue for publishers. *E.g.*, DTX-37 at 2 (2009 Google email: "Despite strong economic headwinds, our ad network grew about 20% year over year overall. We delivered this performance by continuing to create strong ROI for advertisers and therefore good RPMs for publishers.").

530. As Dr. Israel explained, the two-sided nature of ad tech is defined by network effects: "if there's more publishers, the advertisers like that platform better, and vice versa. But it also goes the other way. If a platform starts to lose customers on either side," "the other side isn't as happy, doesn't find as many matches, and the whole platform can start to unravel." 9/26/24 AM Tr. 41:8-42:10 (Israel).

531. Plaintiffs' expert Professor Gabriel Weintraub agreed. He testified that the quality of ad tech tools depends on their ability to attract customers on both the buy side and the sell side. Professor Weintraub identified as an important characteristic of an ad tech platform "thickness," which he defined as "a measure of the number and diversity of buyers on one side of the market and the number and diversity of the sellers on the other side of the market." 9/16/24 PM Tr. 8:5-

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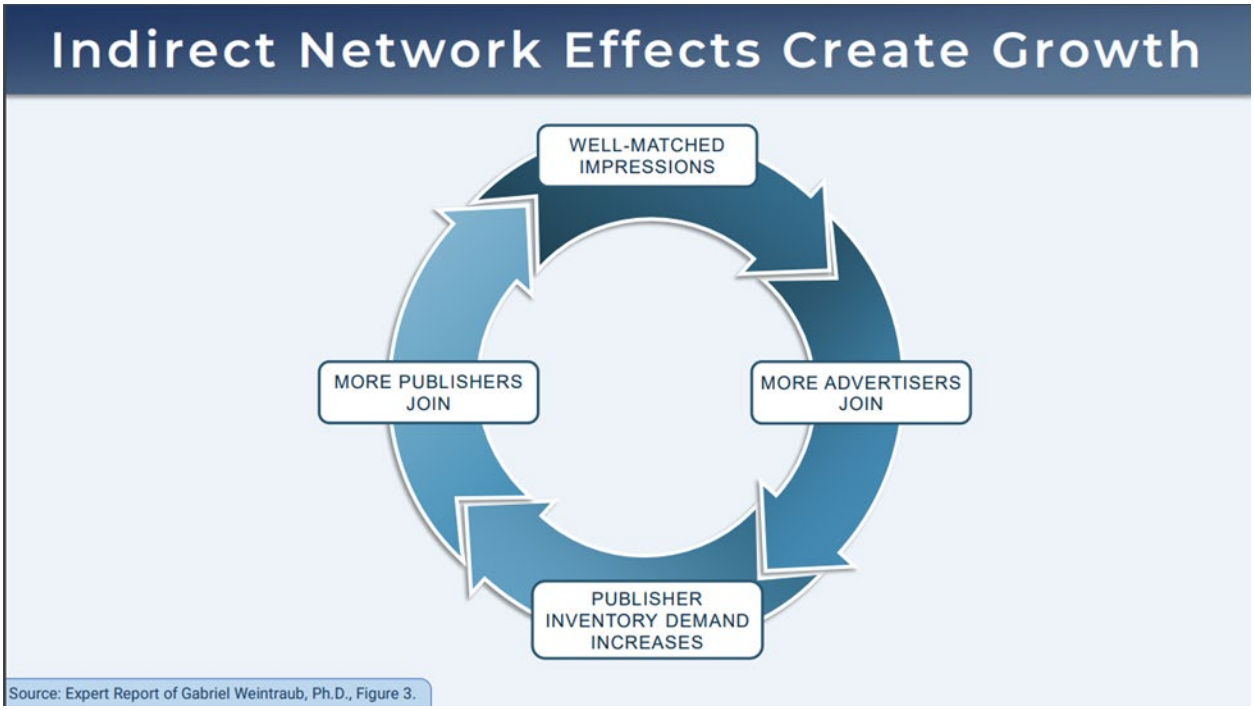
market is made up of complements; instead, it is made up of the paths for connecting impressions and advertisers, where each path is built up from inputs that complement each other. 9/26/24 PM Tr. 72:7-20 (Israel).

[23] Dr. Israel did not define the outer boundaries of a single two-sided market. Doing so was not necessary in order to reach the opinion that Plaintiffs' component-specific markets were inaccurate and too narrow as a result of excluding significant competitive constraints. 9/26/24 AM Tr. 42:17-43:11 (Israel).

12 (Weintraub). As the "thickness" of an ad tech tool on either the advertiser or the publisher side improves, "the quality of the match" also improves. *Id.* at 8:25-9:22 (Weintraub).

532. Because the thickness of ad tech tools is important, Professor Weintraub explained, ad tech tools exhibit indirect network effects. 9/16/24 PM Tr. 10:11-11:5 (Weintraub); *see also* 9/12/24 PM Tr. 103:11-21 (Goel). Plaintiffs' Demonstrative N, presented by Professor Weintraub, depicted these indirect network effects for ad tech platforms:



533. Another industry participant agreed that ad tech tools exhibit indirect network effects: "The more parties use a particular platform or system, the more value or utility all users get from that platform." 9/12/24 PM Tr. 102:16-103:21 (Goel).

534. Another indication that the proper market to analyze is a single two-sided transaction market is that the price charged by the various component ad tech tools is borne by the parties on both sides of that single transaction: advertisers and publishers. 9/26/24 AM Tr. 41:8-42:10 (Israel); 9/19/24 PM Tr. 74:11-75:2 (Lee) ("When fees are actually taken out by these ad tech products, it's actually borne by both advertisers and publishers.").

535. Prices are therefore most appropriately assessed across the entire transaction, on both the buy-side and the sell-side. 9/25/24 AM Tr. 14:2-8 (Chevalier).

535.1. Plaintiffs' expert, Professor Simcoe, "calculated full stack revenue shares because in his apportionment analysis, he acknowledged that it's the full stack revenue share that has to be apportioned and ultimately paid by the publisher and the advertiser." 9/25/24 AM Tr. 16:13-21 (Chevalier). Examining full-stack prices is unlike "adding the price of apples and oranges sold by one fruit producer" because each of the prices in a full-stack price are necessary steps in a single transaction, whereas, as Professor Simcoe admitted on cross examination, "you don't need an apple to eat an orange." 9/18/24 PM Tr. 44:22-45:7 (Simcoe).

535.2. Similarly, Google employees discussed revenue shares across the full stack, recognizing that pricing changes to the buy-side and the sell-side are necessarily intertwined. PTX-904 at -569 (2019 Google slide deck: "You cannot add sell-side to buy-side revenues given that you would be double counting"); PTX-719 at -463 to -464 (2019 Google email discussing Google's "full take rate" of 32%); PTX-624 at -169 (2018 Google email: "I have a reasonably strong perspective that we should not make any chances to the sell-side pricing structure without evaluating changes to the buy-side.").

536. Given these market realities, the ad tech industry is "quintessentially what economists call a two-sided market," and it should be analyzed as a single two-sided market for ad tech that facilitates connections between advertisers and impressions on publishers' pages or apps. 9/26/24 AM Tr. 41:8-42:16 (Israel). As Professor Weintraub explained, "all of the products

and solutions within the ad tech stack" are "intermediaries that facilitate advertisers and publishers in the buying and selling of online ads," including products on the sell-side and the buy-side. 9/16/24 PM Tr. 42:19-43:16 (Weintraub) (intermediaries include publisher ad servers, ad exchanges, demand-side platforms, and ad networks). All of these intermediaries compete with each other.

B. Evidence from Industry Participants Is Consistent with a Single Two-Sided Market.

537. Industry participants, including Google, also understand ad tech tools as competing in a single two-sided market to facilitate transactions.

538. Google has always approached the display advertising ecosystem—and the development of its ad tech tools—as serving a single two-sided display ad market. 9/16/24 AM Tr. 64:23-65:17 (Mohan) ("display advertising ad tech by definition has two sides of the market"); *id.* at 66:8-17 (Mohan) (publishers can never succeed without advertisers, and advertisers can never succeed without publishers, and the industry has always referred to a buy-side and a sell-side); *see also* DTX-259 at 19 (2015 Google presentation: "We define TAM as total online display and video ad spend."); DTX-758 at 27 (2019 Google presentation comparing Google and Facebook across the ad tech stack).

538.1. Mohan, who ran Google's display ads business for multiple years and previously worked at DoubleClick, testified that starting from when he was at DoubleClick he never conceived of running a display ads business that did not serve both advertisers and publishers. 9/16/24 AM Tr. 68:13-20 (Mohan); PTX-14 at -255-75 (2007 DoubleClick materials showed DoubleClick's pre-acquisition tools included both a "sell side product suite," a "buy side product suite," and an ad exchange).

538.2. As Mohan explained, "display advertising, by definition, has two sides of it. Advertisers' demand needs to run on publishers' inventory. Publishers cannot monetize their inventory without advertiser demand." 9/16/24 AM Tr. 22:15-23:2 (Mohan); *id.* at 24:22-25:11 (Mohan). "And so publishers and advertisers, by definition, are two sides of the marketplace, otherwise display advertising, just by definition, does not exist." *Id.* at 64:23-65:17 (Mohan).

538.3. From early in Google's display advertising business, Mohan viewed Google as serving the interests of advertisers and publishers as an "important part" of Google's strategy. 9/16/24 AM Tr. 64:23-65:17 (Mohan); PTX-32 at -917 (2008 Google email: "Our positioning and value proposition to advertisers and publishers" is "tied to our overall themes of reach, results, relevancy for advertisers and yield and control for publishers"). "In order to provide higher yield, meaning more revenue to our publisher customers . . . we also needed to bring the best advertiser demand to those publishers, and the way that we brought the best advertiser demand was to have a product that generated the most ROI for advertisers. . . . And so, in that sense, having a strong advertiser side benefited our publishers, and having a strong publisher side benefited our advertisers." 9/16/24 AM Tr. 28:23-29:15 (Mohan); *see also id.* at 19:19-20:10 (Mohan).

539. As the Microsoft representative explained, investing in the buy-side has effects on the sell-side too.

539.1. "The advertising ecosystem starts with advertisers," who want to reach their audience, and "they're the ones paying the money and paying the check."

Keeping the advertiser spend on the same platform benefits publishers by making it "easier for publishers to see how their inventory gets accessed, and they have the visibility end to end in a transparent way," and "publishers make more money." 9/20/24 PM Tr. 138:7-140:17 (John).

539.2. Investment on the buy-side thus creates a flywheel effect by growing the sell-side. Satisfied publisher customers then "helps advertisers" because the ad tech provider is able to bring its publisher inventory to those advertisers with "the same underlying platform and visibility and transparency." 9/20/24 PM Tr. 137:22-140:17 (John); DTX-939 at 1 (2020 Xandr presentation stating "investment rationale" includes "demand channel for our supply," "with 58% of Invest [Xandr's DSP] spend staying on Xandr's supply side platform").

540. Other industry participants likewise view their products as connecting advertisers and publishers in transactions—not just as particular components of the stack.

540.1. Meta:

540.1.1. Farber, lead Product Manager on Audience Network, testified that Meta's "Audience Network is a two-sided marketplace," because "it connects two businesses, one being publishers and the other one being advertisers, supply and demand." 9/26/24 PM Tr. 151:6-15 (Farber).

540.1.2. Farber also testified that Meta Audience Network exhibits indirect network effects. Meta Audience Network is attractive to its advertiser customers because "it increases the reach as it allows them to serve ads and fulfill marketing objectives across

more opportunities, across more impressions through serving those ads with more apps." 9/26/24 PM Tr. 150:13-151:5 (Farber).

540.1.3. Facebook documents describe the same indirect network effects, including for a sell-side product like DFP that is used only by publishers. DTX-642A at 3 (2018 Meta document: "We have a two-sided market"); PTX-1709 at -934 (2017 Facebook document describing DFP: "Once enough publishers are on-board, advertisers are induced to buy in and adopt Google's protocols and processes. As more advertisers buy in, additional publishers are induced to join.").

540.2. Boland, former Vice President at Facebook, agreed that he viewed the marketplace as containing "two sides." Boland described the indirect network effects that characterize ad tech platforms: "There were publishers; there were advertisers. And as you acquire more advertisers, that is a way that you can incentivize more publishers to join on to your product. As more publishers are there, advertisers have to buy into that platform in order to have access to that supply." 9/13/24 PM Tr. 115:10-17 (Boland).

540.3. Microsoft (including AppNexus and Xandr):

540.3.1. An internal AppNexus document noted that it "depends on sellers of advertising inventory for our buy-side customers to buy through our platform" and "depends on advertising

inventory to allow our sell-side customers to sell through our platform." DTX-358 at 4.

540.3.2. An internal Xandr document recognized the importance of investing in its buy side in order to create a "demand channel for our supply." DTX-939 at 1.

541. Reflecting the reality that ad tech tools are two-sided, industry participants presented by both Google and Plaintiffs identify as competition other providers seeking to win display advertising spend. They do not limit their competitors to companies that provide the exact same components in the ad tech stack:

541.1. Google:

541.1.1. In a 2019 "sell-side FAQ" slide, Google explained that the sell-side and buy-side are two sides of the same transaction: "What is the sell-side? It is the inventory view of the buy-side." PTX-904 at -569.

541.1.2. As Google explained in a 2020 internal presentation, "an evolving supply chain now has many buying doors," including "direct buying," "ad servers," "ad networks," "ad exchanges," "header bidding," and "Open Bidding." DTX-1016 at 12.

541.1.3. A 2019 presentation listed Facebook, Amazon, and The Trade Desk as "serious important competitors," even though they are all outside of the markets as Plaintiffs define them. DTX-733 at 3, 18; 9/26/24 AM Tr. 58:25-60:10 (Israel).

541.1.4. As a Google employee testified, when identifying competitors Google looks at "the entire ecosystem . . . including demand and supply and how that flowed within the digital marketplace." Competitors include "the Facebooks of the world, the Amazons of the world; any large demand source or, you know, anyone else who is looking to buy or execute programmatic buying." Deposition of Bryan Rowley Tr. 40:9-23, 41:10-16.

541.2. Meta: When asked what "broader market" ad servers are in, the Meta representative replied "the ad tech market," which includes "any and all companies' entities that take part in the process of serving digital ads online." 9/26/24 PM Tr. 159:19-160:1 (Farber).

541.3. The Trade Desk: Although The Trade Desk services only one side of the marketplace because it "explicitly sits on the buy side of the advertising industry," it recognizes that the industry in which it operates is two-sided. 9/11/24 PM Tr. 87:19-88:13 (Dederick) ("A lot like economics, the conversation in our industry around the supply side and the demand side is the same. Supply side relates to the ad inventory; demand side relates to the ad buyers."); *id.* at 93:7-94:2, 157:25-158:19 (Dederick) ("Q. There's a buy side and a sell side. I'm trying to figure out what they are the sides of? A. An advertising industry. There are sellers of advertising and buyers of advertising. It's pretty clear."). As the industry has evolved, The Trade Desk has developed a supply path optimization product called OpenPath that creates direct relationships between The Trade Desk, a "buy-side" product, with the

sell-side of the market. The Trade Desk believed OpenPath's relationships with the sell-side would "create a more efficient supply chain for advertisers," its buy-side customers. 9/11/24 PM Tr. 116:11-117:4 (Dederick); 9/12/24 PM Tr. 45:11-17 (Dederick) (The Trade Desk has entered into contracts with publishers that specify the terms and conditions of their use of OpenPath).

541.4. Criteo (including BidSwitch): A 2023 forward planning document created by BidSwitch, which connects buy-side and sell-side tools, observed that even purportedly one-sided businesses must be "two-sided marketplaces to avoid being squeezed out." DTX-1544A at 7. It listed as examples The Trade Desk and Criteo, which offer buying tools but also integrate directly with publishers. DTX-1544A at 7 ("emphasizes the importance of having direct owned Supply AND Demand").

541.5. Microsoft (including AppNexus and Xandr):

541.5.1. In a 2016 document identifying "risks related to our business and its industry," AppNexus stated: "We face intense competition in the marketplace. . . . We compete for digital advertising spending against a variety of competitors, including Google and Facebook, who, in some cases, are also buyers on our enterprise technology platform. We also compete for supply of digital advertising inventory against a variety of competitors, including Google and Facebook." DTX-358 at 2. Xandr identified as competitors both other [redacted]

[redacted] DTX-1282 at 43.

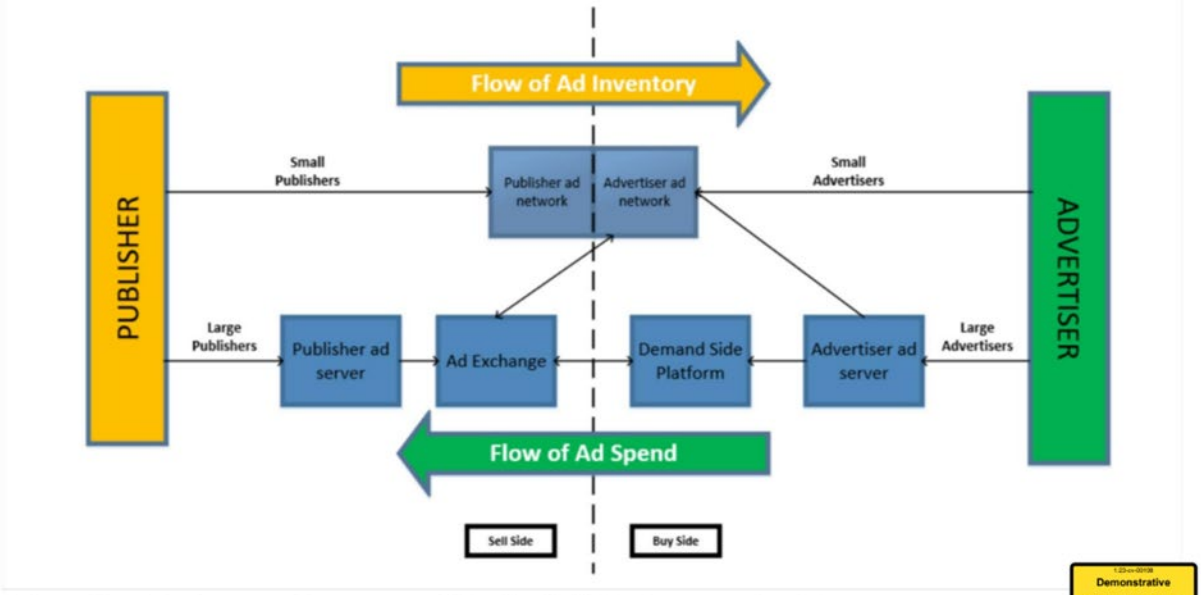
541.5.2. Microsoft's representative testified that Xandr competes with both "companies that have buy and sell side integrated, as well as companies that just do the buy-side and just do the sell-side." 9/20/24 PM Tr. 139:12-15 (John).

541.6. Index Exchange: Casale testified that publisher ad servers can "also effectively act[] as competitors to companies like Index" Exchange, even though Index Exchange offers—by his own description—only an ad exchange. 9/9/24 AM Tr. 111:1-12, 120:12-25 (Casale). But Plaintiffs' component-based markets would not account at all for competitive pressure from publisher ad servers in the ad exchange market.

542. As another indicator that Plaintiffs' component markets are inconsistent with industry recognition, Plaintiffs presented Demonstrative A, which purports to depict ad tech products. Not only do Plaintiffs exclude from their relevant markets demand-side platforms, even though they are depicted in Plaintiffs' own demonstrative as interconnected with tools in Plaintiffs' markets, but Plaintiffs' witnesses contradicted Plaintiffs' depiction.

542.1. Professor Weintraub's depiction of the display advertising ecosystem in his report, Weintraub DX 1, included products that Plaintiffs exclude from their markets. For example, he included an advertiser ad server and a publisher ad network—neither of which, as he testified, are accounted for by Plaintiffs' markets. 9/16/24 PM Tr. 47:20-25, 48:16-49:1 (Weintraub).

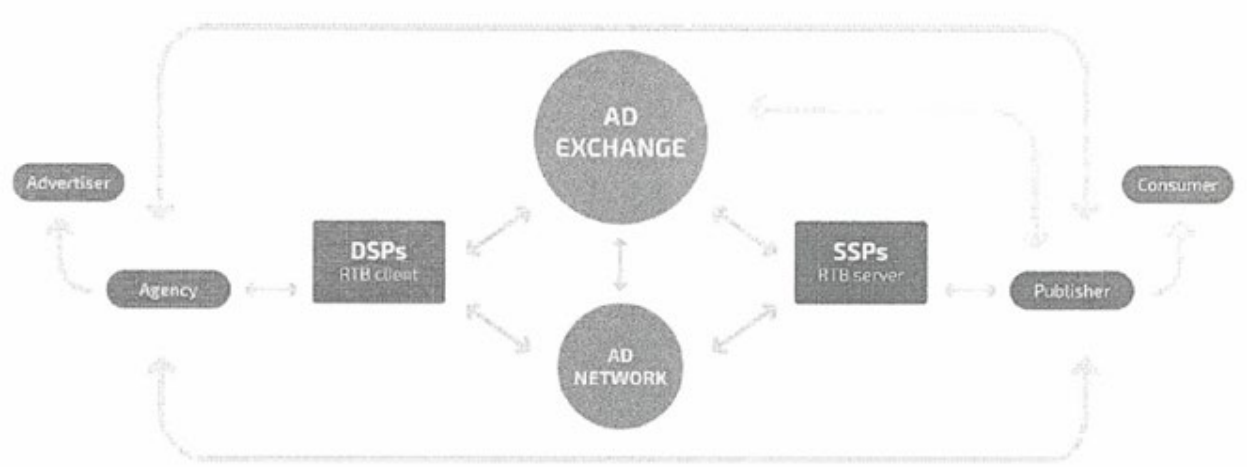
FIGURE 1: AD TECH PRODUCTS USED FOR OPEN-WEB DISPLAY ADVERTISING



2023_12_22ExpertReportofGabrielWeintraub.20.1

542.2. When asked whether the ad tech ecosystem included more tools than those appearing on Plaintiffs' Demonstrative A, the Chief Revenue Officer of The Trade Desk conceded: "There's a few major tools missing." 9/11/24 PM Tr. 152:5-10 (Dederick).

542.3. An ad agency for the Census Bureau depicted the ecosystem differently than Plaintiffs. It included "ad networks" as a two-sided platform that connects to DSPs and SSPs, not a solely buy-side tool. DTX-1343 at 133.



C. Numerous Tools, Including Header Bidding, Provide Alternate Paths to Match Advertisers and Publishers that Are Not Accounted for by Plaintiffs' Component-Based Markets.

543. The universe of ad tech tools that achieve the same purpose of matching advertisers and publishers is far greater than the pathway between the three components Plaintiffs identify: "advertiser ad network" to ad exchange to publisher ad server.

544. Plaintiffs' experts concede that ad tech tools excluded from Plaintiffs' markets can put competitive pressure on Plaintiffs' markets. For example, Dr. Abrantes-Metz testified that traditional yield management technology was not an ad exchange and was not a publisher ad server, but was a competitive threat in both "the exchange market" and "the publisher ad server market for open-web display." 9/18/24 AM Tr. 66:12-68:4 (Abrantes-Metz).

545. Yet Plaintiffs' markets fail to account for the competitive pressures these and other pathways (including header bidding and supply side optimization) exert on "advertiser ad networks," ad exchanges, and publisher ad servers.

546. These exclusions are significant because, as Google has recognized, component tools compete against alternative pathways.

546.1. For example, in March 2020, Google noted that "the average Publisher sold ads through 21.6 different supply paths." DTX-1016 at 14; *id.* at 15 ("Many

paths can lead Buyers to the same inventory."). Google Ad Manager needed to "evolve to keep up with the demand" for different supply paths. DTX-1016 at 17.

546.2. As Dr. Israel explained, the "only way" to "see substitution on both sides and the full effect of those shifts in the price is to look at things in combination and ask the question what paths are competing with other paths," and "if tech is not working as well, how do people find their way around it. That involves looking at choices on both sides and the full paths in combination, not piece by piece."[24] 9/26/24 AM Tr. 99:13-100:8 (Israel).

1. Plaintiffs Exclude Header Bidding from Their Alleged Markets.

547. Header bidding is "among the most important facts" in demonstrating that the display advertising market has not been harmed by Google's conduct. 9/26/24 AM Tr. 103:25-104:16 (Israel). Non-Google exchanges and buy-side tools are actively winning header bidding auctions, and publishers can sell their inventory through header bidding—including when using DFP—to the exclusion of AdX, thus creating immense competition with Google's ad tech. *Id.* (Israel).

548. Professor Lee did not conduct any empirical or quantitative analysis to show Google's conduct had any effect on the number of header bidding transactions. Not only did he not find any negative effect, but he acknowledged that from 2018 through the end of 2022, the percentage of indirect web impressions won by header bidding in DFP increased from a little over

[24] Professor Lee implicitly acknowledged the interconnectedness of the different component parts of the ad tech stack by testifying that a "barrier to entry" for "advertiser ad networks" included the costs "of building or launching an ad exchange, obtaining the necessary data" and "overcoming the scale and network effects to expand an advertiser ad network." 9/19/24 PM Tr. 118:12-21 (Lee).

25% to close to 45%. 9/20/24 AM Tr. 18:23-20:16 (Lee) (discussing DTX-1898[25] (Israel Figure 81: Percentage of DFP U.S. Indirect Web Impressions Won by Header Bidding, Jul 2018-Dec 2022)).

549. Industry documents and testimony from Plaintiffs' witnesses confirm that header bidding is "alive and well" and has continuously posed a significant competitive threat to Google's ad tech, even making the competition among exchanges "hyper-competitive." *Supra* ¶¶ 202-212. By early as 2015, as Professor Lee stated in his report, heading bidding had gone "viral." 9/20/24 AM Tr. 16:8-24 (Lee).

550. Google's and Plaintiffs' experts agree header bidding is "an extremely important competitor" because it "lets publishers sell to whoever they want" using exchanges other than AdX "even if they're within DFP." 9/26/24 AM Tr. 103:7-15 (Israel); 9/20/24 AM Tr. 15:24-16:9 (Lee) (agreeing that "header bidding allowed exchanges to compete against each other on the basis of real-time demand as opposed to being relegated to a waterfall" and "enabled publishers to circumvent" what he referred to as Google's policy of "permitting only AdX to submit real-time bids within DFP").

551. Demonstrating why header bidding is such an important competitive constraint on Google, Professor Lee included in his report a screenshot of a Google document that describes Google's perceived "Nightmare scenario": Amazon would develop a header bidding tag that publishers could add to their pages, which would allow Amazon to "develop the functionality/infrastructure to take control of ad selection and develop it into a DFP replacement." Lee DX 1; 9/20/24 AM Tr. 13:11-14:9 (Lee).

[25] In contrast to the data relied upon by Professor Lee to suggest that exchanges are unable to compete with AdX through header bidding, *infra* ¶ 648.1, the data used to create DTX-1898 does not rely upon the flawed GAM log-level data. 9/26/24 AM Tr. 102:1-103:6 (Israel).

552. Professor Lee admitted the "nightmare scenario" had already come to pass and is widely adopted, at least with respect to Amazon's cheap header bidding wrappers that market a competitive advantage stemming from Amazon's "unique demand." 9/20/24 AM Tr. 9:5-10:10 (Lee); *supra* ¶¶ 208-209.

553. Publishers can use DFP to sell every one of their impressions to header bidding exchanges without giving any access to AdX. In other words, publishers "could use DFP just entirely to run header bidding auctions." 9/26/24 AM Tr. 101:17-25 (Israel); 9/20/24 AM Tr. 127:22-128:14 (Lee) (a publisher using DFP can make every impression available for bidding to any exchange, including through Amazon and Prebid header bidding).

554. For example, Plaintiffs' first witness, Wolfe from Gannett, testified that by 2021 every impression on the USA Today Network was offered in a unified auction of Amazon header bidding and Prebid header bidding, whereas only some were offered to Google's Open Bidding. 9/9/24 AM Tr. 80:2-22, 91:16-92:1 (Wolfe).

555. As Plaintiffs' experts agree, header bidding competitively constrains Google in ad tech and each of Plaintiffs' proposed markets.

555.1. Professor Lee acknowledged that header bidding does "facilitate real-time competition among ad exchanges and demand sources" like Google Ads and AdX and "could pose a threat to DFP's market power." 9/20/24 AM Tr. 25:25-27:15 (Lee); *see also id.* at 5:7-7:13 (Lee) (agreeing "header bidding has increased competition" across Google's ad tech stack).

555.2. Professor Lee also acknowledged that, by 2015, header bidding had gained so much traction that Google was incentivized to innovate in response to header

bidding's popularity, including by developing Open Bidding. 9/20/24 AM Tr. 16:25-17:14 (Lee).

555.3. Plaintiffs' expert Dr. Abrantes-Metz similarly testified that header bidding "had exploded by 2015, was adopted by 70% of publishers by 2016, and was adopted by nearly 80% of top publishers by 2019. 9/18/24 AM Tr. 98:1-20 (Abrantes-Metz).

555.4. Professor Ravi agreed that header bidding is a "competitive threat" to Google's ad server and ad exchange. 9/11/24 PM Tr. 44:2-9 (Ravi).

556. Taking each of Plaintiffs' alleged markets in turn, as to the publisher ad server market, Professor Lee agrees that header bidding could pose a threat to DFP's market power, 9/20/24 AM Tr. 27:1-6 (Lee), by providing "existing competitors or new entrants the potential ability to compete more effectively in the publisher ad server market," *id.* at 5:21-6:14 (Lee), and threatening "Google's strategy of locking up access to publisher inventory toward DFP," *id.* at 6:5-18 (Lee).

556.1. Professor Lee also agreed that header bidding could reduce the impact of DFP's advantageous access to AdX. 9/20/24 AM Tr. 7:10-13 (Lee).

556.2. In addition, "header bidding technology could develop to manage both guaranteed and remnant inventory, which would reduce publisher reliance on DFP and reduce a source of Google's market power." 9/20/24 AM Tr. 14:25-15:7 (Lee); 9/20/24 PM Tr. 19:2-20:1 (Lee) (header bidding solutions may start to "replicate some of the features of the publisher ad servers").

556.3. A 2018 Google email identified this very threat: "There was an existential threat to demand leaving the ad server" posed by header bidding. PTX-590 at -751.

556.4. Tom Kershaw, the founder of Prebid, testified that Prebid header bidding functionality competes with publisher ad servers like DFP because Prebid exercises "control over the auction process that previously had been determined by what was called the ad server." 9/12/24 PM Tr. 164:2-9 (Kershaw).

556.5. Header bidding competition can increase competition among publisher ad servers because publishers can use header bidding wrappers to sell and serve impressions without any publisher ad server at all.

556.5.1. Prebid's website explains how a publisher can use Prebid to run a header bidding auction and display the winning ad without using a publisher ad server. 9/13/24 AM Tr. 15:16-16:3 (Kershaw).

556.5.2. Similarly, Eric Hochberger of Mediavine testified that Mediavine could "render to page" ads sold through header bidding without using a publisher ad server. 9/25/25 PM Tr. 170:18-171:5 (Hochberger).

557. As to other tools, "ad exchanges and advertiser ad networks working with header bidding tools" could "grow themselves." 9/20/24 AM Tr. 5:21-6:14 (Lee).

558. In particular, header bidding intensified competition among ad exchanges by making it easier for publishers to multi-home across exchanges. 9/20/24 AM Tr. 10:20-11:13

(Lee). Professor Lee agreed header bidding has increased competition among ad exchanges. *Id.* at 10:20-24, 11:9-13 (Lee). Further, Plaintiffs' expert Professor Weintraub calculated that since 2015 AdX's win rate has declined from around 47% to just over 15%, demonstrating quantitatively that header bidding has exerted pressure on AdX. PTX-1315.

559. Header bidding could even "facilitate other potential competitors to DFP other than ad exchanges and advertiser ad networks." 9/20/24 AM Tr. 5:21-6:14 (Lee). For example, header bidding could enable other ad tech tools to attract publishers, triggering indirect network effects that threaten Google's market power. *Id.* at 6:25-7:9 (Lee).

560. Beyond the concessions of their own experts, as discussed above voluminous evidence was presented at trial—much of it presented by Plaintiffs—relating to the competitive threat posed by header bidding to the tools in Plaintiffs' markets. *Supra* ¶¶ 173, 187, 206-207, 212; *see also* 9/13/24 PM Tr. 107:7-9 ("we've heard a lot about header" bidding). Plaintiffs presented a long list of Google documents that described header bidding as a "competitive threat" to Google's display ads business, and Google created a new technological solution to compete with that threat. *Supra* ¶¶ 187-189. The testimony of Plaintiffs' other industry participants witnesses showed that they, too, viewed header bidding both as a source of competition and an opportunity to take advantage of the functionality to compete more successfully. *Supra* ¶¶ 173, 205, 207. The result is that, according to witnesses presented by Plaintiffs such as the founder of Prebid, Google and its rivals have all continued innovating on header bidding technology as header bidding continues to gain popularity and win impressions. *Supra* ¶¶ 207, 209-212, 214.

561. Despite all of this evidence that header bidding has been a serious source of competitive pressure to the products in their markets—much of which Plaintiffs themselves chose to put on—Plaintiffs nonetheless excluded header bidding from any of the relevant product

markets, and Professor Lee refused to testify that header bidding constrained AdX's or DFP's power. 9/20/24 AM Tr. 27:16-24 (Lee).

2. Plaintiffs Exclude Supply Path Optimization from Their Alleged Markets.

562. Advertisers and publishers are seeking to capitalize on the benefits of integration by reducing the number of intermediaries necessary to connect. This trend is called supply path optimization. 9/26/24 AM Tr. 104:18-25 (Israel) (advertisers and publishers are "jumping over some of the steps in the ad tech path").

563. Supply path optimization demonstrates why it is necessary to "look at path-on-path competition," as opposed to competition within component-specific markets. "Components are going to miss supply chain optimization. If a buy-side tool bids directly and doesn't go through an exchange, that's a perfectly valid path, but it's not captured by the components." 9/26/24 AM Tr. 105:1-8 (Israel).

564. New ad tech tools that make the pathways connecting advertisers and publishers more efficient have exerted competitive pressure on third-party buying tools, ad exchanges, and publisher ad servers like Google's.

565. *First*, multiple industry participants now offer products that eliminate the need for a third-party ad exchange, exerting competitive pressure that Plaintiffs' component-based markets do not take into account. 9/26/24 AM Tr. 105:9-107:13 (Israel) (referring to Facebook, The Trade Desk, Criteo, and Yahoo).

565.1. In 2022, The Trade Desk, which has historically operated a demand-side platform that serves advertisers, launched its OpenPath product. OpenPath disintermediates exchanges, as well as solutions like Open Bidding that compare bids from exchanges, by connecting directly to publishers' inventory

without an ad exchange, and sometimes without a third-party ad server. 9/11/24 PM Tr. 116:14-117:4 (Dederick); 9/12/24 PM Tr. 40:4-9, 41:6-13, 43:9-44:6 (Dederick); 9/26/24 AM Tr. 105:9-21 (Israel). Publishers can use OpenPath to sell their inventory directly to advertisers that are using The Trade Desk's demand-side platform. OpenPath's publisher customers include major digital content providers such as Reuters, The Washington Post, Gannett, U.S.A. Today, Conde Nast, BuzzFeed, the Los Angeles Times, and Forbes. 9/12/24 PM Tr. 45:18-24 (Dederick).

565.2. In 2017, Criteo launched its Direct Bidder product, which performs the same function as The Trade Desk's OpenPath product. 9/26/24 AM Tr. 105:9-23 (Israel). As a Criteo representative described it, the product integrates "to a publisher so that we're not using an intermediary SSP to access the inventories of that publisher." Deposition of Todd Parsons Tr. 38:14-38:23.

565.3. Within the last year, Yahoo launched a similar product that offers advertisers ways to bypass ad exchanges in accessing publishers' inventory. 9/26/24 AM Tr. 105:9-21 (Israel).

565.4. Mediavine, a publisher that both sells its owned-and-operated inventory and assists other small publishers in monetizing their inventory, has also created proprietary ad tech that bypasses exchanges by directly connecting its publisher inventory with demand-side partners. 9/25/24 PM Tr. 178:1-10 (Hochberger); *see also id.* at 165:16-20 (Hochberger).

566. Professor Lee testified that supply path optimization does not impose a "significant enough" constraint on Google based solely on his unsupported statement that "many of these products aren't for open-web display." 9/19/24 PM Tr. 79:7-19 (Lee).

566.1. Consistent with the lack of any industry documents that reference "open-web display advertising," industry documents describing supply path optimization do not limit the competitive threat posed by supply path optimization to "open-web display advertising." For example, a 2021 Xandr document analyzed supply path optimization with respect to "each demand partner that a publisher works with," which may "have unique access to creative formats (i.e. display, native, video), devices (i.e. desktop, mobile, connected tv), creative sizes, traffic from particular geographic locations, and so on." DTX-1091 at 6; *see also, e.g.*, PTX-759 at -751 (2019 Google analysis identifying supply path optimization as a "business risk" without limitation to any kind of ad); [redacted]

566.2. Moreover, when confronted with The Trade Desk's OpenPath supply path optimization product, which does transact "open-web display," Professor Lee complained that OpenPath is "limited in the publishers it works with" and The Trade Desk testified at a deposition that OpenPath was not meant to be a competitor for exchanges. 9/19/24 PM Tr. 79:7-19 (Lee). At trial, however, The Trade Desk representative testified that OpenPath enables advertisers and publishers to "bypass" exchanges. 9/11/24 PM Tr. 152:5-21 (Dederick).

567. *Second*, other tools offered by exchanges—like Magnite and PubMatic—can eliminate the need for third-party buying tools. 9/26/24 AM Tr. 107:10-13 (Israel); DTX-1544A at 15 (BidSwitch forward planning document listing "the most notable" SPO solutions, including "marketplaces" offered by Magnite, OpenX, PubMatic, and Index Exchange).

567.1. PubMatic's product, called Activate, provides a "single technology layer" connecting publishers and advertisers and has seen significant growth and success. 9/12/24 PM Tr. 142:20-144:19 (Goel) (from Q1 2023 to Q1 2024, "SPO as a percentage of PubMatic's activity on platform went from 35 percent to 50 percent"). Over the next several years, PubMatic anticipates that SPO could account for up to 75% of its total buyer activity. *Id.* at 145:13-16 (Goel). PubMatic's own depiction of Activate, Goel DX 3, shows how an SPO product can directly supplant the products, such as supply-side platforms, that are included in Plaintiffs' markets. 9/12/24 PM Tr. 144:4-10 (Goel).

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568. *Third*, some ad tech tools bypass third-party buying tools, exchanges, and publisher ad servers by connecting advertisers to publishers directly. Such tools are sometimes referred to in the industry as "ad networks" because they aggregate publisher inventory for advertisers to buy and connect those publishers to advertiser demand. *Infra* ¶ 688.

568.1. Many—including some of the largest—digital content providers now offer self-service platforms that allow buyers to purchase owned-and-operated inventory directly from the publisher. 9/26/24 AM Tr. 105:9-21 (Israel) ("Any sort of in-house ad tech, like a Facebook, is basically supply path optimization because it's doing everything in-house in one form of tech.").

568.2. Transactions run through self-service platforms (also referred to as integrated buying tools) can elide any third-party ad tech intermediaries entirely but still involve the use of publisher ad server functionality, auction functionality, and bidding tool functionality. 9/20/24 AM Tr. 32:8-33:11 (Lee); 9/26/24 AM Tr. 105:24-106:20 (Israel).

569. Plaintiffs' market definitions simply ignore supply path optimization because "these are paths that don't fit into the buckets"—the component-specific markets—as Plaintiffs define them. 9/26/24 AM Tr. 106:21-107:8 (Israel). Industry participants like BidSwitch (now part of Criteo), however, recognize that supply path optimization directly exerts competitive pressure on the components in Plaintiffs' markets. For example, demand-side platforms "are building publisher-direct integrations that bypass exchanges." DTX-1544A at 7 (2023 forward planning). And supply-side platforms "are building value-add targeting and ad delivery capabilities that marginalize the role of" demand-side platforms. DTX-1544A at 7.

570. To summarize, as industry participants recognize, all tools that facilitate the matching of advertisers with publishers' impressions compete with each other. Alternate pathways such as header bidding and supply path optimization are marketed as competitive alternatives and exert significant competitive pressure on other component tools.

D. Google Does Not Have Monopoly Power in a Single Two-Sided Market for Ad Tech.

571. While the amount of revenue Google has generated from its display ads business has increased since 2008, Google's share of U.S. display ad spend has decreased since 2012 from 15% to 10% in 2022. (In addition, approximately half of that revenue is generated from ads placed on YouTube, which are outside of Plaintiffs' alleged markets because they are instream video ads.) DTX-1928 (based on eMarketer data); 9/26/24 AM Tr. 94:18-96:8 (Israel).

572. That Google's revenue from display ads has gone up significantly as its percentage of U.S. display ad spending has gone down shows that industry output—the total amount advertisers are spending on display ads—is exploding, but Google is getting a smaller portion of it. 9/26/24 AM Tr. 96:9-97:1 (Israel).

573. These trends are inconsistent with Google monopolizing the industry. As Dr. Israel explained: "If I look for high-level evidence of monopolization, a company that somehow has its thumb on the industry and controls everything, if that's true, I would look for it taking in a very large percentage of the revenue because it's got something the industry can't live without. When I see Google at 10 percent of the total and declining, to me, Google is certainly taking a piece, but it's not like Google is taking the majority. The industry is actually growing much faster than Google's piece." 9/26/24 AM Tr. 96:9-97:1 (Israel).

574. In June 2018, a Google internal analysis concluded that it was growing at a slower pace than other ad tech providers in a single two-sided market. The document stated: "Display +

Video market is dominated by FB spend," "market share of Amazon is expected to increase at both Facebook's and Google's expenses," and "Google expected to grow at 16% CAGR (versus market of 21%)." DTX-571 at 13, 15, 18.

575. To calculate Google's share in a single two-sided market for connecting advertisers and publishers transacting display advertising, Dr. Israel calculated the amount of ad spend that has been facilitated by Google's tools. He summed Google's ad tech revenue with any publisher payout for display ads (using eMarketer's definition of display ads, which includes spend on banner, native, and video ads (instream and outstream) that appear on websites, social media properties, retail media properties, in apps, and on CTV) that has been facilitated by any of Google's ad tech tools. 9/26/24 AM Tr. 98:13-99:12 (Israel) ("we take any money that went to the publisher, and we associate it with the ad tech provider who facilitated that transaction"). Dr. Israel then divided that sum by U.S. display ad spend.

576. Based on Dr. Israel's analysis, during the 2008-2022 period, Google's market share was never higher than 46%. Since 2013, Google's share has been on a steady decline, with a 25% market share in 2022. DTX-1875; 9/26/24 AM Tr. 98:5-99:12 (Israel).

V. Even Within Their Component-Based Markets, Plaintiffs' Market Definitions Exclude Competitive Alternatives and Overstate Market Share.

577. Even if Plaintiffs were correct that some components of the ad tech stack comprise individual markets (they are not), Plaintiffs failed to meet their burden to prove their component-based markets are relevant product markets. Each of their markets, and their assessments of market power within those markets, suffers from multiple flaws.

578. As explained in each section below, even Plaintiffs' component-based markets exclude an enormous amount of competition from ad tech tools that—as shown by real-world data and testimony—customers consider reasonable alternatives to the tools that Plaintiffs do include

in their markets. Of the full universe of competitive alternatives depicted below, Plaintiffs exclude all the ad tech tools and publishers that appear on a gray background—even though those are some of the most significant sources of display advertising spend. Israel DX 7; 9/26/24 PM Tr. 111:10-112:17 (Israel).

Plaintiffs define a lot of competition out of their proposed markets:

579. As an initial matter—even setting aside that defining markets based on individual components cannot hope to account for all competitive pressures without accounting for the entire two-sided market in facilitating display ad matches—Plaintiffs' "advertiser ad network" and publisher ad server markets also fail for a second reason. Plaintiffs have not assessed these individual markets as two-sided markets.[26] Each individual component of an ad tech stack is necessarily facilitating a match between advertiser demand and an impression on a publisher

[26] Professor Lee has claimed that "although indirect network effects exist for ad exchanges, they don't constrain the market power of a hypothetical monopolist." 9/19/24 PM Tr. 75:15-76:2 (Lee). For the reasons explained herein, Professor Lee is incorrect that these network effects are insufficient to constrain Google's alleged market power.

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property, so any analysis of the alleged component markets must still account for competitive pressure on both sides of the transaction. 9/26/24 AM Tr. 115:5-11 (Israel); 9/20/24 AM Tr. 93:15-94:1 (Lee) (agreeing the ad tech products in his three markets "have features common with what economists call two-sided markets").

A. Professor Lee Did Not Perform a Hypothetical Monopolist Test.

580. Professor Lee also failed to conduct a valid hypothetical monopolist test ("HMT") for each of the alleged markets. 9/26/24 AM Tr. 115:12-15, 131:17-19, 140:2-4 (Israel).

581. For each of the alleged component-specific markets, Professor Lee claimed that he conducted a hypothetical monopolist test. 9/19/24 PM Tr. 50:7-12 (Lee). He did not perform any quantitative analysis to analyze substitution, such as a quantitative SSNIP (small but significant non-transitory increase in price) test "that directly uses information and customer substitution patterns." 9/20/24 AM Tr. 95:4-96:6 (Lee). Professor Lee asserted that "there were issues with relying on that"—referring to substitution data—"in monopolization cases" because a quantitative analysis was not appropriate "where there's concern that there's already been an exercise of significant power." *Id.* at 95:5-9, 96:7-19 (Lee). Instead of performing a quantitative analysis, Professor Lee relied on his qualitative discussion of product differences. *Supra* ¶¶ 406-407.

582. A "real-world HMT" can be conducted to assess whether a firm is charging competitive prices by comparing prices in the alleged monopolized market to prices in a market where there is no alleged monopolization. 9/26/24 AM Tr. 116:1-117:12 (Israel). Professor Lee is not providing an opinion as to whether Google possessed market power in any relevant market before 2015, and he was unable to provide a precise date in or after 2015 on which Google acquired market power. 9/20/24 AM Tr. 90:6-92:3 (Lee). Professor Lee did not perform any real-world HMT that compares Google's pricing pre-2015 and post-2015. 9/26/24 AM Tr. 117:13-14 (Israel).

583. In support of his opinion that each of the alleged markets would pass the HMT, Professor Lee relied on: (1) evidence that the products in the relevant market offer distinct features not available from alternatives; and (2) direct evidence of market power, including that Google is able to "deviate significantly away from competitive behavior" by "charging prices that are significantly above competitive levels or failing to maintain quality at competitive levels." 9/19/24 AM Tr. 60:4-61:5 (Lee).

584. With respect to the first category of evidence, Professor Lee has failed to collect or analyze any customer substitution data that would show which products might impose competitive constraints on the products in his alleged markets—even though that is the relevant question that must be answered for market definition. 9/20/24 AM Tr. 94:18-95:9 (Lee).

585. With respect to the second category of evidence, Professor Lee also failed to offer direct evidence establishing that Google has market power in his claimed markets. Professor Lee defines market power as the ability to profitably charge prices significantly above competitive levels, or the failure to maintain quality, product variety, or innovation at competitive levels. 9/19/24 PM Tr. 49:8-21 (Lee); *id.* at 50:23-51:4 (Lee) (substantial and sustained market power means the "ability to profitably charge prices significantly above competitive levels" "long enough to meaningfully affect competition").

586. Each category of direct evidence of market power is discussed below. *Infra* ¶¶ 590-597, 625-631, 696-702. As a threshold matter, Professor Lee acknowledged that by presenting direct evidence of market power, he is trying to avoid defining a market in the first instance. 9/19/24 Tr. 60:4-61:5 (Lee) ("direct evidence of market power doesn't rely on having already defined a relevant market, nor does it rely on market share calculations"). Professor Lee also admitted he has not defined any specific but-for world, so he cannot establish whether Google

charged supracompetitive prices or decreased quality relative to what the competitive level should have been in a but-for world. 9/20/24 AM Tr. 146:4-147:25 (Lee) ("I'm not putting forward a specific but-for world" for any of the alleged conduct).

B. Plaintiffs' Market Based on "Publisher Ad Servers for Open-Web Display Advertising" Excludes Competitive Alternatives and Overstates Google's Market Power.

587. Plaintiffs allege that "publisher ad servers for open-web display advertising" is a relevant product market, and that DFP competes in that market. 9/19/24 PM Tr. 54:23-55:9 (Lee).

588. In support of his claim that the alleged market passes the HMT, Professor Lee relied upon on what he characterized as (1) direct evidence of Google's alleged market power, that Google has failed to maintain quality at competitive levels; and (2) indirect evidence, (a) that publisher ad servers for "open-web display advertising" offer distinct features valued by customers not provided by alternatives, and (b) that Google has a high market share. 9/19/24 PM 60:4-61:5, 70:2-71:16 (Lee). In analyzing direct evidence of market power, Professor Lee did not discuss the price of DFP. *Id.* (Lee).

589. Professor Lee's evidence is insufficient to support his claim that "publisher ad servers for open-web display advertising" pass the HMT. 9/26/24 AM Tr. 115:12-15 (Israel).

1. Plaintiffs Failed to Offer Direct Evidence Showing Their Publisher Ad Server Market Passes the HMT or Google Has Market Power in that Market.

590. For "direct" evidence supporting his publisher ad server market, Professor Lee identified two of Google's product design decisions that allegedly "provided quality below competitive levels or failed to maintain quality at competitive levels": Google's implementation of the Unified Pricing Rules and restriction of AdX real-time bid amounts to DFP, which are two of the five acts that Lee claims to be anticompetitive in this case, *infra* ¶ 715. 9/19/24 PM Tr. 66:7-67:11 (Lee).

591. Put another way, as Professor Lee agreed, the direct evidence of market power "is the conduct" at issue in this case. 9/20/24 AM Tr. 129:3-23 (Lee). Applying this reasoning, to define a market and find market power, all an expert witness like Professor Lee needs to do is make a determination that Google engaged in anticompetitive conduct—here, conduct that was allegedly anticompetitive because Google was not giving its rivals access to its customers. *Id.* at 136:13-137:10 (Lee).

592. Professor Lee cannot show that Google has market power because he has not identified what DFP's quality would have been (or how it would be measured) in a competitive but-for world. There is therefore no way to evaluate whether Google's alleged quality degradations rendered DFP's quality below the "competitive level." 9/26/24 AM Tr. 117:15-118:1 (Israel); 9/20/24 AM Tr. 146:4-147:25 (Lee).

593. Professor Lee opined for the first time on re-direct examination that DFP's fees are evidence of market power because DFP charges "positive" fees and Google realizes "benefits" from use of DFP. 9/19/24 PM Tr. 66:7-67:6 (Lee); 9/20/24 PM Tr. 28:4-29:2 (Lee). But he did not actually conduct any pricing analysis, or explain why DFP's fees are supracompetitive except to argue that DFP's prices are high given that Google "degraded" quality by engaging in the conduct he identified as anticompetitive in this case. 9/19/24 PM Tr. 66:7-67:6 (Lee).

594. In contrast to Professor Lee, Dr. Israel did analyze the price of DFP. His analysis demonstrated that Google's very low DFP ad server fees suggest that the publisher ad server market is improperly defined and that Google does not have market power. Despite the allegation that "DFP shares were quite high," "DFP prices are very low and falling" for publishers who pay

fees.[27] And more than 85% of publishers who use DFP do not pay any fee at all. 9/26/24 AM Tr. 118:2-121:16 (Israel); DTX-1954; DTX-1912 (within each volume tier prices are declining over time); DTX-1977 (DFP fees per thousand impressions have dropped from $0.033 on average in 2014 (1.7% based on a $2 CPM impression) to $0.027 on average in 2022 (just 1.3% based on a $2 CPM impression), even without adjusting for inflation).

595. Conducting a "real-world" HMT entails comparing Google's DFP prices in the allegedly monopolized market after 2015 (including after some competitors have exited the market) to prices in the allegedly non-monopolized market before 2015. Google's prices have fallen after 2015, so the alleged market fails the HMT. 9/26/24 AM Tr. 121:4-122:9 (Israel).

596. In addition to falling DFP prices, Google has continued to make "business concessions," such as agreements about pricing, service level, or building new technical features, in order to win publisher business to DFP.[28] 9/20/24 PM Tr. 96:3-97:13 (Sheffer). For example, when Google responds to RFPs issued by publishers, publishers request a variety of technical features such as "reliability and uptime, latency, the accuracy of your ability to both forecast and deliver ads, your ability to deliver specific technical requirements," and more. *Id.* at 93:2-95:1 (Sheffer). Publishers also ask Google to create new technological features that do not already exist on Google Ad Manager "all the time." *Id.* at 95:2-11 (Sheffer).

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[27] To the extent that Plaintiffs suggest that Google has acted anticompetitively by charging very low fees for its ad server in order to attract business for its other tools, that conduct is not consistent with how a monopolist would behave. 9/26/24 PM Tr. 112:18-113:14 (Israel) ("aggressive price cutting on certain products to attract business is what you need to do when you compete").

[28] Plaintiffs rely heavily on a January 2009 email, forwarded by Brad Bender, to argue that publisher ad servers find it difficult to compete for publisher business. The email contained the statement of David Rosenblatt: "Switching platforms is a nightmare. Takes an act of God to do it." PTX-1814 at 4. Rosenblatt worked at Google for less than a year after the DoubleClick acquisition, was never in an operational role, had no team, and was not responsible for any decision-making. 9/11/24 AM Tr. 15:14-15, 73:2-14 (Bender). When presented with Rosenblatt's statement, Bender reacted: "It seems like an overstatement." *Id.* at 19:14-24 (Bender).

597. Far from dominating a market so that publishers must use its sell-side products, Google loses publisher business to other ad tech providers. 9/20/24 PM Tr. 98:7-9, 98:21-99:23 (Sheffer). For example, in 2023 Google and Microsoft competed to partner with Netflix, a major streaming platform, in ad serving technology and selling their inventory. *Id.* at 98:21-99:23 (Sheffer). Google lost the deal to Microsoft—even though Google offered concessions such as specific development work and a "financial guarantee"—because Microsoft was able to offer better terms. *Id.* at 99:1-100:20 (Sheffer). Microsoft winning the Netflix deal has since had a "halo effect" for Microsoft's display ads business, which continues to garner customer business as a result. *Supra* ¶ 322.

2. Plaintiffs Failed to Offer Valid Indirect Evidence to Support Their Publisher Ad Server Market or Google's Market Power.

598. Turning to the indirect evidence, Professor Lee argued that "publisher ad servers for open web display ads" are a distinct market because they offer distinct features not provided by other ad tech tools. His analysis ignores the reasonable substitutes available to publishers that impose competitive restraints on DFP and therefore overstates DFP's market share. Israel DX 6; Israel DX 7; 9/26/24 PM Tr. 111:10-112:17 (Israel).

599. Those substitutes include: (a) managing and selling inventory other than "open-web display," including in-app content; and (b) alternative products sellers can use to manage and sell their "open web display" inventory, including developing their own ad server. These competitive pressures can and do attract customer spend from DFP.

a. Plaintiffs Exclude Transactions in Formats Other than Banner Ads on the "Open Web" and Display Ad Tools that Do Not Sell "Open-Web Display" Inventory.

600. First, although Plaintiffs purport to define markets for tools, their market share calculations exclude non-"open web display" transactions that take place on those tools, thereby omitting an important portion of the functionality of many publisher ad servers.

601. This omission is significant given a majority of large web publishers also operate apps. 9/26/24 AM Tr. 122:14-25, 123:13-16 (Israel) (the "vast majority" of web publishers have apps); 9/26/24 PM Tr. 109:21-110:6 (Israel) ("of the 100 largest web publishers, according to Comscore data, only three do not have apps"). Those publishers often shift their content to apps and encourage users to use their apps rather than their websites. 9/26/24 AM Tr. 122:14-123:12 (Israel) (providing examples of publishers including PayPal and Chick-fil-A that have offered incentives to encourage users to go to their apps).

602. Impressions are only generated if users visit a publisher's digital property, so when a publisher drives users to an app instead of a website, the amount of web inventory available for sale decreases while the amount of app inventory available for sale increases. 9/26/24 PM Tr. 56:4-15 (Israel) (there is no such thing as web "inventory sitting on the shelf" if no users visit the website because the publisher will only "get impressions when a user comes").

603. If Google is decreasing the quality or increasing the price of DFP, publishers can substitute app impressions for web impressions and, if they choose, substitute ad tech used to serve in-app ads for DFP. 9/26/24 AM Tr. 123:17-124:7 (Israel).

604. One of Plaintiffs' witnesses, Brian Boland, former Vice President at Facebook, testified on direct that Facebook's publisher ad server products for the web, including the web version of Facebook Audience Network and LiveRail, failed because it was difficult to compete in the publisher ad server market for web impressions that Google had monopolized. 9/13/24 PM

Tr. 109:17-110:5, 129:14-21 (Boland). Boland admitted on cross examination, however, that Facebook shifted the attention of Facebook Audience Network to in-app ads as part of a "strategic" move in reaction to ad demand shifting to apps. *Supra* ¶ 332. Boland also had to concede that LiveRail failed for a number of reasons unrelated to Google, including "a number of challenges" with integration into Facebook; the "sales pipeline"; "culture clash" between LiveRail and Facebook employees and failure to relocate employees; a discovery "that the vast majority of LiveRail inventory was not quality supply"' and, ultimately nothing that "directly" related to Google. 9/13/24 PM Tr. 141:7-16, 143:2-5, 143:11-24, 143:25-144:2, 144:10-18 (Boland).

605. Ultimately, Boland agreed that Meta Audience Network has still managed to attain "a lot of scale" in serving third-party app publishers. 9/13/24 PM Tr. 145:15-17 (Boland).

b. Plaintiffs Exclude Competition from In-House Publisher Ad Servers, as Well as Other Pathways to Connect that Do Not Require Third-Party Publisher Ad Servers.

606. Plaintiffs do not include in-house publisher ad servers (i.e., those owned and run by the publisher) in their market for publisher ad servers for open-web display advertising or their market share calculations. 9/26/24 AM Tr. 126:5-11 (Israel).

607. An in-house ad server is a direct substitute for a third-party publisher ad server because a publisher with an in-house ad server does not need to use a third-party publisher ad server to serve the exact same ads. 9/12/24 PM Tr. 43:23-44:6 (Dederick). In-house and third-party ad servers compete to facilitate ad spend. 9/20/24 AM Tr. 35:11-15 (Lee) (agreeing that if an "advertiser moves $1 from open-web display ads to Amazon or Facebook, the ads will be served by the proprietary ad servers of those companies and not DFP or some other publisher ad server on the open web").

608. Meta (Facebook and Instagram), TikTok, Amazon, Reddit, Snapchat, Pinterest, eBay, and LinkedIn are examples of companies that have built in-house ad servers. 9/26/24 AM

Tr. 126:12-25 (Israel); 9/26/24 PM Tr. 110:7-17 (Israel); DTX-1872; *see also* 9/12/24 PM Tr. 44:7-22 (Dederick) (industry participant "understood and heard about interest" in in-house ad servers "across the industry"). These sellers include some of the largest publishers today, which account for a significant portion of digital ad spend and had the resources and capacity to build successful in-house servers.[29] DTX-1969 (Israel Figure 156: U.S. Display Ad Revenue by Company, 2010-2022).

609. Plaintiffs argue that in-house ad servers should not be included in the same market as third-party ad servers because a publisher cannot use another publisher's in-house servers to sell inventory. 9/19/24 PM Tr. 62:1-12 (Lee). For example, a blog owner cannot use Facebook's in-house ad server to sell her own inventory.

610. That argument elides the obvious fact that publishers who build in-house servers literally substitute in-house ad servers (which are not in Plaintiffs' market) for third-party ad servers (which are). "Many publisher partners" "consider on a regular basis whether to take ad serving in-house and develop their proprietary customized technology." 9/20/24 PM Tr. 71:10-72:20 (Sheffer). For example, Amazon, Reddit, Disney, and Snapchat previously used Google's ad server, DFP, before they built their own ad servers. 9/26/24 AM Tr. 126:17-25 (Israel); 9/20/24 AM Tr. 73:15-74:3 (Lee); 9/17/24 PM Tr. 123:9-11 (Helfand). Plaintiffs' market definitions lead to the absurd result that transactions for the same inventory are in the relevant market before the switch but are excluded after. 9/26/24 AM Tr. 127:1-7 (Israel).

[29] Professor Lee testified that he saw documents indicating that Facebook would have difficulty building a publisher ad server that could serve third-party publishers, but clarified on cross that he was "referring to building a successful publisher ad server, gaining traction with open web publisher customers." *Compare* 9/20/24 AM Tr. 74:19-75:1 (Lee), *with* PTX-580, *and* 9/20/24 PM Tr. 23:21-25:18 (Lee) (Facebook is "already able to sell advertising," so "it already does have some advantage over firms who may not be in the business of selling advertising.").

611. Some publishers substitute in the other direction. They substitute DFP for their in-house ad server, in which case Plaintiffs would exclude transactions for the same inventory from the relevant market before the switch but include those transactions after. 9/19/24 PM Tr. 65:4-20 (Lee) (acknowledging the New York Times had its own internal ad server but switched to DFP); 9/20/24 AM Tr. 78:8-79:1 (Lee); 9/26/24 PM Tr. 55:2-8 (Israel) (The New York Times switching from its in-house ad server to DFP is evidence of substitution).

612. In-house ad servers are a significant competitive constraint on Google's alleged market power because they replace Google's publisher ad servers. Publisher customers choose "on a regular basis" whether to switch between third-party or proprietary ad servers. 9/20/24 PM Tr. 71:10-72:20 (Sheffer); *see also* 9/12/24 PM Tr. 44:12-18 (Dederick) (The Trade Desk representative had heard "interest across the industry" in building proprietary ad servers).

613. In-house ad servers are an especially strong constraint because many of the largest publishers, whose business Google is most concerned about losing, have built in-house ad servers. 9/26/24 AM Tr. 127:8-128:2 (Israel).

613.1. A 2017 Google competitive analysis document comparing Amazon's product presence to Google's compared Amazon's "proprietary ad server" to DFP and identified the Amazon server as a "strong existing product." DTX-406 at 6.

613.2. As another example, Disney moved some of its instream video inventory from Google Ad Manager to its in-house ad server, again literally substituting an in-house ad solution for a third-party one. 9/17/24 PM Tr. 123:9-11, 132:7-11 (Helfand) (Disney continues to use both Google Ad Manager and its own in-house ad server to sell inventory today); 9/13/24 AM Tr. 89:8-17 (LaSala)

(noting Disney switched away from Google's publisher ad server and "built their own").

614. The publishers that can substitute away from DFP by building in-house ad servers are far from only the largest, most well-resourced ones that make up a significant amount of ad tech spend. Smaller publishers with more limited resources have tools to build their own servers—for as little as **$80,000** and in a matter of **weeks**.

614.1. Kevel provides infrastructure necessary for a seller to build a publisher ad server in a couple of weeks to a couple of months and at a fraction of the cost—as low as $80,000—associated with building an ad server from scratch. 9/9/24 Tr. at 151:12-25, 154:17-155:18, 155:19-157:1 (Avery). Kevel's clients that have built in-house servers include Ticketmaster, Bed Bath & Beyond, and Yelp. *Id.* (Avery); 9/26/24 PM Tr. 110:18-24 (Israel).

614.2. Over 200 brands, including Ticketmaster, Bed, Bath & Beyond, and Yelp have launched in-house ad servers with Kevel, serving all kinds of ad formats including banner, mobile, and video ads. 9/9/24 Tr. at 155:19-157:1 (Avery).

615. Considering just the subset of sellers with in-house ad servers who produced data in this case (Meta (Facebook and Instagram), Pinterest, Snapchat, and TikTok), Google's share in the ad server market was never higher than 45% for the 2019 to 2022 period, and has decreased from 45% to 38% between 2019 and 2022. DTX-1872; 9/26/24 AM Tr. 128:9-129:16 (Israel) (even just a subset of publishers with in-house ad servers "can discipline Google greatly").

616. Google considers itself to compete in this larger market for "ad monetization" that includes ads served by in-house ad servers, such as on Facebook and Amazon. *Supra* ¶¶ 300, 541; PTX-657 at -350 (2018 Google sell-side strategy deck). Google competes for business from

publishers that have their own in-house ad servers, including Twitter, Pinterest, eBay, and LinkedIn. PTX-657 at -366-67, -369-70; 9/20/24 PM Tr. 76:14-77:19 (Sheffer) (Google was trying to get Twitter's business "for a number of years").

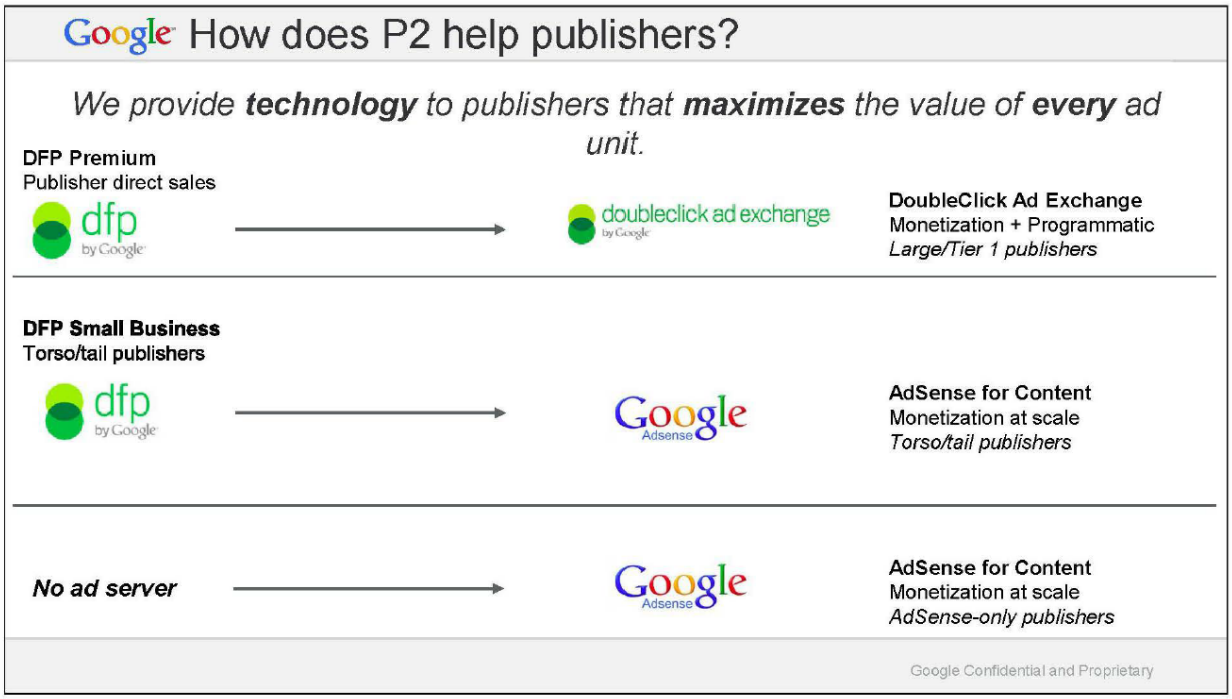
617. Google sometimes successfully competes to win the business of ad serving on publisher properties that were previously served by in-house ad tech tools.

617.1. For example, DFP recently started serving content on Internet Movie Database (IMDb, owned by Amazon). IMDb is owned by Amazon and, for a number of years, managed inventory using Amazon's proprietary internal ad server. IMDb now serves their web and app inventory using Google Ad Manager. 9/20/24 PM Tr. 68:8-18, 70:10-17 (Sheffer); DTX-1511 at 1 (2023 Google email announcement: "We've fully executed a deal and technical architecture which will allow Ad Manager to manage all of IMDb's indirect demand sources and allow AdX and [Open Bidding] to participate in their auction"). Today, AdX and Open Bidding bidders can bid for IMDb inventory. 9/20/24 PM Tr. 70:10-24 (Sheffer).

617.2. At the same time, IMDb still uses Amazon's in-house ad server to manage its direct deals and has a "direct connection to the Amazon DSP." DTX-1511 at 1; 9/20/24 PM Tr. 70:1-9 (Sheffer).

617.3. Similarly, Discord weighed whether to build a proprietary ad server or use Google's, and it requested that Google compete for its business by building new technical features that did not already exist in Google Ad Manager to win its business. 9/20/24 PM Tr. 95:12-96:2 (Sheffer).

618. Plaintiffs' market definition also excludes the competitive pressure exerted by the option to sell inventory without any publisher ad server at all, third-party or in-house. Ad networks such as Google's AdSense and AdMob and Meta Audience Network connect publishers to advertisers. *Supra* ¶¶ 47, 56, 331. Among the millions of publishers, *supra* ¶¶ 52, 102, that use Google's AdSense for Content ad network, it is "very common" for publishers to take advantage of the option, shown below, DTX-173 at 17 (2013 Google presentation), to use AdSense to sell inventory without any publisher ad server. 9/23/24 AM Tr. 15:12-14 (Korula).



619. AdSense for Content is not the only inventory management option for smaller publishers that allows them to monetize without any publisher ad server. For example, publishers can sell all of their inventory through hundreds of exchanges and buying tools using Prebid's header bidding solution without any ad server. *Supra* ¶ 169.

* * *

620. Taking into account the above competitor options for publisher ad serving, the percentage of total U.S. display ad spending accounted for by tools Google offers to manage

inventory (DFP, AdSense and AdMob) and by display ad spending on Google's properties such as YouTube was never higher than 38% for the 2019 to 2022 period. Google's share in 2022 was 30%. DTX-1873; 9/26/24 AM Tr. 129:21-131:1 (Israel) (of all spending on display ads served in the U.S. (using eMarketer's definition of display ads), the percentage running through any Google ad serving tool, including DFP, AdSense, AdMob, and Google's O&O, is only 30%).

621. Google is serving less than a third of the total display market, so it does not have monopoly power in any market for managing or selling inventory. 9/26/24 AM Tr. 131:2-14 (Israel) ("The threat from going to apps, plus the threat from going in-house, plus the two-sided threat that if the ad server doesn't work well, advertisers might find that an unattractive place to buy impressions. All of those things lead to Google actually facing substantial competition from those various options, as reflected in these low shares.").

C. Plaintiffs' Market Based on "Ad Exchanges for Indirect Open-Web Display Advertising" Excludes Competitive Alternatives and Overstates Google's Market Share.

622. Plaintiffs allege that "ad exchanges for indirect open-web display advertising" is a relevant product market, and that AdX competes in that market. 9/19/24 PM Tr. 98:12-21 (Lee).

623. In support of his claim that the alleged market passes the HMT, Professor Lee relied upon what he characterized as (1) direct evidence of Google's alleged market power, Google's allegedly supracompetitive prices for AdX open auction transactions; and (2) indirect evidence.

624. As explained below, Professor Lee's evidence is insufficient to support his claim that his market for "ad exchanges for indirect open-web display advertising" passes the HMT. 9/26/24 AM Tr. 133:16-134:8 (Israel). And Plaintiffs otherwise failed to conduct a valid HMT in order to establish their alleged market for ad exchanges for "indirect open-web display advertising." *Id.* at 131:15-19 (Israel).

1. Plaintiffs Failed to Offer Valid Evidence Showing Their Ad Exchange Market Passes the HMT.

625. Professor Lee identified the 20% fee Google charges for AdX open auction transactions as direct evidence that Google possesses sufficient market power in his alleged ad exchange market for the alleged market to pass an HMT. 9/19/24 PM Tr. 81:20-82:14, 85:1-7 (Lee).

626. Professor Lee's analysis fails, however, to define a but-for world in which Google lacks an alleged monopoly or to perform any price comparison against such a but-for world. Professor Lee is therefore unable to establish that Google charged significantly higher prices or decreased quality relative to what the competitive level should have been in a but-for world, rendering his analyses invalid. 9/20/24 AM Tr. 146:4-147:25 (Lee) ("I'm not putting forward a specific but-for world" for any of the alleged conduct); 9/26/24 AM Tr. 131:20-132:10 (Israel).

627. As discussed *infra* ¶¶ 1147-1152, Professor Lee's comparison of ad exchanges' prices only examined nominal prices, not quality-adjusted prices. Plaintiffs have not submitted evidence that other exchanges provide comparable quality to AdX. Professor Lee's pricing comparison also shows only that some exchanges charge less than AdX does, and others more. *Infra* ¶¶ 1160-1163.

628. Plaintiffs' other expert, Professor Simcoe, attempted to calculate a but-for AdX take rate. His calculation based on U.S. data returned just 17.8%, which is only 2% lower than his calculation of AdX's actual average take rate, 19.8%. 9/19/24 AM Tr. 99:2-8 (Simcoe). Confronted with this data, which demonstrated a very small delta between his but-for world and the as-is world and that his analysis was not very robust, Professor Simcoe tried to maintain that the 2% difference in take rate was still a meaningful price difference because it represents a 15%

overcharge percentage. *Id.* (Simcoe). But on cross-examination, Professor Simcoe had to admit that a 15% percentage difference is not necessarily an overcharge. *Id.* at 112:7-12 (Simcoe).

629. At any rate, AdX's 20% open auction fee originated with DoubleClick, and Google has not increased that revenue share since it acquired DoubleClick in 2008. 9/26/24 PM Tr. 67:18-68:2 (Israel). The 20% revenue share thus originates from long before Google is alleged to have monopoly power. *Supra* ¶ 582 (at the earliest, 2015); DTX-76 at 1 (2011 Google email: "In early 2008, 'Google' and 'display ads' were not often uttered in the same sentence."). It has remained the same since after the acquisition despite the improvements Google has made to AdX, such as expanding the base of advertiser demand. *Supra* ¶¶ 125-130. The fee is still 20% today—when Google is alleged to be a monopolist. Accordingly, the alleged market for "ad exchanges for indirect open-web display advertising" fails the real-world HMT, and Google does not have market power in any such market. 9/26/24 AM Tr. 133:16-134:8 (Israel); 9/26/24 PM Tr. 67:18-68:2 (Israel) ("there's an allegation the market has [since] been monopolized and we don't see a higher price"); *see also* 9/20/24 AM Tr. 97:1-23 (Lee) ("I did not examine DoubleClick's take rate for its earlier ad exchange product").

630. In addition, Google's AdX fee for all transaction types, which includes programmatic direct transactions run through AdX, dropped from 20% in July 2014 to around 16% in July 2022. DTX-1977 (Open Auction fee has been 20% since 2009); DTX-1888; 9/26/24 AM Tr. 132:15-133:14 (Israel). Notably, the overall average fee has dropped because programmatic direct spend on AdX is increasing, yet Plaintiffs exclude any programmatic direct transactions (for all exchanges) from their market share calculations on the basis that they are not "indirect" transactions. 9/26/24 AM Tr. 132:15-133:9 (Israel); *see also* PTX-549 at -079 (average revenue

share for programmatic direct deals (PG or Programmatic Guaranteed) lower than for open auction (OA)).

631. Professor Lee also argued that a document from 2014 that examined Google's prices for its ad tech products showed low publisher price elasticity for ad exchanges that is consistent with a "strong indicator that AdX possesses substantial market power." 9/19/24 PM Tr. 82:15-84:16 (Lee) (discussing PTX-188).

631.1. However, that 2014 document—as well as any claim that the 20% take rate that existed prior to 2015 was supracompetitive—is irrelevant given that Professor Lee does not opine that Google had market power at that time. 9/19/24 PM Tr. 45:24-46:5 (Lee); 9/20/24 AM Tr. 92:9-14 (Lee). If anything, the comparison to 2014 demonstrates that Google's take rate has stayed the same before and after Plaintiffs allege that Google had market power. Moreover, since 2014, competitive conditions are not the same because display advertising has been transformed by the rise of ads and the ad tech to serve those ads on social media, apps, CTV, and other channels. *Supra* ¶¶ 417-419.

631.2. Professor Lee also could not reconcile statements he relied upon in the document suggesting that price elasticity for small publishers was low with statements in the same document stating price was a "key factor" for small publishers. PTX-188 at -982. Nor could Professor Lee explain how the price elasticity calculations in the document were performed. 9/20/24 PM Tr. 4:7-6:1 (Lee).

2. Plaintiffs' Alleged Exchange Market Overstates Google's Market Share by Excluding Reasonable Alternatives to "Ad Exchanges for Indirect Open-Web Display Advertising."

632. Plaintiffs' market for "ad exchanges for indirect open-web display advertising" excludes reasonable alternatives that compete to serve the same function that ad exchanges do of connecting advertisers and publishers.

633. Advertisers and publishers can connect by bypassing third-party ad exchanges entirely, and the tools that facilitate those transactions compete with AdX.

633.1. For example, an advertiser can purchase inventory directly from a publisher using a publisher's proprietary integrated ad tech tools that connect without a third-party exchange. 9/20/24 AM Tr. 35:6-10 (Lee) (agreeing "if an advertiser switches spend from open-web display to Amazon, the advertiser is then participating in auctions on Amazon and not on ad exchanges").

633.2. Providers can rely on both third-party tools and on in-house ad tech tools, and have created in-house versions of ad exchanges. For example, Disney has created an in-house ad exchange that makes Disney inventory available to advertisers and compares different demand sources. 9/17/24 PM Tr. 124:14-125:13 (Helfand).

633.3. Advertisers and publishers can also use third-party tools like AdSense or supply path optimization tools, which connect advertisers to publisher inventory without passing through an exchange. *Supra* ¶¶ 50, 565.

634. In addition, as explained above, direct transactions compete directly with indirect transactions for ad spend, but Plaintiffs' market share calculations for their alleged ad exchange market exclude all direct transactions. *Supra* ¶¶ 495-506.

635. Transactions in other ad channels and formats such as social media, instream video, and in-app advertising also compete with AdX transactions in "open-web display ads." *Supra* ¶¶ 513-519. AdX and other exchanges facilitate auctions in more than just traditional website banner ads, including instream video, native ads, in-app ads, and Connected TV ads. 9/11/24 PM Tr. 148:15-149:3, 149:21-150:4, 150:11-17 (Dederick); *supra* ¶ 394.

636. Accounting for other transaction types, other ad formats, and other ad channels, Google's share among ad exchanges for total U.S. display ad spending was only 17% to 18% during the 2019 to 2022 period. DTX-1868; 9/26/24 AM Tr. 137:11-138:15 (Israel) (exchanges include "any ad tech that runs an auction or facilitates a direct sale" including for social, retail, apps, and Connected TV because "somewhere in the ad tech, it has to facilitate the auction or direct sale"); 9/20/24 AM Tr. 48:5-51:23 (Lee).

637. In comparison, applying those same calculations, in 2022 [redacted] accounted for 38% of display ad spend through exchanges, other social media exchanges for 11%, and [redacted] for 6%. DTX-1949; 9/26/24 AM Tr. 139:9-20 (Israel).

638. "Google is actually quite small once we consider all of these options," along with the constraints imposed by direct sales—which is inconsistent with Google having monopoly power. 9/26/24 AM Tr. 138:16-139:4, 139:21-24 (Israel).

3. Plaintiffs Failed to Offer Valid Evidence that Google Has Monopoly Power in Their Alleged Ad Exchange Market.

639. Even assuming Professor Lee properly defined a market limited to "ad exchanges for open-web display advertising," according to his own market share calculations Google's market share is not consistent with monopoly power.

640. Google's share based on ad spend in Plaintiffs' United States market for ad exchanges has never been higher than 50% and is steadily declining. It has dropped significantly

since April 2020 from around 47% to below 35%. PTX-1266A; 9/20/24 AM Tr. 47:11-17 (Lee); *id.* at 113:18-22 (Lee) ("on a spend basis, the market share is 34 percent" for AdX in 2022); DTX-1863 (Israel Figure 42: Prof. Lee's Exchange Share Estimates Indicate Significant Competition); 9/26/24 AM Tr. 134:12-135:14 (Israel).

641. Similarly, a chart prepared by Professor Lee showed that monthly U.S. net revenues earned by AdX between 2018 and 2022 increased from $30 million to $45 million, while the monthly net revenues earned by AdX and competing exchanges that produced data in this case combined grew from $42 million to $100 to $120 million in that same period. PTX-1262A; PTX-1239A; 9/20/24 AM Tr. 124:25-125:13 (Lee).

642. Professor Lee attempted to inflate Google's market share by calculating share based on metrics other than ad spend facilitated, such as share of impressions and share of ad tech fees.[30] 9/20/24 AM Tr. 44:20-45:4 (Lee); *compare* PTX-1265A (Lee Figure 95, showing AdX share of worldwide spend ranging from around 37% to around 51% during the relevant period), *with* PTX-1237A (Lee Figure 47, showing AdX share of worldwide impressions ranging from around 50% to around 68% during the relevant period); PTX-1258 (Lee Figure 88: showing AdX share of worldwide fees ranging from 56% to 66% during the relevant period).

643. To summarize, even when Google's share of the ad exchange market is calculated using Plaintiffs' metrics, Google's annualized average share has never been higher than 60% in the United States or 66% worldwide, with those shares significantly lower today. PTX-1384; 9/20/24 AM Tr. 113:5-22 (Lee).

[30] Professor Lee also suggested that Google's share should be higher by pointing to Google's share in the market from AdSense. 9/20/24 AM Tr. 43:22-44:5 (Lee). But AdSense is not in any of the relevant markets that Lee defined. 9/20/24 AM Tr. 44:18-19 (Lee).

643.1. According to Professor Lee's worldwide calculations, AdX's baseline share based on impressions ranged from 54% to 65%, and based on fees from 43% to 51%. PTX-1258.

643.2. According to Professor Lee's U.S. calculations, AdX's baseline share based on impressions ranged from 46% to 56%, and based on fees from 36% to 45%. PTX-1259; 9/19/24 PM Tr. 90:7-93:19 (Lee).

643.3. According to Professor Lee's U.S. calculations, AdX's share of impressions decreased from 60% in April 2020 to around 45% in December 2022. PTX-1260A; 9/20/24 AM Tr. 46:23-47:5 (Lee).

644. According to Professor Lee's calculations, Google's share in Plaintiffs' alleged ad exchange market based on fees is 37% in the US and 44% worldwide. PTX-1384; 9/20/24 AM Tr. 114:3-8 (Lee).

645. In the face of Google's low market shares, Professor Lee suggested instead that market power is shown by AdX's scale advantages over its competitors—even though Plaintiffs' experts also agree that AdX's scale can have procompetitive benefits, 9/16/24 PM Tr. 11:20-12:4, 18:11-21 (Weintraub); 9/20/24 AM Tr. 112:5-10 (Lee) ("Scale is important for the competitiveness of an ad tech product and can help improve quality."). 9/19/24 PM Tr. 94:8-95:13, 95:23-96:11, 96:23-97:1 (Lee); 9/20/24 AM Tr. 44:20-24 (Lee) (suggesting that he relies on market shares based on impressions in order to demonstrate scale and volume).

646. That the remaining, sizable share of Plaintiffs' alleged ad exchange market belongs to many smaller competitors does not change that Google does not have monopoly power. "Competition economics generally finds markets with lots of small competitors to be quite competitive markets" as "it indicates small players can continue to compete" and are "not

somehow unable to because they're too small." 9/26/24 AM Tr. 135:15-136:4 (Israel) ("I would call that a situation with vibrant competition" as "they can bid into header bidding, and AdX faces all of that competition"). The record evidence indicates Google's ad exchange rivals are intensely competitive.

646.1. Today, numerous successful ad exchange competitors—including the participants at this trial such as PubMatic, Magnite, Index Exchange, OpenX, and Xandr (owned by Microsoft)—compete with AdX for ad spend. PTX-1317 (Weintraub Figure 9: Monthly Advertiser Spend for AdX and Rival Exchanges); Deposition of Todd Parsons Tr. at 39:12-15, 39:16-40:10 ("There are a whole group of exchanges that are matching-making between buyers and sellers that we are a buyer—are a buyer on."); 9/9/24 AM Tr. 155:23-156:9 (Wolfe).

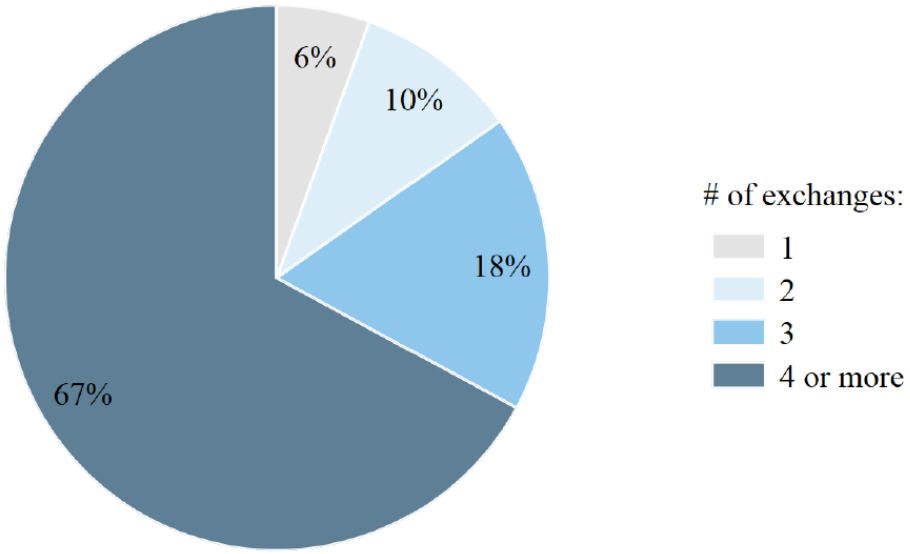
646.2. Plaintiffs' expert, Professor Weintraub, prepared a chart that shows AdX's win rate has declined from around 47% in 2015 to just over 15% in 2022, at which point just two rival exchanges combined had a comparable win rate of 10%. PTX-1315A.

646.3. According to Plaintiffs' own rival exchange witness, the exchanges market is "hypercompetitive." 9/9/24 PM Tr. 23:3-15 (Casale); *see also* 9/12/24 PM Tr. 134:17-135:12 (Goel) (PubMatic describes the "digital advertising ecosystem" it competes in as experiencing "intense competition in the marketplace").

646.4. Publishers multi-home across exchanges. 9/26/24 AM Tr. 136:22-137:10 (Israel). According to Google data as shown below, DTX-1904, 67% of U.S. DFP impressions are accounted for by publishers that use 4 or more exchanges,

85% by publishers that use 3 or more exchanges, and 94% by publishers that use 2 or more exchanges. 9/26/24 AM Tr. 136:13-137:10 (Israel) (noting that the data does not quite capture all of the exchanges used by DFP publishers so "multi-homing is probably slightly larger than is reflected here").

Figure 88: DFP Publisher Multi-homing across Exchanges, 2022



647. Professor Lee also claimed that AdX has market power because "customers of AdX have very limited price responsiveness to its fees." 9/19/24 PM Tr. 81:24-82:9 (Lee).

647.1. Professor Lee's own analysis demonstrates, however, that AdX has lost market share as AdX's competitors reduced their fees. PTX-1279; 9/20/24 AM Tr. 114:9-115:19 (Lee).

647.2. During his redirect testimony, Professor Lee also relied upon a document that suggested that advertisers were responsive to AdX's fee, contradicting his own prior testimony regarding the document. *Compare* PTX-639 at -965 ("AdX is losing third-party demand at a rapid clip. MediaMath, Turn, TTD, etc are growing but not spending on AdX. We're not noticing it because our own demand is growing so fast, but there is clear weakness in the AdX buyer

segment and continued adoption of header bidding. This points pretty clearly to a pricing problem IMHO."), *with* 9/20/24 PM Tr. 16:16-18:3 (Lee) ("This indicates that AdX market power had not been significantly eroded, at least to an extent that it did not reduce its 20 percent fee.").

648. Professor Lee presented charts that he claimed demonstrate that AdX has various advantages, such as the ability to win more auctions, over competitor exchanges. PTX-1393A (Lee Figure 26: Number of worldwide auctions won by top 10 exchanges in GAM, with and without competition, June 28, 2023); PTX-1395A (Lee Figure 28: Percent decrease in worldwide publisher payout if exchange was removed); 9/19/24 PM Tr. 85:16-86:25, 88:2-89:12 (Lee).

648.1. Professor Lee's charts are unreliable because they consistently understate the number of auctions each of AdX's competitors won. They are based on GAM log-level data, which does not reliably report whether header bidding won an auction, or, if header bidding won, which exchange participating in header bidding won. 9/20/24 AM Tr. 117:7-118:13 (Lee) ("Q. You don't know, from this data set that you used, how much header bidding you're leaving out; do you? A. I do not know definitively."); *id.* at 119:9-123:1 (Lee) (discussing footnote from Professor's Lee's report that explains "information on the winning advertiser is not reliable for all auctions in the GAM log-level data" so charts relying on GAM log-level data include only some remnant demand sources (i.e., header bidding demand sources) but exclude others); 9/26/24 AM Tr. 102:14-103:6 (Israel) (Google GAM log-level data can identify header bidding only in a few cases).

648.2. In addition, Plaintiffs' own chart shows that a significant number of the auctions AdX is winning are auctions in which it is not competing with any other exchange. In other words, AdX is bidding on impressions that no other exchange wants rather than taking share from rival exchanges. PTX-1393A; 9/20/24 AM Tr. 118:14-119:8 (Lee).

649. Professor Lee also testified that AdX's scale advantage enables Google to improve AdX's quality, which, if anything, undermines any claim that Google has behaved like a monopolist by degrading the quality of AdX below competitive levels or setting a supracompetitive quality-adjusted price. 9/19/24 PM Tr. 111:22-112:10 (Lee) ("Scale is important for the competitiveness of an ad tech product and can improve quality."); 9/20/24 AM Tr. 100:19-103:12 (Lee) (although he did not calculate a single quality-adjusted price, Professor Lee purported to take into account quality of each tool when comparing nominal fees and prices); *id.* at 104:1-105:16 (Lee) (Google's conduct drove more revenue for its customers relative to competitors).

D. Plaintiffs' Market Based on "Advertiser Ad Networks for Open-Web Display Advertising" Excludes Competitive Alternatives and Overstates Google's Market Share.

650. Plaintiffs contend that their market for "advertiser ad networks for open-web display advertising" is a relevant product market and that Google Ads competes in this market. 9/19/24 PM Tr. 120:19-121:2 (Lee). Their alleged market currently contains only two competitors, Google Ads and Criteo, and included Facebook Audience Network (FAN) before FAN transitioned to transacting in-app ads.[31] 9/20/24 AM Tr. 139:9-14 (Lee); PTX-1281.

[31] Today, Meta Audience Network enables advertisers to buy ads on third-party apps, and previously enabled them to buy ads on third-party websites. Plaintiffs included the ad network in the relevant market only up to the point it stopped buying ads on third-party websites in 2020, at which time they claim it was no longer a competitive constraint on Google's ad tech. 9/19/24 PM Tr. 79:20-80:6 (Lee). Contrary to Plaintiffs' suggestion that Facebook does not have the "ability"

651. In support of his claim that the alleged market passes the HMT, Professor Lee relied primarily on what he characterized as direct evidence of Google's alleged market power: Google Ads' ability to increase prices, as well as Google's alleged degradation of Google Ads below the competitive level.

652. As explained below, Professor Lee's evidence is insufficient to support his claim that his market for "advertiser ad networks for open-web display advertising" passes the HMT. 9/26/24 AM Tr. 139:25-140:25 (Israel). Plaintiffs did not otherwise conduct a valid hypothetical monopolist test in order to establish their alleged market for "advertiser ad networks for open-web display advertising." *Id.* at 139:25-140:25 (Israel).

1. Plaintiffs' "Advertiser Ad Network" Market Is Inconsistent with Commercial Reality and Overstates Google's Market Share by Excluding Reasonable Alternatives.

653. Plaintiffs' alleged "advertiser ad network" market is inconsistent with commercial reality.

654. As a threshold matter, the term "advertiser ad network" is not a term commonly used in the industry. 9/20/24 AM Tr. 137:12-15 (Lee) ("I did not recall hearing those three words in that order prior to this case"); 9/20/24 PM Tr. 54:4-6 (Sheffer) (Google executive with 18 years of industry experience testified he has "not really" heard of the term). Professor Lee's artificially defined term enabled him to exclude competition from dozens of ad networks that do continue to compete across all of the types of inventory that exist today, as well as the other buying tools that are available for advertisers to purchase ad space. *E.g.*, 9/20/24 PM Tr. 54:7-13 (Sheffer).

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to buy ads on third-party websites, Facebook's tools are clearly capable of that functionality because they previously did exactly that. 9/26/24 PM Tr. 53:21-54:7 (Israel).

655. Plaintiffs' fact witnesses did not present definitions of "advertiser ad network" consistent with how Plaintiffs define the term. In fact, when asked to define "ad networks" they all highlighted the fact that ad networks fundamentally serve both publishers and advertisers; there is no such thing as a one-sided "advertiser ad network."

655.1. Dederick testified on behalf of The Trade Desk that an ad network "is typically a combination of websites that's put together to create more ad liquidity or more supply. It's typically not programmatic." 9/11/24 PM Tr. 102:24-103:13 (Dederick). Contrary to Plaintiffs' claim that "advertiser ad networks" are buy-side tools, Dederick testified that "They are thought of as, you know, typically sitting on the supply side. I mean, those ad networks are not buy-side tools or technology, typically." 9/11/24 PM Tr. 104:1-21, 105:21-106:15 (Dederick); *id.* at 156:21-157:24 (disagreeing with Plaintiffs' Demonstrative A and stating "we think of an ad network as something that exists on the supply side. . . . I talk to advertisers and marketers all day—they think of ad networks typically as more akin to working with a publisher than they do a demand-side platform.").

655.2. Another industry witness presented by Plaintiffs, Friedman representing an advertising agency, testified that he has heard the term "advertiser ad network" used to refer to a provider that "puts together a group of websites and bundles that and sells that as a group." 9/10/24 AM Tr. 139:21-140:6 (Friedman). When asked to elaborate on how ad networks work, he described the function served by ad networks as analogous to exchanges because both "aggregate ad impression inventory." 9/10/24 PM Tr. 28:8-21, 29:5-7

(Friedman); *see also id.* at 29:1-4 (Friedman) (there "might be overlap" in the features offered by ad exchanges and ad networks), 31:16-25 (Friedman) (advising advertisers in 2016 that "ad networks' business models and practices may include features similar to those offered by ad exchanges").

655.3. Plaintiffs' own expert, Professor Weintraub, depicted the "ad network" as a fundamentally two-sided product that serves both advertiser and publishers, even though Plaintiffs define a market in only the advertiser side. 9/16/24 PM Tr. 47:15-25 (Weintraub).

655.4. Plaintiffs' witness, Casale of Index Exchange, testified on direct examination that an ad network "typically represents both the interests of the publisher or media, as well as the marketer or the advertisers. So you can kind of look at it as both buying and selling media simultaneously." 9/9/24 AM Tr. 109:22-110:8 (Casale). He further admitted on cross examination that there is a "real lack of formality" in the industry on defining an "ad network." 9/9/24 PM Tr. 7:22-8:7 (Casale).

656. In reality, the traditional conception of "ad networks" on which Plaintiffs appear to base their definition of "advertiser ad networks"—tools that aggregate third-party publisher inventory and offer it to advertisers—is largely obsolete.

656.1. When a Disney representative was asked if he could identify "an example of an ad network that's in existence," he replied: "I can't. Largely because most of the market has moved more towards programmatic versus kind of a—a more simple transactional network model." 9/17/24 PM Tr. 126:13-17 (Helfand).

656.2. Friedman of Goodway Group wrote in 2016 that "ad networks had been obsolete since 2012." 9/10/24 PM Tr. 33:14-34:14 (Friedman).

657. As explained below, *see infra* ¶ 688, today "ad networks" more commonly refer to proprietary ad tech tools like Facebook, Amazon, and TikTok that enable advertisers to purchase both on owned-and-operated inventory and some third-party inventory. But those tools are excluded from Plaintiffs' market.

658. To the extent that Plaintiffs' "advertiser ad network" market instead refers to a market in buying tools, their market definition excludes numerous buying tool alternatives that buyers can choose from, particularly "demand-side platforms" such as Google's DV360. 9/26/24 AM Tr. 144:1-11 (Israel); 9/19/24 PM Tr. 100:12-21 (Lee).

659. Demonstrating the artificial nature of Plaintiffs' market definition, no Google competitive analysis for Google Ads limited Google Ads' competitors to Criteo and, for some time, Facebook Audience Network. They all directly compared Google Ads to excluded buying tools, including demand-side platforms (like The Trade Desk) and integrated buying tools (like Facebook and Amazon). As a leader from the Google advertising sales team testified about how Google views its competitors for selling Google Ads: "We sell against the broad choices that marketers have to where they would place their media. So that would be inclusive of companies like Amazon, Meta, Snapchat, NBC Universal, and increasingly, companies like Walmart" 9/25/24 PM Tr. 54:18-23 (Stewart).

659.1. In a 2015 Google slide deck analyzing the "programmatic competitive landscape," Google identified multiple competitors to Google Ads (referred to as Google Display Network), including Facebook, Amazon, Yahoo, Twitter,

Verizon, AOL, and Apple, as well as generally "DSPs & Walled Gardens." DTX-259 at 4, 6, 15; 9/11/24 AM Tr. 58:10-23 (Bender).

659.2. An internal Google presentation from 2017 listed as an "Objective" to "understand relative performance of AW [Google Ads] vs. FB [Facebook] ad campaigns for SMBs [small and medium businesses]" and "evaluate campaign setup, measurement and advertiser engagement across AW [Google Ads] vs. FB." DTX-399 at 3. According to the document, Google was "thinking about how users are evaluating" Google Ads versus Facebook. DTX-399 at 3, 6-20, 30, 34. As Dr. Israel explained, Google's "discussion of Facebook being" the "easiest interface" demonstrated that Google was "seeing that as creating risk that it's going to lose the small advertisers." 9/26/24 AM Tr. 58:3-19 (Israel).

659.3. In another 2017 competitive analysis, Google identified Amazon's "mobile ad network" and "desktop display network" as competing with Google Ads. DTX-406 at 6; *see also* DTX-423 at 2 (2017 Google competitive analysis); 9/26/24 AM Tr. 155:25-156:19 (Israel) (DTX-423 "clearly says that Google perceived such a competitive threat" and "Amazon is another model similar to Google Ads in the sense that you can buy ads on Amazon, but you can also buy ads on third-party sites, and Google sees that buying tool from Amazon as a threat.").

659.4. In a 2017 competitive analysis, Google compared Amazon's advertiser platform offering against both Google Ads and DV360 along metrics such as inventory, targeting, measurement, bidding and automation, and reach. DTX-

435 at 9, 12. According to Google, Amazon was now in third place after Facebook in first and Google in second. DTX-435 at 7. Amazon's header bidding wrapper created an "'Amazon Prime' for Publishers." DTX-435 at 17.

659.5. A 2017 document discussing Google Ads identified "significant competition, primarily from Facebook, Criteo, Amazon." DTX-486N at 4; *see also* 9/25/24 PM Tr. 41:20-42:6 (Stewart). Google observed: "Facebook has taken the leadership position from Google over the last four years, capturing a significant share of display market growth." DTX-486N at 6. The document contains a graph comparing the year-over-year growth of Facebook against that of Google Ads (and DV360). "Google has fallen from 106% of Facebook's display+video revenue in 2013 to 43% in 2017." DTX-486N at 6.

659.6. In 2017, Google conducted a case study of how two advertisers, Hubble Contact Lenses and Helix Sleep (an online mattress seller), spent their advertising dollars that directly compared Google (including Google Ads) and Facebook. DTX-494N at 4, 6, 8, 10. Following the study, Google planned to engage in "ongoing efforts to address gaps" between Google Ads and Facebook, including "head-to-head tests," "measurement efforts," and "front-end/simplicity." DTX-494N at 12; *see also id.* at 17 (direct comparison of advertiser user interfaces for Facebook and Google Ads).

659.7. In 2018, Google analyzed Google Ads' market share as compared to the market shares of Facebook, Amazon, and Criteo. DTX-549 at 24. A chart

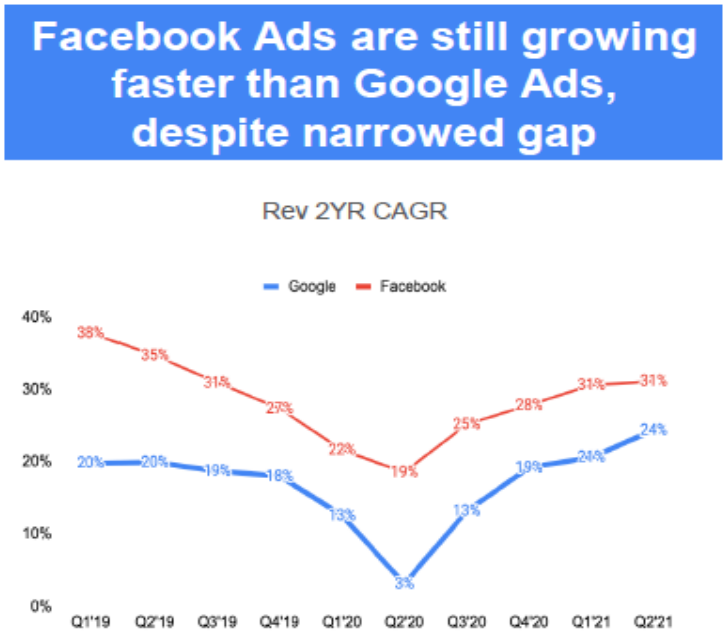
showed Google's share as lower than Facebook's and sloping down while Facebook's increased. DTX-549 at 24; s*ee also* 9/11/24 AM Tr. 55:6-56:7 (Bender).

659.8. A 2019 document directly compared Google Ads revenue to both Facebook and The Trade Desk (a demand-side platform). Google expressed concern that Google is "losing share in US Display market overall to key competitors (FB & TTD), primarily driven by GDA [Google Ads]." DTX-733 at 3; *see also* 9/25/24 PM Tr. 61:2-23 (Stewart). The document directly compared the features available on Google Ads to those available on Facebook and Amazon, and contained strategic plans about how Google Ads would change to compete with those other tools. DTX-733 at 16-17.

659.9. In a 2019 competitive analysis deck, Google conducted a "controlled survey to large AdWords [Google Ads] advertisers" to evaluate what "display buying platforms" they were currently using in addition to Google Ads and were considering in the future. DTX-754 at 7. Google included in the survey Facebook, DV360, Amazon, The Trade Desk, and Criteo. DTX-754 at 7. The deck explicitly compared the Amazon ad network, described as a "competitive offering" to both Google Ads and DV360 across inventory, target, measurement, bidding and automation, and reach, and concluded that Amazon already offered "similar reach and targeting to GDN [Google Ads] / DBM [DV360]." DTX-754 at 9.

659.10. In a Google slide deck that evaluated the market position of Google Ads and compared market shares, Google directly compared Facebook Ads' market

share against Google Ads'. DTX-1132N at 9. The document also noted: "Share in Non-Search Ads has gone to TikTok, Snap, Pinterest, and Twitter." DTX-1132N at 9.



660. A Microsoft competitive analysis similarly compared Google Ads to a wide range of other buying tools. In a slide deck depicting the "buy-side competitive landscape," Microsoft listed Google, whose "share is being threatened by" Amazon, The Trade Desk, Freewheel (a publisher ad server owned by NBCUniversal that is a "commonly used ad server" for video ads, 9/9/24 AM Tr. 117:23-118:12 (Casale); 9/10/24 PM Tr. 148:9-18 (Friedman)), Roku (a Connected TV platform), and more. DTX-1282 at 47; *see also id.* at 43 ([redacted]

[redacted]

661. Plaintiffs' market definition is thus unsupported by any industry reality. As explained below, according to their market definition, Google Ads is distinguished from demand-side platforms because it is an "advertiser ad network" that sells vetted inventory on a cost-per-click basis and has an easy-to-use interface. At the same time, Plaintiffs contend that Google Ads

should purchase more on third-party exchanges, just like demand-side platforms do. *Infra* ¶¶ 795-797. And they contend that other "ad networks" that advertisers can use (such as Facebook, Amazon, and TikTok) do not compete with Google Ads because they do not transact "open-web display ads." Plaintiffs are seeking to distinguish Google Ads from competitor buying tools based on the very same conduct that they allege is anticompetitive, while also trying to exclude from the market the tools that are most similar to Google Ads on the basis that they sell vetted (mostly owned-and-operated) inventory. These artificial distinctions are unsustainable, and lead Plaintiffs to overstate Google's market share.

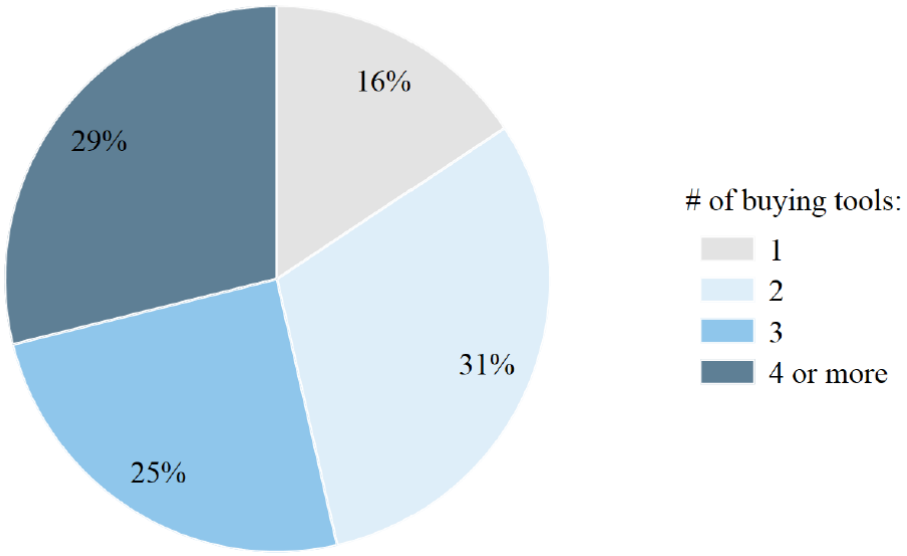
a. Plaintiffs' Market Definition Excludes Demand-Side Platforms.

662. Plaintiffs' "advertiser ad network" market excludes demand-side platforms even though they are a buying tool used by many advertisers to buy ads, including "open-web display ads," across multiple inventory sources. 9/26/24 AM Tr. 144:1-11 (Israel); 9/11/24 PM Tr. 95:12-14 (Dederick).

663. In general, advertisers often multi-home by using multiple buying tools simultaneously, including by using "advertiser ad networks" and demand-side platforms at the same time. DTX-1970 (Israel Table 1: AdX Spending Patterns for Selected Advertisers, 2019-2022); 9/26/24 AM Tr. 146:11-22, 152:9-153:1 (Israel) (DTX-1902 shows "most of the spend" on AdX is made by "advertisers who are using multiple tools," and DTX-1970 shows advertisers multi-homing on Google Ads and on third-party buying tools including demand-side platforms like The Trade Desk, Verizon Media DSP, and Amazon); 9/11/24 PM Tr. 96:16-97:1 (Dederick); 9/27/24 AM Tr. 27:8-29:13 (Bumpers) (retail company advertises using more than ten different buying tools, including Google Ads, Yahoo, Taboola, The Trade Desk, Criteo, and Meta Ad Manager). The figure below, DTX-1902, depicts the small percentage of spend on AdX that is accounted for by advertisers that single-home as compared to the much larger percentage

accounted for by advertisers that multi-home. Because advertisers already multi-home between the two kinds of products, it is easy for them to substitute spend between "advertiser ad networks" and demand-side platforms.

Figure 85: Advertiser Multi-homing across Buying Tools on AdX, 2022



664. The spending patterns of advertisers that use buying tools to bid on AdX are consistent with substitution between Google Ads and demand-side platforms. From 2019 to 2022, there was a large decrease in AdX spending by advertisers via Google Ads and a simultaneous large increase in AdX spending via third-party buying tools that include demand-side platforms. DTX-1970; 9/26/24 AM Tr. 146:11-147:16 (Israel) ("These are selected examples, but just to show situations where . . . buyers who are buying through AdX are— between Year 1 and Year 2 are greatly reducing the amount they buy via Google Ads, and greatly increasing the amount they buy through a third-party tool," including demand side platforms).

665. Demand-side platforms also compete with Google Ads head-to-head at the individual impression level by participating in the same auctions as Google Ads. DTX-1837 (Israel Figure 16: Competition with Google Ads in Google Ad Manager Auction Data); 9/26/24

AM Tr. 147:20-149:2 (Israel); 9/20/24 AM Tr. 144:7-22 (Lee) (agreeing Google Ads competes in auctions with bidders using other tools including demand side platforms); 9/16/24 PM Tr. 45:13-21 (Weintraub) (Plaintiffs' expert agreeing that both ad networks and DSPs "compete for impressions on the advertisers' behalf"); 9/11/24 PM Tr. 147:5-148:14 (Dederick) (when The Trade Desk bids into AdX auctions, it competes with Google Ads).

666. Because Google Ads competes in auctions against demand-side platforms and even with exchanges, Google Ads is constrained by those other ad tech tools. 9/26/24 AM Tr. 149:3-16 (Israel). Consistent with this reality, Plaintiffs' expert, Professor Lee, even presented a document during his testimony that refers to Google Ads as a DSP and shows it competing with non-Google DSPs. PTX-904 at -544 (discussed at 9/19/24 PM Tr. 122:22-124:22 (Lee)).

667. Industry recognition is more consistent with "advertiser ad networks" and demand-side platforms competing as substitutes rather than as distinct products.

668. For example, Plaintiffs would categorize Criteo as an "advertiser ad network" that does not compete with demand-side platforms.

668.1. By contrast, Criteo describes itself as a demand-side platform that competes with other demand-side platforms, including Amazon, Facebook, Google, Microsoft, The Trade Desk, and various smaller demand-side platforms. DTX-1420 at 12, 29 (2022 Criteo 10-K); DTX-1257 at 32 (2022 Criteo investor presentation); Deposition of Todd Parsons Tr. 60:20-24, 71:24:72:4, 73:10-74:11, 75:11-15, 163:23-164:2 (Criteo targets the same types of advertisers as DV360 does).

668.2. Similarly, Google's competitive analysis compared both Google Ads and DV360 (Google's demand-side platform) against Criteo. DTX-961 at 12-13 (2020 Google competitive training on Criteo).

668.3. Even Professor Lee acknowledged that Criteo shares characteristics with DSPs, including allowing its advertiser customers to input their data to help facilitate their display ads purchasing. 9/20/24 AM Tr. 29:12-31:15 (Lee) (discussing DTX-1420 at 12).

669. The Trade Desk offers a demand-side platform, yet views its product as competing with all programmatic buying tools, including Google Ads. 9/12/24 PM Tr. 14:7-24 (Dederick) (The Trade Desk internal document titled "Competitive Intel Framework" discussed various attributes of Google Ads); DTX-1484 at 5 (2022 The Trade Desk 10-K described itself as competing in "the market for programmatic buying for advertising campaigns"); *see also* 9/10/24 PM Tr. 34:20-22 (Friedman) (The Trade Desk competes with Google).

669.1. As The Trade Desk's Chief Revenue Officer testified, its demand-side platform bids into AdX auctions alongside both Google Ads, DV360, and the multitude of other buying tools that participate in the AdX auction and competes for impressions in those auctions. 9/11/24 PM Tr. 147:5-148:14 (Dederick).

669.2. A retail company advertiser testified that it would consider the demand-side platform offerings of The Trade Desk and Yahoo to be "ad networks" "because they're going out to the marketplace" on behalf of advertisers. 9/27/24 AM Tr. 28:6-29:8 (Bumpers).

670. Plaintiffs exclude DV360 from their "advertiser ad network" market because it is a demand-side platform, but internal Google documents show that Google considers DV360 and Google Ads to be competitor tools in the same market.

670.1. Google treats both Google Ads and DV360 as differentiated products—often referring to them as "buying doors"—that compete with each other for the same customer needs. DTX-695 at 3, 7 (2018 Google slide deck including both DV360 and Google Ads as "buying doors" in competition with Facebook and Amazon); DTX-549 at 10 (2018 Google slide deck treating both as "buying doors" to compare revenue); DTX-733 at 15 (2019 Google deck: "Outdated narratives required for two buying doors," referring to Google Ads and DV360); DTX-1514 at 43 (2023 Google slide deck: "Why would someone use [Google Ads or DV360] or the other? Both? Like so many situations, it totally depends on a variety of factors, including client preference.").

670.2. Just like any other two products that serve the same purpose for the same universe of customers, Google Ads and DV360 offer customers choice by prioritizing different qualities. Google Ads provides advertisers with the ability to "deploy a more turnkey optimized campaign." 9/11/24 AM Tr. 47:12-48:5 (Bender). DV360 enables customers to optimize "for broad reach" if they want to "manage those campaigns themselves and run in a multi-exchange environment." *Id.* at 47:12-48:12 (Bender). DV360 can also offer "more controls and options" to drive advertising campaigns. 9/10/24 AM Tr. 140:11-141:13 (Friedman).

670.3. When Google sells its buying tools to advertisers, it proposes strategies to help customers meet their unique advertising goals, which may include either tool—or both tools—precisely because these tools serve the same function with different strengths and weaknesses. 9/11/24 AM Tr. 47:12-23 (Bender) ("But what we wanted to do was help point customers appropriately to basically the best what we call front door for their goals."). "There's no set formula for whether a client would use Google Ads, DV360, or both." 9/25/24 PM Tr. 96:10-12 (Stewart). Some customers even "find there's value in both" products and multi-home. 9/11/24 AM Tr. 47:12-48:12 (Bender).

671. Ignoring this commercial reality, Plaintiffs try to distinguish demand-side platforms from "advertiser ad networks" on two bases: (1) that "advertiser ad networks" have a "simplified user interface that is useful to smaller advertisers with less complex advertising needs," whereas demand-side platforms are used only by more sophisticated advertisers; and (2) that "advertiser ad networks" allow buyers to bid on a cost-per-click basis. 9/19/24 PM Tr. 99:6-14 (Lee). These distinctions do not overcome the data demonstrating actual substitution between the two types of tools. In addition, neither distinction is accurate as a factual matter.[32]

672. *First*, large, sophisticated advertisers account for a predominant portion of the spend on both types of buying tools. Data from Google Ads and DV360 reflect that in 2022, the vast majority of advertiser spend for both platforms came from very large advertisers. DTX-1971 (nearly 89% of Google Ads spending was from advertisers who spent more than $100,000, and nearly 99% of DV360 spend from advertisers who spent more than $100,000); 9/26/24 AM Tr.

[32] Taken on its own terms, Plaintiffs' argument also means that Plaintiffs' case with respect to advertisers is that Google denies its rivals of scale by monopolizing small advertiser customers, not large customers.

144:16-145:15 (Israel). Some of the very large advertisers that use Google Ads include, for example, Amazon, Booking.com, Penguin Random House, HarperCollins, New York Times, and Wall Street Journal. 9/23/24 PM Tr. 12:10-13:10 (Stefaniu).

673. Although Google Ads has more small advertiser customers, those advertisers make up a very small portion of the spend on Google Ads. In 2022, more than 75% of the spend on Google Ads in 2022 was accounted for by only the top 1,748 advertisers, all of whom spent more than $1 million. DTX-1971; 9/26/24 AM Tr. 145:3-15 (Israel).

674. The charts Professor Lee presented as purporting to show that different advertisers use Google Ads and DV360 are misleading.

674.1. One was intended to show that many advertisers only use Google Ads, but the chart only showed the number of advertisers, not the amount of spend. PTX-1231; 9/19/24 PM Tr. 101:4-22 (Lee); 9/26/24 AM Tr. 145:16-146:7 (Israel) ("the money Google makes, which is what drives Google, is based on a percentage of the spend," not the number of advertisers that use the platform).

674.2. Another chart was intended to show that the advertisers that only use Google Ads spend double the amount spent by those that use both Google Ads and DV360. But the chart did not actually show spend per advertiser. Instead, it showed total spend for all advertisers on each tool. PTX-1232; 9/19/24 PM Tr. 101:23-103:4 (Lee).

674.3. When those two charts are put together, the 4 million advertisers who use only Google Ads spend about $2,000 per advertiser on average, and even that small average spend does not account for the wide variability of spend among Google Ads advertisers attributable to lack of a minimum spend requirement

on Google Ads. 9/20/24 AM Tr. 150:9-152:6 (Lee). Within that group of 4 million could be a large number of advertisers that spend $1 and only a few that spend over $1 million and drive up the average. In contrast, the 22,700 advertisers that use both Google Ads and DV360 spend about $175,000 on average. *Id.* (Lee).

674.4. Professor Lee's charts are therefore consistent with the fact that the majority of spend on Google Ads comes from advertisers that spend a significant amount on display ads and are capable of shifting that spend to demand-side platforms like DV360.

675. Demand-side platforms are therefore a "large constraint" on Google Ads because the very large advertisers that make up "the vast, vast majority of Google Ads revenue" can easily substitute to demand-side platforms. 9/26/24 AM Tr. 145:16-146:7 (Israel).

676. Moreover, even smaller advertisers are able to substitute between what Plaintiffs call "advertiser ad networks" and demand-side platforms.

676.1. For example, smaller advertisers like regional automotive dealers and local franchisees of quick-serve restaurants use DV360. 9/25/24 PM Tr. 45:5-23 (Stewart).

676.2. Many smaller advertisers rely on ad agencies or other consultants that make purchases on their behalf using demand-side platforms. For example, through Goodway Group's certified partnership with The Trade Desk, small- and medium-sized businesses can use The Trade Desk's demand-side platform. 9/10/24 PM Tr. 36:8-20, 37:13-18 (Friedman).

676.3. Smaller advertisers can use both Google Ads and demand-side platforms to purchase local advertising. For example, advertisers use DSPs like DV360 to purchase ad space in local newspapers. 9/25/24 PM Tr. 53:19-54:7 (Stewart) ("The Army is utilizing DV360 in order to buy local advertising," including local newspapers); DTX-1429N at 10, 21 (2023 Google presentation partnering with Army to use DV360 for programmatic local advertising); 9/23/24 PM Tr. 132:8-14 (Hardie) (the Census bought local advertising space through DV360).

677. Contrary to Plaintiffs' suggestion, the user interface of DV360 is not inhibiting small advertisers from using DV360. Google's demonstrations of the Google Ads user interface and the DV360 user interface show that they are actually quite similar, and that advertisers take similar steps to set up their campaigns in both interfaces. *Supra* ¶¶ 145-151; 9/23/24 PM Tr. 40:3-48:2, 49:5-8 (Stefaniu). Plaintiffs did not present evidence showing any other buying tool interface to demonstrate that other interfaces of demand-side platforms are significantly more complex than Google Ads.

678. Nor are DV360 and Google Ads differentiated across customers on the basis of advertisers' bidding strategies. Google Ads offers more sophisticated advertisers control over "manual settings" and "the ability to manually input what the bidding strategy and the bidding terms should be," and DV360 offers less sophisticated advertisers the ability to automate bidding and budgeting strategies. 9/23/24 PM Tr. 29:4-8, 49:5-12 (Stefaniu); *see also* Stefaniu DX 1. Google has affirmatively taken steps to ensure feature parity between Google Ads and DV360, including giving more sophisticated Google Ads advertisers more control even over automated campaigns. *Supra* ¶ 152; DTX-101 at 2 (2012 Google email stating that Google Ads had "dual

goals of simplification for the masses and power for sophisticated advertisers"); DTX-733 at 16 (2019 Google presentation).

679. *Second*, Google Ads cannot be distinguished from demand-side platforms on the basis that it offers advertisers cost-per-click (CPC) pricing instead of cost-per-mille (CPM) pricing. Google Ads, like other buying tools, converts any CPC bids made within its platform to CPM prior to submitting them to AdX. 9/26/24 AM Tr. 149:17-150:2 (Israel); 9/20/24 AM Tr. 56:5-9 (Lee) (advertiser ad networks can convert bids submitted on a CPC basis to CPM).

680. Like Google Ads, some demand-side platforms, including Amazon and DV360, offer advertisers the option to pay on a CPC basis. 9/26/24 AM Tr. 150:3-18 (Israel); 9/19/24 PM Tr. 106:9-21 (Lee). The advertiser states the objective it cares about, which can include cost per click, and then artificial intelligence figures out how to bid optimally based on that objective. 9/26/24 AM Tr. 150:3-18 (Israel); 9/11/24 PM Tr. 95:18-96:7 (Dederick) ("These are all variables we use to value how much with think it's worth for an advertiser" to bid on a given impression, and "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" and "help figure out what an advertiser should bid.").

681. Plaintiffs relied on their Demonstrative S to allegedly demonstrate that DSPs do not offer CPC pricing, but their presentation is misleading. In Plaintiffs' Demonstrative S, Professor Lee relied on AdX data to show that all third-party buying tools transact on a CPM basis whereas Google Ads transacts on a CPC basis. Plaintiffs' Demonstrative S; 9/19/24 PM Tr. 104:23-106:21 (Lee).

681.1. AdX data is not informative of how buying tools are charging their customers because Google has no way of knowing whether buying tools are charging

their advertisers on a non-CPM basis before converting the bids to CPM for submission to AdX. The fact that AdX data reflect only CPM bids from demand-side platforms demonstrates only that buying tools are required to submit their bids on a CPM basis in order to compete within AdX. 9/23/24 AM Tr. 34:4-18 (Korula) ("All we see are the bids that come into the auction."); 9/20/14 AM Tr. 56:5-9 (Lee) (advertiser ad networks can convert bids submitted on a CPC basis to CPM).

682. Google Ads data show that Plaintiffs' distinction is particularly artificial because, today, most advertisers are not even manually bidding based on either a CPC or CPM basis. Instead, most are using objective-based bidding to either target a specific return on ad spend or maximize conversions or conversion value. DTX-1882 (percentage of spending on Google Ads based on manual CPC or CPM bids has declined from nearly 100% in 2005 to about 10% in 2022); 9/26/24 AM Tr. 150:22-152:3 (Israel). "This whole idea that there's a difference between tools based on whether you can bid in CPC or CPM has really gone away, because every tool has most of the buyers bidding" by letting "the machine figure out how to optimize" for the advertiser's objectives. 9/26/24 AM Tr. 150:22-152:1 (Israel).

683. Plaintiffs' unjustified exclusion of demand-side platforms from their market definition for buying tools conveniently excludes DV360 from their buy-side market—even though Google has connected DV360 to over 100 exchanges in direct contradiction of Plaintiffs' theory that Google is excluding its competitors from accessing Google's advertiser demand. Stefaniu DX 1 at 1.25; *supra* ¶ 144; 9/23/24 PM Tr. 43:5-7, 44:21-24, (Stefaniu); 9/11/24 PM Tr. 65:3-9 (Ravi) (agreeing that DV360 "has historically been one of the major bidders into third-party exchanges" and "into third-party ad networks").

684. Plaintiffs' own presentation of evidence at trial relating to Google's conduct undermined their exclusion of DSPs from the market that Google Ads competes in.

684.1. Plaintiffs repeatedly introduced evidence treating DV360 as if it were within their relevant product markets when describing Google's conduct, while excluding DV360 from their market definition for purposes of market share calculations. Plaintiffs elicited extensive testimony from their witnesses about Project Poirot, a bid-shading tool that was launched only on DV360 and not Google Ads. *E.g.*, 9/17/24 PM Tr. 27:10-34:22 (Jarayam).

684.2. Plaintiffs also presented testimony at trial relating to Google's "unique demand" that actually referred to advertiser demand from both DV360 and Google Ads. *Infra* ¶ 857.

685. Based on Google data and that of its competitors, when demand-side platforms are included in the buying tools market, Google Ads' share was no higher than 20% of U.S. indirect "open-web display" (non-video) ad spending from 2019 to 2022. DTX-1839; 9/26/24 AM Tr. 154:23-155:20 (Israel).

686. The combined Google Ads and DV360 share was less than 50% in every year and declining, at 40% in 2022. DTX-1839A; 9/26/24 AM Tr. 154:23-155:20 (Israel); PTX-1435A; 9/20/24 AM Tr. 145:8-146:2 (Lee) (Google Ads share on AdX combined with Google Ads share on non-AdX, which is mostly AdSense and is excluded from Lee's market, is about 20% of all "open-web display" ad spend through all ad buying tools[33]).

[33] Plaintiffs' expert, Professor Lee, tried to inflate these shares by presenting a chart showing Google Ads' and DV360's shares inclusive of their spend on AdSense. PTX-1389A; 9/19/24 PM Tr. 129:4-130:2 (Lee). Including spend on AdSense contradicts their own case, however, because Plaintiffs have excluded AdSense from any of their alleged markets. 9/20/24 AM Tr. 152:9-153:6 (Lee).

b. Plaintiffs' Market Definition Excludes Integrated Ad Buying Tools Like Those of Meta and Amazon.

687. Advertisers that use Google Ads can and do shift spend from "open-web display ads" to other ad formats and channels, including those accessible through integrated buying tools. *Supra* ¶¶ 440-468. Those integrating advertising tools can enable advertisers to reach the same users that can be reached through Google Ads, and they compete with Google Ads for ad spend. Plaintiffs nevertheless exclude integrated advertising tools from their "advertiser ad network for open-web display advertising" market because they are proprietary (or "closed") tools.[34]

687.1. As Bender testified: "Q. And so if a Google Ads' advertiser feels like it is not reaching its campaign goal or objective using Google Ads, are they free to choose to switch their spend to any of the other ad-buying tools out there, including Facebook and Amazon? A. Oh, yeah. Absolutely. Q. And in the time that you were at Google, how often would you see that phenomenon? A. I would say fairly frequently. It's a very competitive ecosystem. The players would have evolved over my tenure. But certainly, yeah, advertisers can move their money elsewhere if they want." 9/11/24 AM Tr. 53:6-17 (Bender).

687.2. Plaintiffs' advertising agency witness, Friedman, testified that "social media platforms like Facebook have a very wide" or "large audience." 9/10/24 PM Tr. 10:7-11:8 (Friedman); *see also id.* at 56:7-14 (Friedman) (when asked if there are "audiences that are less available on social media platforms than others," Friedman answered: "I don't know exactly what they would be").

[34] Professor Lee agrees that Google Ads can be used to buy ads on Google's owned-and-operated properties, so Google Ads competes with Meta and Facebook Ads with respect to the sale of ads on their respective owned-and-operated properties. 9/20/24 AM Tr. 141:20-142:3 (Lee).

687.3. As Stefaniu testified based on her experience working closely with Google Ads customers, "a lot of my advertisers" were trying to "shift budgets between the other options" they used, including Facebook, TikTok, and "other social platforms." 9/23/24 PM Tr. 62:17-63:3 (Stefaniu).

687.4. Similarly, Bumpers, Marketing Analytics Manager for an e-commerce company, testified that advertisers can use social media to reach "similar" audiences as they do with traditional banner ads. 9/27/24 AM Tr. 37:2-4 (Bumpers).

688. Even though these integrated buying tools are excluded from Plaintiffs' "advertiser ad network" market, industry participants actually refer to the integrated tools as "ad networks."

688.1. One buyer explicitly testified that Facebook's, Amazon's, and TikTok's integrated buying tools are "ad networks." 9/27/24 AM Tr. 28:6-11 (Bumpers) ("Q. Can you provide any examples of ad networks? A. I think there's Google's ad network, right, and then there's—I think you mentioned Facebook's ad network, and then you mentioned TikTok's, and then you mentioned Amazon's. So those are probably the larger ones, I think.").

688.2. Vox Media, a digital media company that operates 18 editorial brands across various platforms, described one of the proprietary ad tech tools it created as a "network." According to Ryan Pauley, the first tool Vox launched in its suite of ad tech tools referred to as Concert was a network because it was "a collection of inventory" that consists of both "Vox-owned inventory, as well as third-party inventory." 9/27/24 AM Tr. 9:2-13, 18:21-23 (Pauley).

688.3. A 2019 Google competitive analysis of Amazon explicitly described Amazon's ad network as similar to Google Ads (referred to as AdWords) because Amazon also offers "O&O Search and Display (on O&O and Network) through a single platform." DTX-754 at 5 (Amazon ad network "growing faster than overall network").

689. Advertisers shift spend between Google Ads and integrated buying tools like those used to buy ads appearing on social media and retail media. *Supra* ¶¶ 440-468. A long-time Google buy-side executive confirmed that he saw advertisers, including smaller advertisers, switch spend from Google Ads to Facebook and Amazon "fairly frequently" in the "very competitive ecosystem." 9/11/24 AM Tr. 53:6-21 (Bender).

690. Internal Google business documents have explicitly compared integrated ad buying tools, such as Facebook's and Amazon's, to Google Ads as competitors and described losing advertiser business to integrated buying tools. *Supra* ¶¶ 338, 345, 659.

691. Similarly, Google's competitors view integrated buying tools as competing with Google Ads.

691.1. Microsoft (including AppNexus):

691.1.1. John testified on behalf of Microsoft that advertisers "use multiple platforms," including Microsoft Advertising, Google Ads, Facebook Ads, Amazon, The Trade Desk, and Yahoo!. 9/20/24 PM Tr. 124:20-125:16 (John).

691.1.2. A 2016 AppNexus memo described Google Ads as declining because of "the shift to mobile, where Facebook shines" and "the evolution of header bidding." DTX-352 at 2.

691.2. Meta:

691.2.1. In 2017, Meta performed a survey of advertisers that demonstrates that advertisers compare Google Ads and Facebook when deciding where to spend their advertising dollars. DTX-481 at 7.

691.2.2. According to data produced by Meta, [redacted] of the ad spend on Facebook and Instagram is accounted for by advertisers who are also purchasing on Google Ads. DTX-1853 at 1.

691.3. Layser, who is now Global Head of Publisher Ad Tech Solutions at Amazon, testified that Amazon's buying tools compete with the buying tools of Google. 9/10/24 AM Tr. 64:21-5 (Layser).

c. Plaintiffs' Market Definition Excludes Tools that Transact in Other Ad Formats and Channels.

692. Google Ads facilitates ad purchases in a variety of other ad formats and channels beyond "open-web display," *supra* ¶ 386.1, and it competes with buying tools that facilitate those other ad formats and channels.

693. Plaintiffs' definition of "display ads" excludes native ads, and therefore excludes Microsoft's ad network on the basis that it primarily serves native ads. But Google Ads bears many resemblances to and competes with Microsoft's ad network.

693.1. Microsoft's ad network is like Google Ads in that it enables advertisers to buy ads both on Microsoft's owned-and-operated properties as well as on third-party inventory. 9/26/24 AM Tr. 154:1-12 (Israel) ("it's basically exactly like Google Ads. Really a replica of Google Ads"); *supra* ¶ 311.

693.2. Given how similar Microsoft's ad network is to Google Ads, Plaintiffs have failed to offer any legitimate basis to exclude it from the alleged advertiser ad network market. 9/26/24 AM Tr. 154:13-18 (Israel). Plaintiffs' own fact witness admitted that advertisers substitute between native ads and banner ads, so the fact that Microsoft's ad network is focused on native ads is not a sufficient distinction. 9/9/24 PM Tr. at 157:13-158:11 (Avery) (more and more advertisers are looking to advertise through native display ads instead of standard banner ads, hoping to capitalize on higher engagement rates). And Microsoft itself recognizes Google Ads as a competitor to Microsoft Audience Network. 9/20/24 PM Tr. 124:20-23 (John).

694. Google Ads also competes with buying tools that facilitate in-app and Connected TV advertising.

695. Advertisers use multi-functional buying tools to purchase both in-app advertising and website advertising. Almost 90% of Google Ads advertisers use Google Ads to purchase both website ads and in-app ads. DTX-1855; 9/26/24 AM Tr. 83:17-84:6 (Israel). Those advertisers can easily shift spend between website and app ads by using the same tools they are already using.

2. Plaintiffs Failed to Offer Valid Evidence Showing Their "Advertiser Ad Network" Market Passes the HMT.

696. Plaintiffs failed to conduct a valid hypothetical monopolist test in order to establish their alleged market for "advertiser ad networks for open-web display advertising." 9/26/24 AM Tr. 139:25-140:4 (Israel).

697. Professor Lee did not testify about prices in his "advertiser ad network" market. *Supra* ¶ 405. When those prices are examined, the price of Google Ads is one-third and one-half of the two competitors that Professor Lee included in his proposed market. 9/20/24 AM Tr. 140:9-

141:13 (Lee); PTX-1281A (Lee Figure 111: Summary of worldwide open-web indirect display margins among ad networks).

698. Rather than analyze prices, Professor Lee presented two Google experiments, one from 2014 and one from 2018, that tested whether Google could increase its Google Ads margin from 14% to 15%. PTX-1808 (March 2014 experiment examining whether Google could increase the Google Ads margin from 14% to 15%); PTX-858 (May 2018 experiment examining demand elasticity on AdX web publishers); 9/19/24 PM Tr. 108:13-109:25 (Lee) (discussing PTX-1808); *id.* at 110:1-111:18 (Lee) (discussing PTX-858).

698.1. Professor Lee claimed the 2014 and 2018 experiments demonstrated that Google could raise its price profitably and were therefore sufficient to satisfy the hypothetical monopolist test or show market power. 9/26/24 AM Tr. 139:25-140:25 (Israel).

698.2. The 2014 experiment is irrelevant because Professor Lee has not even opined that Google had market power in 2014. 9/19/24 PM Tr. 45:24-46:5 (Lee); 9/20/24 AM Tr. 92:15-19 (Lee). In addition, the 2014 experiment reported only short-term effects. 9/20/24 AM Tr. 142:11-143:6 (Lee).

699. Moreover, both experiments support the opposite conclusion from the conclusion that Professor Lee reaches. Google did not actually raise its price: "if the experiment based just on Google Ads said Google could raise the price, but Google chose not to, something else constrained Google from thinking it was optimal." 9/26/24 AM Tr. 139:25-140:25 (Israel) ("That other constraint that led Google to leave the price unchanged could be a two-sided concern, but in any case, it's the sort of thing . . . that's left out when you look at these markets one by one.").

699.1. As Google witnesses explained, Google tests hypotheses or ideas for product changes incrementally. Google starts with "a lot of" small control experiments that it examines "every day, multiple times a day." 9/23/24 AM Tr. 52:22-53:11 (Korula). Because the industry "changes a lot," however, Google cannot simply rely on initial experimental result. *Id.* (Korula). If early results are promising, Google validates those results by continuing to run longer-term experiments—even after product launch—to ensure that the product is "continuing to make money for the publishers in the way that we thought it would" or otherwise working as it should. *Id.* (Korula); *see also* 9/17/24 AM Tr. 137:8-23 (Jayaram). Plaintiffs' expert agreed that the "short-run" experiments run by Google did not necessarily inform Google about the effects in the "long run," and that he saw no evidence that Google would extrapolate the results of short-run experiments over years. 9/16/24 PM Tr. 92:2-9, 92:18-24 (Weintraub).

699.2. Because of this extended, multi-step process to test new product changes, Google does not implement in real life every hypothesis or change that it tests with an experiment. 9/17/24 AM Tr. 110:20-111:7 (Jayaram); 9/17/24 PM Tr. 7:6-9 (Jayaram). In other words, the results and ideas reflected in short-run experiments do not guarantee that the results would be accurate over the long term or that the idea was ever executed.

699.3. Consistent with that practice, there is no evidence here that Google actually increased its Google Ads average margin take rate after running just two short-run experiments. 9/20/24 AM Tr. 143:7-20 (Lee) (discussing PTX-858). The

evidence and testimony demonstrate that Google never increased its market share on a sustained basis. And since the second experiment, six years ago, there remains no evidence of a price increase despite measurable increases in the quality of Google Ads. *Infra* ¶¶ 1139-1140.

699.4. Between August 2015 and December 2022, the Google Ads revenue share hovered around 14%, and in recent years has fallen below 14%.[35] DTX-1889 (Israel Figure 72: Google Ads Fee Trends, Aug 2015-Dec. 2022); PTX-1401 (Lee Figure 34: US Google Ads and DV360 fees (Jul. 2014-Dec. 2022)); 9/26/24 AM Tr. 141:4-142:19 (Israel).

699.5. That average annual fee has never been higher than 14%, and in some years (including after the experiments that Plaintiffs rely on) was as low as 10% to 12%. DTX-1977; 9/26/24 AM Tr. 141:17-19, 142:20-143:15 (Israel) (Google Ads data does not begin until mid-2015 and fees in DTX-1977 for prior years were taken from other sources[36]).

699.6. Professor Lee's own data, which show average margins for individual months in each year, show that Google never raised Google Ads pricing. According to his data, Google Ads' fee on AdX was between 12% and 14% for four out of five years between 2018 and 2022, with the sole exception 15% in January 2021. Importantly, at all those times, Google Ads' fee was a fraction of competitors' fees. PTX-1281A (Lee Report Figure 111: Summary of

[35] That fee fluctuates slightly because Google Ads does not charge a per transaction fee. 9/20/24 AM Tr. 92:3-8 (Lee) (Google Ads charges a variable take rate).

[36] Included in DTX-1977 is a 15% fee for 2014 that was taken from PTX-1808. Dr. Israel was not aware when creating DTX-1977 that PTX-1808 reflected only an experiment.

worldwide open-web indirect display margins among ad networks); 9/20/24 AM Tr. 139:15-141:13 (Lee); *supra* ¶ 697.

700. Another piece of evidence Professor Lee identifies as consistent with market power in the alleged "advertiser ad network" market is his claim that Google reduced the quality of Google Ads by restricting its access to non-Google exchanges. 9/19/24 PM Tr. 112:11-23 (Lee).

700.1. Professor Lee again conceded that this "evidence" is also one of the five acts he alleged to be anticompetitive in this case, so again Plaintiffs' case collapses into one argument: expert testimony about an anticompetitive act that according to Professor Lee also defines a market and establishes market power. 9/20/24 AM Tr. 134:12-135:1 (Lee).

700.2. In addition, Professor Lee's characterization that Google restricted access to other exchanges is inaccurate. Google offers a buying tool to advertisers, DV360, that bids across third-party exchanges, and Google launched the AwBid program, which has been growing rapidly since 2015, to enable Google Ads advertisers to bid on non-Google exchanges. *Infra* ¶¶ 795, 797.

701. Professor Lee also points to Google Ads' "unique demand" as evidence of Google Ads' alleged market power. 9/19/24 PM Tr. 117:22-118:11 (Lee). For the reasons explained below, *see infra* ¶¶ 843-861, the record does not support that Google Ads has "unique demand" sufficient to exercise market power.

* * *

702. When accounting for all the buying tools that are competitive alternatives to Google Ads, Google's buying tools (Google Ads and DV360) account for 19% of U.S. display ad spend from 2019 to 2022. DTX-1860; 9/26/24 AM Tr. 156:24-157:10 (Israel). That low number—which reflects the numerous significant competitive constraints on Google Ads like demand-side

platforms and integrated buying tools—is not consistent with Google having monopoly power. 9/26/24 AM Tr. 157:11-20 (Israel).

VI. The Relevant Geographic Market Is the United States.

703. Plaintiffs define the relevant geographic market for all of their product markets as the United States, with a worldwide geographic market in the alternative. 9/19/24 PM Tr. 121:6-122:5 (Lee). The relevant geographic market is the United States, and Plaintiffs did not meet their burden of establishing an alternative worldwide market. 9/26/24 AM Tr. 109:23-25 (Israel).

704. The Court need not look further than Professor Lee's testimony to find that his alternative worldwide market is inappropriate. Professor Lee testified that it would be appropriate to consider the narrower geographic market of only the United States as a geographic market. 9/19/24 PM Tr. 125:17-126:24 (Lee). And he admitted that defining a market broadly to "include distant substitutes when competition is truly local can lead to potentially misleading shares." 9/20/24 AM Tr. 97:24-98:5 (Lee). Based on the "smallest relevant market principle," the inclusion of more distant substitutes in a market "could lead to mistaken inferences of market power." 9/20/24 AM Tr. 98:15-99:6 (Lee).

705. Beyond Professor Lee's own testimony about economic principles of defining a market, record evidence demonstrates that a worldwide market is not a proper geographic market.

706. *First*, Professor Lee presented only two documents to support his opinion that a worldwide market is proper, but neither document provides sufficient support for his opinion.

707. According to Professor Lee, one Google document shows that customers of ad tech products interact across country and regional boundaries. 9/19/24 PM Tr. 122:22-124:11 (Lee) (discussing PTX-904 at -553). But this document, which was prepared by the EMEA Business Finance team, reflects both that Google has separate teams for different regions, and that the vast majority of U.S. sell-side revenue comes from U.S. advertisers. PTX-904 at -535, -553 (72% of

US sell-side revenue comes from US advertisers). Testimony from Google's expert, Professor Chevalier, confirmed based on data produced by Google and relied upon by Plaintiffs' expert Professor Simcoe that "over 90 percent of the spend . . . by U.S. advertisers is spent on U.S. consumers. And over 90 percent of the spend on U.S. consumers is spent by U.S. advertisers." 9/25/24 AM Tr. 19:23-20:18 (Chevalier). Accordingly, advertising spend by U.S. advertisers is directed at U.S. customers—not customers in other geographies.

708. Professor Lee also argued that another Google business document is consistent with a worldwide market because it reported one metric for web display sizing for "Global ex China." 9/19/24 PM Tr. 124:23-125:13 (Lee) (discussing PTX-657 at -351). But in the very same document, Google evaluated its ad tech business by region. PTX-657 at -328-30, -336, -342, -353, -358.

709. Evidence from market participants confirms that they do not view the relevant geographic market as worldwide. The internal documents of ad tech providers reflect country-specific and regional—as opposed to worldwide—analyses in assessing competitive conditions. *E.g.*, DTX-399 at 3 (2017 Google competitive analysis of Facebook that considered the "US market"); DTX-733 at 3 (2019 Google competitive analysis focusing on "US Display market"); DTX-758 at 82 (2019 Google competitive analysis of Facebook advertising revenue split into "Asia," "Europe," and "US + Canada"); DTX-1132N at 4 (2021 Google sales planning deck showing revenue growth by "market," split out into U.S., Canada, and Brazil); DTX-1257 at 24-25 (2022 Criteo investor presentation describing separately Criteo's "Retail Media Footprint in the Americas" and its "Retail Media Footprint in EMEA").

710. *Second*, Google's shares for Google Ads and AdX are lower in the United States than in the rest of the world, which suggests that competitive conditions for display advertising

vary by geography. DTX-1877; 9/26/24 AM Tr. 108:6-109:22 (Israel) ("We see higher shares in the rest of the world," which "means the rest of the world is different. We're trying to analyze competition in the U.S., we should analyze competition in the U.S. and use shares in the U.S." and have "separate geographic markets" for "the U.S. versus the rest of the world because the competitive conditions are different, and we'll get a better analysis if we focus on U.S.-specific data.").

711. *Third*, the alternative worldwide market further fails to account for other conditions for ad tech tools differ across geographies, such as the number of different languages spoken across countries and the number of speakers of each language. 9/26/24 AM Tr. 110:1-18 (Israel); 9/20/24 AM Tr. 99:7-17 (Lee).

712. Competitive conditions also vary as a result of regulatory regimes that vary between geographies, including those relating to the use of data by ad tech providers. 9/26/24 AM Tr. 110:1-18 (Israel) (for example, the General Data Protection Regulation—GDPR—governs in Europe); 9/20/24 AM Tr. 99:18-24 (Lee); 9/25/24 AM Tr. 19:23-20:18 (Chevalier) ("there are many transactions that begin and end in the U.S."; "we would expect, due to perhaps regulation and other factors, that the U.S. is distinct from the rest of the world.").

713. AppNexus (now owned by Microsoft) recognized the significant differences in competitive conditions across geographies when it was considering expanding its ad tech business outside of the United States in 2016. As AppNexus wrote, expanding internationally "is subject to the particular challenges of supporting a rapidly growing business in an environment of multiple cultures, customs, legal systems, alternative dispute systems, regulatory systems, and commercial infrastructures." DTX-358 at 10. Expansion would require a number of "risks," including "providing services among different cultures, including potentially modifying our platform and

features to ensure that we comply with local business standards and legal requirements; competition from local companies or competitors that are more established in a particular region"; "longer sales or collection cycles in some countries"; and "currency exchange rate fluctuations, which may affect the demand for our products or our operating expenses in a particular region." DTX-358 at 10-11.

714. *Fourth*, Plaintiffs initially filed this suit seeking damages on behalf of federal agency advertiser ad tech customers located within the United States. The federal agency advertisers' advertising goals are likely directed toward users in the United States. 9/25/24 AM Tr. 19:23-20:18 (Chevalier) ("Over 99 percent of the FAA ad purchases were for U.S. users.").

VII. Plaintiffs Challenge Five Product Design Decisions by Google Because Google Did Not Immediately Provide Rivals "Comparable" Access to Google's Innovations, Infrastructure, and Customers.

A. The Challenged Acts All Involve Dealing With and Aiding Rivals.

715. Plaintiffs' experts now argue that only five forms of conduct were themselves anticompetitive. The five forms of conduct, as described by Plaintiffs' experts, are:

715.1. "Providing unrestricted access to Google's advertiser demand exclusively to its AdX ad exchange, and denying comparable access to rival ad exchanges." 9/20/24 AM Tr. 79:10-80:16, 89:3-16 (Lee).

715.2. Providing DFP "access to real-time bids from AdX," and not providing "comparable access to rival publisher ad servers." 9/20/24 AM Tr. 82:13-18, 89:3-16 (Lee).

715.3. For the period 2009 to 2019, providing access to a feature known as "Dynamic Allocation" exclusively to AdX within DFP, and thereby granting AdX "first look"[37] and "last look" advantages over rival ad exchanges. 9/20/24 AM Tr. 85:10-15 (Lee).

715.4. Following the acquisition of Admeld in 2011, failing to build on its ad tech stack an Admeld feature that shared real-time bid information from the Admeld exchange with non-Admeld publisher ad servers. Plaintiffs' experts' complaint here is about the "same issue" as the second challenged form of

[37] Google separately created a feature that is called "DoubleClick First Look," but that feature is not related to what Plaintiffs call "first look." 9/23/24 AM Tr. 59:3-19 (Korula). "DoubleClick First Look" enabled publishers to allow certain AdX buyers to compete with guaranteed line items when they otherwise could not have. *Id.* (Korula).

conduct. 9/18/24 AM Tr. 47:3-12, 76:21-77:6 (Abrantes-Metz); 9/20/24 AM Tr. 87:8-12 (Lee).

715.5. By implementing the Unified Pricing Rules, impairing "the ability of its customers to work with competitor ad exchanges" within DFP. 9/20/24 AM Tr. 86:10-20 (Lee).

716. As a threshold matter:

716.1. To the extent the Court accepts Plaintiffs' description of any of the five acts, all five are protected refusals to deal with rivals. *Infra* ¶¶ 785, 862, 900, 1012, 1018.

716.2. Nevertheless, Google has facilitated extraordinary interoperability between its tools and rivals' tools. *Supra* ¶¶ 144, 184, 199-201, 214, 297; *infra* ¶¶ 795, 871, 877-878.

716.3. Furthermore, customers multi-home significantly on both the buy and the sell sides. *Supra* ¶¶ 214, 646.4; *infra* ¶ 875.

717. Despite the freedom of choice offered to customers and the many ways Google has facilitated interoperability with third-party tools, Plaintiffs demand that Google provide rivals access to Google's customers and technology comparable to Google's own access and adopt pricing rules that would permit customers to favor rivals even when using Google's own technological infrastructure.

718. As described below, in addition to being contrary to governing law, *see infra* Proposed Conclusions of Law § IV.B.3, Plaintiffs' demands would prevent Google from offering ad tech tools that differentiate themselves on quality through integration on the same ad tech stack. Plaintiffs would also require Google to expend significant time and resources redesigning its

products. Each of Plaintiffs' claims—and the relief that they seek—would undermine firms' ability to make their own product design choices and in turn undermine their incentives to invest, which is what powers innovation. 9/26/24 PM Tr. 4:6-5:20, 6:9-7:9 (Israel) ("if you have an integrated operation, you know you'll capture the return, so you have an incentive to invest. If you have to share that with rivals in ways that you don't want, then that goes away").

719. This, in turn, would also reduce the incentives of Google's rivals to invest because they would be able to free ride and take advantage of Google's investments without investing in their own competing ad tech. 9/26/24 PM Tr. 5:21-6:8 (Israel).

1. Strikingly, Plaintiffs' Witnesses—Most of Whom Were Rivals—Candidly Admitted They Are Asking the Court to Force Google to Make Its Technology "Community Property."

720. Plaintiffs' witnesses—many of whom were rivals—admitted that they believe the real-time bid amounts submitted by Google Ads customers and facilitated by Google's technology, as well as the technology Google created to compare bids, should be "collectively" owned "community property."

720.1. Kershaw, former Chief Technology Officer at Magnite and former Chairman of the Board of Prebid, testified that the "wrong approach" to ad tech is for companies to develop "super secret" software that "is amazingly different than everyone else's." 9/13/24 AM Tr. 28:3-7 (Kershaw). Instead, companies should "contribute our software and our thinking and our better ideas to the industry and own that collectively"—"community property." 9/13/24 AM Tr. 28:1-11 (Kershaw). According to Kershaw, Prebid added value to the ad tech ecosystem because Prebid addressed "the problem" of "competitors wasting resources trying to integrate with one another." 9/13/24 AM Tr. 30:14-21 (Kershaw).

720.2. Layser, former Vice President at News Corp and current Global Head of Publisher Ad Tech Solutions at Amazon Web Services, testified that parts of ad tech, including Google's real-time bidding innovation, "should be community assets"—in other words, shared with rivals. 9/10/24 AM Tr. 102:13-18, 104:2-21 (Layser). As Layser advocated in a 2019 article, Google should "contribute AdX to prebid.org, the industry-regulated header bidding solution and first-price auction." *Id.* at 102:5-9 (Layser); *see also id.* at 100:14-21 (Layser) ("I would like them to bid into the open source solution Prebid."). Ultimately, Layser previously stated, "I think there is a general—there is a general problem with community assets . . . being run by companies that are for-profit companies." *Id.* at 103:1-25 (Layser). The conduct being complained of, then, is that Google runs parts of its display ads business for profit.

720.3. Wheatland, Chief Digital Officer of The Daily Mail, testified that one reason The Daily Mail uses DFP instead of an in-house ad server is because building an ad server is "a lot of risk." 9/27/24 AM Tr. 67:21-68:13 (Wheatland). In essence, Layser's request that the software that compares exchanges against each other (which would include, for example, the Unified First Price Auction software in DFP) be an "open source" "community asset," 9/10/24 AM Tr. 104:4-21 (Layser), is a request that Google's technology become a "community asset" after Google already took on the "risk" to build, operate, and improve on Google Ad Manager to the benefit of its publisher customers.

721. Rivals made clear at trial that, absent access through "community property," their complaint boiled down to a desire to dictate the terms and conditions by which they access Google's customers and technology.

721.1. Avery, CEO and founder of Kevel, a competitor provider, testified that he wants "Google to integrate AdX with Kevel's publisher ad server in the same way that Google integrates AdX with Google's publisher ad server." 9/9/24 PM Tr. 163:9-13 (Avery). Specifically, he requested "that Kevel have the same access to real-time bids from AdX that DFP has." *Id.* at 163:14-16 (Avery). Avery acknowledged that he did not know Google's "internal tech" so had no idea how technically challenging it would be for Google to build this integration. *Id.* at 163:20-164:24 (Avery).

721.2. Goel, CEO and co-founder of another competitor exchange, PubMatic, complained that PubMatic requested integration with Google's DFP product beginning in January 2009—before PubMatic even adopted real-time bidding—and then "a half dozen" more times, but was never granted access by Google. 9/12/24 PM Tr. 91:1-15 (Goel). Goel conceded that building the integration "would require work by Google." *Id.* at 114:22-115:7 (Goel).

721.3. Cadogan, founder and former CEO of OpenX, complained that the ability of OpenX's publisher ad server to compete with DFP was impaired because OpenX wanted "real-time access to AdX." 9/17/24 PM Tr. 51:18-52:6 (Cadogan). OpenX reached out to Google to request "real-time bids to publishers using OpenX's ad server," but OpenX never got such access. *Id.* at 52:13-20 (Cadogan).

721.4. Equativ, a competitor, complained that it is difficult to compete with DFP because it does not have "access to the Google demand" and because of AdX's "non interoperability with a rival ad server." 9/13/24 PM Tr. 68:20-25 (Creput).

721.5. A representative of The Trade Desk, which offers a competitor buying tool, complained that, without using DFP, publishers do not have "access to the greatest source of demand in the history of advertising, which is Google Search advertisers"—in other words, Google's advertiser customers who use Google Ads to purchase search ads. 9/11/24 PM Tr. 152:12-153:19 (Dederick).

722. Plaintiffs' experts espoused the same view.

722.1. Professor Simcoe acknowledged, consistent with demanding a duty to deal, that when he testified about the "near exclusivity of Google Ads demand to AdX," he was talking about "giving rivals more access to Google customers" and "the technical work for Google to undertake that would make its products interoperable with its rivals." 9/19/24 AM Tr. 33:2-34:8 (Simcoe). Professor Simcoe admitted he had no idea how much that would cost, nor had he even tried to analyze it:

> Q. Okay. And when you say that AdX advertisers would be able to submit more real-time bids into third-party competitor publisher ad servers, you understand that that would require Google to build additional technical functionality; are you aware of that?

A. Yes.

Q. Yes. Okay. And you're not offering an opinion on what additional functionality or how much additional functionality would be required of Google to make this happen; right?

A. The costs of that are not something I'm an expert in.

Q. Right. And you didn't look at that at all; correct?

A. The costs, no, that's correct.

9/19/24 AM Tr. 30:13-25 (Simcoe).

722.2. Plaintiffs' expert Dr. Abrantes-Metz attempted to reframe the conduct she evaluated as "exclusionary" on the basis that the conduct allegedly restricted the choices of Google's customers, but clarified that she was referring to "limiting the ability of competitors to compete for the choices of those customers." 9/16/24 PM Tr. 116:23-117:19, 118:6-13 (Abrantes-Metz). As explained for each act below, Dr. Abrantes-Metz's testimony made clear that the "restriction of choice" she identified is just another way of saying that Google did not provide its rivals with comparable access to Google's own tools and customers. *Infra* ¶¶ 786, 863, 927, 979, 1011, 1018. Dr. Abrantes-Metz conceded that remedying the "restriction of choice" would require Google to build new integrations to provide its rivals access to Google's systems and customers. 9/18/24 AM Tr. 74:21-76:13, 76:21-77:6, 77:13-78:4, 79:20-25, 80:17-81:13 (Abrantes-Metz). Her attempts to reframe refusals to deal are thus merely semantic, and they parrot similar arguments that have

been rejected by other courts as attempts to reframe refusals to deal as anticompetitive. *Infra* Proposed Conclusions of Law § IV.B.4.

2. Forcing Companies to Interoperate with Rivals Would Eliminate the Benefits of Using Ad Tech Products in an Integrated Stack.

723. For each of the challenged forms of conduct, Plaintiffs and their witnesses demand that Google build new ways for rivals to access Google's customers and technology so that rivals can benefit from what Google has built. In other words, Plaintiffs ask Google to connect its integrated ad tech platform to rivals even more than Google already has. In doing so, Plaintiffs ignore that forced dealing with rivals would stifle the benefits of integration.

724. Integration is a competitive differentiator in the market that many ad tech providers, including Google, have adopted. *Infra* ¶ 730. Google, for example, offers buy-side tools (Google Ads and DV360) and sell-side tools (AdSense, AdX, DFP, and AdMob). *Supra* ¶ 297. An advertiser and publisher can, if they choose, connect for a display advertising transaction using only Google tools.

725. There are unique benefits to advertisers and publishers when the ad tech tools that facilitate a transaction end-to-end are part of the same integrated stack. 9/20/24 PM Tr. 49:11-14, 52:2-13 (Sheffer) (in an integrated stack the ad tech provider has a relationship with the advertiser and the publisher and can vet both); DTX-939 at 2 (2020 Xandr document describing benefits of an end-to-end platform such as value for customers, tech efficiencies, and improved safety and security); 9/26/24 AM Tr. 159:12-160:20 (Israel) (integrated ad tech stack leads to three primary economic benefits: lower pricing across the ad tech stack, greater incentives to invest, and increased efficiencies).

726. As detailed in the next section, since Google launched its display advertising tools, advertisers and publishers that have chosen to use Google's integrated stack have benefited from

stronger ads safety enforcement, stronger ad traffic quality measures, stronger user privacy protections, lower prices, greater investment in product quality, and lower latency. As a 2017 Google document stated, an external study "demonstrated the advantages of the full stack vs. separate components (speed, reliability, simplicity)." DTX-371 at 2 ("DoubleClick has been a leader in bringing this value proposition to market and innovating.").

727. It is not just Google that recognizes the benefits of end-to-end integration. For example, AppNexus, and both AT&T and Microsoft after they each acquired AppNexus, have repeatedly acknowledged the benefits of an integrated stack.

727.1. Prior to its acquisition, AppNexus pursued a supply path optimization project that took advantage of the fact that AppNexus owned both buy-side and sell-side products. AppNexus limited the number of exchanges into which AppNexus's demand-side platform bid. As a result, the AppNexus demand-side platform purchased more from AppNexus's own exchange than it otherwise would have. Deposition of Brian O'Kelley Tr. 275:13-18, 275:20-24. As O'Kelley, founder of AppNexus, explained: "The point was to eliminate redundant and low-value supply paths. So if we're doing a good job, regardless of who we purchased from in the auction, it would be good for our clients and, hopefully, good for us." *Id.* at 276:1-18 (O'Kelley).

727.2. As "AT&T sought to launch its advertising business" by acquiring AppNexus, AT&T viewed "the acquisition of an ad tech platform" as "central to the strategy, with AppNexus selected in part due to having both buy-side and sell-side capabilities." DTX-939 at 1 (2020 Xandr document).

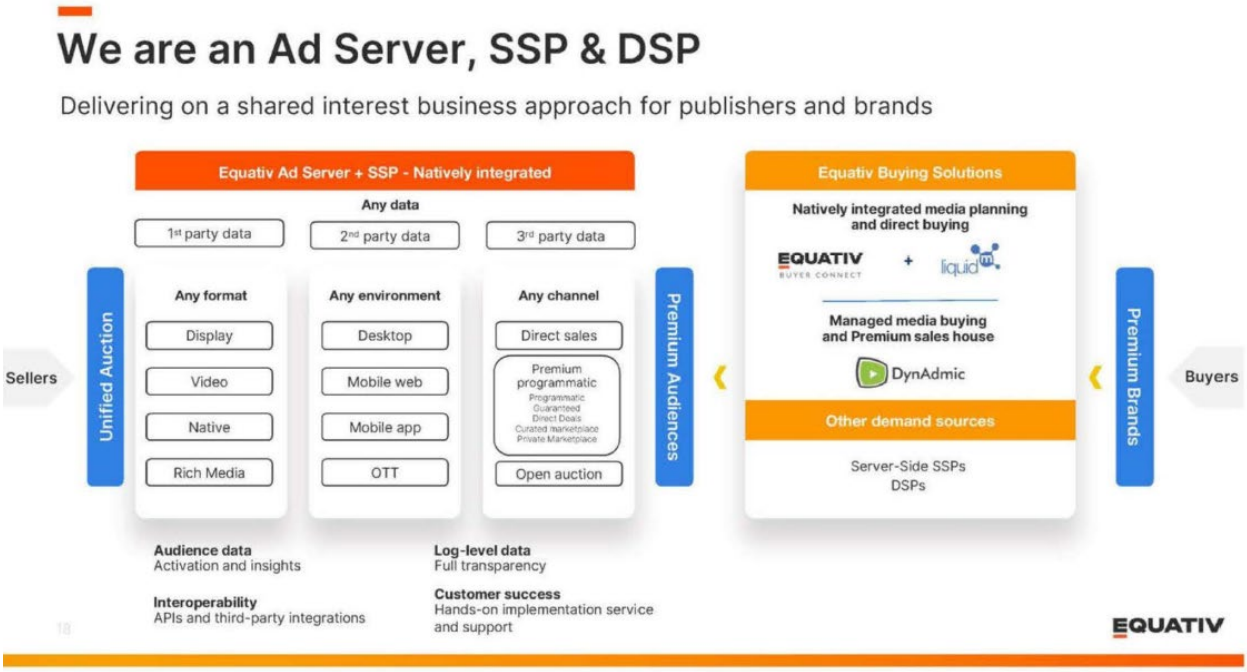
727.3. Xandr (when it was owned by AT&T) stated in a 2020 document that its integrated, end-to-end platform enabled it to "increase value for customers," create "tech efficiencies," and "ensure its high-value data stays within its platform." DTX-939 at 1-2 ("Why our DSP and SSP together offer greater advantages": "Increased value for customers" in the form of "visibility into path of spend"; "Tech efficiencies / access: The combination of Invest [Xandr's DSP] and Monetize [Xandr's SSP] offers unique value for agencies and advertisers, with more direct supply access, a 100% match rate and 0% discrepancy between platforms"; and "Brand safety / data compliance: Xandr can ensure its high-value data stays within its platform").

727.4. When the Microsoft Board was considering the acquisition of AppNexus, it was told that [redacted] would "[redacted]" DTX-1203 at 4 (2021 Microsoft presentation). A 2023 Microsoft deck identified further "benefits of an end-to-end solution" such as "more value from media spend," "seamless deals troubleshooting," and "streamlined transactions." DTX-1524 at 16.

727.5. Microsoft testified: "When you run a marketplace, connecting the buyers and sellers through the underlying same platform, will yield better results for advertisers and that—and avoid errors; and those are the efficiencies when you run a marketplace both buy and sell in the same ecosystem." 9/20/24 PM Tr. 137:3-9 (John). The "linkages between buy and sell side" (1) facilitate better matches because the underlying data is in the same infrastructure; (2)

reduce errors; and (3) enable advertisers to have more visibility into the publisher inventory available. 9/20/24 PM Tr. 137:3-21 (John).

728. Equativ also owns an integrated ad tech stack that consists of a demand-side platform, a supply-side platform, and a publisher ad server. As depicted below, Equativ advertises the capability of its integrated stack to deliver "on a shared interest business approach" across formats, channels, and transaction types. PTX-1674 at -015 (2023 Equativ slide deck); *see also id.* at -008 (the "tightly integrated SSP" and ad server "means no switching between platforms"). According to Equativ's corporate representative, Equativ's integrated stack offers the benefits of reduced costs, increased transparency, and "direct access." 9/13/24 PM Tr. 87:3-9 (Creput).



729. Instead of acknowledging the benefits of an integrated system, Plaintiffs argue the opposite—that owning buy-side and sell-side tools is inherently a "conflict of interest" that harms customers. 9/19/24 AM Tr. 152:17-153:4 (Bellack) (question posed by Plaintiffs to Bellack). No

witness other than a single-sided rival agreed that Google has a "conflict of interest."[38] *Id.* (Bellack); 9/16/24 AM Tr. 28:17-29:15 (Mohan) ("Having a strong advertiser side benefited our publishers, and having a strong publisher side benefited our advertisers."); 9/20/24 PM Tr. 137:3-9 (John) (Microsoft representative agreeing to the benefits of integration).

730. Of course, an ad tech provider can choose to adopt as its "business strategy" or as a "pretty clear distinction" only serving clients on the buy-side or the sell-side. *E.g.*, 9/11/24 PM Tr. 93:7-94:2 (Dederick). But, because ad tech tools exhibit indirect network effects, even a company that is focused only on one side of the ecosystem still has some interest in balancing the interests of the other side. For example, to attract advertiser customers, a buying tool must also attract publisher inventory. 9/26/24 PM Tr. 71:7-14 (Israel); *e.g.*, 9/12/24 PM Tr. 45:11-24 (Dederick) (The Trade Desk, which offers a demand-side platform, has entered direct agreements with publishers); DTX-1257 at 3-4 (2022 Criteo investor presentation stating that Criteo's buying tool integrates directly with publishers, touting access to "thousands of publishers"). A 2023 BidSwitch (now part of Criteo) forward planning document observed that even "formerly one-

[38] One rival—Dederick of The Trade Desk—testified that he views Amazon to have a "conflict of interest," but when pressed the only "conflict" he identified was that Amazon, like Google, is a content owner "trying to introduce a demand-side platform." 9/12/24 PM Tr. 10:13-24 (Dederick); *see also* 9/11/24 PM Tr. 93:7-94:2 (Dederick). As explained above, *supra* ¶¶ 305, 329, 341, 347, several of Google's competitors, including Microsoft, Facebook, and Amazon, offer content and ad tech tools at the same time that they serve their ad tech customers.

In addition, Plaintiffs may rely on a September 2016 email from Bellack in which he wrote: "is there a deeper issue with us owning the platform, the exchange, and a huge network?" PTX-367 at -464. Those sentences were part of a larger email thread Bellack described at the time as "late night jetlag ramblings"; "in active ideation mode"; and "my opinion, laid out here to be argued against and not a foregone conclusion nor decision." PTX-367 at -461, -463. At trial, Bellack reiterated that "these late night jetlag ramblings were my exploration of why header bidding is doing well, why are people using it," and "speculating" about the opinions of "other very large media companies" competing with Google. He was not expressing a personal concern about Google's business structure. 9/19/24 AM Tr. 155:10-156:25 (Bellack); *see also* PTX-367 at -461 to -462 (remainder of thread discusses competitive threat posed by header bidding tools).

sided businesses are forced to become two-sided marketplaces to avoid being squeezed out," forming direct relationships with tools that serve the other side of the transaction. DTX-1544A at 7.

731. Relationships on both sides of a two-sided market are not a conflict of interest but an inherent feature of the display advertising business. The upshot of Plaintiffs' approach is that many of Google's key competitors —including Microsoft, Meta, Amazon, TikTok, Criteo, Equativ, Freewheel, and Yahoo—would likewise have a conflict of interest because they also offer integrated ad tech stacks. *Supra* ¶¶ 330, 341, 349; DTX-1282 at 42-43 [redacted] DTX-1420 at 12 (2022 Criteo 10-K stating Criteo offers an integrated stack); Deposition of Todd Parsons Tr. 60:20-24; 9/13/24 PM Tr. 87:3-9 (Creput) (Equativ's integrated stack); 9/25/24 PM Tr. 174:8-21 (Yahoo offered a publisher ad server, ad exchange, and demand-side platform).

732. An integrated company can choose to interoperate with rivals, as Google does, but what Plaintiffs are demanding is forced interoperability with rivals. The benefits to customers from Google's end-to-end integration—which could be eliminated by forced interoperability)—are described further below. 9/26/24 PM Tr. 73:13-18, 74:21-75:4 (Israel).

a. Integration Across the Ad Tech Stack Improves Ads Safety.

733. Integration across the ad tech stack enables Google, and others who are on both sides, to more effectively police ads safety. 9/23/24 PM Tr. 141:4-6 (John) ("Q. And would you agree that having an end-to-end platform helps prevent fraud? A. Yes."); DTX-939 at 2 (2020 Xandr document recognizing benefits of integration to security and safety).

734. Ads safety encompasses all "aspects of safety, which includes the ad itself and the content that the ad is placed next to, involving safety for the user, the advertiser, and the publisher." 9/25/24 PM Tr. 102:12-21 (Borgia). Ads safety is a significant quality differentiator because safety is important to both advertisers and publishers. 9/25/24 PM Tr. 103:1-104:17 (Borgia) ("if an ad harms a user, they will not interact with ads in the future," hurting advertisers' return on investment and publishers' ability to monetize); DTX-1343 at 58 (2022 Census Bureau media strategy deck: "With all the capabilities digital has in today's media landscape, brand safety and viewability have become critical."); PTX-1674 at -043, -048 (Equativ deck advertising the ability for publishers to mark inventory as brand safe and protections for ad quality).

735. There are two primary components to ads safety: managing the quality of the match between an advertiser and publisher (including ensuring brand safety) and protection from unsafe ads or content. 9/25/24 PM Tr. 104:6-17 (Borgia).

736. With respect to match quality, advertisers "really care about protecting the sanctity of their brands, what their brands represent. And they don't want to have ads that run alongside, you know, shady inventory or low quality inventory." 9/16/24 AM Tr. 74:23-75:25 (Mohan); 9/19/24 PM Tr. 111:22-112:10 (Lee) (from "the advertiser's perspective, an important attribute of quality is the publisher inventory that's available to the advertiser to bid upon").

737. Google's ads safety policies thus protect advertisers from serving ads on harmful or unsafe content, including inventory with illegal or misrepresentative content or malicious and unwanted software. 9/25/24 PM Tr. 104:6-17 (Borgia); *see also* 9/27/24 AM Tr. at 100:13-24 (Wheatland) (Google blocked The Daily Mail content for violating Google's policy on inappropriate sexual content).

738. From the publisher perspective, match quality is important because publishers care about the nature of the ads placed beside their content. 9/25/24 PM Tr. 104:6-17 (Borgia). As an example of why brand safety matters, "imagine you were looking at an article reporting on a plane crash and you were to see an ad from an airline next to that article. That would be an unpleasant experience for the user" and "an unrewarding experience for the advertiser and the publisher." 9/25/24 PM Tr. 104:6-17 (Borgia).

739. In addition, publishers want to be protected from unsafe ads. They want to be "assured that they are working with high-quality advertisers or high-quality intermediaries that might be representing advertisers" so that they are not running "low-quality ads" or "scammy ads" on their content. 9/16/24 AM Tr. 76:16-77:13 (Mohan) ("having visibility into the advertisers" and "whether they were living up to their certification criteria was really, really, important" to Google's publishers).

740. Google's ads safety policies thus protect publishers from harmful ads containing prohibited content, such as ads for adult content, counterfeit goods, dangerous products or services, and inappropriate content, as well as ads that contain misrepresentations or otherwise encourage dishonest behavior. 9/25/24 PM Tr. 104:18-105:7 (Borgia).

741. These policies also protect publishers from malvertising, which refers to ads that contain harmful content ("malware"). When an ad with malware is served to a user, the user may be harmed by being exposed to malware software or redirected to a malicious website if the user clicks on the ad. 9/25/24 PM Tr. 104:18-105:7 (Borgia) (explaining malvertising involves bad actors installing "malicious software on your machine" to steal sensitive information like "banking log-ins").

742. Ultimately, ads safety also matters to advertisers and publishers because it promotes user trust in the ads ecosystem. DTX-1186 at 2 (2022 Google Ads Safety Report presentation).

742.1. From the advertiser perspective, if "the ads ecosystem is unsafe, if users are unwilling to click on their ads, then advertisers are unable to reach the users that they wish to reach, and their ROI goes down." 9/25/24 PM Tr. 103:16-23 (Borgia).

742.2. And from the publisher perspective, if a user comes to a publisher's digital property and becomes the victim of an unsafe ad such as a malvertising ad, the user will not want to return to that publisher's property. 9/25/24 PM Tr. 103:2-15 (Borgia) ("It would be the equivalent of walking into a grocery store and being mugged on the way. You're not going to want to go back to that store.").

742.3. Publishers additionally care about brand safety because publishers can only monetize successfully if advertisers are receiving return on investment and continue to spend on display ads. 9/25/24 PM Tr. 103:24-104:5 (Borgia).

743. When a match between an advertiser and publisher is facilitated by one provider, that provider can more effectively enforce ads safety policies. 9/25/24 PM Tr. 106:8-12 (Borgia) (Google's "integrated end-to-end stack" "makes it a lot easier for us to deliver the safety that's required to keep the ecosystem safe"). Google has been committed to using its integrated stack to improve the safety and security of its tools since the early days of its display ads business. A 2009 internal presentation to Google's founders, Larry Page and Sergey Brin, after the DoubleClick acquisition highlighted the protections that could be provided as a result of integrating Google's ad tech offerings. DTX-47 at 25, 41, 46; *see also* 9/16/24 AM Tr. 74:12-19 (Mohan).

744. In an end-to-end integrated transaction, the ad tech provider has a relationship with both the advertiser and the publisher. It can vet both parties before allowing them to use its tools, require that both comply with safety policies, and monitor their compliance. 9/20/24 PM Tr. 49:11-14, 52:2-13 (Sheffer). When a single match passes through multiple providers, each individual provider has less visibility into and control over the security and safety standards of other providers. DTX-1016 at 8, 43 (2020 Google presentation). Similarly, a third-party safety vendor is not as effective as an integrated ad tech provider at enforcing ads safety policies because a third party has less visibility into both sides of the transaction. 9/25/24 PM Tr. 114:24-115:5 (Borgia) (Google has "a unique point of visibility on both the ad and the content to be able to, at the time of serving the ad, deliver safety").

745. Google's integrated ad tech stack enhances Google's ability to enforce its ads safety policies at scale. 9/25/24 PM Tr. 105:18-106:12 (Borgia). Those safety policies are enforced for both advertisers and publishers on all of Google's products because advertisers and publishers are "two sides of the same coin." 9/25/24 PM Tr. 105:18-106:3 (Borgia).

746. Part of Google's ads safety enforcement is vetting customers in order to screen out potential bad actors before they can use any of Google's advertising tools. 9/25/24 PM Tr. 106:13-107:5 (Borgia); *infra* ¶¶ 763-764 (describing publisher vetting process).

747. The vetting process for advertisers includes an identity verification program that helps Google better understand the identity of the advertiser. DTX-1490 at 7 (2022 Google Ads Safety Report Training). This vetting process has applied to advertisers that purchase on AdX since AdX was launched. DTX-47 at 25, 46 (2009 Google presentation). In this process, Google blocks millions of advertisers with malicious intent from using its buying tools. 9/25/24 PM Tr. 107:6-11 (Borgia).

748. In the vetting process, Google also verifies that both publishers and advertisers have agreed to comply with Google's over 300 ads safety policies. 9/25/24 PM Tr. 106:13-107:11, 108:12-109:2, 134:16-20 (Borgia). For example AdX advertisers have always been required to agree to Google's policies before being able to purchase inventory from AdX, including confirming that the advertiser will not try to serve malvertising or ads that do not comply with safety policies. DTX-47 at 41, 46 (2009 Google presentation). Google's ads safety policies are updated around 30 times a year to incorporate what Google learns about the evolution of bad actors in the digital ecosystem. DTX-1186 at 6 (Google's 2022 Ads Safety Report presentation); 9/25/24 PM Tr. 109:3-7 (Borgia).

749. A Google advertiser can only benefit from publisher vetting when it purchases inventory from a publisher that is using Google's tools. 9/16/24 AM Tr. 76:1-15 (Mohan) ("By operating the publisher-side solutions, we were able to do checks on the inventory."). From Google's perspective, "it was really important to have that visibility into that" publisher "inventory to apply those controls, otherwise, we wouldn't have been able to give this type of a guarantee to" Google's advertisers. *Id.* (Mohan).

750. After advertisers and publishers are let into Google's systems, an integrated ad tech stack also provides Google greater visibility into the particular ad and the content it is served against. 9/25/24 PM Tr. 119:22-120:3 (Borgia). For example, since Google launched AdX it has reviewed the ads themselves for malware or viruses as well as content and policy compliance. DTX-47 at 46 (2009 Google presentation); 9/16/24 AM Tr. 77:25-78:7 (Mohan). When a Google publisher serves an ad that was purchased through a third-party exchange, Google does not know where the ad comes from and has less ability to enforce its ads safety policies. 9/25/24 PM Tr. 119:11-21 (Borgia).

751. Google uses its visibility into ads and content to enforce its ads safety policies through a combination of automated and human review. DTX-1186 at 10 (2022 Google Ads Safety Report presentation). Google relies on proprietary machine learning technology that screens the trillions of ads served through Google's systems, 9/25/24 PM Tr. 112:20-113:4 (Borgia); DTX-1490 at 7 (2022 Google Ads Safety Report training); general purpose AI tools, 9/25/24 PM Tr. 144:20-145:24 (Borgia); a team that trains Google's automated tools and drafts its safety policies, *id.* at 110:12-23 (Borgia); and the integration of new threats into its detection systems, *id.* at 113:14-114:6 (Borgia).

752. As to brand safety, Google offers advertisers controls over "where their ads appear" and publishers controls over "which ads appear on their sites." 9/25/24 PM Tr. 111:12-19 (Borgia). These controls "protect their brand identity above and beyond the checks that are related to policy." *Id.* (Borgia)

753. Enforcing brand safety controls requires properly classifying publisher content and advertiser creatives. DTX-1186 at 11 (2022 Google Ads Safety Report presentation explaining that advertiser ads get classified so that publishers can execute blocks and publisher content gets classified so that advertisers can execute exclusions). When an ad transaction is facilitated by Google end-to-end, Google can pre-screen and classify both the ad and the content it is served against. 9/25/24 PM Tr. 111:12-112:19 (Borgia).

753.1. Before an ad is served, the advertiser uploads its ad creatives (the content, such as words and images, that make up an ad) to Google's servers and ad systems. At that point, Google conducts rigorous policy checks that ensure the advertiser's ads comply with Google's safety policies and classify the

creatives before they are even served. DTX-1186 at 10-11; 9/25/24 PM Tr. 110:12-111:11 (Borgia).

753.2. The same process occurs when a publisher uses a Google tool to initiate a bid request. Google performs a policy check on the publisher's content to make sure it is safe and classifies the content. DTX-1186 at 11; 9/25/24 PM Tr. 112:7-19 (Borgia).

754. Google cannot conduct the same pre-screening and filtering processes if, for example, a publisher's bid request is not initiated using a Google tool but instead using a third-party publisher ad server. 9/25/24 PM Tr. 106:8-12 (Borgia).

755. The value of Google's various ads safety enforcement efforts is concretely demonstrated by the billions of ads or inventory that Google enforces its safety policies against every year. Without end-to-end integration across the ad tech stack, Google's enforcement would not be as effective.

755.1. Each year, Google issues Ads Safety reports that describe Google's efforts at addressing ads safety and quality issues. 9/25/24 PM Tr. 107:24-108:5; 115:13-19 (Borgia).

755.2. In 2022 Google blocked or removed 5.2 billion ads run through its tools—almost twice as many ads as were blocked in 2021 and 2020. DTX-1182 at 2 (2022 Google Ads Safety Report); 9/25/24 PM Tr. 116:10-21, 121:10-17 (Borgia); Borgia DX 1.3. Google also suspended 6.7 million advertiser accounts, up by more than 1 million from 2021 and more than triple the number of accounts suspended in 2020. DTX-1182 at 2; DTX-1490 at 7, 11 (2022 Ads Safety Report training).

755.3. In 2022, Google stopped ads from being served on 1.57 billion publisher pages because of policy violations and demonetized 143,000 publisher properties.[39] DTX-1182 at 4; DTX-1490 at 7; 9/25/24 PM Tr. 118:13-25 (Borgia).

756. Google's ads safety enforcement work has always been important, but has become even more pressing than ever because bad actors are "always evolving." 9/25/24 PM Tr. 109:3-7 (Borgia). The number of ads Google blocks has increased considerably from 2020 to 2022, and into 2023, because automation has made it even easier for bad actors to make money from their fraudulent tools at scale. *Id.* at 121:18-122:2 (Borgia).

b. Integration Across the Ad Tech Stack Improves Ability to Fight Invalid Ad Traffic and Ad Fraud.

757. Ad traffic quality refers to fighting "invalid traffic" (or "spam"), defined as "any ad clicks and impressions that are not representative of a genuine user interaction or intent." 9/24/24 PM Tr. 48:10-22 (Bjorke).

758. Ad fraud is a subset of invalid traffic, and refers to "invalid traffic generated for malicious purposes, typically, for making money" for "illegitimate reasons." 9/24/24 PM Tr. 48:23-49:4 (Bjorke). For example, if a bad actor creates software ("click bots") that visits webpages and clicks on links as if it were a real user, the advertiser ends up paying for clicks that did not correspond to an actual person viewing the ad. 9/24/24 PM Tr. 48:8-22, 66:21-67:5, 68:22-70:9 (Bjorke) (describing tactics used in the "3ve" ad fraud operation).

759. Protections against invalid traffic are a competitive advantage. PTX-1674 at -048 (2023 Equativ deck advertising that it offers invalid traffic protections); DTX-476 at 3 (2017

[39] Google's enforcement starts on the page level rather than the site level, but Google blocks ads on a publisher's entire property when a publisher commits an egregious or repeated violation. 9/25/24 PM Tr. 119:1-10 (Borgia); *see also* DTX-1490 at 11.

Google strategy deck expressing concern that "lack of trust in DCLK [DoubleClick] spam defenses may divert spend to competitors"). By 2015, Google described ad fraud as "one of online's advertising's biggest challenges. . . . Internally, we typically catch . . . low double-digit percentages on AdSense and AdX. In poorly protected products, ad fraud can quickly grow and overtake organic traffic." DTX-214 at 1.

759.1. Invalid traffic is a problem for advertisers because they do not want to pay for clicks or ads that are "not representative of a genuine user interaction or intent."

759.2. Invalid traffic also harms legitimate publishers because "for every dollar that goes to a bad actor, that's a dollar that good publishers are not receiving." 9/24/24 PM Tr. 48:8-22, 49:5-14 (Bjorke); *see also* DTX-476 at 3 ("Fear of ad fraud is limiting display and video online programmatic spend").

760. Google has an AdSpam team that is dedicated to protecting Google's ad network and the broader ad tech ecosystem from invalid traffic, including ad fraud, with the goal of preserving "the long-term sustainability of Google Ads' business." 9/24/24 PM Tr. 51:1-9 (Bjorke).

761. End-to-end integration enables Google's AdSpam team to better monitor ad traffic quality for a number of reasons.

762. First, in an integrated transaction, Google can vet publishers and stop bad actors seeking to take advantage of display advertising before they even enter Google's network. In other words, "the better lock you have on your front door, the better you are protected." 9/24/24 PM Tr. 54:13-19 (Bjorke); *see also supra* ¶¶ 744, 746.

763. Google thoroughly screens publishers before they can use its sell-side tools and accepts only a small minority of those who apply. 9/24/24 PM Tr. 51:18-54:12 (Bjorke)

(describing multiple steps in vetting process); Bjorke DX 1.3; *see also* DTX-47 at 47 (2009 Google presentation).

764. When a Google advertiser does not buy from Google's tools, Google has not vetted the publisher at the other end of the transaction. 9/24/24 PM Tr. 58:1-59:3 (Bjorke). That advertiser may be exposed to invalid traffic, particularly because non-Google exchanges do not invest as much as Google does to vet publishers and keep bad actors out of their networks. *Id.* at 59:9-19 (Bjorke).

765. After its extensive vetting process, Google's ad traffic quality work continues. Google monitors "publisher activity and looks for signs of bad activity." For example, Google checks whether publishers are changing their address. If Google flags suspicious activity, it engages in additional verifications or reviews as needed. 9/24/24 PM Tr. 53:20-54:3 (Bjorke); *see also id.* at 54:20-55:19 (Bjorke); Bjorke DX 1.3.

765.1. Google's monitoring efforts rely on a combination of human and automated review, including Google's own computer-automated technology that scans trillions of events every day through sophisticated filters, 9/24/24 PM Tr. 49:15-50:6, 55:2-9 (Bjorke), and continuous updates of those filters by Google's employees to reflect new invalid traffic activity and tactics that have been identified, *id.* at 55:2-9 (Bjorke). The computing power of Google's automated scanning technology equates to roughly a hundred thousand computers running around the clock to process data. *Id.* at 49:15-50:6, 55:2-4 (Bjorke).

766. Google has better signal detection capabilities when Google Ads advertisers purchase from Google tools. 9/24/24 PM Tr. 59:20-60:20, 72:17-73:4 (Bjorke).

766.1. Signals are details about an impression and the clicks it receives that can be used to detect irregular activity, such as a user "always clicking on the same spot in" an ad. 9/24/24 PM Tr. 60:21-61:10 (Bjorke). "Signal collection is the foundation" for invalid traffic detection. *Id.* (Bjorke).

766.2. When a transaction is not integrated, Google cannot "ensure the integrity of signal collection" the same way because it does not have a "secure environment that" it "can control to prevent tampering and misrepresentations" of signals. 9/24/24 PM Tr. 58:1-59:3, 59:20-61:10 (Bjorke).

767. Finally, integration also enhances Google's enforcement systems for invalid traffic. 9/24/24 PM Tr. 55:20-56:17 (Bjorke). In an integrated transaction, if an advertiser places an ad and Google detects it was not clicked on by a real user, Google can prevent payment to a publisher for that invalid traffic, and essentially ensure the advertiser is "not charged" or is "refunded." *Id.* at 55:20-56:5, 61:11-62:3 (Bjorke). When the transaction is not integrated, Google has limited ability to block payment to the publisher for fake clicks. *Id.* at 58:1-59:3, 61:11-62:3 (Bjorke).

768. Although Google works with third-party vendors to augment its ad traffic quality defenses, Google would not be able to rely solely on a third-party vendor to monitor traffic quality. A third-party vendor "would not be as effective" as Google because "an outside vendor will not have access to all of the data we have," which "is, for business and commercial and contractual reasons, confidential." 9/24/24 PM Tr. 56:18-57:9 (Bjorke).

c. Integration Across the Ad Tech Stack Increases User Privacy.

769. Integration across the ad tech stack also better protects user privacy, which matters to advertisers and publishers because "user information is important for presenting users with relevant ads." 9/25/24 PM Tr. 125:25-126:11 (Borgia). Increased user privacy enhances user

trust in the ads ecosystem, which in turn benefits advertisers by increasing advertiser return on investment from users viewing ads and publishers by increasing ad spend. *Id.* at 128:8-11 (Borgia).

770. When a publisher issues a bid request, it sends to the ad exchange a packet of user information about the user who will view the impression. 9/25/24 PM Tr. 125:25-127:3 (Borgia). That information, which helps advertisers assess their interest in a particular impression, can include sensitive information about the user such as the user's location, language, demographic information, machine identifiers, IP address, and even viewing history. *Id.* (Borgia). "All of that information can be used for positive or negative purposes." *Id.* (Borgia).

771. Within its integrated stack, Google enforces strict limits on the types of user information publishers soliciting bids can send to Google's tools, including AdX, and imposes strict timeframes to delete user data. 9/25/24 PM Tr. 127:4-12 (Borgia). Google also allows users to "turn off" ads personalization entirely, or control the types of information being used to serve them ads through My Ad Center. *Id.* at 128:23-129:10 (Borgia); *see infra* ¶¶ 1117.

772. In contrast, if a publisher makes a bid request to a third-party exchange, Google does not know what user information the publisher has shared with that exchange, and has no control over that information. 9/25/24 PM Tr. 127:13-23 (Borgia). In other words, introducing third-party ad tech providers into Google's ecosystem increases the risk that sensitive user information is leaked. *Id*. (Borgia).

d. Integration Across the Ad Tech Stack Decreases Prices.

773. Economics shows that, when one firm provides functionality across the stack, lower prices generally result because there is only one profit margin. If multiple firms along the stack facilitate one transaction, each gets a bite at the apple to charge a fee or revenue share, which causes "double marginalization" because each firm tries to add profit margin to the same

transaction. 9/26/24 AM Tr. 159:12-160:20 (Israel). As a result, an integrated ad tech stack lowers prices while offering improvements in quality.

774. Integration reduces costs in part because it is easier to develop integrations between pieces of the stack that are offered by the same firm. 9/26/24 AM Tr. 159:12-160:20 (Israel). The software tools of different providers are not automatically interoperable. Connecting tools from different providers always requires writing new code to make the connection work in a reliable way. 9/20/24 PM Tr. 67:7-15 (Sheffer) ("A significant amount of technical work has to be done to make all of these connections," referring to the connections drawn in the "spaghetti football," Sheffer DX 1); 9/13/24 AM Tr. 25:18-26:1 (Kershaw). With integration, the resources that would be expended on that additional work are saved.

775. Demonstrating the economic value of an integrated stack, Google's prices are lower than its competitors' prices when viewed across the stack. As Professor Chevalier explained, it is important to compare prices across the full stack because "the crux of an ad transaction is the transaction between an advertiser and a publisher." 9/25/24 AM Tr. 14:2-8 (Chevalier). "The buy-side fee" and "the sell-side take rate both need to be paid. So both of these take rates are part of—an important part of completing the overall transaction." *Id.* (Chevalier); *see also* 9/18/24 PM Tr. 34:4-18, 36:14-19 (Simcoe) (Plaintiffs' witness explaining that his apportionment analysis apportioned revenue share between the buyer and the seller because "both sides" are affected by an ad tech fee).

776. Across Google Ads, AdX, and DFP, the average revenue share on an impression has totalled slightly over 30% from 2014 to 2022, DTX-1977, as compared to average fees of 42% to 46% charged by different combinations of buy-side and sell-side competitors in the same time period. DTX-1886; *see also infra* ¶¶ 1153-1154.

e. Integration Across the Ad Tech Stack Promotes Investment.

777. Integration across the ad tech stack creates a greater incentive to invest. One problem with investing in better products in an industry like ad tech is that it is difficult to determine whether the benefits of an investment on one side of the stack will be experienced on that side or the opposite side. If a firm is not on both sides of the stack, it cannot be sure that it will capture return on its investment on one side. In contrast, an integrated firm can be sure that it will capture the return on its investment. 9/26/24 AM Tr. 159:12-160:20 (Israel).

778. Google's expenditures reflect that Google has incentives to invest consistent with the incentives of owning an integrated product. Google's display engineering expenditures for the period 2017 to 2022 totalled $7.6 billion, or over $1 billion each year. DTX-1881; 9/26/24 AM Tr. 162:15-163:5 (Israel) (display engineering expenditures do not capture additional expenditures such as servers and computer hardware); *see also* DTX-1883 (Israel Figure 66: Google Display Product Launches from Ariane Launch Calendars); 9/26/24 PM Tr. 75:18-76:5 (Israel) (over 1,500 display product launches each year since 2016). Google's investments in safety and security alone totalled $604 million from 2017 to 2022. DTX-1827; 9/24/24 PM Tr. 50:17-51:9 (Bjorke); 9/25/24 PM Tr. 130:21-131:8 (Borgia).

779. As another example, Xandr (now owned by Microsoft) was incentivized to invest in its buy side because it also owned a sell-side platform and ad server and wanted to grow by scaling the overall marketplace for advertising. 9/20/24 PM Tr. 137:22-138:21 (John). As a 2020 strategy document stated, Xandr considered investing in a demand-side platform to be "the most profitable and efficient way to grow digital media spend and scale the marketplace, with 58% of Invest spend staying on Xandr's supply side platform." DTX-939 at 1. Because publishers like to access inventory for which "they have the visibility end to end in a transparent way," investing in one side of Xandr's stack would benefit the other. 9/20/24 PM Tr. 137:22-139:11 (John).

f. Integration Across the Ad Tech Stack Decreases Latency.

780. Latency refers to the period of time between when the user reaches the digital content and an ad is selected and loaded on the digital content. 9/9/24 PM Tr. 75:12-20 (Lowcock); 9/11/24 PM Tr. 138:14-16 (Dederick).

781. Display ads must load in fractions of a second, so latency is critical. 9/9/24 AM Tr. 69:17-25 (Wolfe). As Plaintiffs' witness Kershaw testified, "latency frames every decision, technically, that we made in the industry." *Id.* at 23:13-24 (Kershaw). "You literally paid for things with milliseconds . . . because if you run out of time, you literally don't get a chance to be on the page." *Id.* (Kershaw). Ultimately, if latency is too high, the ad may never serve. 9/10/24 AM Tr. 16:14-19 (Layser).

782. Increased latency hurts all the stakeholders in display advertising: advertisers, publishers, and viewers of digital content.

782.1. From the advertiser perspective, when an ad loads slowly it is likely a user might have clicked away from the content or scrolled down by the time the ad loads—without actually viewing the ad. 9/9/24 PM Tr. 75:12-76:5 (Lowcock) ("The lower the latency, the more likely the ad will be viewable and, therefore, the advertiser will achieve their business outcomes.").

782.2. From the publisher perspective, latency has direct negative impacts on the publisher's revenue because "any slowdown" in the "process around loading the content and the ads" has "negative impacts to the number of ads that we serve." 9/26/24 PM Tr. 139:1-15 (Glogovsky).

782.3. For users, it is annoying when content loads slowly. 9/26/24 PM Tr. 139:1-15 (Glogovsky).

783. Latency is lower when the ad tech tools facilitating a match are part of an integrated ad tech stack. Time is lost each time an additional provider's ad tech platform is called. DTX-371 at 2 (2017 Google strategy document); *cf.* 9/10/24 AM Tr. 16:20-17:1 (Layser) (latency is increased when two publisher ad servers are used because "you would have to do some ad decisioning in the ad server and then you would have to push it over into a secondary ad server"); 9/12/24 PM Tr. 61:13-62:14 (Goel) (when latency is too high from "going from one ad network to the next to the next, that could take time and cause loss of ad inventory").

784. All of these benefits of using Google's integrated ad tech stack—safety, security, user privacy, lower prices, quality, efficiency, and product differentiation—are put at risk by forced interoperability with rivals.

B. Allegation that Google Provides AdX Near-Exclusive Access to Google Ads Demand, Denying Comparable Access to Rival Ad Exchanges[40]

785. "Google Ads demand" is just another way of describing Google's advertiser customer base. 9/23/24 AM Tr. 14:11-15 (Korula) ("Google Ads demand" refers to "all of the customers of Google Ads, the advertisers who use the product."); 9/19/24 AM Tr. 33:2-34:8 (Simcoe) ("near exclusivity of Google Ads demand to AdX" refers to "Google customers"). In other words, what Plaintiffs seek is unrestricted access to Google's advertiser customers for its rivals. Further, they insist that this access by rivals must be "comparable" to Google's own access to its customers. 9/20/24 AM Tr. 79:10-80:16, 89:3-16 (Lee).

786. Plaintiffs' lead expert concedes that this would require Google Ads to bid into rival exchanges on the very same terms that it bids into AdX. 9/20/24 AM Tr. 89:3-16 (Lee). Similarly,

[40] 9/19/24 PM Tr. 127:11-24 (Lee) ("The five pieces of conduct that I evaluated and examined to be anticompetitive" include "the conditioning of unrestricted access to Google Ads to the use of AdX. This is referred to sometimes as the near-exclusive relationship between the two products.").

with regard to Google Ads bidding on AdX, Dr. Abrantes-Metz agreed that remedying her "restriction in choice" would require enabling advertisers "to use Google Ads to bid into AdX and into rival ad exchanges," which she conceded would require "technical connections and integrations to the other exchanges." 9/18/24 AM Tr. 80:17-81:13 (Abrantes-Metz).

787. Putting aside for the moment that it is completely antithetical to U.S. antitrust law to compel access to a rival company's customer base, *infra* Proposed Conclusions of Law § IV.B.1, as explained below Plaintiffs ignore the significant benefits created when Google Ads customers buy on Google tools, and how those benefits make Google Ads a distinctly valuable product.

788. In short, Plaintiffs are seeking that the Court order Google to turn Google Ads into DV360, which Google already offers to advertisers who prefer a buying tool that purchases broadly across exchanges. Doing so would require Google to undertake the significant work required, as demonstrated by the development of AwBid, to build more connections between Google Ads and rival exchanges—a functionality that Google Ads, unlike DV360, was not designed to handle. It would also take away from Google's customers the attributes of Google Ads that distinguish it from DV360, such as Google Ads' curated inventory and the safety and security enhancements that come from end-to-end integration.

789. Even setting aside that Google is not required to take on enormous amounts of work to turn Google Ads into a product with the same functionality as a tool it already offers, Google is not required to share with its rivals the customers it has attracted, maintained, and supported through significant product investments, as well as thousands of Google Ads customer account representatives and tech support. To the extent Plaintiffs' challenge ultimately rests on the unsupported claim that publishers must use AdX in order to access Google Ads' purported "unique

demand," that claim has no basis in reality because Google Ads demand is not exclusive to AdX, and is largely available through many other pathways.

1. The Integration of Google Ads and AdX Offers Benefits When They Are Used Together.

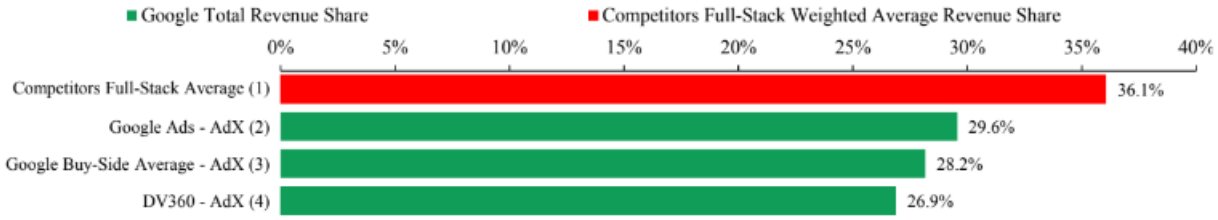
790. When Google Ads was first created in 2000, its value proposition for advertisers was to connect to a high-quality, curated set of publisher inventory that was aggregated in one place. *Supra* ¶¶ 31-33, 140; 9/11/24 AM Tr. 50:3-51:4, 51:25-52:17 (Bender). Google Ads initially bid only into Google owned-and-operated properties and third-party publisher properties that joined the Google Display Network by using AdSense, Google Ad Manager, or AdMob. 9/20/24 PM Tr. 52:22-53:5, 57:15-20 (Sheffer); 9/11/24 AM Tr. 9:18-21, 24:25-25:16, 41:3-10 (Bender).

791. The relationship between Google AdX and the Google Display Network enables Google to better protect Google Ads advertisers from invalid traffic by vetting publishers, monitoring signals for invalid traffic, and enforcing policies by not paying publishers for invalid traffic. *Supra* ¶¶ 743-744, 762, 765-766, 767. Even with all of Google's efforts to continuously combat invalid traffic, an end-to-end transaction facilitated through Google Ads and AdX is still better protected from invalid traffic threats than purchasing on Google Ads through a third-party exchange. 9/24/24 PM Tr. 81:11-16 (Bjorke).

792. As explained above, an end-to-end integrated transaction also lowers prices across the ad tech stack. *Supra* ¶¶ 773-776.

793. As Professor Chevalier demonstrated in the chart below, DTX-2071A, between 2019 and March 2023 using Google Ads and AdX together to complete a transaction cost less (29.6%) than the average cost to use a competitor buying tool and exchange together (36.1%). 9/25/24 AM Tr. 15:12-25 (Chevalier).

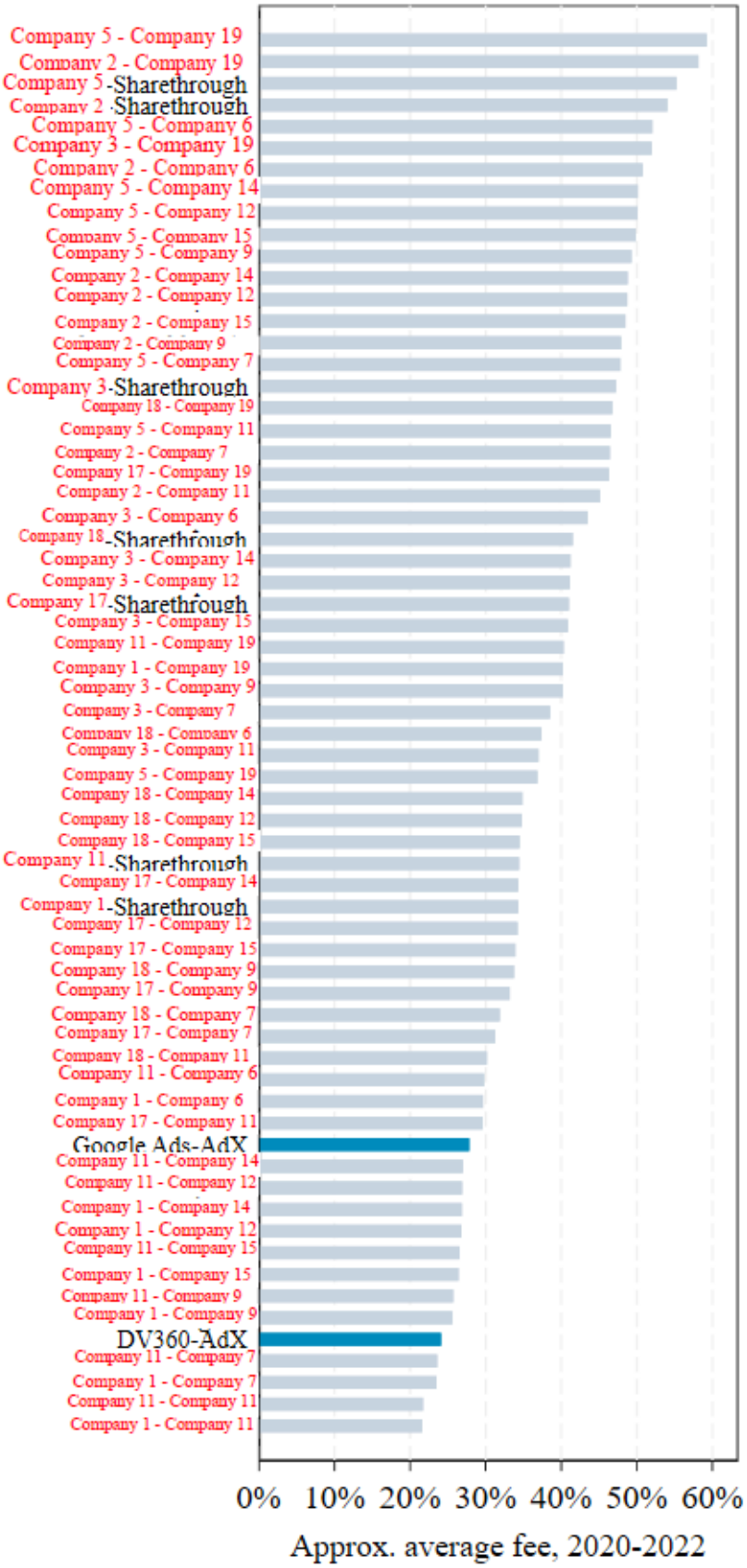
Figure 15. U.S. Comparison of Google Full-Stack Revenue Shares to Competitors Full-Stack Revenue Shares (Jan. 2019 – Mar. 2023)



Notes & Sources: Based on U.S. transactions over the period from January 2019 – March 2023. Google Buy-Side Average – AdX is the weighted average by gross revenue of the full-stack revenue shares associated with Google Ads to AdX transactions and DV360 to AdX transactions. *See* Exhibit 9.

794. The combined fee for Google Ads and AdX is significantly lower—among the ten least expensive—when compared to the combined fees of a wide swath of other buying tools and exchanges paired together. DTX-1893A (Israel Figure 76: Combined Advertiser Buying Tool and Exchange Fees, 2020-2022); 9/26/24 AM Tr. 173:23-175:5 (Israel).

Figure 76: Combined Advertiser Buying Tool and Exchange Fees, 2020-2022



2. Google Is Not Required to Make Its Differentiated Buying Tools, Google Ads and DV360, the Same Tool.

795. Notwithstanding the benefits to advertisers when they bid on Google Ads into AdX, Plaintiffs demand that Google expand Google Ads bidding to all inventory available on all exchanges. Plaintiffs acknowledge that Google has already built a feature, AwBid, that provides Google Ads advertisers with a way to bid into third-party exchanges. 9/19/24 PM Tr. 133:17-134:3 (Lee). As explained below, *infra* ¶¶ 805-838, Google has invested considerable resources into overcoming the challenges of building AwBid so that its Google Ads customers can have expanded access to inventory while maintaining Google Ads' value proposition of high-quality inventory.

796. Plaintiffs complain that Google has not invested even more into building AwBid as quickly and on the same terms as Plaintiffs would like. They take issue with the fact that AwBid does not enable Google Ads advertisers to "bid on all impressions" and "represents a small share of Google Ads' impressions transacted." Plaintiffs' Demonstrative Q; 9/19/24 PM Tr. 133:17-135:2 (Lee); 9/16/24 PM Tr. 132:20-133:16 (Abrantes-Metz). They argue that, rather than offering Google Ads customers curated publisher inventory, Google should have offered customers access to all inventory available on all exchanges. 9/19/24 PM Tr. 132:16-133:15 (Lee).

797. Plaintiffs' argument fails because Google already offers a buying tool that does exactly what Plaintiffs request—DV360, a demand-side platform that Plaintiffs exclude from all of their alleged product markets. Unlike Google Ads, the competitive advantage of DV360 is that it gives access to broader inventory that is not curated like the Google Ads inventory. 9/11/24 AM Tr. 27:10-18, 51:25-52:17 (Bender); *supra* ¶ 144 (DV360 connects to over 100 rival exchanges). Advertisers can use DV360 to connect to non-Google exchanges, as well as to AdMob, AdX, and

AdSense. 9/18/24 AM Tr. 88:2-4 (Abrantes-Metz) (DV360 makes all of its advertiser demand available to rival third-party exchanges).

798. DV360 is already a "major bidder" into rival exchanges. 9/11/24 PM Tr. 65:3-21 (Ravi). According to the calculations of Plaintiffs' expert Professor Weintraub, the share of DV360 impressions purchased on rival exchanges rose between 2017 and 2022 from 29.7 percent to 48.7 percent. 9/16/24 PM Tr. 61:15-23 (Weintraub). During that time period, DV360 contributed 3.6 trillion impressions and $8.3 billion of ad spend to third-party exchanges. *Id.* at 62:11-64:21 (Weintraub).

799. Though DV360 offers access to more inventory across exchanges, DV360 has always been unable to assure quality to the degree that Google Ads can because, for many purchases on DV360, the seller is not using Google tools. There was "an understanding there that if something fraudulent or spammy happens" when using DV360, "the onus would be on the advertiser." 9/11/24 AM Tr. 27:10-18 (Bender).

800. The 3ve and Methbot ad fraud schemes that operated in 2016 and 2017 demonstrate the differentiation between Google Ads and DV360. Both schemes primarily infiltrated Google's network through third-party exchanges integrated with DV360, not Google Ads, because Google cannot control inventory quality in the same way on DV360. 9/24/24 PM Tr. 71:25-72:16 (Bjorke); 9/11/24 AM Tr. 27:10-18 (Bender).

800.1. The 3ve scheme infected home computers with malware that directed botnets (large, sophisticated networks of bots) to fake websites, generating fraudulent ad impressions and revenue through invalid traffic (referred to as "domain misrepresentation"). DTX-635 at 3-4 (2018 "Google Security Blog" post); 9/24/24 PM Tr. 68:21-67:5, 77:20-78:7 (Bjorke). 3ve compromised roughly

one million IPs through its activity and faked selling ad space on over 10,000 legitimate websites. DTX-635 at 2-3 (2018 "Google Security Blog" post); 9/24/24 PM Tr. 69:7-70:9 (Bjorke). At its peak, 3ve generated more than 3 billion fake ad bid requests per day. DTX-635 at 3; 9/24/24 PM Tr. 68:22-69:6 (Bjorke).

800.2. Google independently detected 3ve and brought 3ve to law enforcement's attention. DTX-635 at 2 (2018 "Google Security Blog" post); 9/24/24 PM Tr. 67:6-12 (Bjorke). While working to contain the fraud in its own systems, 9/24/24 PM Tr. 71:5-14 (Bjorke), Google cooperated with law enforcement and other industry actors to investigate, take down, and eventually prosecute 3ve. DTX-635 at 4-6.

800.3. 3ve cost Google's advertisers roughly $20 to $30 million that Google refunded to them at its own expense. 9/24/24 PM Tr. 70:10-21 (Bjorke). Other industry actors were also likely impacted by the scheme, which operated across over 60,000 sellers in the ecosystem. *Id.* at 70:22-71:4 (Bjorke).

800.4. In 2017, a similar ad fraud scheme known as "Methbot" also occurred and impacted Google's systems. 9/24/24 PM Tr. 71:15-24 (Bjorke).

800.5. In both schemes, a majority of the fraudulent traffic was infiltrating the third-party exchanges integrated with DV360—not through AdX. 9/24/24 PM Tr. 71:25-72:16 (Bjorke).

801. Google Ads customers are free to "conduct as much of their business as they want using other buying tools." 9/10/24 PM Tr. 25:2-8 (Friedman). Google places no restrictions on what Google Ads or DV360 customers use to buy advertising, so Google's advertiser customers

are free to choose whether to use Google Ads, DV360, neither, or a combination of both depending on the product features they want. 9/25/24 PM Tr. 39:8-13 (Stewart).

802. Google's advertiser customers also can and do multi-home between Google's buying tools, including Google Ads, and non-Google tools, and they shift spend based on return. 9/19/24 AM Tr. 80:18-81:5 (Simcoe); 9/9/24 PM Tr. 166:11-16 (Avery). Numerous advertisers, like the Census, [redacted] spend significant amounts of money on both Google and non-Google buying tools. 9/23/24 PM Tr. 125:20-22 (Hardie); 9/25/24 PM Tr. 39:5-7 (Stewart); DTX-1970 (Israel Table 1: AdX U.S. Spending Patterns for Selected Advertisers, 2019-2022); 9/19/24 AM Tr. 22:22-24:18 (Simcoe) (acknowledging that "large companies that buy ads" multi-home). For example, Criteo shares "many customers with Google and with Facebook or Meta." Deposition of Todd Parsons Tr. 115:24-116:5.

803. Google's advertiser customers are also "free to submit bids into other exchanges" in addition to AdX or not into AdX at all. 9/10/24 PM Tr. 25:12-14 (Friedman). Advertisers buy through numerous exchanges that are not AdX. 9/17/24 PM Tr. 141:13-142:6 (Schiekofer) ("There's just a ton of exchanges. There's a lot of people who have built exchanges."); 9/19/24 AM Tr. 81:11-17 (Simcoe). They can choose which exchange to use based on performance and shift spend accordingly. 9/17/24 PM Tr. 141:13-18, 143:7-17 (Schiekofer).

804. In sum, advertiser customers have many options to access inventory on third-party exchanges, including using a Google buying tool. It is not anticompetitive for Google to offer advertisers two differentiated products. 9/26/24 PM Tr. 9:23-10:7 (Israel). When asked how Google could avoid being anticompetitive while still offering one product with curated inventory and another with broader but uncurated inventory, Plaintiffs' lead expert, Professor Lee, could not

provide an answer. 9/20/24 AM Tr. 80:17-81:19 (Lee) ("I'm not opining on what Google should have to do or should have done.").

3. In Order to Make Google Ads Interoperable with Rival Exchanges, Google Would Have to Undertake Significant Technical Work, as Demonstrated by the Challenges Google Overcame to Build AwBid.

805. The significant work and trade-offs that would be required to build connections between Google Ads and rival exchanges are not just theoretical, but demonstrated in reality by the history of Google's development of AwBid, a feature that connects Google Ads to certain third-party exchanges. 9/20/24 PM Tr. 63:1-6 (Sheffer).

806. Since AwBid was first conceived in 2011, one of the critical challenges to building and launching a feature like AwBid was that integrating Google Ads with third-party exchanges raised multiple quality and security concerns. 9/10/24 PM Tr. 82:3-84:5 (Lipkovitz); DTX-189 at 3 (2014 email describing initial AwBid integrations); DTX-129 at 1.

807. An advertiser purchasing through AwBid might end up purchasing an impression on a website that would not have been approved to join AdX or AdSense. 9/24/24 PM Tr. 58:1-59:3 (Bjorke).

808. As explained, *supra* ¶¶ 749, 764, 766, for inventory bought through third-party exchanges, Google has reduced ability to vet the publisher's inventory, monitor it, and reimburse the advertiser for invalid traffic. 9/11/24 AM Tr. 63:20-64:9 (Bender); 9/24/24 PM Tr. 58:5-59:3 (Bjorke); DTX-129 at 3 (2012 Google document describing the need to "protect GDN from low quality or unsafe content" on non-Google exchanges). As a Google buy-side executive explained, ensuring AwBid would have "that same kind of level of safety and quality" available on AdX and AdSense and would require "an incremental engineering build." 9/11/24 AM Tr. 62:21-64:9 (Bender).

809. Even those at Google who were strong proponents of AwBid, such as Bender, acknowledged an evolution in Google's approach as it grew to understand the challenges of Google Ads integrating with third-party exchanges while "protecting the network buyers from spam and fraudulent inventory." 9/11/24 AM Tr. 37:6-16 (Bender). In order to roll out AwBid, "building up those defenses was paramount." *Id.* (Bender).

810. As Bender explained, expanding AwBid required balancing incremental inventory against security and safety: "When you're operating a buy-side network, there's a naive idea that incremental inventory is a good thing. And I would say that's true, but not true if that inventory is spammy or fraudulent or, you know, nefarious in some way. . . . Part of my education as we were pursuing this pilot was . . . to understand the work that we were required in order to try to run incremental inventory sources that potentially had those types of issues." 9/11/24 AM Tr. 61:18-62:5 (Bender).

811. Recognizing these trade-offs, Google developed AwBid "in a way where we could continue to protect our advertisers to the level they expected from having used [Google Ads] in the past" while expanding access to third-party exchanges at the same time. 9/24/24 PM Tr. 59:4-8 (Bjorke); *see also* 9/11/24 AM Tr. 65:11-25 (Bender); DTX-85 at 3 (2011 Google email stating the need for "a plan on how to handle Google publisher policy and AdSpam" for AwBid).

812. In 2011, when Google first conceived of AwBid, it planned to start by building connections to buy owned-and-operated inventory on Yahoo (Right Media Exchange) and Microsoft (AppNexus). DTX-129 at 1 (2012 Google document detailing the "AWBid Pilot" and "original AWBID concept"); 9/24/24 PM Tr. 57:19-22 (Bjorke). Connecting to owned-and-operated inventory from Yahoo and Microsoft was safer than buying unknown inventory on third-

party exchanges because, when Google is aware of who the publisher is, it can better vet the quality and safety of the inventory. *Cf.* 9/16/24 AM Tr. 116:2-24 (Mohan).

813. The first version of AwBid fell through because Google was unable to reach deals with Yahoo and Microsoft (at the time, AppNexus was the exchange through which Microsoft sold its owned-and-operated inventory). DTX-129 at 2 (2012 Google document: "The product did not go live due to deals with key third party exchange partners falling through.").

814. In the second version of AwBid, Google considered what forms of targeting would balance both the benefit from access to inventory outside the Google Display Network and security. It decided to start with remarketing (also referred to as "retargeting"). 9/17/24 AM Tr. 116:9-117:1 (Jayaram). Remarketing refers to showing ads to users who had previously interacted with an advertiser's website or ad. For example, a clothing store like Macy's might seek to remarket to a user who had already clicked on clothes on Macy's website and added them to his cart without purchasing. 9/11/24 AM Tr. 39:11-40:1 (Bender).

815. The benefit from access to non-Google inventory is particularly great in the context of remarketing. Access to more inventory is important to remarketing because "users tend to lose interest quickly, and so the sooner we were able to show a product to the user, the higher chance that they would purchase it. And by having access to more inventory, the hope was that we would be able to get the product across the user sooner." 9/17/24 AM Tr. 116:9-117:1 (Jayaram). Because of advertiser demand for remarketing, Google Ads was "hurting in a very competitive remarketing field," and a feature like AwBid would help to "close competitive gap" on remarketing. DTX-129 at 1-2.

816. Google also decided to start with remarketing because securely launching AwBid for other types of targeting would be more difficult from an engineering standpoint, as other types

of targeting are based on the context of the surrounding digital content or the viewer's interests and therefore require "building complex models around the user, around the page, and being able to on the fly retrieve this information about the user and the page to figure out which ads should be" eligible. 9/17/24 PM Tr. 14:21-15:11 (Jayaram).

817. Google began work on a version of AwBid limited to remarketing inventory in late 2012. DTX-277 at 3 (2015 Google presentation detailing "Awbid Timeline"). In 2013, after extensive engineering work and contract negotiations and review, DTX-129 at 1-4, Google began an extended launch of AwBid that culminated in an official launch in 2015. 9/17/24 AM Tr. 123:18-124:23 (Jayaram); DTX-277 at 3.

818. Building and launching AwBid was "a really large-scale effort" with "lots of challenges." 9/17/24 AM Tr. 119:9-120:4 (Jayaram).

819. Before AwBid could even be tested, Google had to "align with exchanges on policies" and "signals that will be shared," and "build the pipes to integrate with exchanges," which was "a significant engineering effort." 9/17/24 AM Tr. 119:9-120:4 (Jayaram). For example, incoming ad query calls needed to be "translated into a format similar to the existing AdSense/AdX calls." DTX-129 at 2.

820. In addition, one of the requirements for launching AwBid was a "brand safe list of domains and publishers to protect GDN [from] low quality or unsafe content." DTX-129 at 3; *see also* 9/11/24 AM Tr. 62:10-20 (Bender).

821. After those initial steps, Google was able to build integrations with 6 exchanges in 2013 and 2014. DTX-277 at 3 (2015 Google presentation detailing "Awbid Timeline"); 9/17/24 AM Tr. 124:3-23 (Jayaram).

822. Once Google had built the integrations with the first exchanges, Google conducted tests on portions of traffic to evaluate advertiser performance. DTX-277 at 3. These tests demonstrated to Google that there were additional challenges, such as latency, spam, fraud, advertiser performance problems, and brand safety problems, that would require "new engineering solutions" before the full launch. 9/17/24 AM Tr. 119:9-120:4 (Jayaram).

823. After the launch of AwBid began, Google also had to "work with exchanges to figure out how to deal with what we called billing discrepancies," which occurred when Google and the exchange arrived at different estimates of "how many impressions were served and how much payment needs to be made." 9/17/24 AM Tr. 120:5-15 (Jayaram). Those discrepancies were "a continuous area of discussion." *Id.* (Jayaram).

824. Contemporaneous documents and testimony demonstrate that AwBid, as first built, experienced a significant uptick in invalid traffic and spam from non-Google exchanges.

824.1. Bjorke, Director of Product Management for the AdSpam team, observed "exceptionally high level[s] of invalid traffic" during Google's first AwBid experiments. 9/24/24 PM Tr. 59:9-14 (Bjorke).

824.2. According to 2014 internal Google documents, based on manual review Google detected a rate of 100% for invalid traffic on one third-party exchange and over 30% on another. PTX-199 at -241; 9/24/24 PM Tr. 97:19-98:6 (Bjorke) (these numbers likely undercount the actual amount because Google's automated detection systems had not yet been updated and a couple of exchanges did not yet have enough traffic to assess ad fraud levels).

824.3. Google conducted another investigation of AwBid traffic quality in December 2014. DTX-230 at 1. The results listed a number of challenges specific to AwBid that did not exist when Google Ads purchased on AdX or AdSense:

824.3.1. Although Google had "not noticed a great volume of malicious traffic on" the "three now serving exchanges," one exchange, PubMatic, "had some issues." DTX-230 at 2 (finding in manual review that 52% of clicks were spam); *see also* DTX-277 at 23 (2015 AwBid update finding 70% of clicks from PubMatic were spam); 9/17/24 AM Tr. 125:6-127:18 (Jayaram).

824.3.2. For PulsePoint, an exchange, "there were traffic issues so severe" that Google "eventually had to stop bidding on the exchange altogether (95% of click and impression traffic was deemed as invalid). This highlights the need to carefully evaluate any new exchanges that [Google] may consider bidding on in the future." DTX-230 at 2; *see also* DTX-277 at 23 (98% of clicks from PulsePoint were spam).

824.3.3. "Compared to AdX/AdSense," AwBid is "missing some significant signals and entities that [Google] would use to isolate and evaluate traffic." DTX-230 at 3.

824.3.4. Google also continued to "see challenges with" low quality content "that we wouldn't allow on AdSense Publishers,"

particularly for "very sensitive / 'brand aware' advertisers." DTX-230 at 4.

825. Google also found that advertisers bidding through AwBid were exposed to "troubling content and behavioural violations," such as illegal file sharing, deceptive ads and sites, pedophilia, or explicit content. DTX-230 at 5.

826. An added concern following the initial build of AwBid was that publishers who had been disabled from Google's tools—including because they were reported by Google Ads customers—could still be connected to Google Ads buyers through AwBid. 9/24/24 PM Tr. 58:5-59:3 (Bjorke). As Google wrote in 2014: "It is possible that AdWords advertisers that opt into AwBid will be disappointed to see their ads shown on pages that they have reported to us and were told that we have disabled all bad publishers." DTX-230 at 2.

827. These challenges were attributable in part to third-party exchanges' failure to properly vet publishers using their tools. 9/24/24 PM Tr. 59:9-19 (Bjorke). To manage these concerns, Google's invalid traffic team worked diligently to minimize the ad traffic quality concerns raised by AwBid. 9/24/24 PM Tr. 59:4-8 (Bjorke).

827.1. Google undertook significant efforts to enhance its invalid traffic detection and enforcement tools on third-party exchanges. DTX-277 at 23 (2015 AwBid update). Google developed a system to check invalid traffic levels for each exchange before it ramped up buying on an exchange. DTX-277 at 23; 9/9/24 PM Tr. 62:20-63:3 (Bjorke). In addition, Google developed a technical mechanism to encrypt its signal collection techniques to prevent bad actors from reverse engineering them. DTX-277 at 23; 9/9/24 PM Tr. 63:4-17

(Bjorke). Google also implemented real-time spam filtration capabilities. DTX-277 at 23; 9/9/24 PM Tr. 64:18-64:7 (Bjorke).

827.2. Google also negotiated contractual refund rights with each third-party exchange participating in AwBid so that it could claw back money paid to the exchanges for invalid traffic, refund advertisers, and avoid paying bad actors. DTX-277; 9/24/24 PM Tr. 64:8-19 (Bjorke).

827.3. Demonstrating the results of Google's technical protections, in 2015 Google blocked "25-30%" of publishers on Rubicon's exchange based on its monitoring of inventory quality. DTX-277 at 21.

827.4. This additional work was not as simple as replicating what Google had done for invalid detection in DV360. The two tools were built on entirely different software and required different solutions. 9/9/24 PM Tr. 65:3-11 (Bjorke).

828. After reviewing the results of its initial integrations and testing and working to address its concerns, Google was "happy with the performance for advertisers," and officially launched AwBid in 2015. 9/17/24 AM Tr. 119:9-120:4, 124:1-23 (Jayaram). AwBid formally launched its first integration with a third-party exchange in June 2015, followed by launches of integrations with three additional exchanges in September 2015. DTX-277 at 3 (Rubicon in June 2015, and OpenX, CCI, and Casale Media (now Index Exchange) in September 2015).

829. Since AwBid's launch, non-Google exchanges have continued to struggle with spam and traffic quality. 9/17/24 AM Tr. 124:24-125:24 (Jayaram) ("When AdWords started buying on PulsePoint, if we got 100 clicks through PulsePoint, 98 percent of them were marked as spam in manual review."). In 2015, for example, the CEO of AppNexus acknowledged that as much as 65 percent of the inventory being offered on AppNexus was fraudulent. Deposition of

Brian O'Kelley Tr. at 322:15-323:3. In 2019, Google again observed that "AwBid challenges" included "Spam: it's a wild world out there" and "publisher quality." PTX-791 at -224; 9/9/24 PM Tr. 65:18-66:2 (Bjorke).

830. Google continued to engage in technical work and innovative solutions to address the security challenges associated with buying on third-party ad exchanges. 9/17/24 AM Tr. 129:3-18 (Jayaram). For example, Google temporarily halted bidding on one exchange on which it detected invalid traffic and built a filtering detection system to detect invalid traffic on other exchanges. DTX-277 at 23 (2015 AwBid update). Google's efforts to detect and combat invalid traffic on third-party exchanges continues today. 9/9/24 PM Tr. 66:3-8 (Bjorke).

831. Another challenge AwBid has continued to face is latency. High latency results in "timeouts," which means that a bid is "thrown away" by the exchange if the buying tool does not respond with a bid within the time limit set by the exchange. 9/17/24 AM Tr. 128:1-129:2 (Jayaram). An October 2015 slide titled "Challenge: Latency" indicated that between 32% and 80% of ad requests through AwBid (depending on the third-party exchange and the type of ad delivery infrastructure) resulted in timeouts. DTX-277 at 17. Google has continued to invest resources in addressing latency challenges so that AwBid bids can successfully be delivered. 9/17/24 AM Tr. 129:12-18 (Jayaram).

832. Persevering through the constant work required to build integrations and to address these challenges, Google has steadily expanded AwBid to connect now to nearly 50 third-party exchanges. 9/17/24 AM Tr. 129:6-24 (Jayaram).

833. Since AwBid's initial launch, Google has also expanded AwBid beyond remarketing to more challenging targeting types such as contextual keyword targeting and contextual interest targeting. 9/17/24 PM Tr. 14:17-15:11 (Jayaram) (explaining that these other

forms of targeting are "much harder in practice compared to" retargeting); PTX-791 at -212 (2019 presentation describing the "expansion" of AwBid into "other targeting types").

834. Building and maintaining support for each additional exchange and for additional inventory has been expensive.

834.1. Every ad request processed by Google Ads requires "machine resources," which refers to "the computers that run these algorithms to value the bids, value the ads and come up with the right ad candidate." 9/17/24 AM Tr. 122:2-6 (Jayaram). Google has "several thousands" of clusters of computers for "processing ad requests," and "physical space limits" mean that when Google wants to expand the ad requests processed, it "cannot just buy more machines and put them somewhere." 9/17/24 AM Tr. 122:7-123:8 (Jayaram).

834.2. Purchasing through AwBid costs more machine resources because buying through multiple exchanges means that Google Ads will get "duplicate calls for the same ad opportunity." 9/17/24 AM Tr. 122:12-123:8 (Jayaram). "What this means is even though there is only one ad opportunity, we have to keep processing every independent request, and it consumes our machines" in a "very wasteful way" because "we are processing the same thing so many times." *Id.* (Jayaram).

835. Google now has to charge a higher revenue share for bidding through AwBid than for bidding through AdX because maintaining AwBid is more costly, including to cover "billing discrepancies," "machine costs," "spam refunds," and "original costs to integration and building all of these systems to be able to ramp up AwBid." 9/17/24 PM Tr. 16:19-17:10 (Jayaram). Similarly, the revenue share for non-retargeting inventory requires covering additional costs of

building complex user and page models to support more complex forms of targeting and "high machine costs." *Id.* at 15:12-16:10 (Jayaram).

836. Despite AwBid's inherent limitations, use of AwBid has grown, with spending on third-party exchanges increasing from $11 million in 2015 (1% of Google Ads spend on ad exchanges) to in excess of $295 million (13% of Google Ads spend on ad exchanges) by 2022—a twenty-fold increase in just 7 years. DTX-1907; 9/26/24 PM Tr. 18:6-19:13 (Israel); *see also* 9/16/24 PM Tr. 60:15-19, 61:15-18 (Weintraub) (Plaintiffs' expert agreeing Google Ads spend attributable to spending in third-party exchanges through AwBid increased by his calculations from 6.6 percent to 11 percent between 2017 and 2022).

837. The challenges of integrating with third-party exchanges are not unique to Google Ads.

837.1. The Trade Desk has to do "technical work in order to bid into an ad exchange," including "integration work, ongoing support, technical support of integration, partnership support," and "importantly we need to license data centers and we need to support all of the data that comes in through the ad requests that we're getting from SSPs." 9/11/24 PM Tr. 112:13-2 (Dederick).

837.2. As an Index Exchange representative testified, "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, they're very selective. Some DSPs we've literally waited five years to integrate into Index." 9/9/24 AM Tr. 144:3-145:1 (Casale).

838. Nor is integrating Google Ads with third-party exchanges as straightforward as integrating DV360 with third-party exchanges. Historically, DV360 operated "more or less as a

pipe for advertisers' bids to be sent to the exchanges." 9/17/24 AM Tr. 120:16-121:17 (Jayaram). "Google didn't do any optimization for them," and advertisers took responsibility for their own "spam issues and brand safety issues." *Id.* (Jayaram). Google Ads, on the other hand, "focused on optimization" and was "relied on by advertisers to manage all the issues, including performance, fraud, brand safety." *Id.* (Jayaram). As a result, integrating Google Ads with third-party exchanges requires "completely new systems" and redoing "a vast majority of the engineering" as opposed to simply using the integrations that exist from DV360. *Id.* (Jayaram).

4. Google Is Not Required to Share the Google Ads Customer Base It Has Worked Hard to Develop.

839. With forced integration, Plaintiffs seek to require Google to share the benefits of its considerable investments in building a robust Google Ads customer base.

840. In addition to the high-quality inventory and pricing benefits that Google Ads provides based on Google's investments in the product, *supra* ¶¶ 790-794, Google Ads also attracts customers because Google invests enormously in supporting its Google Ads customers.

841. Google invests in thousands of employees to support the advertisers (large and small) that buy on Google Ads. 9/23/24 PM Tr. 8:5-15 (Stefaniu). That team is called the Google Customer Solutions Team and consists of both the large customer sales group (LCS) and a group dedicated to supporting small and medium businesses (SMB). *Id.* at 7:12-8:15 (Stefaniu). In addition, another team of thousands of employees, gTech, provides on-demand support for all Google Ads customers with immediate troubleshooting or reporting questions. *Id.* at 8:16-9:22 (Stefaniu).

842. Caldwell, a small business owner, testified to the benefits that Google Ads offers to small to medium-sized businesses like hers that are seeking to advertise:

842.1. The flexible and usable Google Ads platform provides Caldwell with reporting and data that helps her save time and money on designing her ad campaigns. 9/25/24 PM Tr. 10:12-11:18 (Caldwell).

842.2. In connection with Caldwell's use of Google Ads, Google employees have reached out and offered to assist in optimizing campaigns and re-crafting ad designs. 9/25/24 PM Tr. 11:19-12:22 (Caldwell). The advice Caldwell has received from Google employees has helped her improve her advertising using non-Google advertising tools as well. *Id.*

5. Publishers Do Not Need to Use AdX to Access Google Ads Demand, and Plaintiffs Have Not Shown that Google Ads Demand Is "Unique."

843. Plaintiffs allege that the Google Ads customer base is so "unique" that publishers must use DFP and AdX in order to access Google Ads customers, which in turn forecloses competition in the ad exchange market. 9/20/24 PM Tr. 8:11-9:2 (Lee); 9/16/24 PM Tr. 128:21-129:5 (Abrantes-Metz) ("If the publisher values access to Google Ads because it is a large and unique demand source, the publisher has to transact on AdX.").

844. As an initial matter, Plaintiffs' characterization of their claim does not change the fact that what they are demanding is that Google share its customers (Google Ads advertisers) with Google's rivals (other ad exchanges).

845. Plaintiffs also have not carried their burden to establish the factual bases for their complaint. Plaintiffs allege that the source of Google Ads' market power is advertising demand. 9/20/24 PM 8:23-9:2 (Lee). But, as Plaintiffs' expert admitted, he has not defined "a relevant market where the products are the underlying advertisements." *Id.* (Lee). In other words, Plaintiffs have not defined a market in—much less evaluated market share in—what they claim is the source

of Google's market power. For that reason alone, Plaintiffs' assertion that Google has market power in some undefined market of advertising demand fails.

846. If anything, the evidence that was presented at trial shows the opposite of what Plaintiffs claim.

847. *First*, Plaintiffs ignore that publishers can access Google Ads demand without using AdX.

847.1. Millions of publishers use AdSense for Content, which gets "effectively all of the Google Ads' demand" and is used without AdX. 9/20/24 PM Tr. 73:1-25 (Sheffer); 9/23/24 AM Tr. 14:5-15:14 (Korula) ("access to the same demand"); 9/16/24 AM Tr. 93:18-21 (Mohan). In particular, a website publisher seeking to sell inventory indirectly to Google Ads can do so using only AdSense. 9/20/24 PM Tr. 113:16-114:17 (Sheffer) ("The Court. You're saying that a website that wants to sell indirectly can use AdSense? The Witness. Absolutely, yes."). But AdSense is not included in any of Plaintiffs' markets, presumably because doing so undermines their argument that publishers must use AdX in order to access Google Ads' "unique" demand.

847.2. As explained above, Google Ads advertisers can buy on third-party exchanges for certain kinds of inventory through AwBid. *Supra* ¶¶ 832, 836.

847.3. Google has also developed a tool, Google Ad Connector, that directly integrates Google Ads with publishers, but the tool has not been widely adopted because large publishers are "not necessarily willing to share" information needed to evaluate brand safety and content. 9/17/24 AM Tr. 131:22-133:4 (Jayaram).

848. *Second*, advertisers using Google Ads do not constitute such "unique" demand that rival exchanges are foreclosed from competing without access to those Google advertiser customers.

849. Most advertisers multi-home on Google Ads and other buying tools. *Supra* ¶ 663; DTX-1970A (Israel Table 1: AdX U.S. Spending Patterns for Selected Advertisers, 2019-2022); *see also* 9/10/24 PM Tr. 32:1-13 (Friedman) (Plaintiffs' advertising agency witness testifying that "there are not unique advertisers available" on any "ad network"); DTX-298 at 2 (2016 Google email stating "mostly the same buyers exist in every exchange"); 9/25/24 PM Tr. 173:25-174:7 (Hochberger) (when asked about "the largest buy-side source [of] demand," Mediavine responded "DV360 or The Trade Desk," not Google Ads).

850. The overwhelming majority of ad spend comes from advertisers that multi-home. In 2022, 85 percent of AdX spend came from advertisers who used more than one buying tool. DTX-1902; 9/26/24 AM Tr. 152:11-153:1 (Israel); 9/26/24 PM Tr. 18:6-19:13 (Israel). These multi-homing advertisers are by definition accessible through paths other than Google Ads buying through AdX, so they are not "unique" to Google Ads. Those advertisers can also use buying tools to bid into other exchanges, so they also are not "unique" to AdX.

851. Plaintiffs respond that Google Ads has "unique" demand because there may be small advertiser customers that do not multi-home and use only Google Ads. PTX-1444A; Plaintiffs' Demonstrative Pa (both based on GAM log-level data[41]); 9/19/24 PM Tr. 113:11-117:21 (Lee).

[41] Because these charts are based on GAM log-level data, they are unreliable for the reasons stated *supra* ¶ 648.1. Further, Plaintiffs' Demonstrative Pa purportedly shows that 58% of advertiser-publisher connections are only through Google Ads, but that calculation is based on one day of data. That means that if the same publisher-advertiser connection was made through another buy-side tool the prior day or the following day, it would not be reflected in the chart. 9/20/24 AM Tr.

852. The problem for Plaintiffs is that they have not actually presented any analysis of the full universe of advertising demand and what proportion comes from advertisers that use only Google Ads.

853. The available data that were presented by Dr. Israel show the opposite of what Plaintiffs argue. To the extent there are small advertisers that use only Google Ads as a buying tool, those advertisers account for a vanishingly small amount of ad spend, and their existence does not establish that Google Ads demand is "unique."

853.1. Large advertisers account for the vast majority of ad spend. In 2022, the top 0.1 percent of advertisers (who each spent more than $1.7 million during the year) accounted for 72 percent of total spending; the top one percent for 90 percent of total spending; and the top quarter for 99 percent of total spending. DTX-1978; 9/26/24 PM Tr. 10:10-11:19 (Israel); *see also* DTX-486N at 7 (2017 Google slide deck finding that the top 10% of Google Ads customers accounted for 71% of revenue).

853.2. Consistent with that pattern, when Professor Lee's analysis is corrected to account for the fact that large advertisers are very likely multi-homing, the allegedly "unique" advertisers that only use Google Ads account for less than 5% of ad spend transacted through exchanges. DTX-1900; 9/26/24 PM Tr. 11:20-13:12 (Israel) ("to the extent any demand here was unique, it would be the smaller advertisers," who "make up a very small percentage of impressions").

148:1-149:9 (Lee). The chart therefore overstates the extent to which publishers connect with advertisers only through Google Ads.

854. Instead of analyzing the revenue contributed by any advertisers that are actually "unique" to Google Ads, Professor Lee conducted an analysis of how much publisher payout across all demand sources would decrease from removing all Google Ads demand as a demand source. PTX-1444A (based on GAM log-level data); 9/19/24 PM Tr. 113:11-114:22, 130:3-131:6 (Lee).

855. Professor Lee's analysis still does not salvage Plaintiffs' claim. Fixing the problems in Professor Lee's analysis,[42] publishers would lose at most **2.6%** without access to any "unique" Google Ads advertisers—that is, small advertisers who do not multi-home. DTX-1986 (Israel Table 19: Estimates of Publisher Revenue Effects from Losing Access to Google Ads Advertisers); 9/26/24 PM Tr. 14:13-17:17 (Israel).

855.1. A study performed by News Corp of display ad revenues in 2016 made the same analytical error because, as Layser admitted, News Corp analyzed the amount of revenue that comes from all Google Ads advertisers—not just revenue from advertisers unique to Google Ads. 9/10/24 AM Tr. 76:2-77:21 (Layser). Notably, even News Corp's overinclusive number was relatively small. All Google Ads demand accounted for just 17 percent of News Australia's and 13 percent of News UK's total indirect revenue—excluding revenue from direct deals, which are generally more lucrative, *supra* ¶ 507. *Id.* at 78:2-79:1 (Layser).

[42] To correct Professor Lee's analysis, Dr. Israel looked only at the United States; removed only advertisers that buy less than 500,000 impressions a year as a proxy for advertisers likely to be "unique" (conservatively, removing 99.9% of advertisers); and accounted for both direct and indirect deals. 9/26/24 PM Tr. 14:13-17:16 (Israel).

855.2. Similarly, The Daily Mail ran an analysis purporting to calculate "unique demand" from AdX. But when pressed about what "unique demand" meant, Wheatland explained that The Daily Mail defined "unique demand" by looking at whether, for a given impression, any non-Google exchange submitted a bid or only submitted a lower bid than the AdX auction price. 9/18/24 AM Tr. 165:1-10 (Wheatland). In other words, the calculation did not differentiate between any of the demand sources that bid into AdX, including Google Ads, DV360, or non-Google buying tools. And it certainly did not analyze whether the advertisers submitting bids were available only through Google Ads. Even then, The Daily Mail's overinclusive number was relatively small. Out of all indirect revenue—not including direct revenue, *id.* at 164:20-21 (Wheatland)—so-called "unique" AdX demand accounted for only between 18% and 22% of The Daily Mail's revenue. PTX-1717 at -644.

856. Plaintiffs argued that small, independent publishers are particularly harmed by Google Ads bidding into AdX because small publishers are particularly dependent on "unique" Google Ads advertisers. 9/20/24 PM Tr. 31:18-32:2 (Lee). What Plaintiffs do not mention is that thousands of smaller publishers use DFP Small Business for free, 9/26/24 PM Tr. 114:20-115:3 (Israel); DTX-76 at 3 (2011 Google email), and millions access Google Ads advertisers using AdSense, a product particularly suited for supporting small publishers. *Supra* ¶ 46. Small publishers can and do connect with large buying tools other than Google Ads by partnering with companies like Mediavine, which offers "ad management" services such as "full monetization" of small publishers' inventory. DTX-1733 at 1, 2-7 (Mediavine list of supply-side and demand-side

platform partners that buy from its publisher customers); *see also* 9/25/24 PM Tr. 161:8-24 (Hochberger).

857. Nor does the testimony of Plaintiffs' witnesses at trial demonstrate that Google Ads demand is "unique" demand. Instead, Plaintiffs' witnesses consistently revealed that when they complained about Google's "unique demand," they were actually referring to advertiser demand from both Google Ads and DV360. Of course, DV360 demand is hardly exclusive to AdX. DV360 already buys from third-party exchanges at significant scale. *Supra* ¶¶ 797-798. Plaintiffs excluded DV360 from their alleged markets, so they have conducted no analysis of any market share or market power as to DV360, and Plaintiffs have not alleged that Google's conduct with respect to DV360 was anticompetitive.

857.1. Gannett: When asked about his testimony that "50 percent" of Gannett's "programmatic revenue comes from Google," Wolfe admitted he was referring to demand in AdX, which includes DV360. 9/9/24 AM Tr. 105:4-10 (Wolfe).

857.2. Kevel: Avery testified that Google's "unique demand" comes from AdX demand, which includes both DV360 and Google Ads demand. 9/9/2024 PM Tr. 123:13-23, 165:24-166:6 (Avery). As Avery himself wrote, DV360 "definitely bids across lots of different exchanges." *Id.* at 164:25-165:23 (Avery).

857.3. The Daily Mail: Wheatland admitted that, "when someone's referring to unique AdX demand, typically they're referring to Google revenue and maybe, to a lesser extent, DV360 revenue." 9/18/24 Tr. AM at 165:1-10 (Wheatland).

857.4. Layser (formerly News Corp): Layser complained to Google that "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." 9/10/24 AM Tr. 55:6-16 (Layser). As Layser explained, she felt concerned that "switching away from DFP could cause News Corp to lose revenue from DV360" specifically. *Id.* at 112:11-13 (Layser).

857.5. Professor Ravi: Professor Ravi testified that Google's advertiser demand includes Google Ads and DV360, but also acknowledged that DV360 "has historically been one of the major bidders into third-party exchanges" and "third-party ad networks." 9/11/24 PM Tr. 64:25-65:9 (Ravi).

857.6. Similarly, Bellack wrote in an email and testified that Google Ads is just "half of AdX" demand, with the "other half" coming from DV360 and "other DSPs, networks, etc." PTX-403 at -511; 9/19/24 AM Tr. 150:6-152:7 (Bellack).

858. Despite this clear factual record established at trial, Plaintiffs will undoubtedly point to Google documents that refer to and market its "unique demand" as an advantage.[43] Trial testimony and evidence showed, however, that many of Google's rivals also claim to have "unique demand." Israel DX 3 (public statements from Adform, Amazon, Criteo, Facebook, Magnite, Media.net, Microsoft, PubMatic, and The Trade Desk touting "unique demand" or similar language); Deposition of Ken Blom Tr. 122:09-11, 122:14, 122:16-21, 122:24-25 (Buzzfeed

[43] Some of these documents did not use the term "unique demand" to refer to unique advertisers inaccessible through other channels. Instead, "unique demand" referred to the value added by Google's technology in Google Ads, such as data about user interests, "Google's proprietary contextual targeting technology," PTX-453 at -191, and "Google policy restrictions," DTX-298 at 2. Any claims based on those qualities of "unique demand" are also a demand that Google share its technology with rivals.

representative agreeing that "many SSPs" market themselves "as having access to unique demand"); 9/26/24 PM Tr. 17:17-18:5 (Israel). As just a few examples:

858.1. Xandr (acquired by Microsoft): Xandr advertised its products as "Driving Unique Demand for Your Inventory." DTX-1524 at 15 (2023 Microsoft Advertising presentation).

858.2. AppNexus (acquired by Microsoft): AppNexus represented that "We are the only independent ad server with our own unique advertiser demand." DTX-1487 at 40 ("AppNexus Publisher Adserver" deck); Deposition of Brian O'Kelley Tr. at 270:16-271:14, 271:17-18.

858.3. PubMatic: PubMatic has made "multiple statements and representations" to the investing public "about PubMatic's access to unique demand." In particular, it has stated that its SPO offering "creates a growing moat and flywheel to attract new customers, new publishers, who want to access the unique demand only available on PubMatic." 9/12/24 PM Tr. 145:17-24 (Goel).

858.4. Amazon: As Layser, current Global Head of Publisher Ad Tech Solutions at Amazon Web Services acknowledged, Amazon advertises that it has "unique demand" and that its header bidding wrapper solutions, TAM and UAM, can access "unique demand" from Amazon. 9/10/24 AM Tr. 86:12-20 (Layser); *see also* 9/20/24 PM Tr. 83:4-84:1 (Sheffer).

859. That one tool touts "unique demand" does not establish that other tools cannot compete on the basis of their own pools of advertiser demand. Plaintiffs have not presented any evidence that, of all the ad tech providers that represent that they have "unique demand," Google

Ads demand is actually "unique." As Google has noted in internal documents, rivals can—and successfully do—compete by providing access to a different set of "unique" advertiser demand than Google Ads.

859.1. A 2016 Google email sent by Bellack stated that Rubicon has "true unique demand due to buy-side sales efforts," as well as "leads on deals" with buyers Google cannot access. DTX-298 at 2. As Bellack observed, when competing with rivals with "true unique demand," "we'll never win everything every time." DTX-298 at 2.

859.2. A 2017 Google competitive document expressed concern that Facebook and Amazon have "robust and unique demand to rival AdWords [Google Ads]." DTX-463 at 4.

859.3. A 2018 Google competitive analysis noted a "key differentiator" for Amazon was that it "provides unique demand." DTX-879 at 10.

860. Plaintiffs also allege that Google's market power in advertising comes from demand for advertising on Google's owned-and-operated properties, particularly Google Search. As Professor Lee claimed, "a key part of Google Ads' market power" (in the undefined market of advertising demand) "comes from the search advertisers [that] used its product and are then available for purchasing display advertising." 9/19/24 PM Tr. 99:18-22 (Lee); *see also* 9/11/24 PM Tr. 98:15-99:7, 153:13-154:20 (Dederick).

861. But Google Ads is just one of many buying tools that enables advertisers to run display ad campaigns on both owned-and-operated properties and third-party properties. 9/26/24 PM Tr. 86:17-87:1 (Israel). Facebook, Amazon, Yahoo, and Microsoft operate some of the most popular web properties in the United States—including search engines—and compete using that

same strategy, but Plaintiffs conveniently exclude those integrated buying tools from their alleged markets. DTX-1901 (Figure 84: Most-Visited Web Properties in the United States); 9/26/24 PM Tr. 13:13-14:12 (Israel).

C. Allegation that Google Provides DFP Exclusive Access to Real-Time Bids from AdX, Denying Comparable Access to Rival Publisher Ad Servers[44]

862. Plaintiffs demand that Google provide rival publisher ad servers access to AdX that is "comparable" to Google's own access, another clear demand that Google deal with its competitors. 9/20/24 AM Tr. 82:13-18 (Lee); *id.* at 89:3-16 (comparable access would require Google to give rivals comparable access to real-time bids).

863. Dr. Abrantes-Metz conceded that what she has identified as a "restriction on customer choice" would require Google to "integrate technically with that other ad server," so that a customer could use a rival publisher ad server to connect "directly in a way that they could get real-time bids" from AdX. 9/18/24 AM Tr. 74:20-76:13 (Abrantes-Metz). As she acknowledged, publisher customers of AdX remain free to use rival publisher ad servers. *Id.* at 75:23-76:2 (Abrantes-Metz). Google does not restrict publishers using AdX from calling non-Google ad servers. 9/10/24 AM Tr. 99:19-21 (Layser).

864. Plaintiffs claim rival ad servers are unable to compete absent this "comparable access" because the "unique demand" of Google Ads advertisers is available only through AdX. 9/16/24 PM Tr. 128:21-129:5 (Abrantes-Metz) ("if the publisher wants to get the real-time price from AdX" for "unique demand" from Google Ads, "then the publisher must use DFP"); 9/19/24 PM Tr. 137:17-138:13 (Lee). According to Plaintiffs, rival publisher ad servers are foreclosed from competing effectively because Google does not give rivals the ability to compare real-time

[44] 9/19/24 PM Tr. 127:11-24 (Lee) ("The five pieces of conduct that I evaluated and examined to be anticompetitive" include the "conditioning of access of real-time bids from AdX to DFP.").

AdX bid amounts, submitted by Google Ads advertisers, in the same way that Google's own publisher ad server, DFP, does. 9/16/24 PM Tr. 128:21-129:5 (Abrantes-Metz); 9/19/24 PM Tr. 137:17-138:13 (Lee).

865. In other words, Plaintiffs are asserting this claim based on the same "unique demand" theory that afflicts their Google Ads and AdX claim. They argue that publishers must use DFP in order to access "unique" customer demand only available on Google Ads, but they have not demonstrated that Google Ads has "unique" demand. *Supra* ¶¶ 843-861.

1. The Integration of AdX and DFP Offers Benefits When They Are Used Together.

866. The use of AdX and DFP together benefits advertisers and publishers because integration enables Google to offer a higher quality product at a lower cost. *Supra* ¶¶ 733-784 (explaining benefits of end-to-end integration).

867. The integration benefits advertisers buying on AdX because Google has vetted publishers that are using DFP, so it can more effectively protect advertisers from invalid traffic and enforce ad safety standards. *Supra* ¶¶ 744, 762, 765-767. As Mohan explained, the integration of AdX and DFP gives Google "insight and visibility into the quality of the inventory on the publisher's side." 9/16/24 AM Tr. 116:2-24 (Mohan). Without the ability to maintain "spam and policy controls" against publishers who are using DFP, "your entire premise on the advertiser side in terms of the quality of the inventory you're representing starts to fall apart." *Id.* at 118:17-119:9 (Mohan).

868. The integration has also benefited publishers because using DFP and AdX together creates additional synergistic benefits for publishers above using either one alone. 9/18/24 AM Tr. 18:-17-24 (Spencer); DTX-47 at 5 (2009 Google email stating integration "eliminates discrepancies and simplifies reporting"); DTX-150 at 3 (2013 Google email describing "more

proof points of DFP/AdX integration beyond just dynamic allocation," such as "stuff like revenue consultants, the opportunity report, unified buyer reporting, DFP ad units in the AdX rules engine, Live CPM etc."). For example, when publishers used DFP and AdX, the combination of real-time bidding with Dynamic Allocation (and later Enhanced Dynamic Allocation) increased publisher revenue. *Infra* ¶¶ 910-912. Plaintiffs' witness Avery, who runs a competitor publisher ad server, acknowledged that the integration between AdX and DFP makes publishers more money. 9/9/24 PM Tr. 161:23-162:9 (Avery) (publishers make more money from using GAM due to connection between DFP and AdX).

869. In addition, the combination of DFP and AdX into a single interface, Google Ad Manager, benefits publishers above and beyond simply combining the separate functionalities.

869.1. Google Ad Manager allows publishers to "get better and more unified information" about the money they are making from each part of their inventory because publishers can access unified reporting about profits from their direct and indirect sales. 9/23/24 AM Tr. 17:8-18:16 (Korula).

869.2. By unifying information about direct and indirect deals, Google Ad Manager also helps publishers better forecast how future decisions will affect their monetization. For example, if a publisher is contemplating signing another direct deal with an advertiser, the GAM forecasting tool can tell the publisher how that deal would impact both direct and indirect revenue. 9/23/24 AM Tr. 17:8-18:16 (Korula).

869.3. Google Ad Manager also "offers new functionality" that "would be hard to do in a product that didn't actually unify the two," such as Programmatic Guaranteed deals. 9/23/24 AM Tr. 17:8-18:16 (Korula).

2. Plaintiffs Are Not Asserting a Tying Claim; They Are Challenging a Refusal to Deal with Rival Publisher Ad Servers.

870. Plaintiffs are not actually asserting a tying claim between AdX and DFP. Each of the two functionalities can be used without the other, and, as explained below, Plaintiffs are not challenging the combination of the two functionalities together in a unified interface. Instead, Plaintiffs are challenging refusal to deal—that AdX does not provide real-time bid amount information ("comparable access") to rival publisher ad servers.

a. Publishers Can Access AdX Without Using DFP.

871. Publishers can access AdX without DFP by using AdX Direct tags, which integrate AdX demand "into a publisher's ad serving infrastructure." 9/20/24 PM Tr. 61:9-19 (Sheffer); 9/23/24 AM Tr. 44:12-22 (Korula). An AdX Direct tag is "a small snippet of code" that the publisher can copy and paste on its digital properties. 9/23/24 AM Tr. 44:23-45:5 (Korula). When an impression is formed and the AdX Direct tag is called, the tag sends an ad request to AdX with a publisher-set floor price. *Id.* (Korula). AdX runs a real-time auction and, if an ad beats the floor price, returns the winning ad. *Id.* at 45:9-13 (Korula). Using the AdX Direct tag, publishers can therefore access all of the demand that is bidding into AdX. *Id.* at 44:23-45:13 (Korula).

872. AdX Direct tags provide rival publisher ad servers with the same access to AdX as DFP. Since its launch, AdX has returned a winning ad, not a bid amount, to DFP. *Supra* ¶ 112.

873. Google has not deprecated AdX Direct tags because "there were still many publishers using AdX Direct and they were deriving value from the product." 9/23/24 AM Tr. 48:5-12 (Korula).

874. Plaintiffs do not dispute that AdX Direct provides access to real-time AdX demand without using DFP. *See, e.g.,* 9/16/24 PM Tr. 127:7-128:4 (Abrantes-Metz) (relying on PTX-758 to explain that AdX Direct "lets the publisher know whether it is going to serve the ad or not, but

it does not return a price"); PTX-758 at -945 (2019 email from Kevel noting that publishers using AdX Direct "can set a floor price"); DTX-404 at 11 (2017 News Corp document acknowledging that using AppNexus ad server would allow it to "retain some access to AdWords demand"). In fact, a rival ad tech provider, Equativ, advertises that its publisher ad server can access "Google AdX demand," which "is part of our full holistic yield." PTX-1674 at -013 (2023 Equativ deck).

875. Publishers can also rely on a dual publisher ad server set-up to access AdX demand without using DFP as their primary ad server. 9/20/24 PM Tr. 72:21-73:8 (Sheffer). For example, one publisher that uses such a dual publisher ad server set-up is Axel Springer, a "very large international publisher" that owns Business Inside and Politico. *Id.* at 67:19-68:7 (Sheffer); *see also* 9/18/24 AM Tr. at 180:21-181:1 (Wheatland). Politico is "moving off of just GAM as an ad server and is adopting Microsoft Monetize as their primary ad server." 9/20/24 PM Tr. 67:19-68:7 (Sheffer). A publisher can do the same with an in-house ad server. *Id.* at 72:21-73:8 (Sheffer).

b. Publishers Can Use DFP Without AdX.

876. Publishers can use DFP and choose not to sell through AdX. DFP publisher customers do not have any contracts with Google that prevent them from working with other exchanges or header bidding tools, including using rival tools for every single impression sold. *See* 9/9/24 AM Tr. 80:2-22, 81:12-15 (Wolfe).

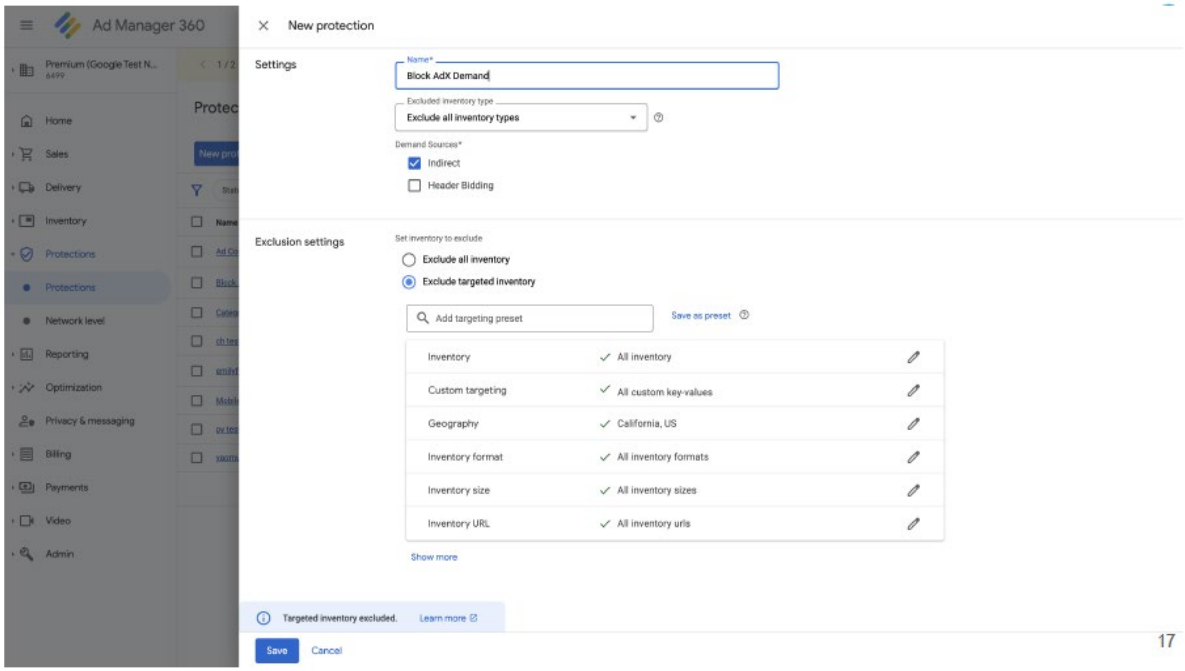
877. In fact, the "vast majority" of publishers using the DFP ad server functionality in Google Ad Manager do not use AdX. 9/23/24 AM Tr. 41:15-42:1 (Korula).

877.1. By default, publishers that sign up for Google Ad Manager do not have access to AdX. 9/23/24 AM Tr. 41:15-42:1 (Korula). Only a small minority of Google Ad Manager publisher customers are given access to AdX. *Id.* at 20:23-21:8 (Korula).

877.2. In order to gain access to AdX, publishers must take affirmative action to access the exchange, including undergoing a vetting process with multiple steps. 9/23/24 AM Tr. 41:10-42:9 (Korula); *supra* ¶ 763.

877.3. Even for those Google Ad Manager customers who are given access to AdX, publishers can choose whether they want to enable AdX for only part of their inventory or all of it. 9/23/24 AM Tr. 42:10-43:2 (Korula).

877.4. Finally, even if a publisher gets access to AdX and makes it eligible for inventory, the publisher can still configure Google Ad Manager to turn off AdX using the inventory exclusion protection functionality demonstrated below. Korula DX 1.17; 9/23/24 AM Tr. 43:12-24 (Korula).



Korula DX 1.17

878. Publishers thus have multiple ways to use DFP without calling AdX. 9/10/24 AM Tr. 99:5-7 (Layser). Sheffer had personal knowledge of "several hundred" publishers that use the DFP functionality in GAM but do not use AdX, including Harvard Business Review, Nordstrom,

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Walgreens, CVS, and the Public Broadcasting System. 9/20/24 PM Tr. 80:16-81:2 (Sheffer); *see also* DTX-213 at 17 (2014 Google presentation observing that "65% of DFP imp[ression]s are not made available to AdX").

c. Plaintiffs Are Not Challenging the Combination of AdX and DFP into a Single Unified Interface, Google Ad Manager.

879. Google combined the AdX and DFP functionalities into one unified tool, Google Ad Manager, in response to publisher feedback. *Supra* ¶¶ 120-121. That unified tool provides publishers who choose to use AdX and DFP together additional benefits they could not access by using only one at a time. *Supra* ¶ 869.

880. Plaintiffs have not identified the combination of DFP and AdX into one interface as an allegedly anticompetitive act. 9/19/24 PM Tr. 127:11-128:2 (Lee); 9/16/24 PM 116:14-22 (Abrantes-Metz). Nor have they presented evidence that the combination had any adverse effect on competition. 9/26/24 PM Tr. 19:14-20:9, 115:4-24 (Israel).

881. Plaintiffs' witness Casale of Index Exchange testified the opposite—that separating DFP and AdX, rather than enhancing competition, would possibly accelerate consolidation in the ad exchange market. 9/9/24 PM Tr. 42:5-14 (Casale).

882. Instead, what Plaintiffs are really complaining about is a refusal to deal by denying rival publisher ad servers access to the amount of AdX real-time bids. 9/18/24 AM Tr. 97:17-25 (Abrantes-Metz) ("It's the conditioning of access to real-time bids to AdX to DFP, not that the AdX and DFP cannot be bought separately."). Plaintiffs' expert admitted that selling DFP and AdX separately would not "solve that problem" they are complaining of. 9/18/24 AM Tr. 97:10-25 (Abrantes-Metz) (agreeing that removal of Google Ad Manager in Abrantes-Metz DX 2 would not fix Plaintiffs' complaint); *see also* 9/26/24 PM Tr. 20:1-9 (Israel) (as an economist, access to real-time bids is "separate from how they sell their own products").

883. According to Plaintiffs, the refusal to deal matters because Google should give rival publisher ad servers the same ability DFP has to put real-time bid amounts from AdX in head-to-head competition with bid amounts from other exchanges. 9/18/24 AM Tr. 96:21-97:4 (Abrantes-Metz); *see also* 9/16/24 PM Tr. 123:5-124:17 (Abrantes-Metz) (AdX Direct is inadequate because rival publisher ad servers want to know the price AdX is willing to pay "in time . . . to be able to make a comparison with other sources"); 9/19/24 PM Tr. 139:17-21 (Lee) (complaining that AdX Direct "doesn't allow a rival publisher ad server to get those real-time bids from AdX and run real-time auctions between AdX and other exchanges").

3. In Order to Enable AdX to Share Real-Time Bid Amounts with Rival Publisher Ad Servers, Google Would Have to Undertake Significant Technical Work.

884. Achieving what Plaintiffs seek—enabling rival publisher ad servers to compare real-time bid amounts from AdX to other exchanges' real-time bids—would require a complete redesign of how AdX has worked since it was first built by DoubleClick. AdX has never shared bid amount information with any publisher ad server in real time, **including DFP**.

884.1. Since AdX was first built by DoubleClick—before it was even acquired by Google—AdX returns only the winning ad if a bid beats the floor price, and nothing if it does not. AdX does not output in real time the winning bid amount. 9/23/24 AM Tr. 46:24-47:6 (Korula). That design was consistent with how exchanges in the "waterfall" worked at the time that AdX was built. As explained above, *supra* ¶ 70.2, they returned a "yes" or "no," not a bid amount. At that time, "the understanding was that if you called an exchange and you had a floor price and [if] the exchange beat that price, the exchange would win and that ad would serve." Exchanges did not need to submit real-time bids anywhere. 9/23/24 AM Tr. 46:23-47:6 (Korula).

884.2. AdX's design does not distinguish between DFP and third-party publisher ad servers. 9/18/24 AM Tr. 18:25-19:12 (Spencer); 9/23/24 AM Tr. 45:14-17 (Korula) (Q. "Will AdX return a real-time bid to the third-party ad server? A. It will not but it also doesn't return real-time bids to Google Ad Manager or DFP.").

884.3. Google Ad Manager's Partner Guidelines reflect the way that AdX has always worked: because AdX provides as its real-time output the winning ad and not the bid amount, publishers have no way to put the AdX winning bid "in competition with other bids based on price." 9/23/24 AM Tr. 45:7-46:6 (Korula); DTX-1771 at 5 (Google Ad Manager Partner Guidelines).

885. Changing the design of AdX to enable what Plaintiffs demand would require "a substantial amount of work." 9/23/24 AM Tr. 47:12-48:4 (Korula); *see also* 9/20/24 AM Tr. 85:4-9 (Lee) (admitting that at least "some change would be necessary for AdX to submit real-time bids to rival publisher ad servers, as it's not doing that currently"). Google would have to change AdX's "core code in many places, and it would take a team of engineers years to actually undo" the fact that AdX does not submit real-time bids "or make that no longer true." 9/23/24 AM Tr. 47:12-48:4 (Korula). The resources required to execute the change would take away from "other projects that could increase publisher monetization or improve the product in other ways." *Id.* (Korula).

886. Google has already invested in making it possible for publishers to compare real-time bid amounts from AdX against real-time bid amounts from rival exchanges without needing to completely redesign AdX's "core code." 9/23/24 AM Tr. 47:12-48:4 (Korula). The Unified First Price Auction, run within Google Ad Manager, now enables an "auction of auctions" that

compares real-time bid amounts from AdX and many non-Google exchanges. *Supra* ¶ 261. Plaintiffs' complaint is that Google has not redesigned AdX to make this possible using non-Google ad server functionality. 9/18/24 AM Tr. 97:17-25 (Abrantes-Metz).

887. Even were Google to invest years to redesign AdX to provide real-time bid amounts to any publisher ad server, building the integrations to third-party publisher ad servers would still require additional engineering work. DTX-150 at 2 (2013 Google email: "I haven't heard any stories of easy integrations with ad servers."). For each additional integration, new code would need to be written. For example, when Kevel integrated its publisher ad server with Index Exchange and PubMatic, engineering work was required. 9/9/24 PM Tr. 141:4-14 (Avery).

888. Google would also have to engineer additional tools, including to control for spam and the quality of inventory sold through third-party ad servers. DTX-150 at 2 (2013 Google email reflecting that integrating AdX into third-party ad servers would be a "new challenge with every customer"; "we still have remaining spam and policy work to bring this to life").

889. Early on, Google explored the possibility of integrating AdX with third-party ad servers. In a 2013 email, a Google product manager on AdX expressed that he was "happy to align with any pubs who own ad servers and want to do this integration, or who can convince their 3rd party ad servers to do the work." DTX-150 at 2.

890. Before building any such integrations, Google wanted to ensure that it wasn't "losing insight and visibility into the quality of the inventory on the publisher's side." 9/16/24 AM Tr. 116:2-24 (Mohan) (concerns about quality on the publisher side related to the fact that display ads are a "two-sided marketplace" that also servers advertisers). In exploring integrating with third-party ad servers, Google considered "starting with in-house ad servers," given that it was "a safer way to go in terms of inventory quality, because you know who that publisher is." *Id.*

(Mohan). Clients with in-house ad servers, however, were reluctant to do the work that integration would require. For example, Google had a publisher using an in-house ad server "lined up" to work on building an integration, but according to contemporaneous documents, "that client quickly backed away from the required work for server-side integration, once [Google] explained the integration steps." DTX-150 at 2-3; 9/16/24 AM Tr. 117:15-119:9 (Mohan).

891. Google's initial efforts with respect to third-party ad servers were also stalled by "engineering concerns associated with spam detection and inventory quality controls." 9/16/24 AM Tr. 117:4-14 (Mohan); DTX-150 at 4 (2013 Google email). Without spam and policy controls, the "entire premise on the advertiser side in terms of the quality of the inventory you're representing starts to fall apart. And once that starts to erode, it starts to implicate the quality of the entire Google Display Network in that sense," which is why Google wanted to make "sure that anything that we did would not compromise the publisher quality standards we needed to make sure because that would have a serious impact on the advertiser side of the business." 9/16/24 AM Tr. 118:17-119:9 (Mohan).

892. Third-party ad servers were also unwilling to engage in the technical work without being paid. They showed "a continued reluctance to do the integration coding required without rev share." DTX-150 at 2 (2013 Google email).

893. On top of everything, as the Google team learned from the Admeld co-founder and chief technology officer who joined Google in connection with the Admeld acquisition (Brian Adams), Admeld's past experiences with similar features (integrating real-time bids from an ad exchange with third-party publisher ad servers) were "plagued with ongoing issues," and integrations with publisher-owned ad servers presented "a new challenge with every customer." DTX-150 at 2; 9/16/24 AM Tr. 119:10-121:6 (Mohan); *see also* PTX-159 (2014 Google analysis

following the Admeld acquisition of challenges to Admeld's feature providing real-time bids to rival publisher ad servers).

894. Given these challenges, Google ultimately concluded that there was no business case for integrating AdX with third-party ad servers. 9/18/24 AM Tr. 17:14-18:3 (Spencer) (extending Dynamic Allocation to third party ad servers "requires integration on the actual primary ad server to make it work. I don't think we ever had anybody [third party ad servers] who was ever willing to do that work.").

4. Publishers Do Not Need to Use DFP to Access Google Ads Demand, and Plaintiffs Have Not Shown that Google Ads Demand Is "Unique."

895. Plaintiffs seek forced interoperability because, according to them, publishers want access to real-time bid amounts from "unique" Google Ads demand and to put them in competition with real-time bids from other sources. 9/16/24 PM Tr. 128:21-129:5 (Abrantes-Metz) ("if the publisher wants to get the real-time price from AdX" for "unique demand" from Google Ads, "then the publisher must use DFP"). Google has already made it possible for publishers to compare real-time bid amounts from AdX bidders, including Google Ads customers, against other real-time bid amounts—first, against partner third-party exchanges through Open Bidding, and now against all other sources of demand through the Unified First Price Auction. *Supra* ¶¶ 190, 261. What Plaintiffs demand is that rival publisher ad servers be able to do the same comparison on the same terms.

896. Plaintiffs' argument is therefore that rival publisher ad servers are unable to compete because publishers need access to real-time bids from "unique" Google Ads demand and are therefore forced to use DFP. Plaintiffs' claim fails for the same reasons their claim about the Google Ads and AdX integration does. As their lead market definition expert admitted, he did not define any market or calculate market share in the advertising demand on Google Ads that is

allegedly the source of Google's market power. *Supra* ¶ 845. Plaintiffs have no way to show—and have not shown—that Google Ads demand is so "unique" that rival publisher ad servers are foreclosed from competing without access to Google Ads customers.

897. In addition, the evidence presented at trial contradicts Plaintiffs' assertion. Publishers do not need to use DFP to access AdX demand because they can use AdX Direct tags. *Supra* ¶¶ 871-874. And publishers can also access Google Ads demand without using either AdX or DFP at all, such as by using AdSense for Content with no publisher ad server or with a third-party or in-house publisher ad server. *Supra* ¶ 847.

898. And, for the same reasons explained above, other sell-side products can and do compete with DFP based on their own advertiser demand. *Supra* ¶¶ 848-861. The data about revenue derived from any advertisers that use only Google Ads do not demonstrate that Google Ads demand is "unique."[45] *Supra* ¶¶ 853-855. Even when News Corp set up DFP to deprioritize all AdX demand—not just "unique" demand from Google Ads—and allow AdX advertisers to bid only on certain, less popular impressions, News Corp found "no noticeable revenue loss" from diversifying revenues away from AdX. DTX-655 at 3-4 (2019 News Corp document); 9/10/24 AM Tr. 91:21-24 (Layser).

[45] Professor Lee presented a chart and testimony purporting to show that losing access to AdX would decrease publisher payout by 27.9%. PTX-1395A (Lim Rebuttal Figure 28: Percent decrease in worldwide publisher payout if exchange was removed); 9/19/24 PM Tr. 138:14-139:2 (Lee). That chart is based on GAM log-level data, and is therefore unreliable for the reasons stated above. *Supra* ¶ 648.1.

D. Limitation of Dynamic Allocation to AdX[46]

899. Plaintiffs' experts opine that Google should have extended the functionality of Dynamic Allocation, a product innovation first built by DoubleClick, to rival exchanges or done so earlier. Plaintiffs assert that through this conduct Google used its alleged market power in the ad server market to diminish the competitiveness of rivals in the ad exchange market. 9/20/24 PM Tr. 7:1-8 (Lee).

900. More specifically, Plaintiffs claim that Dynamic Allocation gave AdX what they call a "first look" and "last look" over other exchanges. Plaintiffs' experts maintain that Google should have built comparable access to Dynamic Allocation for rival ad exchanges so that rivals could have had a "first look" or "last look," or, alternatively, "designed" Dynamic Allocation to allow rival exchanges to submit real-time bids for head-to-head competition. 9/20/24 AM Tr. 85:16-86:9 (Lee); 9/18/24 AM Tr. 77:12-78:4 (Abrantes-Metz) (complaining that publishers could not use Google's publisher ad server to offer a "first look" or "last look" to exchanges other than AdX). Again, this is another demand for a duty to deal.

901. In reality, as explained in the next section, what Plaintiffs call "first look" describes how publishers could set up Dynamic Allocation with the waterfall before header bidding emerged. What Plaintiffs call "last look" describes how publishers could set up Dynamic Allocation after header bidding emerged. When publishers chose to use these set-ups, they retained complete control over whether to give AdX bidders a "first look" or "last look" and, if they did, over the floor prices they set for AdX auctions. Publishers chose to use these set-ups in order to maximize revenue, not to advantage AdX to the disadvantage of its rivals. The possibility that publishers

[46] 9/19/24 PM Tr. 127:11-24 (Lee) ("The five pieces of conduct that I evaluated and examined to be anticompetitive" include "exclusive advantages within DFP provided to AdX. This relates to these first and last look advantages.").

could give AdX bidders a "first look" or "last look" also made Google's exchange, AdX, more attractive to advertisers. 9/11/24 PM Tr. 27:18-29:1, 38:4-8 (Ravi). What Plaintiffs' experts really complain about is that Google did not invent new technology earlier that would interoperate with rivals.

902. Both "first look" and "last look" no longer exist. "First look" ended when publishers started to use header bidding, *infra* ¶ 934, and "last look" was deprecated when Google shifted to the Unified First Price Auction in 2019, *infra* ¶ 982.

1. Dynamic Allocation with the Waterfall ("First Look")

a. Dynamic Allocation Was an Innovation on the Existing Waterfall System Introduced by DoubleClick in 2007.

903. From before DFP and AdX existed, publishers used a "waterfall" process to establish the order in which they offered a particular impression to various demand sources. 9/24/24 AM Tr. 36:3-11 (Milgrom).

904. In the "waterfall," publishers could choose to order demand sources based on the average historical value received from that source, an amount pre-negotiated with that source, or some other value that the publisher chose. 9/24/24 AM Tr. 37:7-18 (Milgrom); 9/11/24 PM Tr. 33:12-25 (Ravi); 9/23/24 AM Tr. 107:3-24 (Korula).

905. For unsold remnant impressions, the publisher would offer the impression to the first demand source in the waterfall, and the demand source would respond "yes, I'll take that one" or "no, I won't." If the answer was yes, the demand source's ad would be served. If not, the impression was "passed back" to the publisher, who could offer it to the next demand source in the waterfall. 9/24/24 AM Tr. 33:24-35:3 (Milgrom).

906. The "waterfall" process had inherent inefficiencies. For each individual impression, a demand source might have an advertiser that valued the impression more than the previously

agreed-upon price or the historical price. *Supra* ¶ 68. As a result, the "waterfall" sometimes resulted in a buyer winning an impression even though a buyer lower in the waterfall would have valued the impression more. 9/24/24 AM Tr. 38:2-39:25 (Milgrom).

907. Dynamic Allocation was a product innovation introduced in 2007 by DoubleClick—before it was acquired by Google, 9/23/24 AM Tr. 58:12-16 (Korula)—to improve on the waterfall. Dynamic Allocation, which ran on DoubleClick's publisher ad server, called DoubleClick's ad exchange to inquire whether a buyer on the exchange was willing to pay more than the highest value in the waterfall. DoubleClick's ad exchange would run an auction using the highest value in the waterfall as the floor price. If no buyer on the DoubleClick exchange could match or beat that floor price, the impression would be offered to the top demand source in the waterfall. If that demand source did not fill the impression, the Dynamic Allocation process would repeat at every step down the waterfall. *Supra* ¶¶ 76-77. When the publisher set the values in the waterfall at the amount the publisher expected to receive from each demand source, a DoubleClick ad exchange buyer would only win if it would pay at least what the publisher expected to make from the next highest demand source. DTX-117 at 117 (2010 white paper on Dynamic Allocation commissioned by Google stating that, with this setting, "publishers essentially have a risk-free way to get the highest yield"); 9/24/24 AM Tr. 40:23-41:9 (Milgrom); 9/23/24 AM Tr. 107:3-24, 123:9-21 (Korula).

908. As Professor Milgrom explained, at the time Dynamic Allocation was invented, putting the auction "in first position"—before the remainder of the waterfall—was "very natural" and essential to the value of Dynamic Allocation because the auction created competitive pressure that could increase the price paid above the price floor. 9/24/24 AM Tr. 40:1-16 (Milgrom).

909. As a 2010 study conducted by Google determined, the first-generation version of DoubleClick's Dynamic Allocation resulted in "an average CPM lift of 136%" for publishers. DTX-117 at 118; *see also* 9/24/24 AM Tr. 51:24-52:5, 57:14-23, 59:4-60:7 (Milgrom). In this study, Dynamic Allocation resulted in a revenue lift even when run with an auction based on static bids. 9/24/24 AM Tr. 51:7-23 (Milgrom); *see also* 9/11/24 PM Tr. 24:15-21 (Ravi). At the time, "there was no notion of real-time bidding." 9/12/24 PM Tr. 64:11-65:9 (Goel).

b. Plaintiffs Use "First Look" to Describe How Dynamic Allocation Worked When Paired with AdX.

910. After acquiring DoubleClick, Google continued offering the Dynamic Allocation feature on DFP. In addition, Google rebuilt the nascent DoubleClick ad exchange on its own ad tech stack with real-time bidding, which allowed buyers to submit bids based on real-time information about the impression for sale as opposed to static bids. 9/16/24 AM Tr. 69:13-70:6 (Mohan). The real-time bidding auction benefited both advertisers and publishers because advertisers could decide how much they valued an impression based on improved information and bid more if they valued an impression. 9/24/24 AM Tr. 62:13-63:5 (Milgrom); 9/11/24 PM Tr. 38:4-8 (Ravi).

911. Plaintiffs use the term "first look" to refer to how the same Dynamic Allocation feature that DoubleClick designed in 2007 worked when paired with the AdX auction. 9/16/24 PM Tr. 135:16-136:20 (Abrantes-Metz). Publishers could, before offering impressions via the waterfall, give AdX bidders a "first look" by first running an AdX auction using the highest predicted value from the waterfall as the price floor to see if any AdX bidders were willing to pay more. 9/11/24 AM Tr. 96:9-14 (Ravi).

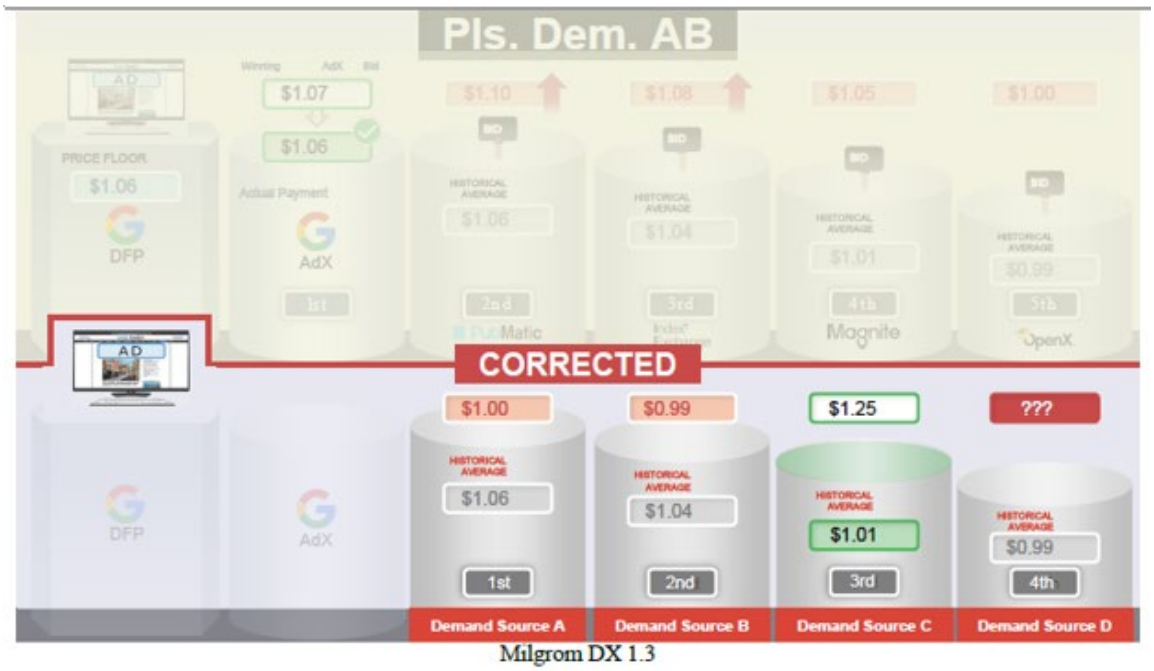
912. When publishers chose to grant AdX bidders a "first look" after AdX was re-launched with real-time bidding, publisher revenue increased even more than using Dynamic

Allocation with an ad exchange using static bids. DTX-80 at 2 (2010 Google study finding the combination led to a 188% increase in revenue, on average, when AdX won the auction); 9/24/24 AM Tr. 61:15-62:5 (Milgrom); 9/23/24 AM Tr. 63:22-23 (Korula).

913. Plaintiffs ignore historical context in order to argue that "first look" harmed publishers and advertisers. As Professor Milgrom explained, Plaintiffs' experts failed to consider what was "already available in the market and the capabilities and processes of the existing participants." 9/24/24 AM Tr. 27:1-7 (Milgrom); *see also* Israel DX 4; 9/26/24 PM Tr. 20:10-23:22 (Israel).

914. For example, Plaintiffs argue that "first look" reduced publisher revenue and match quality because, if AdX was called first and won, an advertiser later in the waterfall—after AdX—might have been willing to pay more for an impression but never had the opportunity to bid. 9/11/24 AM Tr. 96:20-97:2 (Ravi); *see also* 9/16/2024 PM Tr. 137:13-23 (Abrantes-Metz); 9/12/24 PM Tr. 86:7-16 (Goel). Plaintiffs are taking issue with an inefficiency that always existed in the "waterfall" system, predating both Google's acquisition of DoubleClick and DoubleClick's design of Dynamic Allocation. 9/11/24 PM Tr. 24:9-14 (Ravi); 9/12/24 PM Tr. 61:6-62:14 (Goel). That inefficiency was not created by either Dynamic Allocation or "first look."

915. As illustrated below, Milgrom DX 1.3 (contrasted with Professor Ravi's Plaintiffs' Demonstrative AB), because the waterfall system was sequential there was always a possibility that an advertiser on a later demand source valued the impression more, but was never called. Dynamic Allocation did not change the sequential nature of the waterfall. 9/24/24 AM 36:3-11, 40.1-16 (Milgrom); 9/23/24 AM Tr. 57:23-24 (Korula) (Google did not invent the waterfall).



Milgrom DX 1.3

916. Plaintiffs conflate the innovation of real-time bidding with the development of Dynamic Allocation, even though the two were separate innovations by different companies at different times. Plaintiffs' experts complained that, when AdX received a "first look," AdX competed with real-time bids against a price floor that was based on static values. 9/18/24 AM Tr. 120:20-121:1 (Abrantes-Metz); 9/11/24 AM 98:14-20, 99:7-23 (Ravi). That was simply a function of the fact that Google had innovated real-time bidding on AdX, so AdX could compete with real-time bids, and was not related to the design of Dynamic Allocation.

c. Publishers Chose Whether to Give AdX Bidders a "First Look."

917. With Dynamic Allocation, publishers retained complete control over their DFP set-up. Publishers were free to place third-party, non-Google demand sources, including exchanges and ad networks, at higher priority levels than AdX within DFP so that AdX would not receive a "first look." DTX-376 at 7 (2017 Google deck stating that certain priority levels for other exchanges "prevent AdX from competing in DA"), 25 (showing priority levels). As Plaintiffs'

witness from a rival exchange confirmed, whether "AdX was first in line" was "entirely dependent on each individual publisher and their own strategies." 9/9/24 PM Tr. 44:13-24 (Casale).

918. Plaintiffs' experts Professor Ravi and Dr. Abrantes-Metz agree that publishers could configure DFP to call other exchanges before AdX. 9/11/24 AM Tr. 105:25-106:9 (Ravi) ("I did find some ways that exchanges could be placed ahead of AdX."); 9/11/24 PM Tr. 30:9-14 (Ravi) (using "configurable priorities," publishers could put exchanges "in any order"); 9/18/24 AM Tr. 35:3-36:21 (Abrantes-Metz). They complain, however, that publishers may not have used this "workaround" very much. 9/11/24 AM Tr. 110:3-111:6 (Ravi); 9/18/24 AM Tr. 35:3-36:21 (Abrantes-Metz).

919. Neither Professor Ravi nor Dr. Abrantes-Metz explained why publishers would want to work around a feature that made them more money. Nor did either expert base their speculation on an actual analysis of the degree to which publishers prioritized other exchanges. Testifying under cross-examination, Professor Ravi conceded that there were "maybe thousands" of publishers and that he did not "know what they were doing" as to whether they put other exchanges before AdX. 9/11/24 PM Tr. 30:15-23 (Ravi). Dr. Abrantes-Metz's testimony was limited to the degree to which publishers "potentially" prioritized other exchanges. 9/18/24 AM Tr. 35:3-36:21 (Abrantes-Metz).

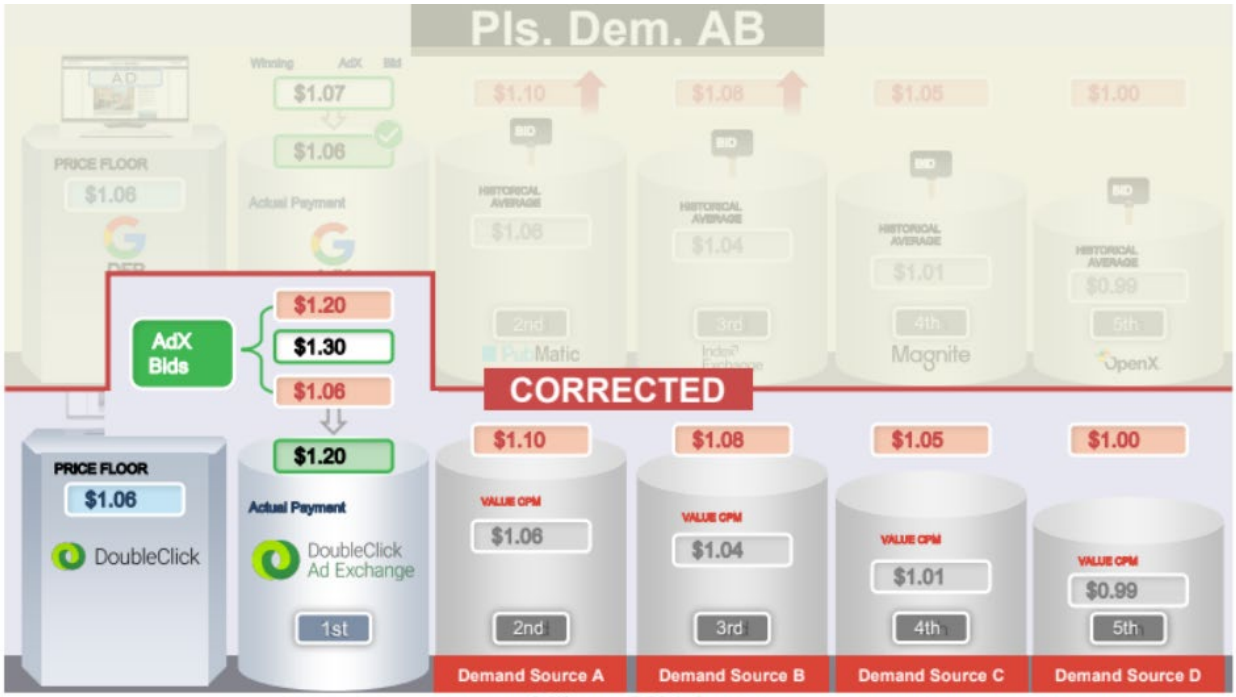
d. Publishers that Chose to Give AdX Bidders a "First Look" Set the AdX Floor Price and Made More Revenue.

920. Publishers that chose to give AdX a "first look" never made less money than they expected to make in the waterfall, and usually made more.

920.1. AdX would only win the impression if an AdX bidder bid as high as or higher than the price floor. 9/24/24 AM Tr. 54:18-55:10 (Milgrom); *see also* Milgrom DX 1.7. Since Dynamic Allocation set the at the highest static price

that the publisher assigned to a demand source in the waterfall (also referred to as a "value CPM"), the publisher could not make less from AdX than the highest value CPM in the waterfall. 9/24/24 AM Tr. 40:23-41:17 (Milgrom).

920.2. A publisher would always make more than the highest value CPM if multiple bids on AdX exceeded the price floor. As shown below, Milgrom DX 1.5, for example, a publisher could set the floor price for AdX at $1.06 and make 14 cents more, $1.20, if two AdX bidders bid above the price floor. 9/24/24 AM Tr. 40:23-41:17 (Milgrom).



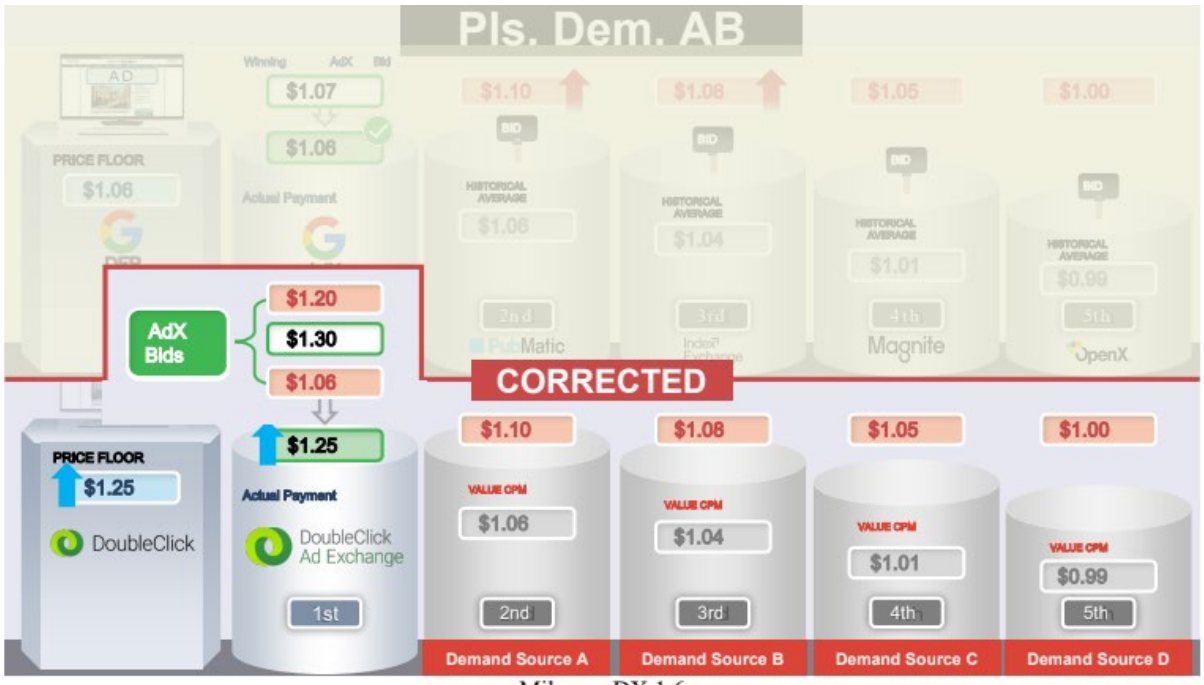
Milgrom DX 1.5

920.3. It was not just possible that publishers would make more from giving AdX a "first look," but "quite common" that they would. 9/24/24 AM Tr. 77:25-78:19 (Milgrom). In the AdX auction, it is "more frequent" that there are multiple AdX bids higher than the price floor than just one bid higher than the price floor. *Id.* at 76:10-77:1 (Milgrom). When there are multiple that exceed

the price floor, the AdX winning bidder pays the second-highest bid, which is higher than the price floor. *Id*. at 76:10-77:1, 77:25-78:19 (Milgrom).

921. Publishers could increase their revenues even more using "first look" by making AdX bidders beat a higher price floor than the highest value they expected to receive from a demand source in the waterfall. As Professor Milgrom explained, publishers were incentivized to do so because, when you are setting the floor price for an auction, "you always want to set the floor price to be at least as high—higher than, actually, the—your outside option." 9/24/24 AM Tr. 52:24-53:10 (Milgrom); 9/11/24 PM 32:16-18 (Ravi) (the publisher had the choice to set the price floor as high as they wanted); *see also id.* at 34:5-14 (Ravi). Publishers wanted to "hold out for a higher price," so they set floor prices for the AdX auction that "typically were much higher than the prices that would be quoted to the ad networks further down the waterfall." 9/24/24 AM Tr. 63:14-64:23 (Milgrom).

922. If a publisher set the floor price higher, then it would receive more than the publisher expected to receive in the waterfall even if only one AdX bidder was higher than that floor price. 9/24/24 AM Tr. 53:11-21 (Milgrom). For example, as demonstrated below, a publisher could set the price floor for the AdX auction at $1.25, higher than the value CPMs in the remainder of the waterfall. As long as one AdX bid exceeded $1.25, the publisher would make extra money. Milgrom DX 1.6.



Milgrom DX 1.6

923. Dr. Abrantes-Metz disagreed with Professor Milgrom's demonstration of how second-price auctions worked with "first look" to increase publisher revenue. Dr. Abrantes-Metz claimed that Professor's Milgrom's numbers demonstrated that publishers were actually harmed by "first look." 9/16/24 PM Tr. 137:24-139:1 (Abrantes-Metz). On cross-examination, however, she admitted that the numbers she referenced were her "calculation of his own simulations," not Professor Milgrom's numbers. 9/18/24 AM Tr. 103:16-19 (Abrantes-Metz).

923.1. Professor Milgrom is one of the founders of the field of market design, and he received a Nobel Prize in economics for improvements to auction theory and invention of new auction methods in 2020. 9/24/24 AM Tr. 18:17-19:2, 20:7-13 (Milgrom); DTX-2536 (Milgrom CV). His work has been cited over a hundred thousand times, including by Plaintiffs' experts Professors Ravi and Weintraub. 9/24/24 AM Tr. 19:11-23 (Milgrom). He has worked with numerous companies in display advertising, as well as advised public sector

clients (including US federal agencies) on auctions. *Id.* at 21:24-23:7 (Milgrom).

923.2. Dr. Abrantes-Metz is not an expert in digital advertising. 9/18/24 AM Tr. 68:5-7 (Abrantes-Metz). Nor is she an expert in the subfield of market design. 9/24/24 AM Tr. 19:24-20:3 (Milgrom) ("I have not encountered her in the subfield of market design at all."). Moreover, Dr. Abrantes-Metz's testimony revealed that she had no understanding of how "first look" worked as a technical matter. *See* 9/18/24 AM Tr. 117:12-118:12 (Abrantes-Metz) (suggesting that "first look" could have been extended to other exchanges by just making "a change in the order").

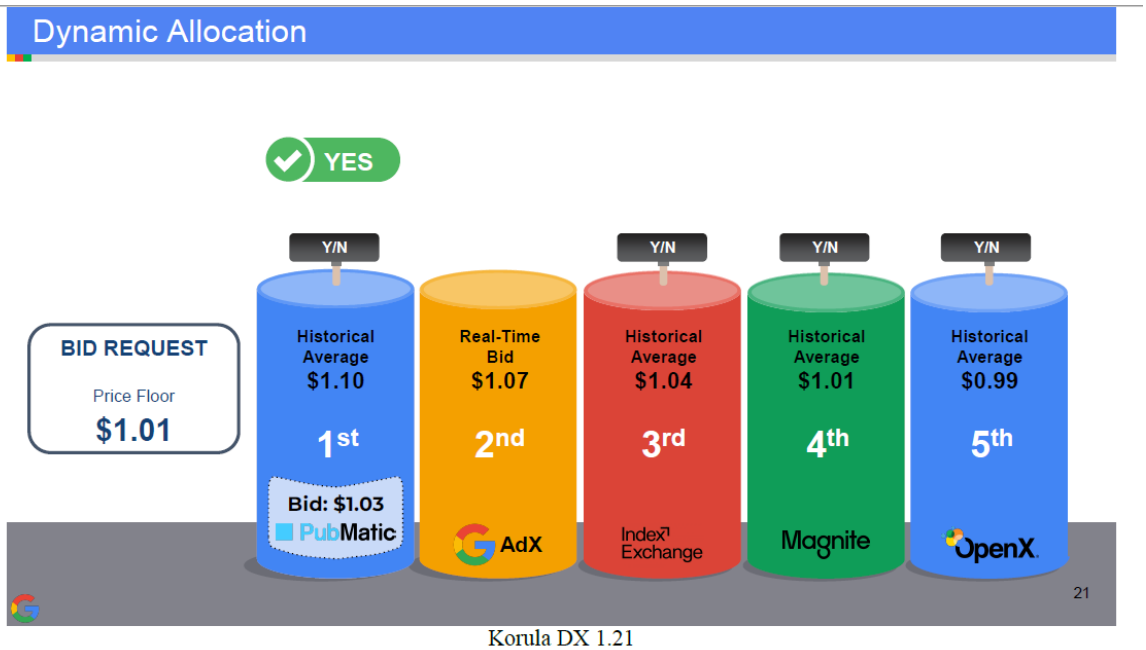
924. Because publishers were incentivized to set higher floor prices for AdX, granting AdX a "first look" both advantaged and disadvantaged AdX bidders.

924.1. To their advantage, "if you are in first position, you get to look at all of the inventory, and that's an advantage, you get to select the inventory that's of most interest to you." 9/24/24 AM Tr. 63:14-64:14 (Milgrom). As Plaintiffs' expert Professor Ravi agreed, "first look" made AdX attractive advertisers. 9/11/24 PM Tr. 37:14-38:6 (Ravi) ("That's a fact.").

924.2. At the same time, however, "the prices that you're facing tend to be higher." 9/24/24 AM Tr. 63:14-64:23 (Milgrom); *see also id.* at 66:17-67:11 (discussing an academic paper by Professor Ravi that explains how an exchange in the first position might face such a high floor price that its advertisers are disadvantaged). An internal 2017 Google email that Plaintiffs rely on stated the same, explaining that AdX buyers "enjoy a competitive

advantage from dynamic allocation because they receive first look," but this "first look" also results in AdX buyers paying "higher CPMs." PTX-551 at -048.

924.3. An example is illustrated below. Korula DX 1.21. A publisher could choose to set a general price floor of $1.01 and set the "price" of PubMatic, the first exchange in the waterfall, at $1.10. If the publisher chose to use "first look" to run an AdX real-time auction, AdX bidders would need to beat the highest "price" in the waterfall, or $1.10. But other demand sources would face only the lower price floor of $1.01. That means an AdX advertiser might bid $1.07 and not win the impression, so AdX would "pass back" the impression to the first source in the waterfall. A PubMatic advertiser could bid only $1.03 and win—despite offering a lower bid than the AdX advertiser. 9/23/24 AM Tr. 61:12-19 (Korula). In other words, the AdX advertiser became "a victim of the inefficiency of the waterfall" and lost an impression despite bidding more. *Id.* (Korula). In this example, the AdX advertiser is disadvantaged, not advantaged, as a result of a publisher's choice to use "first look." *Id.* (Korula).



Korula DX 1.21

925. Nor could "first look" unfairly advantage AdX bidders by allowing them to "peek" at competing bids. Bidders in a second-price auction do not benefit from seeing the amounts of the other bids because it is always in their interest to bid their maximum value for the impression regardless of what the other bids are. 9/24/24 AM Tr. 49:24-50:20 (Milgrom) ("There's no advantage at all in the second-price auction to learning what the other bids will be."); *see also* 9/11/24 AM Tr. 124:25-125:22 (Ravi) ("In a second-price auction, it doesn't make sense" to bid lower because bidding lower "doesn't affect how much you pay.").

926. Professor Milgrom empirically studied whether "first look" resulted in buyers later in the waterfall getting lower-quality inventory and "found no evidence that that was taking place."[47] 9/24/24 PM Tr. 28:16-24 (Milgrom). As he explained, display advertising is "a matching

[47] None of Plaintiffs' experts provided any empirical support for Professor Ravi's claim that rivals were disadvantaged by "first look" because they only saw lower-quality inventory. 9/11/24 AM 102:10-103:12 (Ravi). Instead, Professor Ravi showed a few lines from a single email, with no discussion of the basis for the statements, who the writer was, or how the email is informative or relevant given that it is from 2017—three years after header bidding rendered the waterfall and

market" in which an impression's value is different for different advertisers. *Id.* at 27:17-28:10 (Milgrom). For example, an impression where the user has shown interest in buying shoes will be very valuable to a shoe store advertiser, but comparatively less valuable to a restaurant advertiser. 9/24/24 AM Tr. 70:2-16 (Milgrom). In such a market, "what's good for me and what's best for me and what's best for you might be different. And the one with first look is able to select the ones that are best for the first buyer," which is unrelated to what is best for the next buyers. 9/24/24 PM Tr. 27:17-28:10 (Milgrom).

e. Plaintiffs' Experts' Complaint About "First Look" Is that Google Did Not Build Integrations with Rivals or Invent Header Bidding Sooner.

927. Plaintiffs complain that, in 2009, Google should have built in DFP new technology enabling publishers to give rival exchanges a "first look"—in other words, for DFP to send third-party exchanges a price floor based on other line items in DFP and solicit real-time bids from those third-party exchanges. 9/18/24 AM Tr. 117:13-118:12 (Abrantes-Metz) ("all that would have to be done would be for DFP to call that exchange first rather than calling second," "it was just a change in order"). Yet from the time that Dynamic Allocation was invented—which was before any real-time bidding even existed—until Google created Open Bidding, no such technology existed. 9/12/24 AM Tr. 14:10-17 (Srinivasan) ("The technology did not exist" for DFP "to solicit bids from other competing exchanges."). In other words, Google "did not have the technical capability" to "extend Dynamic Allocation to other demand sources besides AdX." 9/19/24 AM Tr. 139:16-23 (Bellack).

"first look" obsolete, *infra* ¶¶ 933-934. 9/11/24 AM 104:3-105:24 (Ravi) (discussing PTX-551); PTX-551.

928. Plaintiffs' experts admitted they did not know what technical work Google would have to undertake in order to create this new technology, much less what work would have been required in the time period that publishers used "first look" set-ups.

928.1. For example, Professor Ravi testified: "Q. Do you know whether first look was something that was in place due to the technology from DoubleClick for Publishers and whether Google, in order to get rid of that, would have had to redesign the system? Do you know? A. I don't, but the waterfall is—there is no technology that locks in that first position in any way. The waterfall is just an ordering. So I don't understand what technology you'd be referring to." 9/11/24 PM 27:18-25 (Ravi); *see also id.* at 43:22-44:1 (Ravi) ("Q. Do you know how much technological work went into building unified first price auction—A. No, I don't. Q. You know it was a lot, don't you? A. No, I don't know how much it was. Yeah.")

928.2. Dr. Abrantes-Metz conceded she did not know whether and what technical work would have been required to create the ability to give a "first look" to bidders on rival exchanges, but claimed the issue was "more or less" irrelevant to her opinion. 9/18/24 AM Tr. 78:15-79:7 (Abrantes-Metz).

929. At the time that publishers used "first look," AdX was the only ad exchange integrated with DFP closely enough that price floors for AdX auctions could be set by line item values from DFP. 9/18/24 AM Tr. 17:23-18:3 (Spencer). That integration was precisely what guaranteed that "first look" was a "risk free" way for publishers to increase revenue, as a publisher using "first look" would never receive less from AdX than the highest expected value from the waterfall (which corresponded to a DFP line item). DTX-117 at 117 (2010 white paper on

Dynamic Allocation commissioned by Google); *see also* DTX-45 at 2 (2009 Google email noting no Dynamic Allocation is possible without integration into ad servers). In order to extend the same "first look" set-up to rival exchanges and protect publishers' interests, Google would have had to build similar integrations between third-party exchanges and DFP as between AdX and DFP. 9/19/24 PM Tr. 25:23-26:11 (Levitte) (technical integrations between DFP and other real-time exchanges "is fairly onerous and didn't exist prior to" Open Bidding).

930. Even today, long after Dynamic Allocation was first created and "first look" was used by publishers, building such an integration between a rival exchange and DFP would require significant work. 9/19/24 PM Tr. 26:4-11 (Levitte) (integration is "very effort intensive," "there are a lot of things that can break," and integration "entails a significant investment of time and effort"). As PubMatic, a competitor exchange, testified, integrating PubMatic's exchange to Google's ad server would require Google to build an API, write the documentation, and test and scale the new code. PubMatic's integrations with third-party publisher ad servers have taken three to six months. 9/12/24 PM Tr. 93:7-16, 115:1-7 (Goel).

931. Similarly, as explained above, *supra* ¶¶ 884-894, technical work would be required to build integrations that allowed non-Google publisher ad servers to run Dynamic Allocation using real-time bids from AdX. 9/18/24 AM Tr. 17:14-18:16 (Spencer) (Dynamic Allocation "requires integration on the actual primary ad server to make it work").

932. Plaintiffs' other complaint about "first look" is that Google did not create new technology in DFP to allow both AdX and other exchanges to compete head-to-head using real-time bids from each exchange, not static line items in the waterfall.[48] 9/20/24 AM Tr. 86:2-9 (Lee);

[48] Professor Ravi also complained that "first look," "last look," and UPR were not "an optimal way to sell these impressions on behalf of Google's customers." 9/11/24 AM Tr. 94:2-9 (Ravi). In

9/11/24 AM 97:6-99:23 (Ravi) (criticizing "first look" for enabling AdX to bid in real-time while other exchanges used static bids); 9/16/24 PM Tr. 24:2-15 (Weintraub) (comparing publisher revenues under first look to publisher revenues under a "head-to-head" scenario).

933. On cross-examination, Plaintiffs' experts admitted that this critique is ahistorical. The technology to compare real-time bids from exchanges against each other would not exist until header bidding was invented in or around 2014. 9/11/24 AM 111:8-11 (Ravi); 9/16/24 PM Tr. 84:20-24 (Weintraub) ("when first look first appeared around 2009, head-to-head didn't exist"); 9/25/24 PM Tr. 170:6-8 (Hochberger) (header bidding changed the waterfall dynamic by allowing "all networks to submit a real-time bid to compete in real-time"). At that time, rival exchanges had not yet invested in the technology to submit real-time bids into other publisher ad servers, like DFP, so there was nothing DFP could do unilaterally that would enable it to compare real-time bid amounts from multiple exchanges at once. 9/23/24 AM Tr. 62:23-63:10, 64:3-13 (Korula).

934. Professor Ravi and other witnesses agree that, once publishers adopted header bidding, "first look" no longer existed. 9/11/24 AM 111:12-112:18 (Ravi); *see also* 9/18/24 AM Tr. at 140:4-11 (Wheatland) ("So the adoption of client-side header bidding allowed for essentially the removal of first look for AdX within the ad server, and it allowed for non-Google exchanges to compete in a unified auction inside of Google Ad Manager."); 9/24/24 PM Tr. 38:8-16 (Milgrom) (once header bidding is dominant, first look "becomes essentially just last look"); 9/23/24 AM Tr. 68:12-19 (Korula) (Once header bidding took hold, "we didn't have a first look at all. In fact, publishers would call their header bidding partners even prior to Ad Manager getting any call or

other words, Professor Ravi complained that Google did not create an even more efficient innovation than the one it launched.

Ad Manager knowing that an ad request existed."). Plaintiffs are therefore complaining that Google did not invent header bidding, or a similar technology like Open Bidding, sooner.

935. By Plaintiffs' lights, Google should have simply innovated faster, even though all innovation builds on what came before and the other parallel developments in the industry. Plaintiffs' demand would be harmful to competition because customers would be deprived of incremental innovation. In addition, firms would be disincentivized from innovating for the risk of being deemed anticompetitive for failing to launch innovations fast enough. 9/26/24 PM Tr. 21:9-22:8 (Israel) ("It's all really just other versions of the requirement to deal. If you tell firms they have to do things in a certain way, it's going to make it harder to invest."); *see also id.* at 6:19-24 (Israel).

2. Dynamic Allocation with Header Bidding ("Last Look")

936. For the time period after header bidding emerged until the Unified First Price Auction, Plaintiffs complain about a different configuration of Dynamic Allocation in DFP. Before header bidding, with Dynamic Allocation, AdX floors were based on the static values ("value CPMs") publishers assigned to other exchanges in the waterfall. 9/12/24 AM Tr. 14:10-17, 28:20-29:11 (Srinivasan). After header bidding emerged, those same value CPMs became informed by real-time bids from other exchanges competing in header bidding. *Id.* at 28:20-29:11 (Srinivasan).

937. "Last look" refers to one way that publishers could configure DFP to use Dynamic Allocation with header bidding bids. 9/12/24 AM Tr. 28:20-25 (Srinivasan) ("last look was an industry terminology that came about"); 9/11/24 AM Tr. 111:12-16 (Ravi); 9/25/24 PM Tr. 171:23-172:11 (Hochberger).

938. Neither DoubleClick nor Google could have foreseen header bidding when Dynamic Allocation was first invented and continued on Google's version of DFP. 9/12/24 AM

Tr. 14:10-17 (Srinivasan) (The "technology did not exist to solicit bids from other competing exchanges"); 9/23/24 AM Tr. 62:23-63:10 (Korula). They could not have designed Dynamic Allocation to grant a "last look." 9/23/24 AM Tr. 70:5-11 (Korula) ("I don't think it's accurate to say that we designed this last-look advantage at all.").

a. Publishers Chose Whether to Give AdX Bidders a "Last Look."

939. Publishers who ran header bidding auctions chose what to do with the winning header bid. 9/24/24 AM Tr. 74:18-75:5 (Milgrom); *see also* 9/23/24 AM Tr. 34:23-37:23 (Korula) (testifying that publishers determine the mechanism and price by which header bidding bids are reflected within Google Ad Manager); 9/11/24 PM Tr. 39:22-40:1 (Ravi). One option was to not call AdX at all and "just take the highest header bidding bid and serve its ad for that impression." 9/24/24 AM Tr. 74:18-25 (Milgrom).

940. If a publisher wanted to use the header bidding bid to generate more competition for the impression, it could also use the header bid "to determine a line item in DFP." 9/24/24 AM Tr. 74:18-25 (Milgrom); *see also* 9/11/24 PM Tr. 39:15-40:6 (Ravi). Dynamic Allocation would then trigger an AdX auction using the header bid line item as the price floor. 9/24/24 AM Tr. 74:18-25 (Milgrom). According to Plaintiffs, AdX bidders would thus receive a "last look." 9/16/24 PM Tr. 24:16-25:1 (Weintraub); *see also* 9/23/24 AM Tr. 68:20-69:8 (Korula).

941. Publishers had full control over whether to give AdX bidders a "last look." 9/11/24 PM Tr. 39:15-40:6 (Ravi); 9/25/24 PM Tr. 172:7-23 (Hochberger) ("last look" was something Mediavine "set up on purpose as a publisher" to "increase revenue"). Plaintiffs' own publisher witnesses agreed that publishers could "turn off" last look by not giving impressions to AdX. 9/27/24 AM Tr. 92:16-23 (Wheatland) (The Daily Mail "could always turn last look off"); 9/10/24 AM Tr. 88:19-23, 89:22-90:2 (Layser) (NewsCorp could take "the last look functionality out of Google").

942. Even among the publishers that testified at trial, at least one acknowledged using DFP to deny AdX bidders the opportunity to bid on certain impressions at all. A former employee of News Corp testified that News Corp ran a 2019 study that adjusted its DFP set-up so that other exchanges were called "ahead of AdX in DFP." 9/10/24 AM Tr. 89:20-21 (Layser). In that set-up, News Corp could set up DFP so that AdX bidders could only submit bids if other demand sources, such as Prebid and Amazon TAM, were not interested in a particular impression. 9/10/24 AM Tr. 89:22-91:1 (Layser); DTX-655 at 2 ("Google could not compete if other SSPs bid but could provide backfill in the absence of any bids."). The results of the study showed that News Corp's revenue from AdX decreased, while News Corp's revenue from Amazon TAM increased by 94%, Facebook Audience Network by 75%, AppNexus by 115%, and Index Exchange by 82%. DTX-655 at 3.

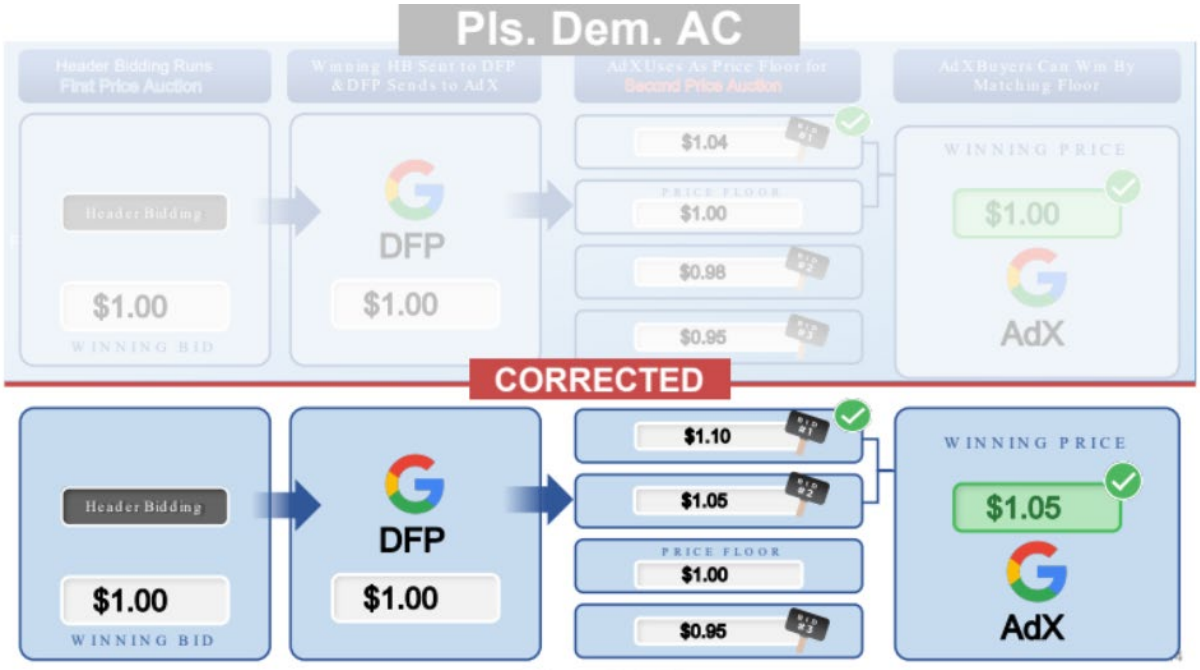
b. Publishers that Chose to Give AdX Bidders a "Last Look" Set the AdX Floor Price and Made More Revenue.

943. Publishers who chose to grant AdX bidders a "last look" also set the AdX floor price by choosing the value of the header bid line item that would be used as the floor. 9/24/24 AM Tr. 78:20-79:5 (Milgrom); 9/23/24 AM Tr. 34:23-37:23 (Korula).

944. One option for publishers was to simply set that price floor amount at the amount of the winning header bid. 9/24/24 AM Tr. 78:20-79:5, 141:23-25 (Milgrom). According to Plaintiffs, this particular "last look" set-up granted an "advantage" to AdX because an AdX bidder would win as long as it was at least as high as the header bid. 9/16/24 PM Tr. 24:16-25:1 (Weintraub). It was, however, always the publisher's choice—not any choice AdX or DFP made—whether to implement "last look" "in a way that gave AdX an advantage." 9/24/24 AM Tr. 141:23-142:4 (Milgrom); *see also* 9/24/24 PM Tr. at 27:3-9 (Milgrom).

945. As Mediavine, a publisher, testified when asked if "last look" was "unfair": "Yield is all that matters" to a publisher. 9/25/24 PM Tr. 172:12-19 (Hochberger). Ultimately, "last look" was "the setup we set up on purpose as a publisher." *Id.* at 172:20-23 (Hochberger).

946. Even in the version of "last look" that Plaintiffs characterize as giving AdX an "advantage," publishers using the "last look" set up never made less than they expected to receive from header bidding and often made more. *E.g.*, 9/25/24 PM Tr. 172:12-23 (Hochberger) ("the reason I would put Google into that mix would be to increase revenue"); 9/11/24 PM Tr. 83:11-84:2 (Ravi). As with "first look," *supra* ¶ 920, because AdX ran a second-price auction, publishers who used "last look" received more money for their inventory whenever more than one bid in the AdX auction exceeded the floor price. 9/24/24 AM Tr. 76:10-77:1 (Milgrom) (testifying that auction prices were higher as a result). As shown below, if a publisher set the AdX floor price at $1.00 to match the winning header bid, it would make more than $1.00 (here, $1.05) if two AdX bidders bid higher than $1.00. Milgrom DX 1.9. As Professor Milgrom explained, the existence of two bids above the price floor is "quite common." 9/24/24 AM Tr. 77:25-78:19 (Milgrom).



Milgrom DX 1.9

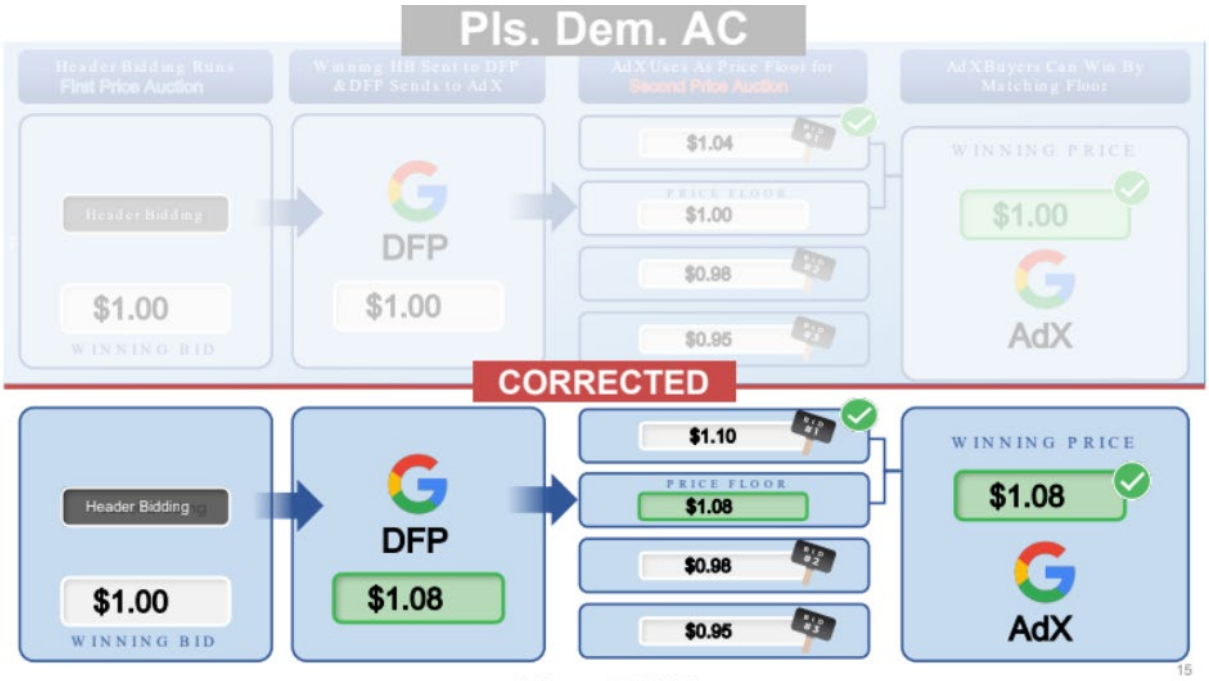
947. Publishers could make even more money by setting the AdX price floor higher than the winning header bid.

948. One way to do this was by inflating the value CPM of the header bid line item, which would be used as the AdX price floor. 9/24/24 AM Tr. 75:1-15, 79:18-80:14 (Milgrom); 9/11/24 PM Tr. 40:16-24 (Ravi). A publisher could set the header bid value CPM at the same as the highest header bid, lower, or higher. 9/24/24 AM Tr. 78:20-79:5 (Milgrom) ("The Court. And, again, this price floor we're talking about results from header bidding that's already occurred. A. True. But it's chosen by the publisher, and the publisher can choose the level of the price floor. The Court. So the publisher could choose the highest bid that came in through header bidding or a lower number; correct? A. Or a higher number. The Court. Or higher number."). In other words, publishers could decide "that the bid from AdX or Open Bidding needs to be twice as high as the header bidding bid in order to win." 9/23/24 AM Tr. 14:11-15:14, 37:2-19 (Korula). There was no limit on how high the header bidding line item could be set. *Id.* at 37:20-23 (Korula).

949. A publisher could also achieve the same goal by simply setting a separate, higher price floor for the AdX auction. *E.g.*, DTX-578 at 1 (2018 Google document: "AdX Pricing rules allows publishers to set reserve prices on AdX bids"); 9/24/24 AM Tr. 139:24-140:16 (Milgrom).

950. As with "first look," publishers not only could set higher price floors on AdX, but were incentivized to make the AdX floor price higher than what they were guaranteed to get from header bidding. 9/24/24 AM Tr. 75:1-15, 80:2-14 (Milgrom); *see also id.* at 78:1-11 (Milgrom) (Any "time you run an auction, you always want to set the floor price higher than your best outside option, and when header bidding has taken place, that header bid is an outside option. So you'd want to set a price floor higher than that, not lower."); *id.* at 80:2-14 (Milgrom) ("The worst that happens is that you set the floor price too high and you get your outside option of $1 anyway.").

951. When publishers inflated the value CPM of the header bid line item or otherwise set a higher floor for AdX, they would make even more money from "last look" because they would receive a higher price every time even a single bid in the AdX auction exceeded the floor price. 9/24/24 AM Tr. 80:2-14 (Milgrom). As shown below, a publisher could choose to set the AdX floor price at $1.08, 8 cents higher than the header bid. With just one AdX bidder willing to pay $1.10, the publisher would make 8 cents more than it would have without AdX. Milgrom DX 1.10.



Milgrom DX 1.10

952. The evidence shows that publishers did use last look and did set higher floor prices for AdX. 9/24/24 AM Tr. 80:18-24 (Milgrom).

952.1. A 2018 Google document noted that some publishers were inflating value CPMs of header bids. "We've anecdotally heard from some publishers that they inflate the value CPM of remnant line items to try and extract more value from AdX (since the remnant line item can set the reserve price for AdX 2P bids) to make it 'work harder.'" DTX-578 at 2; *see also* PTX-1035 at -370-71 (noting that "last look" "incentivizes pubs to inflate ('boost') the floor sent to AdX" by "inflating HB bid results"); 9/24/24 AM Tr. 87:5-88:4 (Milgrom) ("We don't have third-party data, so I don't get to see what actually happens to header bids and whether they're actually inflated." "So all I have available is the descriptions of others who observed evidence. . . . I had determined before I saw" DTX-578 "that I worked out as an economist what the incentives

were for all the parties. . . . I expected to find this evidence, and I found this. So this was intended to confirm my belief that there would be inflation of the header bids.").

952.2. The same Google document calculated that, out of the 54% of auctions that header bidding won when publishers put header bidding in competition with AdX, the price floor for AdX was higher than the header bid line item in 42% of those auctions. DTX-578 at 2 ("tree diagram"); *see also* 9/24/24 AM Tr. 88:11-90:8 (Milgrom) ("those header bidding line items may already be inflated, but even after they have been inflated, this says 42 percent of the time the floor price" for AdX was "even higher than the header bidding line item price"); 9/12/24 AM Tr. 39:10-40:7 (Srinivasan).

952.3. Publishers even had access to tools that specifically assisted in inflating the value CPMs of header bids so that AdX would have to beat a higher floor. Prebid, a popular header bidding tool, offers a Bid Adjustments feature (which consists of open-source code that can be easily inserted by the publisher) that automatically inflates the value CPM of header bids before entering them as line items in DFP. 9/24/24 AM Tr. 81:20-82:4, 82:13-83:17 (Milgrom).

952.4. Nitish Korula, an engineering director responsible for DFP and AdX, testified that his "understanding at the time was that it was quite common" for publishers to boost the value CPM associated with a header bidding bid. 9/23/24 AM Tr. 153:18-154:9 (Korula).

953. As Plaintiffs' experts agree, the publishers who chose to give AdX a "last look" made more money. According to a 2019 Google experiment that Professor Weintraub relied on

to calculate the effects of "last look," the removal of "last look" would cause publisher payouts from AdX to decrease by 10.64 percent. 9/16/24 PM Tr. 73:20-24 (Weintraub); PTX-1035 at -359. Professor Ravi testified that "last look" made more money for publishers, even if "not as much as a unified first-price auction that came later." 9/11/24 PM Tr. 41:10-23 (Ravi); *see also id.* at 42:18-43:3 (Ravi); 9/23/24 AM Tr. 70:1-4 (Korula) (not sharing "last look" information "would have resulted in reduced revenue for publishers").

954. Plaintiffs complain that, when publishers gave AdX a "last look," AdX could "see the competitor's price" and bid "just the minimum price it had to pay to win the transaction." 9/18/24 AM 38:2-20 (Abrantes-Metz). The publisher would make less money, they claim, while bidders on AdX took the impression from bidders on header bidding exchanges. 9/18/24 AM 38:2-20 (Abrantes-Metz); *see also* 9/11/24 AM 120:23-211:8 (Ravi).

955. Plaintiffs' complaint misunderstands how AdX works, misunderstands the motivations of AdX bidders in a second-price auction, misunderstands publishers' incentives to set up "last look," and ultimately is based on no actual analysis of whether AdX was ever bidding "just the minimum price it had to pay to win."

956. First, Plaintiffs' complaint ascribes bidding strategy to AdX when AdX does not and cannot have any such strategy. AdX does not bid; it is a mechanism for conveying the bids of its advertiser customers and facilitating transactions. *See, e.g.*, 9/18/24 PM Tr. 99:4-18 (Abrantes-Metz) (conceding "AdX doesn't do any bidding itself" and that, instead, the bids come from "buyers in an AdX auction who all bid for that impression" "based on the value that they perceive from that impression"); 9/23/24 AM Tr. 70:12-71:4 (Korula) ("First of all, AdX is not bidding. Right. It's AdX's buyers who are bidding. So AdX is not bidding 1 penny more. But secondly,

these buyers are not just competing with that floor price, they're competing with each other, and we have hundreds of Authorized Buyers.").

957. Second, Plaintiffs' assertion that, when publishers used "last look," AdX bidders were systematically incentivized to submit bids that exceeded the floor price of AdX by just a penny is mistaken. As Professor Milgrom, a Nobel Laureate in auction theory, explained, the optimal strategy for all bidders in second-price auctions (including those bidding through AdX) is to bid their maximum value for an impression. "There's no advantage at all" "to learning what the other bids will be." 9/24/24 AM Tr. 49:21-50:20 (Milgrom); *see also* 9/18/24 AM Tr. 99:12-18 (Abrantes-Metz) (admitting that advertisers "bid based on the value that they perceive from that impression").

958. If anything, AdX bidders are disincentivized from bidding just one penny more than the floor price because they must compete with other AdX bidders, too. 9/23/24 AM Tr. 70:12-71:4 (Korula). An AdX bidder that bid just one more penny more would be at risk of being outbid by a competing bidder. *Id.* at 73:12-20 (Korula).

959. Plaintiffs' own expert Professor Ravi agreed, stating that the "logical rational thing to do in second-price auctions" is to bid the true value of the impression to the advertiser, not to reduce bids in order to win with the lowest bid possible. 9/11/24 AM Tr. 124:25-125:22 (Ravi). As he explained: "Let's say you value something at $5 and the next highest bidder is at $3. Let's say you bid shade to $4, you still win, but your bid shading has no consequence on what price you won that impression for. You still pay the same $3. So bid shading doesn't affect how much you pay." 9/11/24 AM Tr. 124:25-125:22 (Ravi).

960. Third, as explained above, *supra* ¶¶ 939-942, publishers chose whether to give AdX bidders a "last look," and they also chose whether to take advantage of the multiple ways they

could make AdX bidders bid higher than the header bid in order to win an impression. Publishers were actually incentivized to boost header bids or set the AdX floor price higher. *Supra* ¶ 950. When they did, AdX bidders could not win an impression by simply bidding one cent more than the header bid.

961. Finally, Plaintiffs did not support their allegation with any systematic empirical analysis of how often AdX bidders won impressions in a "last look" set-up by bidding just one penny more than the header bidding bid. *See* 9/16/24 PM Tr. 24:16-25:15, 68:24-69:15 (Weintraub) (Professor Weintraub's calculation of the effects of "last look" did not examine how much AdX won by). To the contrary, documents and testimony suggest that publishers often set up "last look" so that AdX bidders could not be "advantaged" at all. *Supra* ¶ 952. In addition, by the admission of Plaintiffs' own expert, header bidding remains immensely popular today and continued growing after "last look," which is inconsistent with Plaintiffs' theory that "last look" consistently impeded competition from rival exchanges participating in header bidding. 9/18/24 AM Tr. 98:1-20 (Abrantes-Metz) (header bidding grew and remained immensely popular from 2015 to 2019, the time period "last look" was in effect).

c. Plaintiffs Have Not Shown that Rival Exchanges Were Disadvantaged by Any Interaction Between "Last Look" and Sell-Side Dynamic Revenue Sharing, Which Was a Feature Designed to Facilitate Matches that Would Otherwise Not Be Possible.

962. Sell-side Dynamic Revenue Sharing ("sell-side DRS") was a Google feature that dynamically adjusted AdX's revenue share to enable AdX bidders to win auctions that might not otherwise have had a winner. 9/11/24 PM Tr. 78:2-9 (Ravi); *see also id.* at 48:12-49:4 (Ravi) (agreeing that the primary purpose and effect of sell-side DRS was expanding the number of matches).

962.1. No Plaintiffs' expert opined that sell-side DRS was anticompetitive. 9/19/24 PM Tr. 127:11-24 (Lee).

962.2. But, according to Plaintiffs' experts, the combination of "last look" and sell-side DRS advantaged AdX because AdX could "see" the competing header bid and dynamically adjust its revenue share just enough to beat the competing header bid by one penny. 9/11/24 AM Tr. 114:21-115:6 (Ravi); 9/18/24 AM Tr. 38:21-39:3 (Abrantes-Metz); *see also* 9/11/24 PM Tr. 70:20-71:3 (Ravi) (complaining that, in this set-up, the publisher gets "the exact same amount of money" but the winner is shifted to AdX).

963. Plaintiffs' imagined "advantage" for AdX bidders could, however, only arise if for a given impression: (1) the publisher chose to give AdX a "last look," (2) the publisher chose not to inflate the header bidding bid or set a higher floor price for AdX, (3) only one AdX bidder bid higher than the price floor so the winner paid the price floor, and (4) sell-side DRS operated to reduce Google's revenue share on that particular auction. 9/24/24 PM 25:9-27:9 (Milgrom).

964. Plaintiffs' experts have made no effort to quantify how often—if at all—that theoretical "advantage" arose, much less to quantify the effects of sell-side DRS and "last look" together on rivals. 9/11/24 PM Tr. 47:21-48:4 (Ravi); 9/16/24 PM Tr. 75:19-76:6 (Weintraub) (conceding he had only calculated effects of sell-side DRS in total, not to the extent that it "enhanced" last look despite that aspect being his "focus").

965. As explained below, Google launched sell-side DRS in order to facilitate additional matches for impressions that would otherwise have gone unsold, which would benefit advertisers and publishers and increase Google's revenue. DTX-212 at 1 (2014 Google sell-side DRS product design document); 9/11/24 PM Tr. 48:12-49:4, 78:2-9 (Ravi). Plaintiffs presented no evidence, in

documents or in testimony, to support the speculation of their expert witnesses that the launch of sell-side DRS had any relation or connection to "last look." *Cf.* 9/23/24 AM Tr. 128:22-129:3 (Korula) (asking Google sell-side engineering director, with no reference to any document, whether "last look and Dynamic Revenue Share also allowed Google to win a transaction that otherwise would have been won by another exchange" in theory, to which Korula responded: "That is correct, though as I said, that was not the common case.").

966. Before launching sell-side DRS in 2015, Google had already launched a buy-side version of dynamic revenue sharing in 2013 that achieved a similar purpose. Google observed that buy-side DRS (which later was innovated and became Project Bernanke) improved outcomes for advertisers and publishers and increased Google's revenue.

966.1. Prior to the launch of Project Bernanke, Google observed that "a large fraction of ad requests were going unfilled" on AdX. 9/17/24 AM Tr. 134:20-135:4 (Jayaram); *see also id.* at 135:10-15 (Jayaram) (the unmatched rate was "around 50 percent at the time"). Google viewed this as "a missed opportunity" because those ads were "going completely unmatched." 9/17/24 AM Tr. 134:20-135:4 (Jayaram).

966.2. Google launched Project Bernanke in 2013. DTX-172 at 1 (2013 Google launch presentation). Project Bernanke varied Google Ads' revenue share so that, instead of taking a fixed revenue share of 14% on every bid request, Google sometimes lowered its own revenue share to increase the number of auctions that had winners. 9/17/24 AM Tr. 137:24-138:19 (Jayaram).

966.3. Project Bernanke increased the number of matches between advertisers and publishers. DTX-172 at 5, 6 (experiments showing 11.8% and 8% increase in

matched queries); 9/11/24 PM Tr. 63:12-24 (Ravi) (experimental documents from Google show that buy-side DRS increased matches). Advertisers spent more on ads, and publishers received more revenue. 9/17/24 AM Tr. 138:25-139:8 (Jayaram); DTX-172 at 5, 6 (experiments over short and intermediate periods showing 9.2% and 7.4% increase in advertiser spend, and 8% and 6.4% increase in publisher revenue).

966.4. Although buy-side DRS maintained the same revenue share of 14% on average, Google's profit also increased by 12% due to the increase in auctions that resulted in matches. 9/17/24 AM Tr. 139:9-20 (Jayaram).

967. In 2015, after seeing Project Bernanke's success in increasing matches, Google introduced sell-side DRS "in order to get more auctions with winners (and increased revenue)." DTX-212 at 1 (2014 sell-side DRS product design document); *see also* 9/23/24 AM Tr. 80:3-5 (Korula) (sell-side DRS launched in 2015).

968. Sell-side DRS was directed at auctions that did not have a winner because no advertiser bid higher than the publisher's minimum floor price. 9/23/24 AM Tr. 77:15-78:2 (Korula). Google identified this problem when engineers from the quality team looked "closely at the records of many, many auctions," identifying that there were auctions that were not clearing because of Google's 20% revenue share. 9/23/24 AM Tr. 79:8-15 (Korula). As the sell-side engineering director testified, the intent of sell-side DRS was to "have more transactions occur overall." *Id.* at 80:10-17 (Korula); *see also* DTX-212 at 1 (purpose of sell-side DRS is "to get more auctions with winners (and increased revenue)").

969. The first version of sell-side DRS lowered the revenue share taken by AdX. 9/23/24 AM Tr. 81:8-82:1 (Korula). Reducing AdX's revenue share effectively increases a buyer's bid.

Id. at 78:3-79:7 (Korula). If, for example, the buyer's bid was $1.20, with AdX taking a 20% revenue share the seller would only see a 96-cent bid. *Id*. at 78:3-79:7 (Korula). If, instead, AdX's revenue share was 17% for that particular bid, the seller would see a $1 bid. *Id.* (Korula). If the seller's floor price was set at $1, changing AdX's revenue share could thus enable a match to be made that would not have otherwise been possible. *Id.* (Korula)..

970. In a second, later version of sell-side DRS, Google adjusted AdX's revenue share in both directions—sometimes increasing the revenue share and other times decreasing the revenue share—while maintaining an average revenue share of 20 percent. 9/23/24 AM Tr. 81:8-82:1 (Korula). "This made the product more sustainable because" Google "had seen that otherwise publishers could raise floors and buyers could lower bids such that DRS would no longer sustainably work." *Id.* at 81:8-82:1 (Korula).

971. The third, and last, version of sell-side DRS was called "truthful DRS." 9/23/24 AM Tr. 81:8-82:1 (Korula). "Rather than receiving bids and then determining" its "revenue share for each auction," Google "would determine the revenue share prior to calling buyers." *Id.* at 81:8-82:1 (Korula). Google believed this change made it easier for buyers to bid consistent with their incentives ("incentive compatible") because the revenue share variation was made before the bids were received. *Id.* at 82:7-82:13 (Korula) ("This is not using truthful in the commonly understood sense but in the technical auction sense where perhaps the more accurate phrase would be incentive compatible.").

972. Publishers could choose to opt out of the second and third versions of sell-side DRS. 9/23/24 AM Tr. 82:14-17 (Korula). For example, Mediavine testified that AdX's "variable take rate" was "an optional feature" that Mediavine enabled in order to "make AdX more competitive." 9/25/24 PM Tr. 165:25-166:20 (Hochberger).

973. Post-launch documents confirm that sell-side DRS successfully increased seller revenues and the number of transactions that cleared. DTX-313 at 3 (2016 Google presentation). For example, according to an experiment relied on by Plaintiffs' expert to calculate the effects of sell-side DRS, version 2 of sell-side DRS consistently made publishers more money through AdX and lifted publisher revenue through AdX by 4.17 percent and overall revenue by 2.8 percent (including both AdX and other sources of demand). 9/16/24 PM Tr. 78:3-19 (Weintraub); 9/23/24 AM Tr. 82:23-83:17 (Korula).

974. The "considerable majority" of transactions that were made possible by sell-side DRS were transactions "that wouldn't have otherwise closed, not transactions that would have closed on other exchanges." 9/23/24 AM Tr. 80:18-24 (Korula). Plaintiffs' expert Professor Ravi agrees that sell-side DRS increased matches between advertisers and publishers in auctions that "would have gone unsold." 9/11/24 PM Tr. 48:12-16 (Ravi).

975. Google did not charge anything for sell-side Dynamic Revenue Sharing. 9/23/24 AM Tr. 83:18-21 (Korula).

976. Plaintiffs' expert Professor Ravi testified that "dynamic revenue sharing at auction by any of the participants is good for the ecosystem." 9/11/24 PM 50:11-15 (Ravi). Other ad tech companies (including Xandr and [redacted] also have features similar to sell-side DRS. 9/11/24 PM Tr. 48:5-11 (Ravi); *see also* [redacted]

977. Google discontinued sell-side DRS following the launch of the Unified First Price Auction in September and October 2019. 9/23/24 AM Tr. 83:22-84:2 (Korula); DTX-829 at 1 (2019 Google email: "We have completed the migration . . . to a unified first-price auction."). Google decided to discontinue sell-side DRS with the shift to the Unified First Price Auction because "the nature of floor prices is different in a first-price auction." 9/23/24 AM Tr. 84:3-16 (Korula). In addition, Google was committed to the Unified First Price Auction being "a consistent auction with consistent rules in which generally speaking all the buyers were competing in the same way." *Id.* at 84:3-16 (Korula).

d. Plaintiffs' Experts' Complaint About "Last Look" Is that Google Did Not Build Integrations with Rivals or Invent an "Auction of Auctions" Sooner.

978. In sum, what Plaintiffs call "last look" refers to how publishers could choose to set up Dynamic Allocation to work with header bidding bids after 2014.

979. Plaintiffs' complaint boils down to an assertion that, after header bidding emerged, Google should have built in DFP new technology enabling publishers to give rival exchanges' bidders a comparable "last look." 9/18/24 AM Tr. 39:15-40:1 (Abrantes-Metz).

980. Just as with "first look," until Google created Open Bidding, no such technology—to solicit real-time bids from third-party exchanges based on price floors in DFP—existed in DFP. *Supra* ¶ 929. When Google did build that technology and launched Open Bidding, Google made "last look" information available to the other exchanges that were integrated with DFP through Open Bidding. 9/23/24 AM Tr. 69:19-25 (Korula) ("It's the same" principle, "for all of the buyers who were integrated with us, we were providing as much information as possible to make it easy for them to bid effectively."). In other words, once what Plaintiffs seek was technologically possible, "last look" was extended to the bidders on rival exchanges integrated with DFP via Open Bidding.

981. Plaintiffs also complain that, after header bidding emerged, Google should have invented a way for AdX real-time bids to compete simultaneously with the real-time bids of other exchanges, instead of calling the real-time AdX auction after the header bidding auction. 9/18/24 AM Tr. 39:15-40:1 (Abrantes-Metz); 9/20/24 AM Tr. 85:16-86:9 (Lee).

982. At the time that header bidding first emerged, Google had no such technology. 9/12/24 AM Tr. 14:10-17 (Srinivasan) (The "technology did not exist to solicit bids from other competing exchanges."); 9/19/2024 AM Tr. 139:16-23 (Bellack); 9/23/24 AM Tr. 62:23-63:10 (Korula). Google created that technology for DFP in 2019 when it rolled out the Unified First Price Auction, an "auction of auctions" that finally compared bids from all sources simultaneously. 9/23/24 AM Tr. 93:24-94:12 (Korula); 9/24/24 AM Tr. 124:18-125:25 (Milgrom). At the same time as that rollout, Google removed the option for any "last look" set-up. 9/23/24 AM Tr. 73:1-3 (Korula); 9/12/24 AM Tr. 113:20-115:9 (Srinivasan). Here, too, once what Plaintiffs seek was technologically possible, "last look" was removed.

983. Of Plaintiffs' experts, only Dr. Abrantes-Metz complained about a provision in publishers' contracts with Google Ad Manager that she characterized as contractual "last look." This provision limited publishers from "contact[ing] AdX and then contact[ing] somebody else after AdX." 9/16/24 PM Tr. 125:14-126:12 (Abrantes-Metz).

984. Despite what Dr. Abrantes-Metz calls it, this provision bears no relation to the DFP Dynamic Allocation and header bidding set-up that is referred to as "last look." Nor does the contractual provision require publishers to call AdX for any particular impression. 9/18/24 AM Tr. 95:3-6 (Abrantes-Metz). The provision applies only on an impression-by-impression basis and is triggered only if the publisher chooses to call AdX for a particular impression. *Id.* (Abrantes-Metz). Nothing in the provision—or anywhere else in the contract—requires Google exclusivity

for any period of time or for any number of impressions. *See* DTX-1771 (Google Ad Manager Partner Guidelines).

985. The contractual provision is, as explained above, simply a function of how AdX works. AdX does not return a real-time bid amount that can be compared to other real-time bids simultaneously. *Supra* ¶ 884. To the extent that Dr. Abrantes-Metz is complaining that comparison can only be done today using DFP, she is complaining again that Google has not invested the significant engineering work required to make AdX real-time bid amounts available to rival publisher ad servers. *Supra* ¶¶ 879-894.

E. Alleged Conduct Following the Acquisition of Admeld[49]

986. Plaintiffs' experts complain that Google's 2011 acquisition of Admeld had anticompetitive effects in the publisher ad server and ad exchange markets for two reasons: (1) Google eliminated Admeld's yield management business because it was a competitive threat to DFP in Plaintiffs' asserted publisher ad server market, 9/18/24 AM Tr. 46:4-47:2 (Abrantes-Metz); and (2) Google did not build in AdX an Admeld feature that provided real-time bid amounts from Admeld's exchange to third-party ad servers, 9/20/24 AM Tr. 87:8-12 (Lee); 9/18/24 AM Tr. 47:3-12, 61:8-17 (Abrantes-Metz) (agreeing the API functionality referenced in PTX-141 at -448 is the real-time bidding technology at issue); *see also id.* at 74:21-76:13 (Abrantes-Metz) (admitting her complaint is not that AdX did not implement real-time bidding but that publisher customers could not use rival ad servers to "get the real-time bid from AdX").

987. Prior to the acquisition, Admeld had built integrations for a "small handful" of publishers that provided real-time bid amounts from Admeld's ad exchange to non-Admeld

[49] 9/19/24 PM Tr. 127:11-24 (Lee) ("The five pieces of conduct that I evaluated and examined to be anticompetitive" include "the acquisition of Admeld.").

publisher ad servers. PTX-141 at -448 (2013 Google document). According to Plaintiffs, Google should have built that functionality for AdX when it integrated Admeld's other functionalities so that AdX would send its own real-time bid amount information to other publisher ad servers.

988. Plaintiffs' experts have not opined that Google had substantial market power before 2015, which was four years after the Admeld acquisition. 9/19/24 PM Tr. 45:24-46:5 (Lee).

1. Google Acquired AdMeld and Incorporated Its Traditional Network Yield Management Functionality Because Google, Which Had Focused on Real-Time Bidding, Lacked Network Yield Management Functionality.

989. As discussed above, *supra* ¶¶ 109-111, Google was among the first companies to innovate real-time bidding when it re-launched the DoubleClick ad exchange as AdX in 2009.

989.1. After Google had acquired the DoubleClick publisher ad server and ad exchange, it took significant time and engineering—not just a simple "cut-and-paste"—for Google to successfully rebuild those products on Google's ad tech stack. 9/16/24 AM Tr. 59:14-60:9 (Mohan).

989.2. Because rebuilding DoubleClick's products, and particularly adding real-time bidding to the ad exchange took so long, Google continued offering the core functionality it had acquired at the same time that it was writing new code to rebuild those products on Google's stack. 9/16/24 AM Tr. 60:10-23 (Mohan) ("you don't want to just be standing still in the market" for "years"); DTX-37 at 3 (2009 Google email stating that Google "continued to grow the 1.0 version of the business" while rebuilding AdX). For both DFP and AdX, Google operated DoubleClick's products and rebuilt those products for Google's stack at the same time: "changing the engines on a plane while continuing to fly it." 9/16/24 AM Tr. 62:9-63:17, 70:11-71:4 (Mohan).

990. At around the same time that Google launched AdX, Google first began to evaluate the distinction between the recently rebuilt AdX and another category of tools on the market referred to as traditional yield managers or network yield managers (sometimes referred to at the time as "supply-side platforms"). 9/16/24 AM Tr. 97:4-14, 97:25-99:9 (Mohan). Google considered whether it should invest in developing a network yield management solution. DTX-45 (2009 Google email); 9/16/24 AM Tr. 101:4-20 (Mohan).

991. The primary yield managers in the market at the time were Admeld, Rubicon Project (now Magnite), and PubMatic. 9/12/24 PM Tr. 67:7-16 (Goel). These three yield managers were all significant players in the industry. PTX-112 at -975, -978, -986 (2011 Google document analyzing traditional yield managers).

992. Network yield managers helped publishers optimize their yield from ad networks in the traditional waterfall framework, which ordered networks based on static historical prices. DTX-45 at 1-2 (2009 Google email). As one example of how these yield managers improved on the traditional waterfall, in fall of 2007 PubMatic created "multiple waterfalls" for publishers, "organize[d] waterfalls," and enabled publishers to "change the sequencing of the waterfall on an hourly basis." 9/12/24 PM Tr. 64:11-65:9 (Goel). PubMatic's network yield management technology automatically pulled pricing data from ad networks hourly so that the waterfall would contain relatively up-to-date information. *Id.* (Goel). At that time, PubMatic's network yield manager was an improvement on the existing system because publishers usually used only one waterfall and refreshed the waterfall ordering only weekly or monthly. *Id.* (Goel). "There was no

notion of real-time bidding back then," so even pulling pricing data every hour and reordering the waterfall every hour improved publishers' information about ad network pricing.[50] *Id.* (Goel)

993. From Google's perspective in 2009, after it had innovated real-time bidding, network yield management had "some key differences" from real-time bidding that were a "huge limitation" for yield managers and caused a "big loss of potential revenue across millions of impressions." DTX-45 at 1-2 (2009 Google email). Network yield managers were still ordering the waterfall based on static, historical data, and none "run a real time auction." DTX-45 at 2 (making decisions based on historical data is "like trying to manage yield with imperfect information").

994. In contrast, Google's AdX auction combined with Dynamic Allocation enabled advertisers to bid based on real-time information about an impression and filled publisher inventory based on those real-time bids. 9/16/24 AM Tr. 97:4-99:9 (Mohan) (Dynamic Allocation improved on "static evaluation process that was existing before"); PTX-44 at -913 (2009 Google email listing limitations of Admeld, Rubicon, and PubMatic such as "No true dynamic allocation," "No integration with buy-side platform," "No Real-time Bidder", "No Ad Quality controls," and "No Inventory Quality controls"); PTX-22 at 5[51] (2008 Google presentation noting "yield mgmt. solutions" are a "problem since those solutions allocate based on averages and adsense has much

[50] In January 2009, when PubMatic offered only this yield management functionality and PubMatic had not yet innovated real-time bidding, one of PubMatic's founders reached out to Google to ask that PubMatic's yield manager be integrated with DFP. PTX-36 at -305; 9/12/24 PM Tr. 112:3-113:1 (Goel). Google never provided that API integration. 9/12/24 PM Tr. 113:2-114:8 (Goel).

[51] At trial, Plaintiffs highlighted selected language from a 2008 email: "Larry gave a cautionary green light to proceed on developing the business case. He did not 100% agree to a fully open network—suggested Google set some baseline controls about which exchanges to let in, competitors to restrict, and operating policy." PTX-22 at -725. This language does not show anticompetitive conduct, but instead Google's decision about whether to exercise its freedom to deal or not deal with competitors. 9/26/24 PM Tr. 115:25-116:17 (Israel).

higher CPMs on highly focused pages," which is "suboptimal for users, advertisers, publishers and google"). In other words, real-time information is better than historical information.

995. Accordingly, Google believed that its real-time bidding auction was a superior solution to network yield managers. 9/16/24 AM Tr. 99:19-101:3 (Mohan). Google also believed that real-time bidding was where "the industry was going"; "yield management capability was almost like solving yesterday's problem." *Id.* at 101:4-20 (Mohan) ("like going from CDs to streaming"). Google thus determined that it should not develop a traditional yield management solution in 2009. *Id.* (Mohan).

996. It took longer than Google expected, however, for many industry participants to transition to real-time bidding. "Despite [their] limitations," network yield managers were still "getting traction and positioning themselves as an alternative to exchanges." DTX-45 at 2 (2009 Google email). At a time when the waterfall set-up was relatively familiar but real-time bidding with Dynamic Allocation was very new, it was "a big leap of faith" for publishers to adopt Google's novel solution. 9/16/24 AM Tr. 99:19-101:3 (Mohan). "Cautious" publishers were particularly reluctant to "give up those network relationships they had," which were still managed in the waterfall and optimized using traditional network yield managers. *Id.* (Mohan). Even though Google shared with publishers its excitement about the significant potential to increase yield using Google's innovations, not all publishers were ready to give up yield managers. *Id.* (Mohan).

997. By 2011, Google recognized that traditional network yield management remained "a pressing need for publisher" customers who still sought to manage their non-real time bidding ad networks. PTX-112 at -976, -979 (2011 Google presentation); 9/16/24 AM Tr. 105:2-25 (Mohan) ("It was becoming clear at the time that while we felt that we had the solution that was

the way forward," publishers "wanted to get there maybe in baby steps and wanted to hold onto this older type of technology"); DTX-76 at 5 (2011 Google email noting that yield management of "fixed network relationships" "is still a critical need for most large publishers and has been a weakness in our offering").

998. At that point, however, Google did not have any network yield management technology. 9/16/24 AM Tr. 105:2-25 (Mohan). Google had been focused on innovating on its real-time bidding exchange, which Google considered to be the way of the future. For example, in 2010 Google had launched nearly 100 product launches on AdX, including "numerous RTB enhancements." DTX-76 at 1, 3 (2011 Google email).

999. To fill the gap in its functionality, instead of building the functionality from scratch, Google considered acquiring either Admeld or PubMatic, two of the major network yield managers on the market at the time. PTX-112 at -975, -976 (2011 Google document analyzing network yield managers). Google did not have time to build its own network yield management solution. And even if it did build the feature, Google's offering may still have been weaker than Admeld's. PTX-112 at -979 ("strategic rationale" for the acquisition included improving "time-to-market for key functionality"); 9/16/24 AM Tr. 107:7-24 (Mohan). Google thus decided that it needed to acquire an existing network yield manager in order to "deliver a complete yield manager to the market quickly," PTX-112 at -975, -979, and "close that gap as quickly as possible," 9/16/24 AM Tr. 107:7-24 (Mohan); *see also id.* at 44:13-20 ("We were missing a certain functionality, this indirect yield management – static yield management capability was not a feature that AdX offered, and so we had a choice there to try to build it ourselves or acquire it.").

1000. Google concluded that Admeld had a "stronger product offering" than PubMatic. PTX-112 at -981. And in 2011, Google acquired Admeld. 9/16/24 AM Tr. 46:24-47:1 (Mohan).

1001. Contemporaneous Google documents and testimony from Google witness Neal Mohan explain the legitimate business reasons and strategy guiding the acquisition: Admeld's fully-formed yield management services and valuable relationships with publishers would "complement" the existing products that Google already offered.

1001.1. The "Strategic Rationale" was to satisfy "a pressing need for publishers - ad network management (+ other features)." PTX-112 at -976 (2011 Google document). Google also described the yield management functionality as "a pressing need for publishers," "looking for ad network management for non-RTB [real-time bidding] deals." PTX-112 at -979.

1001.2. Admeld would enable Google to "deliver a complete Yield Manager to the market quickly: closes product and service gaps in today's AdX+DFP offerings; Improves time-to market for key functionality." PTX-112 at -979; *see also* DTX-101 at 3 (2012 Google email: "Strategically, Admeld brings industry leading yield management capabilities enabling Google to provide publishers with the most comprehensive solution in the market."); DTX-126 at 11 (2012 Google document: "We're committed to helping you meet your long-term goals as a publisher. That's why we bought Admeld, and it's why we're so excited about the future of this new platform.").

1001.3. Admeld's business would "complement" "existing AdX growth." PTX-112 at -979. As Neal Mohan explained, yield managers did "something adjacent to but different than what AdX did." 9/16/24 AM Tr. 107:25-108:22 (Mohan).

1001.4. Google also sought to "acquire" Admeld's "talented engineering, service, and sales team." PTX-112 at -979. After the acquisition, Google kept "a lot" of

the engineers, service, and sales teams from Admeld. 9/16/24 AM Tr. 108:5-17 (Mohan). The Admeld team members understood the network yield management business—which Google had relatively little experience with—and could "augment the Google and DoubleClick teams that were already speaking with these publishers." *Id.* at 108:23-109:23 (Mohan).

1002. After the acquisition, Google integrated key Admeld features into AdX, particularly Admeld's network yield management functionality. DTX-126 at 10, 13 (2012 Google document); 9/16/24 AM Tr. 112:25-113:24 (Mohan); DTX-101 at 5 (2012 Google email listing a "goal" "to offer an integrated platform to maximize our publishers' advertising revenue" included building "a complete yield management solution by integrating Admeld and further improving AdX"); 9/20/24 AM Tr. 87:3-7 (Lee); PTX-141 at -444-445 (2013 Google document describing "feature parity" as "an absolute requirement for the product migration"); *see also* 9/18/24 AM Tr. 62:9-15 (Abrantes-Metz) (agreeing she did not know of any Admeld technology that was not integrated into Google other than the integration of the functionality that provided real-time bid amounts to other publisher ad servers). Google integrated Admeld's traditional ad network optimization feature, as well as mobile ad network optimization support and a private exchange functionality. DTX-126 at 10, 13.

1003. Integration of Admeld features was no small task. Google had to rebuild Admeld features on the Google stack, set and renegotiate pricing, and migrate customers. PTX-112 at -980.

1004. Neal Mohan was heavily involved in both the DoubleClick and Admeld acquisitions. He was the former senior vice president of strategy and product management at DoubleClick before it was acquired, and became director of Display Ads product management at

Google after the DoubleClick acquisition. 9/16/24 AM Tr. 6:24-7:25 (Mohan). At the time of the Admeld acquisition, Mohan was a Google executive responsible for DFP, AdX, and the Google Display Network. 9/16/24 AM Tr. 7:8-8:7 (Mohan).

1005. Mohan testified that, to manage the daunting task of integrating Admeld's functionality, Google adopted the same approach that it used to successfully rebuild DoubleClick's products for the Google stack. "It's the exact same theme that we've talked about before, which is the necessity to keep flying the plane while changing the engines." 9/16/24 AM Tr. 110:3-23 (Mohan).

1005.1. As Mohan explained, after the Admeld acquisition Google needed to do two things at once: (1) in the short term, "continue to offer" key Admeld functionality "to our publisher customers" so there was no disruption in service; and (2) "in the long term, really rebuild the rest of the Admeld features onto the Google stack so that we could drive innovation further forward." 9/16/24 AM Tr. 109:23-110:23 (Mohan). Rebuilding on the Google stack was a particularly important part of the integration because, on Google's stack, Admeld "connects seamlessly with DFP" so that publishers could "make smarter, more holistic decisions" across their inventory. DTX-126 at 12 (2012 Google document).

1005.2. Google thus continued to offer Admeld functionality in the short term while, at the same time, rebuilding Admeld's key functionality on Google's own stack for the long term. This required a phased approach over time to rebuild and integrate key Admeld features. PTX-112 at -976, -980; PTX-141 at -442-43; 9/16/24 AM Tr. 111:12-20 (Mohan).

1005.3. Had Google not continued to offer Admeld "in the marketplace while" Google "rebuilt it" in a more long-term way "on the Google stack," Google "would have fallen further behind, defeating the purpose of the acquisition in the first place." 9/16/24 AM Tr. 46:3-47:24 (Mohan).

1005.4. As shorthand for Google's strategy following the DoubleClick and Admeld acquisitions to combine short-term planning and long-term planning, Mohan used the term "parking" to refer to "continuing to offer it in the marketplace while we rebuilt it on the Google stack." 9/16/24 AM Tr. 47:2-24 (Mohan) (discussing PTX-58, 2010 Google email). In other words, "parking" described Google's short-term plan to continue to offer Admeld as it existed, while the rebuilding process took place in parallel. *Id.* (Mohan).

1006. Consistent with its acquisition strategy, Google only discontinued Admeld's products after it had completely rebuilt and integrated the key Admeld network yield management features into Google's product. DTX-126 at 10 (2012 Google update on Admeld integration: "Because Admeld's key features will be available on the new platform when it launches (or soon thereafter), we're planning to discontinue Admeld later in 2013.").

1007. As demonstrated by Google's strategy and actual actions after the Admeld acquisition, Google did not acquire Admeld in order to "immobilize the leading yield manager while Google had a chance to catch up." 9/16/24 AM Tr. 46:14-23 (Mohan) (responding to a question whether this was Google's strategy: "Absolutely not."); *see also id.* at 111:12-20 (Mohan) (Google had no intent to acquire Admeld in order to put a competitor out of business). Google did the opposite: it needed network yield management functionality because it had invested in real-time bidding but publishers were not yet willing to give up network yield management, so Google

continued to maintain and offer that functionality after the acquisition until it had rebuilt that functionality into AdX.

1008. Nor did the Admeld acquisition eliminate competition in the traditional network yield management marketplace or cause competitor network yield managers to shut down. 9/26/24 PM Tr. 27:1-10 (Israel).

1008.1. After the acquisition, Google continued to compete with the two other major network yield managers at the time, Rubicon and PubMatic, to offer traditional network yield management. Israel DX 5; 9/26/24 PM Tr. 26:19-27:10 (Israel).

1008.2. Both Rubicon (now known as Magnite) and PubMatic still exist today, were founders or early members of Prebid, and had representatives who testified at this trial. 9/13/24 AM Tr. 28:17-22 (Kershaw). (Rubicon was founder of Prebid and PubMatic was "an early member"); 9/12/24 PM Tr. 56:8-16 (Goel) (PubMatic cofounder and CEO). Today, both now offer real-time bidding exchanges, demonstrating that, over time, real-time bidding did eventually gain traction over the static network yield management tools originally offered by these companies. 9/12/24 PM Tr. 56:24-2, 69:6-22 (Goel) (testifying that real-time bidding was "innovative"); *id.* at 160:1-13 (Goel) (Rubicon offers an "independent advertising exchange"); 9/13/24 AM Tr. 5:13-18 (Kershaw). None of the competitors that testified at trial described their products as offering traditional network yield management services.

2. Plaintiffs' Complaint that Google Did Not Rebuild and Integrate Certain Admeld Functionality Is the Same as Their Complaint that Google Denied Rival Publisher Ad Servers Real-Time Bids from AdX.

1009. Plaintiffs' experts identified only one functionality of Admeld that Google did not rebuild for its own ad tech stack: the ability to provide real-time bids from Admeld's ad exchange to third-party ad servers. 9/18/24 AM Tr. 59:2-6 (Abrantes-Metz). They complain that Google did not rebuild this functionality for AdX. 9/20/24 AM Tr. 87:8-12 (Lee); 9/18/24 AM Tr. 47:3-12, 74:21-76:13, 76:21-77:6 (Abrantes-Metz); *see also* 9/18/24 AM Tr. 60:1-5 (Abrantes-Metz) (conceding that Google incorporated yield management functionality).

1010. Neither Plaintiffs nor their experts identified at trial a single document establishing that Google considered Admeld's ability to provide real-time bids from its ad exchange to third-party ad servers to be a competitive threat or a single document establishing that Google chose not to rebuild that functionality in order to extinguish a competitive threat. 9/18/2024 AM Tr. 59:17-25 (Abrantes-Metz) (every document Plaintiffs' expert "cited about a competitive threat from Admeld technology was referring to yield management technology").

1011. Plaintiffs' own expert, Dr. Abrantes-Metz, admitted instead that Plaintiffs' complaint that Google did not rebuild this Admeld functionality into AdX is the same as Plaintiffs' complaint that Google does not provide third-party publisher ad servers with comparable access to real-time bid amounts from AdX. 9/18/24 AM Tr. 47:3-12, 75:6-77:6 (Abrantes-Metz) (deprecation of certain Admeld functionality is the "same issue" she claims is anticompetitive with respect to AdX's provision of real-time bid amounts only to DFP);[52] *see also* 9/26/24 PM Tr.

[52] Nor did Google shut down any "real-time bidding" functionality. At the time Admeld was acquired, in 2011, Google had already innovated real-time bidding and incorporated it into AdX. 9/26/2024 PM Tr. 27:11-22 (Israel) (Google was pursuing real-time bidding "anyway" and "the Admeld transaction really" didn't "change that"); 9/16/2024 AM Tr. 101:4-20 (Mohan) (testifying

27:11-28:9 (Israel) ("the conduct we've talked about" regarding "Google's policies towards real-time bidding to DFP and other ad servers" is "the same thing we're talking about with Admeld").

1012. Plaintiffs' second complaint about Admeld therefore fails for the same reasons that their complaint about comparable access to real-time bid amounts from AdX does. *Supra* ¶¶ 862-898. Plaintiffs are complaining about a refusal to deal. The integration of AdX and DFP offered advertiser and publisher customers benefits unique to integration. 9/20/24 PM Tr. 49:11-14, 52:2-13 (Sheffer) (in an integrated stack the ad tech provider has a relationship with the advertiser and the publisher and can vet both); DTX-939 at 2 (Xandr document describing benefits of an end-to-end platform including value for customers, tech efficiencies, and improved safety and security); 9/26/24 AM Tr. 159:12-160:20 (Israel) (integrated ad tech stack leads to three primary economic benefits: lower pricing across the ad tech stack, greater incentives to invest, and increased efficiencies). Forcing Google not to offer that integrated product and provide AdX real-time bid amounts to rival publisher ad servers would have required significant technical work to redesign AdX. 9/16/24 AM Tr. 120:19-121:6 (Mohan) (each integration was different because each ad server was "custom built"); 9/9/24 PM Tr. 141:4-14 (Avery) (engineering work was required when Kevel integrated its publisher ad server with Index Exchange and PubMatic).

1013. Admeld's own challenges with integrations between its exchange and third-party ad servers before it was acquired by Google further demonstrate the technical challenges and quality concerns introduced by forced interoperability. DTX-150 at 2 (2013 Google email with Admeld founder and CEO); 9/16/2024 AM Tr. 119:10-121:6 (Mohan).

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one reason he was not as interested in developing a traditional yield management solution was because Google "had invented this real-time bidding RTB capability").

1014. Google considered whether rebuilding and integrating the Admeld functionality that provided real-time bids to third-party ad servers could be "truly economically viable." PTX-159 at -003 (2014 Google document). When it investigated the possibility, Google found multiple business reasons not to proceed with rebuilding and integrating the functionality.

1015. First, building this functionality would have required technical work to not only redesign AdX to output real-time bid amounts, but also build and maintain a connection to each additional non-Google publisher ad server that was connected. 9/16/24 AM Tr. 120:19-121:6 (Mohan) (each integration was different because each ad server was "custom built"); PTX-159 at -003-004 (2014 Google document). As the co-founder of Admeld, Brian Adams, explained to the Google team, integrating real-time bids from an ad exchange into other publisher ad servers "is a new challenge with every customer." DTX-150 at 2 (2013 Google email with Brian Adams); 9/16/24 AM Tr. 118:3-121:6 (Mohan).

1016. At the time there was not much demand for the functionality, including because publishers could access Google Ads advertisers through AdSense. DTX-150 at 2 (Brian Adams noting that "Adsense was the 3rd largest demand source for Admeld over the years and we generated a lot of revenue from that so I'm not surprised that the 3P ad servers aren't interested").

1017. Integration of real-time bids from AdX with third-party ad servers also raised "engineering concerns associated with spam detection and inventory quality controls." DTX-150 at 4; PTX-159 at -004 ("Account managers and the spam team will have a new type of spam to manage."). According to Brian Adams, co-founder of Admeld, Admeld's previous integrations with third-party publisher ad servers such as Criteo had been "plagued with ongoing issues." DTX-150 at 2. Rebuilding an integration that would cause Google to lose spam and quality controls risked creating "a serious impact on the advertiser side of our business." 9/16/24 AM Tr. 118:3-

119:9 (Mohan). In sum, Google determined that for these reasons "the business case does not justify the development." PTX-159 at -0004.

F. Unified Pricing Rules[53]

1018. Plaintiffs' experts opine that Google's adoption of the Unified Pricing Rules was anticompetitive because Google should not have eliminated publishers' ability to set, on DFP, variable price floors by demand source. 9/20/24 AM Tr. 86:10-20 (Lee) ("It's referring to removal of a feature that was present within DFP."). Plaintiffs maintain that requiring uniform floor prices across demand sources on DFP impaired rival ad exchanges in Plaintiffs' alleged market for ad exchanges. 9/20/24 AM Tr. 86:10-20 (Lee).

1018.1. Dr. Abrantes-Metz agreed that the "restriction in choice" she identified was that publishers cannot use Google's publisher ad server to "discriminate against Google by setting higher price floors for Google AdX than its rivals." 9/18/24 AM Tr. 79:8-25 (Abrantes-Metz).

1019. There is no evidence that rival ad exchanges were impaired. By the calculations of Plaintiffs' own expert, the market share of Google's own ad exchange has declined from 2019 to 2022, the years after UPR was adopted. PTX-1384. Also by Prof. Lee's own calculations, non-Google exchanges have earned increased revenue since then. PTX-1262A; PTX-1266A; *see also* 9/18/24 AM Tr. 102:3-9 (Abrantes-Metz).

1020. As explained in the next section, Google adopted the Unified Pricing Rules together with the shift to the Unified First Price Auction in order to create a safer and simpler auction on AdX. According to Plaintiffs, Google should have designed its shift to the Unified First Price

[53] 9/19/24 PM Tr. 127:11-24 (Lee) ("The five pieces of conduct that I evaluated and examined to be anticompetitive" include "Unified Pricing Rules.").

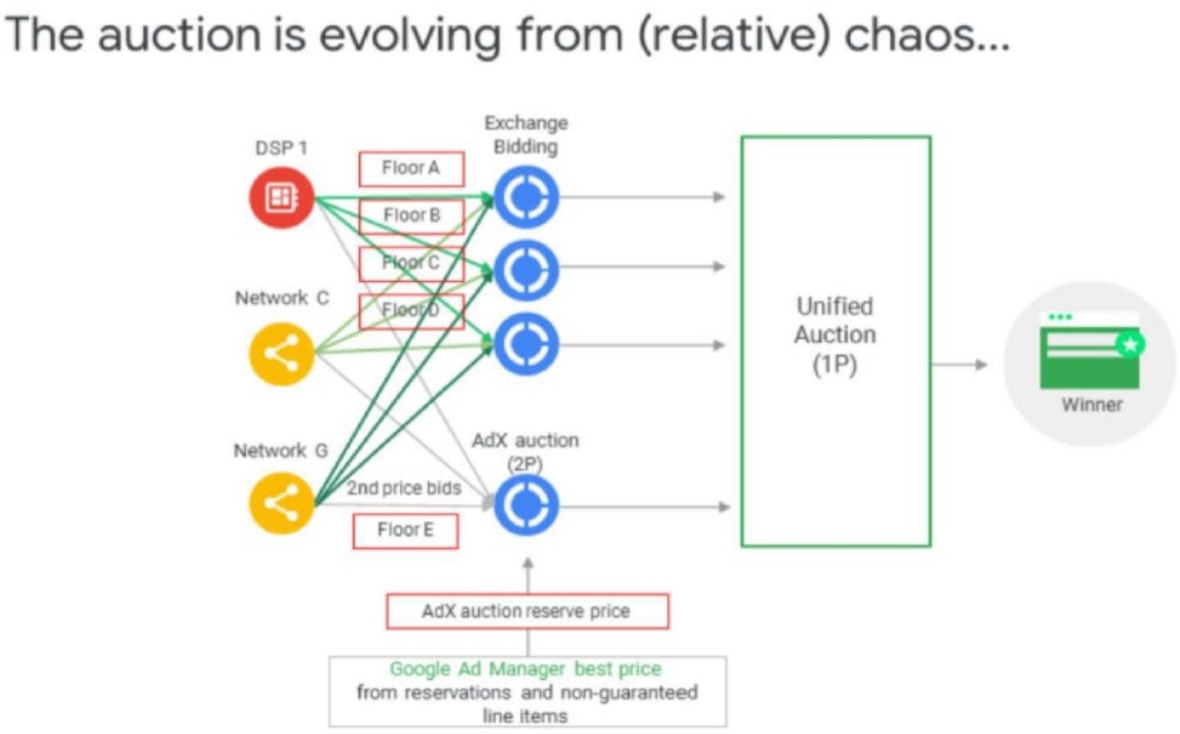
Auction without adopting the Unified Pricing Rules even though Google considered UPR "integral" to the Unified First Price Auction because, under the UFPA, exchange-specific floors no longer serve the same purpose they did before. In other words, Plaintiffs complain that Google did not change its approach to the UFPA so that publishers could retain their ability to use Google's own publisher ad server to discriminate against bidders on Google's ad exchange. *E.g.*, 9/12/24 AM Tr. 33:14-17 (Srinivasan) (variable floor prices could be used to make AdX bidders "work harder"); PTX-609 at -146 (2018 Google email describing exchange-specific price floors).

1021. Requiring Google to redesign the Unified First Price Auction to enable publishers to use price floors to discriminate against AdX would reduce its incentive to innovate. 9/26/24 PM Tr. 6:25-7:9 (Israel).

1. UPR Were Implemented to Establish a Safer and Simpler Auction for Advertisers and Publishers.

1022. Google implemented the Unified First Price Auction ("UFPA") and UPR in order to address an increasingly complex advertising ecosystem by making the auction more "safe and simple for the bidders." 9/24/24 AM Tr. 134:8-21 (Milgrom).

1023. In the time period between the rise of header bidding and Google's implementation of the UFPA and UPR, publishers were running sequential auctions with many different exchanges and demand sources, each of which had different auction rules (such as first-price or second-price) and parameters. 9/23/2024 AM Tr. 93:24-94:9 (Korula). As depicted on the left side of the Google visual below, the auction at the time was "relative chaos" from the advertiser's perspective. DTX-705 at 7 (2019 Google presentation); 9/24/24 AM Tr. 124:4-17 (Milgrom); *supra* ¶¶ 250-257.

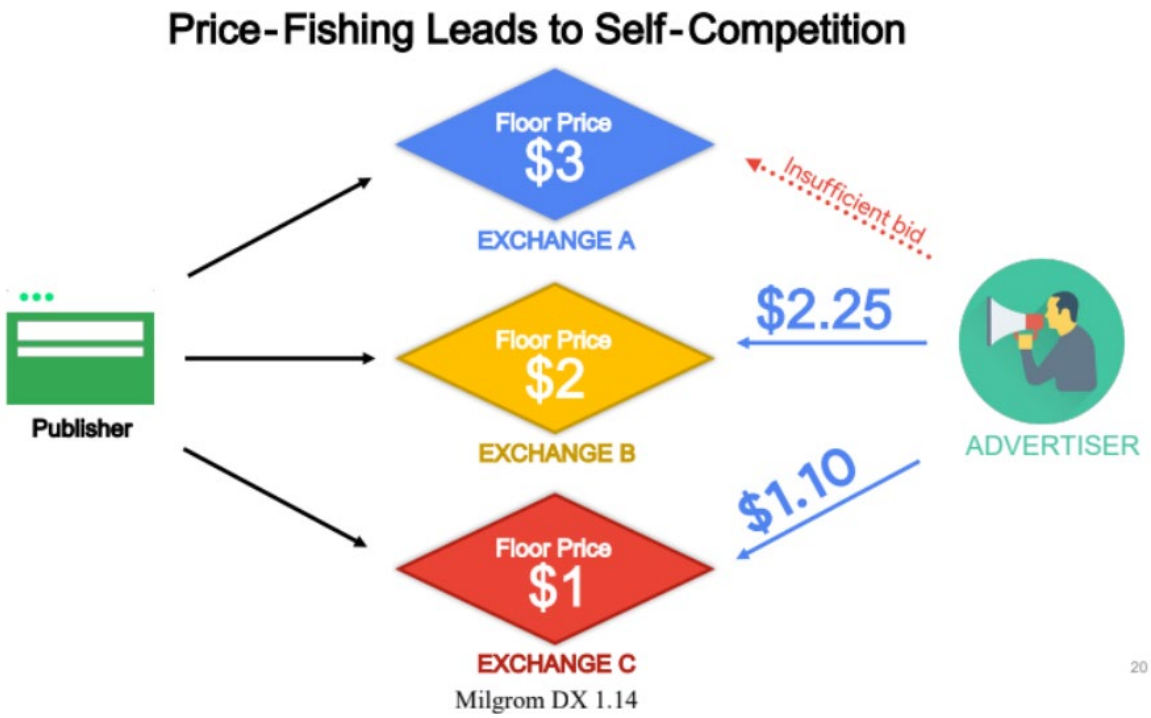


1024. The "chaos" began with the rise of header bidding. As Plaintiffs' expert Professor Ravi wrote in an academic paper, header bidding caused ad exchanges to transition from second-price to first-price auctions. 9/11/24 PM Tr. 67:8-18 (Ravi); *see also* 9/24/24 AM Tr. 90:18-91:13 (Milgrom).

1025. As ad exchanges started to experiment with the first-price auction format, some also experimented with auction rules that made it less transparent whether an auction was first-price or second-price. 9/24/24 AM Tr. 108:22-109:23 (Milgrom); *see also* 9/12/24 PM Tr. 119:8-16 (Goel) (PubMatic noted at the time it transitioned to a first-price auction that there was "inconsistency across auctions and a lack of transparency into how each auction operates where that's created an environment where buyers don't have visibility into whether the auctions are being closed at first price or second price"); 9/19/24 AM Tr. 137:14-138:5 (Bellack) ("other exchanges in the industry were playing games with their auction logic").

1026. As a result, the combination of auctions with different pricing rules—some of them not transparent—"was extremely confusing for buyers." 9/23/24 AM Tr. 93:24-94:9, 94:24-96:16 (Korula); 9/17/24 AM Tr. 158:18-159:7 (Jayaram). As Plaintiffs' expert Professor Ravi summarized in an academic paper: "In the past few years, the selling mechanism in RTB market has dramatically changed. First, publishers moved from waterfalling to header bidding, and then exchanges moved from second-price to first-price auctions. **This leaves advertisers uncertain about how to adjust their bidding strategies under the new mechanism.**" 9/24/24 AM Tr. 99:22-100:15 (Milgrom) (agreeing with Professor Ravi's writing).

1027. Some publishers took advantage of the complex and confusing auction to mislead advertisers into paying more for an impression by "price-fishing" or "multi-calling." 9/24/2024 AM Tr. 128:18-130:2 (Milgrom). Price-fishing refers to a tactic by which some sellers called the same buyers on different exchanges for the same impression using different price floors. PTX-784 at -969 (May 2019 email from Srinivasan expressing concern about publishers using variable price floors "to effectively fish for the highest price"); 9/12/24 AM Tr. 148:7-149:3 (Srinivasan); 9/17/24 AM Tr. 142:22-143:16, 159:8-20 (Jayaram). As shown in Professor Milgrom's demonstrative below, for example, a publisher might "mislead" the advertiser by showing three different floor prices, $3, $2, and $1, in order to convince the advertiser to bid $2.25 when it really could have acquired the impression for $1.10. 9/24/24 AM Tr. 126:21-127:14 (Milgrom). Milgrom DX 1.14.



Milgrom DX 1.14

1028. Price-fishing was "harmful" to advertisers. 9/24/24 AM Tr. 127:15-19 (Milgrom). In the example above, for example, the advertiser "is confused" and "unable to optimize its bid "because, if it understood the full picture that the same impression was being offered with different floor prices, it would not have bid through Exchange B. *Id.* at 127:15-128:3 (Milgrom). Not all buyers had the ability to de-duplicate these requests and figure out that they were being made for the same impression. 9/12/24 AM Tr. 148:7-149:3 (Srinivasan).

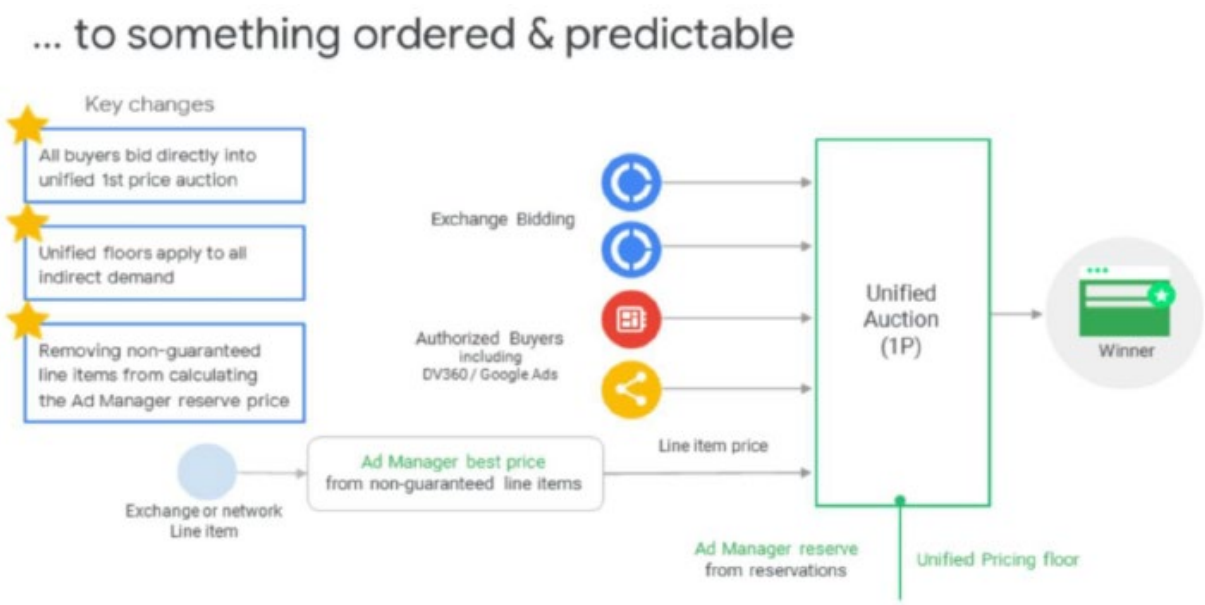
1029. As Professor Milgrom explained, evidence in the record demonstrates that prior to the implementation of UFPA and UPR, publishers were using a tactic, multi-calling, that similarly fishes for higher prices from advertisers. DTX-298 at 1 (2016 Google email); 9/24/24 AM Tr. 128:18-130:2 (Milgrom); DTX-372 at 16 (2017 Google presentation showing results of Google's efforts to combat publisher multi-calling).

1030. When a representative from an advertising agency was asked whether he liked "that publishers set variable price floors," he replied: "of course not." 9/10/24 PM Tr. 38:13-24

(Friedman). "As a buyer, we want everything as low priced as possible. And so the fact that there were certain buying paths that might have cost more money was not desirable. On the flip side, there were some paths that cost less money, and it just took a lot of effort to figure that out. And that was beneficial. But, yeah, as a buyer, we prefer less games." *Id.* at 39:2-9 (Friedman).

1031. Amidst the complex and confusing landscape, Google introduced a group of changes to Google Ad Manager in order to "establish a level playing field" and make the auction "simpler for Buyers and Sellers." DTX-1016 at 20 (2020 Google presentation). Those changes included: (1) the adoption of the Unified First Price Auction; (2) the adoption of Unified Pricing Rules; (3) the removal of "last look"; and (4) "increased transparency into the auction" 9/12/24 AM Tr. 113:20-115:9 (Srinivasan).

1032. As depicted below, the UFPA, combined with UPR and removing "last look," were "key changes" to make the auction "ordered & predictable." DTX-705 at 10 (May 2019 Google presentation). The Unified First Price Auction compared all bids for an impression, including from AdX, Open Bidding, and header bidding exchanges, "in the same auction with the same mechanics" in a first-price auction. 9/23/24 AM Tr. 96:25-97:6 (Korula); *supra* ¶ 261.



1033. UPR was a way to "deal with the issue of price fishing." 9/24/24 AM Tr. 126:6-14 (Milgrom). Under UPR, publishers could use Google Ad Manager to set the same price floor for all exchanges. 9/25/24 PM Tr. 173:2-7 (Hochberger) (UPR allows a publisher to "set the floor across the board" in Google Ad Manager); 9/23/24 AM Tr. 140:6-141:2 (Korula) (prior to UPR, publishers could use GAM to set floor prices for only AdX; floor prices for other exchanges had to be set within those exchanges). What they could not do was use Google Ad Manager to set a price floor for any exchange—including AdX—higher or lower than for other exchanges. 9/24/24 PM Tr. 19:18-22, 33:1-9 (Milgrom); 9/11/24 AM Tr. 131:2-7 (Ravi) ("UPR refers to DFP not letting the publishers set different floor prices for different exchanges and buyers with the advent of this Unified First Price Auction."). In other words, under UPR, a publisher cannot use DFP to discriminate against non-Google exchanges or buying tools in favor of AdX; nor can they use DFP to discriminate against AdX in favor of non-Google exchanges or buying tools.[54] 9/23/24 AM Tr.

[54] Plaintiffs' expert Dr. Abrantes-Metz incorrectly described UPR as enabling publishers to set price floors for AdX that were lower than other exchanges, but not higher. *See* 9/18/24 AM Tr.

101:8-102.9, 113:1-11 (Korula); DTX-701 at 26 (2019 Google presentation explaining UFPA and UPR).

1034. In addition to protecting advertisers from price-fishing, according to Plaintiffs' expert UPR also benefited advertisers by simplifying their bidding and reducing bidding errors because UPR created a single floor a buyer had to beat no matter what exchange it bid on. 9/11/24 PM 19:7-16 (Ravi).

1035. In parallel, UPR also provided benefits to publishers by simplifying the incredibly complex system for setting pricing floors that previously existed. 9/24/24 AM Tr. 126:6-14 (Milgrom).

1035.1. Before UPR, some publishers found it difficult to understand and optimize price floors across the many different auctions that could be subject to different—and inconsistent—rules. 9/12/24 AM Tr. 118:18-119:2 (Srinivasan). Google "regularly got feedback" from publishers complaining about the complexity of the old pricing rules. 9/23/24 AM Tr. 104:4-15 (Korula). For example, publishers would "misconfigure" rules and ask Google why they were getting paid less than the floor price they attempted to set. *Id.* UPR, in tandem with UFPA, simplified pricing rules and how they applied so that sellers could be sure how the price floor would work.

1035.2. Before 2019, publishers could configure pricing rules along "upwards of five dimensions," leading to up to "multiple thousands of rules" for some publishers. 9/12/24 AM Tr. 118:18-119:17 (Srinivasan). Publishers might

122:20-23 (Abrantes-Metz) ("My understanding of UPR is that it forbids publishers from flooring AdX higher within DFP, not to floor AdX lower.").

end up with "legacy rules that have been built up over multiple years that they don't know or understand how they operate." *Id.* at 119:18-120:6 (Srinivasan). Some publishers had set so many pricing rules across different dimensions that the application of the overlapping rules could cause technical problems. 9/23/24 AM Tr. 101:8-102:9 (Korula). In addition, publishers sometimes lost revenue from filtering bids that would otherwise have provided revenue. 9/12/24 AM Tr. 118:18-119:17 (Srinivasan). The morass of pricing rules could make it difficult to "reason through" which "pricing rule applied to any given single auction," so that bids that would have resulted in higher revenue might inadvertently be filtered. *Id.* (Srinivasan).

1036. By simplifying the dimensions along which publishers could set variable pricing rules and limiting the number of pricing rules a publisher could configure, UPR simplified the old system of pricing rules for publishers. 9/12/24 AM Tr. 119:18-120:6 (Srinivasan); DTX-705 at 32 (2019 Google presentation: "Our new unified pricing rules will help publishers more easily manage floor prices across all non-guaranteed partners.").

1037. Creating a simpler and safer auction for advertisers also benefited publishers because increased advertiser participation "increases the amount of value that's created by the auction and benefits both sides." 9/24/24 AM Tr. 134:8-21 (Milgrom). Price fishing was not good "for either advertisers or publishers" because it "depress[ed] participation." *Id.* at 134:14-21 (Milgrom).

1038. For example, at a meeting with publishers Google explained that one existing inefficiency in the auction was that "different floor prices for different sources of demand" could "compromise publisher revenue." 9/12/24 AM Tr. 122:1-14 (Srinivasan). A higher bid may be

subject to a higher floor price and get filtered out of participating in the auction, so the variable price floors would hurt the publisher, too. *Id.* (Srinivasan). The publisher would lose out on the additional revenue it could have won. *Id.* (Srinivasan); *see also* DTX-701 at 16 (2019 Google presentation to publishers showing the effects of differing floor prices).

1039. Unified Pricing Rules are now viewed as an industry best practice.

1039.1. Brian O'Kelley was the founder of AppNexus, a major full stack competitor to Google that has since been acquired by Microsoft. Deposition of Brian O'Kelley Tr. 64:09-11, 210:21-24, 211:4-9, 211:13. O'Kelley has previously complained that Google has used its "leadership position in ways that made it very difficult for others compete." *Id.* at 182:18-19, 182:22-183:2. Even so, O'Kelley agreed with the principles behind the Unified Pricing Rules. In a 2017 blog post, O'Kelley wrote: "Rule 3: Publishers should set uniform hard floors to create scarcity and maximize yield." *Id.* at 281:17-282:04, 282:15-16, 283:10-13. When asked to explain the sentence, he stated: "It means that it shouldn't matter which SSP you buy through. The floor should be consistent for a given advertiser." *Id.* at 285:18-24.

1039.2. Meta's code of conduct requires that floor prices be equal for all bidders. 9/26/24 PM Tr. 158:16-159:3 (Farber).

1039.3. [redacted]

1039.4. Xandr "recommend[s] floors to be equal across exchanges." 9/18/24 AM Tr. 42:12-43:7 (Abrantes-Metz).

1039.5. Plaintiffs' expert Professor Ravi conceded that, at the time he formed his opinions in this case, he was not aware of whether other companies had similar rules about uniform price floors. 9/11/24 PM 19:17-20 (Ravi); *see also id.* at 21:3-10 (Ravi) ("So whether it was appropriate, I don't have that comparative analysis with the other exchanges of what they were doing.").

2. The Unified First Price Auction and UPR Were Always Going To Be Implemented Together.

1040. Google launched the Unified First Price Auction and Unified Pricing Rules at the same time because the two changes are necessarily linked to each other.

1041. Plaintiffs presented no evidence at trial that Google ever considered actually launching the move to a Unified First Price Auction by itself or launching Unified Pricing Rules by themselves. *See* 9/24/24 AM Tr. 130:5-10 (Milgrom) ("My understanding is this happened at the same time. It was a package."). Instead, the testimony and exhibits showed UFPA and UPR were always considered together: As the Google product manager responsible for the 2019 roll-out of the Unified First Price Auction and UPR testified, "we had always discussed Unified Pricing Rules in the context of also moving to a first-price auction." 9/12/24 AM Tr. 61:16-23 (Srinivasan). A contemporaneous email sent by an engineering director during the 2019 roll-out stated: "removing floor-pricing options . . . has been perceived as an integral part of 1st-price migration." PTX-762 at -291 (May 2019 Google email).

1042. Google viewed the two changes as linked because the Unified Pricing Rules are part of the move to "a simpler and more consistent auction," 9/12/24 AM Tr. 113:18-115:9 (Srinivasan), and because, in the Unified First Price Auction, exchange-specific floors no longer serve the same purposes that they did in the old auction, *id.* at 115:11-116:8 (Srinivasan); 9/24/2024 AM Tr. 130:11-132:1 (Milgrom). Price floors do not work the same way (1) in a

simultaneous auction as they do in a sequential process, and (2) in a first-price auction as they do in a second-price auction. As a result, in the UFPA publishers had less need for exchange-specific floors to drive revenue.

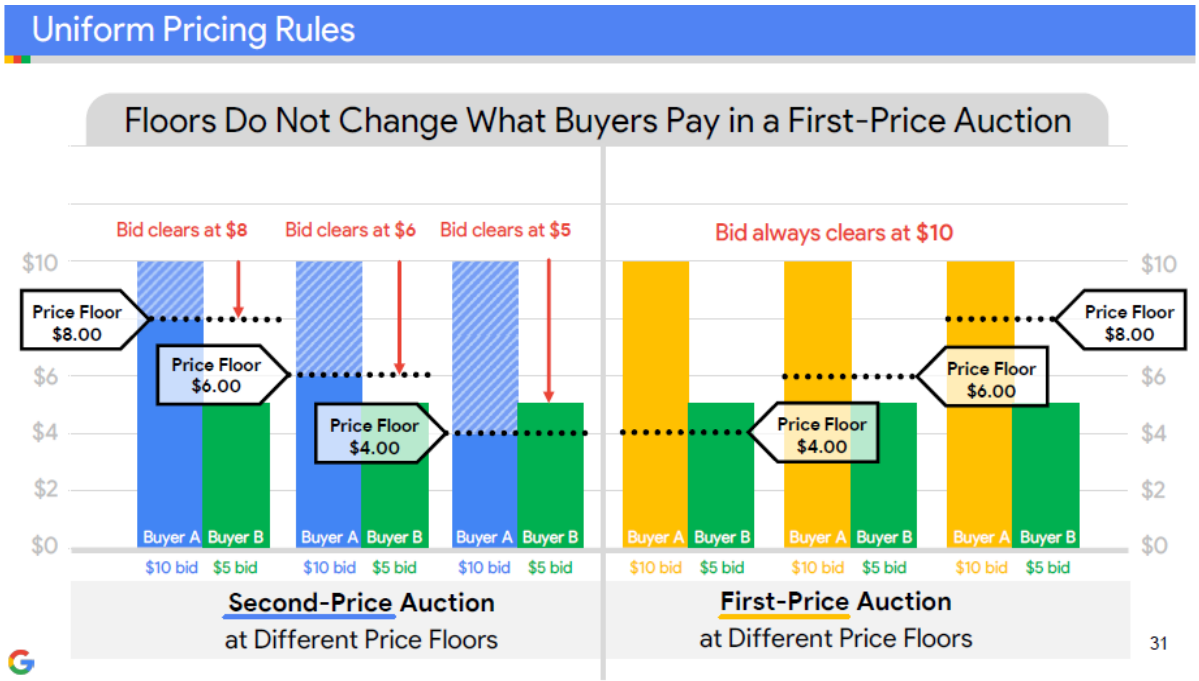
1043. *First*, in a simultaneous auction publishers do not have the same incentive to set exchange-specific price floors. 9/24/2024 AM Tr. 131:12-132:1 (Milgrom). In a sequential process, it is "appropriate to have different floor prices" when the publisher offers an impression to one demand source while knowing that it has other potential buyers available. *Id.* at 130:11-131:9 (Milgrom). As Professor Milgrom explained, when publishers set price floors in a sequential process in which there is an alternative option that can be called, publishers "always want to set the floor price to be at least as high—higher than, actually, the—your outside option." *Id.* at 52:24-53:10 (Milgrom). In the Unified First Price Auction, all exchanges competed simultaneously. No exchange was an "outside option" because bids were compared at the same time. The publisher's incentive to set exchange-specific floors thus no longer existed. *Id.* at 130:11-131:9 (Milgrom); s*ee also* 9/11/24 PM 76:21-25 (Ravi) (publishers will get more revenue in the Unified First Price Auction than they would using "last look plus bid inflation").

1044. *Second*, "in a first-price world" exchange-specific floor prices are "unnecessary" to increase price pressure. 9/12/24 AM Tr. 113:20-115:9 (Srinivasan); 9/23/24 AM Tr. 101:2-7 (Korula) ("it was an appropriate time for us to change how pricing rules worked to be relevant to the new auction type that we had"); *see also* PTX-699 at -260 (January 2019 Google email noting "less need for" price floors that vary by exchange "in the first-price world"); PTX-715 at -001 (January 2019 Google email noting certain benefits to publishers from setting variable floors for different buyers are "reduced through the move to a 1P auction").

1044.1. In a second-price auction, "the reserve price that publishers configure can add price pressure in determining the final price that the bidder pays." 9/12/24 AM Tr. 115:11-116:8 (Srinivasan).

1044.2. In contrast, in a first-price world, "the floor price does nothing to determine what the winning price of the impression" is. 9/12/24 AM Tr. 115:11-116:8 (Srinivasan). The winning bid must be higher than the floor price, but the floor price does not otherwise influence the amount paid by the winner. "The need to specify floor prices for different buyers" therefore "reduces meaningfully in a first-price world." *Id.* (Srinivasan); 9/24/24 AM 131:12-132:1 (Milgrom) ("Floor prices play different roles in a first-price auction and a second-price auction" because "in a second-price auction, if you raise the floor price and there is only one bidder above the floor price, then you raise the price that the bidder pays," while in a first-price auction, the floor price "has no effect on the price that's paid."); 9/18/24 AM Tr. 106:10-20 (Abrantes-Metz) (agreeing that "a rationale for differential flooring, e.g., across first price and second-price exchange auctions was eliminated with Google's move to UFPA").

1044.3. That distinction between how floor prices apply in a first-price world and a second-price world is depicted below. Korula DX 1.31. In the second-price auction, the amount the publisher receives varies based on floor price; in the first-price auction, the amount the publisher receives remains the same. 9/23/24 AM Tr. 102:10-103:18 (Korula) (explaining Korula DX 1.31).



Korula DX 1.31

1045. Because price floors work differently in the UFPA, Plaintiffs cannot rely on documents that assess the impact of UPR without considering how UPR would work in the Unified First Price Auction.

1045.1. Professor Ravi claimed that a Google document showed that removing exchange-specific price floors would cause AdX bidders to win 16% more impressions. 9/11/24 AM 132:14-133:23 (Ravi) (relying on PTX-705 at -085, a January 2019 Google presentation). But that document is a presentation from before UFPA was introduced, when AdX still ran a second-price auction, and when different demand sources still competed sequentially.

1045.2. Similarly, Professor Ravi agreed that the two documents he cited to support his opinion about the effects of UPR on rivals both dated from August 2019—before UFPA actually launched.[55] 9/11/24 PM Tr. 21:11-23:2 (Ravi).

1045.3. As Professor Milgrom explained using a variation of the same "tree diagram" that Professor Ravi did,[56] *see* DTX-578 at 2, in a pre-UFPA world one would expect that exchange-specific price floors might be more impactful. In what Plaintiffs call a "last look" set-up, an exchange-specific floor can set the price that a winning bid in AdX's second-price auction would pay, so setting a higher AdX floor would drive publisher revenue even higher than what it expected to receive from header bidding. 9/24/24 AM 86:1-90:8 (Milgrom). As explained above, in a post-UFPA world, exchange-specific floors do not have the same effect because the UFPA is a unified and first-price auction. *Supra* ¶ 1044.

1045.4. Professor Weintraub's calculation of the effects of the Unified Pricing Rules was based on a Google experiment that evaluated the effects of UPR operating

[55] Of those two documents, one is an email thread between Google employees discussing data from Rubicon that Professor Ravi conceded he had no way to evaluate, 9/11/24 PM Tr. 22:8-25 (Ravi), in which a Google employee expressly noted that "there are a ton of experiments going on" and only "a couple" were "potential end-state candidates." DTX-774 at 3. The other is a discussion of experiments on the potential impact of UPR, one which resulted in "a slight (1-3%) decrease in impressions and revenue" for third-party exchanges and another that was "measured in the true second-price world." DTX-768 at 1-2.

[56] The two diagrams are slightly different. The diagram in PTX-705 at -085 breaks down "100% Eligible Queries" (defined as "Queries where any header bidding line items submitted an eligible bid, even if the top competing line item with the auction was not HB"), whereas the diagram in DTX-578 at 2 breaks down "100% Competing Queries" (defined as "Queries where a header bidding line item was the top competing line item from DFP"). "Competing queries" is a subset of "eligible queries." The two lower categories descending from the "HB won" branch are the same.

under a second-price auction. 9/16/24 PM Tr. 79:9-81:6 (Weintraub) (discussing experiment run on September 3, 2019, before the unified first-price auction fully launched). He did not analyze the effect of UPR in the context of a first-price auction, which is what actually occurred and would not yield the same result.

1046. One publisher has suggested that publishers still need exchange-specific floors in the UFPA in order to compare the payout a publisher expects to receive from each demand source on an equal basis. PTX-1854 at 53:21-54:22 (transcript of April 2019 meeting between Google and publisher customers); 9/12/24 AM Tr. 76:2-7 (Srinivasan). That complaint fundamentally misunderstands how bids are compared. When bids are compared against each other in the UFPA, they are compared based on expected payout—meaning that the bids are already compared based on how much the publisher would receive after revenue shares were taken by ad tech tools. 9/12/24 AM Tr. 76:2-20 (Srinivasan); *see also* PTX-1854 at 55:13-56:6.

3. Google Implemented UPR After Extensive Feedback and Engagement with Publisher Customers.

1047. Google announced its bundle of changes, including UPR, in the spring of 2019, but it did not launch those changes until September 2019. 9/12/24 AM Tr. 113:20-115:9, 130:14-23 (Srinivasan). It implemented the changes in an incremental fashion, gathering feedback at the same time and making product changes in response. *Id.* at 83:20-24, 130:24-131:17 (Srinivasan). For example, the Unified Pricing Rules were first launched in alpha and open beta, and only small percentages of traffic were shifted to a first-price auction at a time. DTX-701 at 23, 49 (April 2019 Google presentation); DTX-2530 at 1 (The Daily Mail participation in alpha testing of UPR).

1048. Plaintiffs argue that publishers were dissatisfied that Google was removing exchange-specific floors, primarily relying on excerpts of an audio recording of an April 2019

meeting Google held to explain the bundle of UFPA and UPR changes to publishers and get their feedback. 9/12/24 AM Tr. 72:16-19, 75:14-18 (Srinivasan) ("some set of local publishers" "were frustrated that this was control that Google was wresting away from them"). At that meeting, some of the same publishers who have been involved in this trial expressed frustration with the announced changes, such as Stephanie Layser, who then worked at News Corp, *id.* at 72:6-19 (Srinivasan), and Felix Zeng of Weather.com, who was included on Plaintiffs' witness list and cited in their pre-trial Proposed Findings of Fact but not called, *id.* at 76:8-22 (Srinivasan). Of the "probably between 30 and 40" publisher customers in the room, *id.* at 67:16-21 (Srinivasan), Plaintiffs presented only the voices of a few who complained, not the views of any other publishers who did not speak up to complain, *id.* at 153:15-19 (Srinivasan).

1049. Even more importantly, focusing on one video of a meeting with 30 to 40 publishers months before the full launch discounts Google's extensive publisher outreach efforts after the meeting. Publisher feedback is a "critical part" of how Google operates its sell-side business and how it "develops all of" its tools. 9/20/24 PM Tr. 84:24-85:10 (Sheffer). Throughout the process of launching the UFPA and UPR, Google held conversations with publishers about the changes, incorporated publisher feedback into new auction functionalities, and received positive feedback from other publishers about the changes. 9/12/24 AM Tr. 130:24-131:17, 136:6-137:17, 138:1-139:16, 140:6-141:7 (Srinivasan).

1050. In the months between the meeting with publishers in April 2019 and the full launch, Google held "multiple conversations one-on-one with a lot of" its "top" publisher partners in order to hear "their concerns in more detail in depth." 9/12/24 AM Tr. 131:7-17 (Srinivasan). Through that "continued dialogue," Google was able to get "to the root of a lot of the concerns that publishers had" and proposed changes to address those concerns. *Id.* (Srinivasan). This process

was consistent with Google's practice of doing major rollouts in a "staggered manner" in order to "evaluate the impact on all of [its] customers" before completely rolling out changes. *Id.* at 133:6-18 (Srinivasan).

1051. Responding to the initial "negative press" around Google's announcement to publishers, Google's publisher outreach before the full launch took multiple forms. PTX-1035 at -380 (September 2019 Google slide deck).

1051.1. Google engaged in "extensive partner education through individual, more than 20 one-on-one [Product Manager] and pub meetings and group engagements," as well as "user groups around the benefits of the upcoming changes reaching more than 400 pubs." PTX-819 at -322 (August 2019 email); *see also* PTX-1035 at -380.

1051.2. Google "shared some aggregated experiment data with a very small set of strategic partners to give them some visibility into experiment performance." PTX-819 at -323. Those results were "mostly neutral to mildly positive." *Id.*

1051.3. In total, Google participated in "hundreds of 1:1 meetings with top sell-side and buy-side partners." DTX-829 at 2 (November 2019 email).

1052. The changes that Google adopted in response to publisher feedback included:

1052.1. Google increased limits on the number of pricing rules a publisher can set. 9/12/24 AM Tr. 136:6-18 (Srinivasan). Now, publishers can have up to 50,000 advertisers named in pricing rules. 9/23/24 AM Tr. 109:5-111:2 (Korula).

1052.2. Google extended pricing rules functionality to permit publishers to block certain segments of inventory. 9/12/24 AM Tr. 136:6-18 (Srinivasan). This

enabled publishers to leverage floor prices in order to "block certain segments of demand that they deemed were undesirable." *Id.* at 137:3-11 (Srinivasan); *see also id.* at 137:12-17 (Srinivasan) (idea was "accelerated" in response to "publisher feedback").

1052.3. Google extended pricing rules functionality to enable variable price floors for specific advertisers. 9/12/24 AM Tr. 138:1-17 (Srinivasan); 9/23/24 AM Tr. 11:3-19 (Korula). This permitted publishers to prioritize their relationships with certain advertisers by setting lower floors for those advertisers. 9/12/24 AM Tr. 138:1-17 (Srinivasan); *see also id.* at 138:19-25 (Srinivasan) (helped publishers achieve one of the reasons they set differential price floors).

1052.4. Google extended pricing rules functionality to enable variable price floors based on ad format. 9/12/24 AM Tr. 139:1-14 (Srinivasan). Publishers explained that they wanted the "flexibility and granularity" to "specify rules differently for different formats of inventory." *Id.* (Srinivasan).

1053. By June 2019, following these discussions with sellers and proposed changes, a contemporaneous Google launch update described "positive feedback received from a variety of publishers, including the Washington Post, Vice Media, NYT, MailOnline, etc." PTX-819 at -322 (August 2019 email).

1053.1. MailOnline, the online version of the Daily Mail: "Google's move to first-price auctions and unified pricing is an opportunity to improve transparency throughout the ecosystem, including improved visibility of their own actions and practices, which I believe should benefit everyone." PTX-819 at -322; *see also* PTX-1633 at -124 (2020 internal MailOnline email: "And the test

result shows Google is doing a honest 1PA after UPR, which helped our rev."); DTX-2530 at 1 (Daily Mail participated in alpha testing for UPR).

1053.2. Vice Media: "We welcome Google's move to first-price auctions and Unified Pricing Rules. These changes will help us simplify how we implement our most advanced pricing strategies between our header bidding partners, Ad Manager and exchange bidders. We believe this will help create a level playing field for non-guaranteed transactions and help us review the performance of our demand partners." PTX-819 at -322.

1054. By July 2019, there were only "a few unhappy publishers (including NewsCorp and the Guardian) who we continue to engage." PTX-1035 at -380; *see also* 9/20/24 AM Tr. 131:9-133:13 (Lee) (Professor Lee relied on PTX-1035 to support his claims that publishers reacted negatively to UPR, but did not recall any specific documents post-dating July 2019 reflecting publisher dissatisfaction).

1055. A Google experiment run before the full launch showed an "aggregate publisher indirect revenue impact of +1.4%," with "positive impact on indirect revenue" for 76 of the top 100 publishers and a "neutral-positive overall revenue impact" on the publishers with the highest impact from the change. PTX-1035 at -364-365 (September 2019 Google presentation).

1056. The number of publishers that experienced negative impacts was limited—only approximately 5 in the top 100 experienced a greater than 5% revenue decline. PTX-1035 at -377; 9/24/24 AM Tr. 135:16-24 (Milgrom).

1057. Immediately after the full launch, in November 2019, Google observed that most sellers were either positively impacted or experienced no change. As one employee noted, "to

land everything in the neutral-to-positive arena for publishers and our advertisers is an amazing achievement." DTX-829 at 1 (November 2019 Google email).

1057.1. Google's "top 500 publishers saw a median increase of 2.7% in auction revenue." DTX-829 at 2 ("Overall, publishers experienced a neutral to positive impact in revenue."). After the bundle of changes, Google Ads and DV360 were "near neutral in revenue and CPD impact" and publishers made more money. 9/23/24 AM Tr. 114:4-25 (Korula); DTX-829 at 2.

1057.2. Publishers also saw increased revenue from header bidding as a result of these changes, as header bidding competed more effectively with AdX in certain segments of inventory following the shift to a first-price auction and the deprecation of last look. 9/12/24 AM Tr. 144:12-23 (Srinivasan). After the changes in 2019, publishers continued to use header bidding to drive yield. 9/12/24 AM Tr. 145:19-146:4 (Srinivasan).

1058. One of the publishers that testified at trial explicitly testified that it was "in favor" of the change to UPR. Deposition of Ken Blom Tr. 73:5-6, 8 ("Q. But are you in favor of the UPR functionality? . . . A. Yes, we are."). As the Chief Product Officer at Buzzfeed explained, his "ad op team and programmatic technical account managers like using" UPR because "changing bids all the time is a pretty laborious task." *Id.* at 72:4-20 (Blom).

1059. None of Plaintiffs' experts examined evidence relating to the effects of UPR on publishers after the full launch of UPR with the UFPA. 9/11/24 PM Tr. 23:24-24:2 (Ravi) ("Q. You have no other information after August 2019 of any effect on rivals from the uniform pricing rules, right? A. Yes, I do not have any more. Yeah."); 9/20/24 AM Tr. 131:15-134:2 (Lee);

9/16/24 PM Tr. 79:25-81:2 (Weintraub) (analyzing UPR experiment run before the shift to a first-price auction).

1060. The ultimate impact of the Unified Pricing Rules on publishers was dynamic and unpredictable even to Google because publishers have full control of how they set their floor prices, which in turn dictates their revenues. 9/12/24 AM Tr. 133:19-134:10 (Srinivasan); *see also* 9/27/24 AM Tr. at 97:6-8 (Wheatland) ("Q. It's The Daily Mail that always chooses the amount of the price floor; yes or no? A. Yes.").

1061. Plaintiffs have not demonstrated that Google publisher customers were actually harmed by the Unified Pricing Rules. Nor have they even demonstrated that many Google publisher customers disliked the Unified Pricing Rules as they were finally officially launched in late 2019.

4. After UPR, Publishers Could Still Use DFP to Favor Non-Google Exchanges and Demand Sources.

1062. Despite Plaintiffs' suggestions otherwise, UPR did not completely take away publishers' ability to discriminate between ad exchanges. To the extent publishers still sought to set exchange-specific price floors for their own reasons, they still could.

1063. UPR only applied on Google Ad Manager, so publishers could still use non-Google tools to set different price floors for different exchanges. 9/24/2024 PM Tr. 19:35-20:5 (Milgrom). UPR had no effect on the flooring functions in other ad tech tools or what publishers did using those other, non-Google tools. *Id.* (Milgrom). Publishers can continue to set different price floors for different ad exchanges using the tools made available by other ad exchanges. *Id.* (Milgrom). The other, non-Google ad exchanges can apply those price floors prior to submitting bids into the Unified First Price Auction, after which the other ad exchanges are also subject to the price floors set by the seller in Google Ad Manager. *Id.* at 19:23-20:10 (Milgrom); *id.* at 33:13-21 (Milgrom).

1064. In addition, both before and after the Unified Pricing Rules, publishers could still use DFP to preference or discriminate against a particular exchange, including AdX -- they just could not do so through price floors.

1064.1. Publishers had multiple ways to "give a preference to header bidding to allow header bidding to win more" than AdX within DFP. 9/23/24 AM Tr. 111:22-112:4 (Korula). Publishers retained the ability to artificially inflate—or "boost"—header bidding bids within DFP. *Supra* ¶ 948. Google even informed publishers seeking to advantage header bidding that they could do this. 9/23/24 AM Tr. 111:22-112:23 (Korula). For example, a publisher could choose to enter a $3 winning bid from the header bidding auction as a $4 bid in the UFPA. In effect, publishers could force AdX to beat a higher price floor. 9/12/24 AM Tr. 134:19-135:11 (Srinivasan); *see also* PTX-819 at -319 (August 2019 Google email: "In practice, for many publishers," "they apply a boost to header bidding bids."). Though Google did not recommend this strategy because it might result in publishers receiving "lesser revenue than they otherwise would," Google "did not do anything to prevent those setups." 9/12/24 AM Tr. 134:11-135:21 (Srinivasan).

1064.2. Publishers could also choose to exclude an exchange from an auction entirely. 9/24/24 AM Tr. 132:7-133:3 (Milgrom). That included the ability to exclude AdX. *Supra* ¶ 877.

1064.3. Publishers could also offer post-auction discounts, which would favor a chosen demand source by encouraging them to bid higher. 9/24/24 AM Tr. 132:7-133:3 (Milgrom).

1065. Publishers were aware of these options after UPR. Of just the publishers that testified at trial, a former News Corp employee testified that a publisher could boost bids from header bidding or Prebid when inputted into DFP. 9/10/24 AM Tr. 96:25-97:8 (Layser). As she confirmed, publishers could insert "whatever value they wanted" in order to boost the header bidding bid. *Id.* at 97:23-98:6 (Layser).

VIII. When All the Reasonable Alternatives that Exist Are Considered, the Competition to Facilitate Display Advertising Matches Keeps Growing, Creating Dynamic and Rigorous Competition.

1066. By any metric, the marketplace for ad tech tools has, with the benefit of such intense competition, experienced dramatic growth and innovation in the exact time period Plaintiffs allege monopolization, all while new entrants and technologies have constantly entered the marketplace. 9/26/2024 AM Tr. 38:19-40:19 (Israel).

1067. The display advertising industry exhibits all the qualities of a healthy, competitive market. Numerous ad tech providers, large and small, have successfully competed against Google. Although Google has transacted more transactions and spend, it has continued to lose market share. 9/20/2024 AM Tr. 115:16-19 (Lee); 9/26/2024 AM Tr. 70:16-71:4, 96:9-97:1 (Israel). Pricing across the industry and of Google's tools has been flat or declining, and Google's prices have remained low despite increases in quality. 9/26/2024 AM Tr. 120:20-121:9, 157:21-158:18, 165:24-168:1 (Israel). Plaintiffs have not demonstrated that Google's conduct caused anticompetitive effects in the display advertising industry, or even significant effects that have prevented rivals from competing successfully.

A. Ad Tech Providers—No Matter Their Size or Whether They Are New or Established Entrants—Can Successfully Compete Against Google.

1068. As explained in the next section, throughout the history of display advertising, numerous competitors—both big and small—have been able to break into the display advertising market and attain sufficient scale to win market share from Google and others. 9/26/24 PM Tr. 7:22-8:11 (Israel) ("There's lots of small competitors who are continuing to compete at a smaller scale."); 9/20/24 PM Tr. 84:2-8 (Sheffer) ("There are dozens, if not hundreds, of companies and pieces of technology that they can use across that entire ads ecosystem."); DTX-1544A at 4 (2023

BidSwitch forward planning document describing "a much stronger reliance on trading" from very large demand-side platforms on much smaller "longer tail" supply side platforms).

1069. Google's conduct has not prevented rivals from competing effectively, and the attempts of their expert Professor Weintraub to demonstrate otherwise fail.

1. Numerous Ad Tech Providers Have Attained Sufficient Scale to Compete Successfully Against Google.

1070. According to Plaintiffs, Google's conduct has "denied rivals scale" and created barriers to enter the display advertising market. 9/19/24 PM Tr. 46:6-16, 89:16-90:2 (Lee). But the evidence presented at trial shows that numerous rivals have been able to grow quickly and attain sufficient scale to successfully compete for ad spend.

1070.1. For example, TikTok's advertising business started from nothing in 2019 and has experienced 50% annual growth since. DTX-1874. In 2022, 4% of total display advertising dollars spent in the United States accrued to TikTok (as compared to 10% to Google). DTX-1874.

1070.2. As another example, not only has Amazon experienced 900% growth in just five years, *supra* ¶ 466, but it also has immense potential to continue that growth trajectory and attain even greater scale in display advertising. As a 2020 Google competitive analysis presentation noted, Amazon has "all the building blocks to compete at Google/Facebook scale" with access to personalized data from over 90 million Amazon Prime subscribers and over 300 million active customers that can be applied to its "quickly growing" ads business. DTX-879 at 19. One external research group projected Amazon's ad business will grow to $50.6 billion by 2028. DTX-879 at 23.

1071. The ad tech providers that testified at trial all confirmed that they have been able to attain sufficient scale to compete effectively in display advertising.

1072. Microsoft:

1072.1. A 2023 Microsoft slide deck described Microsoft's Xandr publisher ad server as "an open and flexible platform with global scale trusted by the world's most sophisticated publishers across all channels and ad formats." DTX-1524 at 14.

1072.2. Microsoft has described its new combined offering post-Xandr acquisition as "one of the world's largest marketplaces," with an "expansive" advertising ecosystem that reaches over one billion users "across different audiences and different formats." DTX-1756 at 2 (Microsoft website landing page); *see also* DTX-1384 at 2 (2022 Xandr in Microsoft Product Synergy outline); 9/23/24 PM Tr. 140:16-143:3 (John).

1073. Index Exchange: Index Exchange can handle today "400 times more auctions than it could . . . ten years ago," has "five to ten times" more publishers using its product, has seen a "five to ten times growth in revenue," and employs over 550 employees. 9/9/24 PM Tr. 37:5-18 (Casale). As Casale agreed, Index Exchange has "massive scale." *Id.* at 39:4-8 (Casale).

1074. The Trade Desk:

1074.1. The Trade Desk has in recent quarters reported increases in revenue that outpaced the rest of the digital marketing industry, just as it has every quarter for the last few years. 9/12/24 AM Tr. 163:11-164:7, 164:8-165:22, 165:23-166:9 (Dederick) (investments in connected TV and digital audio are driving The Trade Desk's top-line revenue growth).

1074.2. As it has stated to investors and analysts, The Trade Desk's success is due in large part to the fact that over the last four years, there has been a massive shift in terms of where consumers are spending their digital time towards Connected TV and digital audio. 9/12/24 AM Tr. 166:10-167:21 (Dederick); 9/12/24 PM Tr. 5:6-6:20 (Dederick).

1074.3. When pitching to potential customers since as early as 2016, The Trade Desk emphasized the scale of its company. DTX-319 at 11 ("Our ability to buy inventory across all channels at scale, and all over the globe positions us as a leader in the space, and an ideal DSP for large global brands."); 9/12/24 PM Tr. 21:24-22:9 (Dederick). The Trade Desk has grown "quite substantially" since then. *Id.* at 24:24-25:5 (Dederick).

1075. Criteo:

1075.1. Criteo offers both buy-side products, such as a demand-side platform, and sell-side products, such as a publisher ad server and a supply-side platform. DTX-1420 at 12 (Criteo 2022 10-K). Criteo grew from a company that predominantly offered a buy-side tool to a full ad tech stack. *Supra* ¶ 359.

1075.2. Criteo markets as a competitive advantage its access to proprietary commerce data about users. Criteo's access to this proprietary data gives it "exposure to over $1 trillion in online sales" in 2022, reflecting approximately "$2.7 billion worth of transactions per day on average" and delivering 1.8 trillion ads in 2022. DTX-1420 at 13 (2022 Criteo 10-K). Criteo has used these datasets to develop AI tools that improve user targeting. DTX-1179 at 2 (2022 Criteo presentation describing its "AI-built audiences" as a competitive advantage).

1075.3. Criteo's direct integrations with publishers give it access to "~60% of web [Daily Active Users] addressable through" the "thousands of publishers" in its publisher network. DTX-1257 at 3-4 (2022 Criteo investor presentation); Deposition of Todd Parsons Tr. 91:9-92:3.

1076. OpenX: OpenX launched its ad exchange in September 2008, doubled its size within a few months, and experienced "encouraging growth" even in the "very early days." 9/17/24 PM Tr. 85:7-86:10 (Cadogan). By 2013, OpenX described itself as having "massively scalable architecture." *Id.* at 86:15-22 (Cadogan). By 2017, OpenX had thousands of publisher and advertiser customers. *Id.* at 87:8-16 (Cadogan). Also by 2017, OpenX described itself as having a "massive scale global operation." *Id.* at 87:17-88:14 (Cadogan). [redacted]

1076.1. Former CEO of OpenX, Tim Cadogan, complained that, despite OpenX's success in the exchange market, OpenX's publisher ad server was not able to successfully compete with DFP because OpenX lacked access to real-time bids from AdX. 9/17/24 PM Tr. 46:4-48:16, 48:17-49:3, 50:12-52:20, 54:18-55:19 (Cadogan).

1076.2. That post hoc complaint is belied by Cadogan's own testimony and OpenX contemporaneous business documents documenting the numerous reasons OpenX's publisher ad server did not succeed that are unrelated to Google. As Cadogan agreed, "there were a couple of areas" where OpenX was "probably not quite so good" as DFP. 9/17/24 Tr. 48:17-20 (Cadogan). For example,

OpenX's ad server had "low levels of sales focus and marketing support"; "video ad serving not supported properly"; "significant discrepancies encountered"; "lack of support for flexible ad sizes"; and various other reasons for product churn. *Id.* at 74:5-12, 77:4-15, 77:19-79:17 (Cadogan). At the time, OpenX did not list as a reason for its lack of success in the publisher ad server market the inability to access real-time AdX bid amounts. *Id.* at 79:18-20 (Cadogan); *see also* DTX-181 at 2 (2013 OpenX internal email stating OpenX would "reduce" its "investment in and exposure" to the ad server business because "ad serving has lost its luster strategically and is more commoditized competitively").

1077. Meta Audience Network: Brian Boland, a former Vice President at Facebook, testified that Meta Audience Network "was incredibly successful at attracting app publishers to its platform" and at "selling mobile app ads to advertisers." 9/13/24 PM Tr. 145:12-17 (Boland). Meta Audience Network became "one of the fastest growing businesses at Facebook," eventually serving ads to 1 billion people each month and attaining "a lot of scale." *Id.* at 144: 13-21, 145:15-17 (Boland).

1078. PubMatic: PubMatic represents to "investors, potential investors, and analysts" that it is "global-scaled and profitable." 9/12/24 PM Tr. 136:12-15 (Goel). It has also represented that PubMatic has "grown roughly at twice the rate of growth in the market." *Id.* at 135:20-24 (Goel).

1079. Equativ: Equativ offers an SSP and a publisher ad server, and its sales revenue has [redacted] over the last 3 years. Deposition of Arnaud Creput Tr. 81:8-11 (sealed testimony referenced at 9/13/24 PM Tr. 87:25-88:3 (Creput)). Today, Equativ's SSP conducts approximately [redacted] auctions a day. *Id.* at 81:22-24 (Creput) (sealed testimony referenced at 9/13/24 PM Tr. 88:9-11

(Creput)). In 2022, Equativ reported a net recurring revenue of 92 million euros, a "record" for the company. 9/13/24 PM Tr. 88:5-8 (Creput). And in 2022, Equativ increased its employee count by "a little over 100." *Id.* at 88:13-18 (Creput). Equativ now connects to "55% of the top 1,000 biggest websites worldwide." PTX-1674A at -009 (2023 Equativ deck describing its products).

1080. Vox Media: Vox Media, a publisher, launched a suite of proprietary ad tech tools called Concert that connect advertisers to "premium inventory" on Vox's own properties and third-party publisher properties. 9/27/24 AM Tr. 10:16-25 (Pauley).

1080.1. Concert has unlocked access to inventory from a "scaled" set of "known publishers," including NBCUniversal, Penske Media, Conde Nast, and others. 9/27/24 AM Tr. 10:16-25 (Pauley). By connecting to these publishers, the Concert ad tech tools enable advertisers to "get more scale" "for their advertising investment." *Id.* at 11:9-18 (Pauley). These tools have provided "continued business growth opportunity for Vox," which has "the ability to build more scale with Concert." *Id.* at 11:5 -8, 11:19-21 (Pauley).

1080.2. In the first six months of 2021, Concert revenue more than doubled, exceeding the expected growth rate. 9/27/24 AM Tr. 17:12-17. 18:6-12 (Pauley); *see also* DTX-1813 at 1 (2021 Vox document indicating Concert was "in pursuit of exceeding $50mm in net revenue"). Concert has won business from Google, including setting up a private marketplace in the Concert SSP due to dissatisfaction with AdX and moving a Hulu deal over to Concert from AdX. 9/27/24 AM Tr. 16:17-17:11 (Pauley); DTX-1496 at 9, 12 (2022 Vox document reporting Vox's success in winning competition from AdX). Ultimately, Vox has viewed Concert as a "success" with an "upward trajectory

of growth via revenue." 9/27/24 AM Tr. 19:9-14 (Pauley); *see also* DTX-1813 at 2 (2021 Vox document stating Concert has also helped Vox Media "expand its advertiser base with new and smaller advertisers").

1081. Professor Weintraub testified that Google's scale is significantly larger than that of its competitors, but his analysis overstated Google's scale relative to its competitors' in two important ways:

1081.1. First, Professor Weintraub excluded some of the largest rivals that compete significantly with Google, including Meta and Amazon. 9/16/24 PM Tr. 49:13-15 (Weintraub).

1081.2. Second, Professor Weintraub confined his analysis to "open-web display" transactions, excluding the other channels and formats that even the competitors he considered transact in. 9/16/24 PM Tr. 49:16-25 (Weintraub).

1082. Moreover, even if Google has more scale, Plaintiffs overemphasize the importance of scale to compete for ad spend. As Plaintiffs' own witness Lowcock, who has extensive experience with advertising agencies, explained, advertisers should not be focused solely on "scale" because "the more inventory you add to the pool, the more sites you add and the less actual diligence that occurs in adding sites to that pool." 9/9/24 AM Tr. 110:8-111:13 (Lowcock). In other words, ad tech tools can distinguish themselves by offering not just a wide set of inventory, but also a high-quality set of inventory.

1083. This long history of competition and shifting market shares in the display advertising industry is not consistent with a market so dominated by one competitor that rivals are unable to attain the requisite scale to effectively compete. Google's share of ad tech tool spending has been on a steady decline. *Supra* ¶ 576. Even as the amount of ad spend and volume of queries

on AdX have increased between 2015 and 2022, AdX's win rate during this same time period has decreased from almost 50% to under 20%. 9/16/24 PM Tr. 52:3-9 (Weintraub); *see also* PTX-1315 (Weintraub Figure 7: Share of Impressions Won Among Bids Submitted (Win Rate) For AdX and Rival Exchanges); PTX-1316 (Weintraub Figure 8: Number of Queries Where the Exchange Submitted at Least One Bid); PTX-1317 (Weintraub Figure 9: Monthly Advertiser Spend for AdX and Rival Exchanges).

2. Plaintiffs Have Not Demonstrated that Google's Conduct Prevented Rivals from Attaining Sufficient Scale to Compete.

1084. Plaintiffs' expert Professor Weintraub failed to show that—despite the evidence of significant successful competition from rivals—Google's conduct has deprived rivals of the scale they need in order to compete.

1085. As an initial matter, merely analyzing the impact of Google's conduct on rivals does not demonstrate harm to competition. Plaintiffs must demonstrate that Google's conduct had some effect that made it "so other firms . . . can't compete" or otherwise "undermine[d] the competitive process." 9/26/24 PM Tr. 7:10-21 (Israel) ("Competition by its very nature is rivals competing with each other. Some win; some lose. So harm to rivals is an inherent part of the competitive process"). As Dr. Abrantes-Metz agreed, "providing a better product is pro-competitive" and "doesn't harm competition" even if it "harms the other rivals." 9/16/24 PM Tr. 117:20-118:5 (Abrantes-Metz).

1086. Professor Weintraub did not evaluate the effects of Google's conduct on competition. 9/16/24 PM Tr. 41:13-17 (Weintraub). Nor did he account for the effects of Google's conduct on the quality of its products. *Id.* at 42:4-12 (Weintraub). Instead, Professor Weintraub opined only that certain of Google's conduct "decreased rival scale and, therefore, diminished rivals' ability to compete." *Id.* at 21:11-16, 41:13-17 (Weintraub). Professor Weintraub

exaggerated "the scale needed to achieve certain benefits" and gave unreliable calculations of the effects of Google's conduct on rivals' scale. 9/24/24 AM Tr. 32:8-13 (Milgrom) ("Economies of scale are real, but they're not unlimited.").

1087. First, Professor Weintraub opined that Google's rivals cannot effectively compete because they do not have sufficient access to data at scale. 9/16/24 PM Tr. 11:15-12:4 (Weintraub). But the evidence, including evidence cited in Professor Weintraub's own report, shows that Google's rivals are able to access sufficient data to attain scale.

1088. There are two forms of data that are important to ad tech providers: targeting data and transaction data. Targeting data refers to the data that facilitates advertisers' purchasing of display advertising by describing the particular user who will be viewing an impression. 9/20/24 AM Tr. 29:12-30:7 (Lee); 9/12/24 PM Tr. 72:24-73:12 (Goel).

1089. The ability to amass scale in targeting data is far from unique to Google. For example, a recent trend in ad tech is the increasing use of first-party data—that is, information that a company collects directly from its own users or website visitors—to improve targeting. 9/27/24 AM Tr. 12:11-18 (Pauley). Many companies have access to valuable first-party data collected from users in their ordinary course of business. Ad tech providers market as a competitive advantage their ability to leverage first-party data.

1089.1. Vox's "unique" first-party audience data is gathered across a broad portfolio of content and is there "a part of the proposition" of the value of its ad tech tools. 9/27/24 AM Tr. 12:4-24 (Pauley).

1089.2. Quad, a media agency, owns a data stack that represents 89% of United States households for purposes of targeting. 9/9/24 AM Tr. 109:3-6 (Lowcock).

1089.3. Following Microsoft's acquisition of Xandr, Microsoft recognized that it had "Unique Data," and began "working on a project to unify Microsoft's first-party data and Xandr's third-party data" in order "to join the data to scale the audience." 9/23/24 PM Tr. 139:7-140:15 (John); DTX-1376 at 2-4 (November 2022 "Xandr in Microsoft – Product Synergies" deck).

1089.4. The Microsoft Audience Network advertises: "There are many advantages to partnering with an industry-trusted partner like Microsoft Advertising. Still, none are more significant than access to our first-party proprietary data—which nobody else can claim." DTX-1303 at 2 (2022 Microsoft blog post titled "10 reasons why Microsoft Audience Network is a must-buy"). Microsoft's first-party data includes user information from properties such as Outlook.com, Microsoft Edge, and LinkedIn. *Id.*

1089.5. Retailers with digital presences have access to valuable first-party data collected from customers, such as customers' purchase history. Retailers' first-party data have provided them a competitive advantage in advertising, as they can implement data-driven ad tech solutions that are based on this first-party data. 9/25/24 PM Tr. 55:1-20 (Stewart); DTX-1132N at 12 (2021 Google presentation stating online retailers like Home Depot, Target, CVS, and Wal-Mart are significant competitors in ad revenue growth); 9/25/24 AM Tr. 54:24-55:8 (Stewart) (Wal-Mart competes with Google Ads and DV360). One former Google employee noted that Amazon has "the best data for detail on their O and O." Deposition of Eisar Lipkovitz Tr. (Litigation) at 211:13-

212:02; *see also* DTX-754 at 11 (2019 Google competitive analysis of Amazon).

1090. An ad tech provider like Criteo can also successfully amass targeting data without itself operating digital properties. Internal Criteo documents describe Criteo's targeting ability as a competitive advantage, or "How Criteo Wins" against Meta, Google Ads, and other competitors. DTX-1179 at 2-5 (2022 Criteo deck assessing audience competition).

1091. Ad tech providers also rely on transaction data, i.e., data about historical transactions, to improve the performance of their tools, including by training algorithms to better predict bids, performing experiments to develop and test new innovations, and making a firm more cost efficient. 9/16/24 PM Tr. 13:2-13 (Weintraub).

1092. Both large and small ad tech providers are able to use transaction data to run experiments and improve their products. Even smaller ad tech providers can still achieve the necessary sample size to run experiments by operating with different percentages of a company's daily data or over a longer period of time. 9/24/24 AM Tr. 138:2-12 (Milgrom).

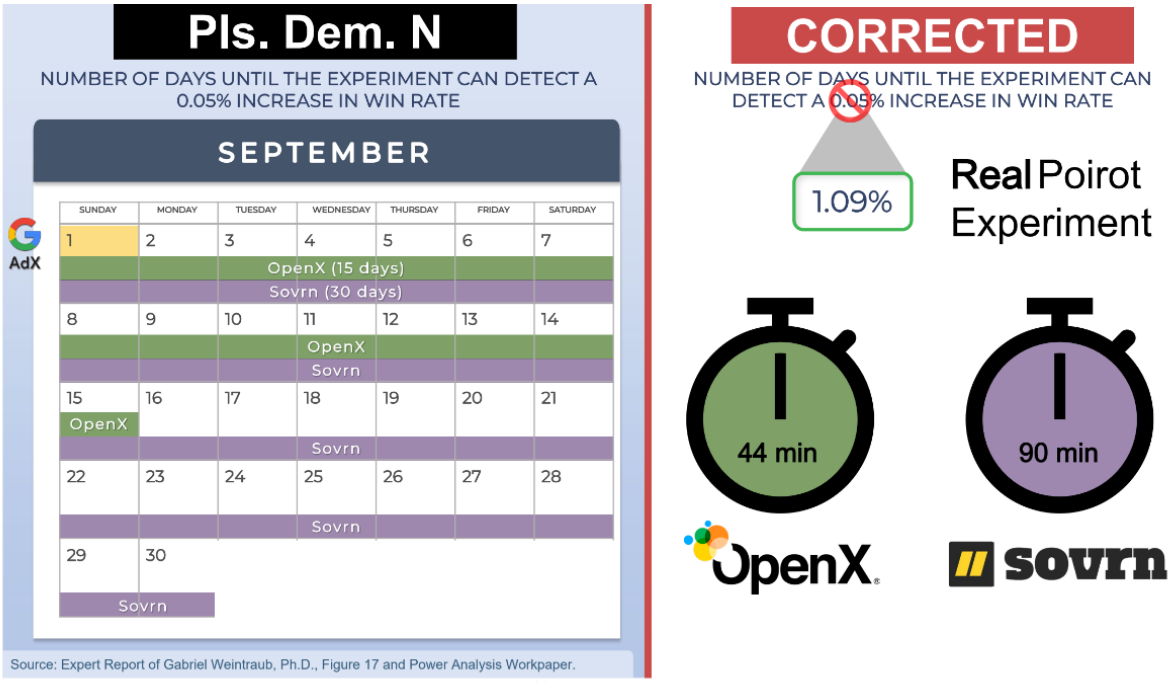
1093. Google's competitors have stated that they have accumulated significant amounts of transaction data. *E.g.*, 9/9/24 PM Tr. 39:9-40:11 (Casale) (Index Exchange had 4.5 petabytes of bid data in 2016); [redacted]

1094. In the face of evidence that numerous competitors have sufficient data to attain scale, Professor Weintraub presented only his simulation purporting to calculate that smaller exchanges would take 15 days or 30 days to run the kinds of experiments that Google can run in 1 day. 9/16/24 PM Tr. 14:12-15:12 (Weintraub).

1095. As the Court observed, Professor Weintraub's "scale" analysis was not reliable:

1095.1. First, Professor Weintraub's opinion was not based on a single real experiment run by Google or a competitor. 9/16/24 PM Tr. 57:19-58:13 (Weintraub); *see also id.* at 108:12-15 (Weintraub) ("The Court. Well, the problem is that it's not based on a specific experiment that was done; it's a conglomerate of them. And I think that gives it less reliability. Move on to something else.").

1095.2. Second, as Google's expert Professor Milgrom explained, Professor Weintraub's analysis "exaggerated the importance of scale economies." 9/24/24 AM Tr. 138:2-12 (Milgrom). The smaller an effect is, the longer it takes to detect. *Id.* at 136:24-137:7 (Milgrom). To arrive at his conclusion that other exchanges would require 15 days or 30 days to run an experiment, Professor Weintraub arbitrarily required that the experiment be able to detect an "imaginary," very small effect size of 0.05%. In reality, of all of the actual tests and experiments considered by Professor Weintraub, the smallest effect size was 1.09%. *Id.* at 136:21-137:11 (Milgrom). As Professor Milgrom calculated and shown below, Milgrom DX 1.15, a smaller exchange would take only 44 minutes (OpenX) or 90 minutes (Sovrn) to run that experiment and achieve the same effect size of 1.09%—not, as Professor Weintraub suggested, 15 days or 30 days. *Id.* at 137:12-138:1 (Milgrom); Milgrom DX 1.15 (contrasted with Plaintiffs' Demonstrative N).



Milgrom DX 1.15

1095.3. Professor Milgrom concluded that Plaintiffs "had exaggerated the importance of scale economies because, at this scale of OpenX or Sovrn, it doesn't take very long to run these experiments. It takes even less time for Google, but this is not an economically-significant disadvantage." 9/24/24 AM Tr. 138:2-12 (Milgrom).

1096. Professor Weintraub also presented calculations of the amount that certain forms of Google's conduct allegedly reduced rivals' scale, but those calculations have virtually no probative value.

1097. For one, the assumptions underlying Professor Weintraub's calculations are unreliable.

1097.1. Professor Weintraub attempted to extrapolate annual effects on rivals based on short-run experiment results conducted over days or weeks. 9/16/24 PM Tr. 91:17-92:9, 92:18-24 (Weintraub).

1097.2. Professor Weintraub calculated the effects of the Unified Pricing Rules based on a Google experiment that evaluated UPR under a second-price auction. 9/16/24 PM Tr. 79:25-81:2 (Weintraub). But UPR was launched at the same time as Google's shift to a first-price auction, and the effect of UPR would be different in a first-price auction than in a second-price auction. *Supra* ¶¶ 1042-1045.

1097.3. For all of his calculations based on Google experiments, except for Project Poirot, Professor Weintraub performed two calculations based on different assumptions, but he could not even express an opinion in his report as to whether the larger or the smaller set of numbers was correct. 9/16/24 PM Tr. 69:20-70:5 (Weintraub). For the analysis returning larger numbers ("substitution from rival exchanges" analysis), Professor Weintraub assumed that every impression won by Google as a result of a product improvement was at the expense of a rival exchange. *Id.* at 26:20-27:6, 65:6-14 (Weintraub). His alternative calculation ("GAM June 2023" analysis) was based on a month of real Google Ad Manager auction data and assumed that the only impressions gained at the expense of a rival were those in which AdX won but the second-highest bid was actually from a non-AdX exchange. *Id.* at 30:21-31:15, 65:15-19, 66:5-9 (Weintraub).

1097.4. The two sets of calculations differ significantly: the smaller calculation showed effects on rivals that are only 14% to 19% of the results of the other calculation. 9/16/24 PM Tr. 25:2-15, 28:9-20, 29:18-25, 31:10-15, 68:4-8,

71:3-6, 71:21-23 (Weintraub). *Compare* PTX-1326; PTX-1328; PTX-1331, *with* PTX-1327; PTX-1329; PTX-1332.

1098. Even setting aside the flaws in Professor Weintraub's calculations, the numbers he arrived at have little significance because of the limited scope of Professor Weintraub's assignment. Professor Weintraub did not actually opine on the minimum viable scale of an exchange, or "the scale sufficient for a firm to operate profitably in a medium to long term." 9/16/24 PM Tr. 52:14-25 (Weintraub). In other words, he had nothing to say about whether the purported effects on rivals he calculated are even significant enough to affect a rival's ability to compete.

1099. If anything, the evidence suggests that even the largest effects Professor Weintraub calculated—on the order of millions of dollars and billions of impressions annually, PTX-1333 (Weintraub Table 8: Effects of Google's Conduct on Impressions of Rival Exchanges); PTX-1334 (Weintraub Table 9: Effects of Google's Conduct on Advertiser Spend of Rival Exchanges)—are relatively insignificant. Sources cited and quoted by Professor Weintraub in his report state that Google's rivals operate on many times that scale. 9/16/24 PM Tr. 54:10-23 (Weintraub).

[redacted]

1099.3. As another example of the relatively large size of the display advertising market, The Trade Desk refers to the total addressable global display

advertising market to be "approaching a trillion-dollar advertising market." 9/12/24 PM Tr. 17:18-23 (Dederick).

1100. Moreover, Professor Weintraub did not account for the effects of Google conduct that have increased rivals' scale. Professor Weintraub did not provide any opinion as to whether Google's conduct net benefited or hurt the scale of rival exchanges.

1100.1. For example, by Professor Weintraub's own calculations DV360 has contributed 3.6 trillion impressions and $8.3 billion of ad spend to rival exchanges from 2017 to 2022 alone. 9/16/24 PM Tr. 62:15-64:21 (Weintraub). As of 2018, 78% of spend by DV360 and AwBid on third-party exchanges was on inventory that Google already had a relationship with. PTX-625 at -410 (2018 Google document comments). In other words, a significant amount of the spend Google's buying tools contributed to third-party exchanges was for inventory already available to Google through its own tools.

1100.2. As another example, according to a document relied on by Professor Weintraub, 9/16/24 PM Tr. 93:5-8 (Weintraub), Project Poirot actually increased revenues for a rival exchange, AppNexus, by 32.7% for inventory sold through a "true second price auction." PTX-860 at -685 (2018 Google design document).

1101. To summarize, Professor Weintraub's limited opinions regarding the effects of Google's conduct on rivals' scale are inconsistent with the weight of evidence presented at trial, rest on flawed calculations, and ultimately have little to nothing to say about the effects of Google's conduct on competition.

B. All of the Metrics for a Competitive Market—Expanding Output, Improved Quality, Flat or Declining Prices, and Google's Declining Market Shares—Demonstrate that the Ad Tech Marketplace Remains Competitive.

1102. Examining the metrics that are relevant to competition, output has been expanding while prices have been declining and quality has been increasing—all indicative of an industry that is thriving. 9/26/24 AM Tr. 157:21-158:18 (Israel) ("I don't see any evidence of a market that has been subject to the exercise of monopoly power or been harmed."). Google has continued to invest in and improve the quality of its products, while keeping its prices flat or declining at the same time that quality is improving.

1103. Given this evidence, the only way to demonstrate harm would be to compare the existing conditions to a but-for world to show that but-for Google's conduct, market conditions would have been even better. 9/26/20 AM Tr. 158:19-159:11 (Israel). Plaintiffs, however, failed to put forward any specific but-for world. *Id.*; 9/20/24 AM Tr. 146:4-147:25 (Lee) ("I'm not putting forward a specific but-for world" for any of the alleged conduct).

1. Output Is Expanding, Including as a Result of Google's Innovations, While Google's Market Share Is Declining.

1104. The output of digital display advertising facilitated by ad tech has increased eighteen-fold from 2008-2022, with spending growing from $7.6 billion in 2008 to $136.7 billion in 2022—an average annual growth rate of 22.9 percent. DTX-1828 (based on eMarketer data); PTX-1249 (Lee Figure 78: Growth in US display, native, and video ad spending (web and app), 2008-2022); 9/26/24 AM Tr. 168:10-169:5 (Israel) ("this kind of explosion" of "output" is an indicator of "a very healthy industry" and "to show harm, you have to show that it should have been higher"); *cf.* 9/12/24 PM Tr. 16:11-18:2 (Dederick) (The Trade Desk's Chief Revenue Officer testified that The Trade Desk looks at a nearly trillion-dollar Total Addressable Market for all advertising, including "video, display, social, and digital out-of-home").

1105. Not only has output been expanding exponentially, it has been beating industry projections. DTX-1884; 9/26/24 AM Tr. 169:24-170:25 (Israel) (if "Google did something that hindered the industry, I would expect to see output fall below projections. But output has consistently been above projections").

1106. Output has increased even within Plaintiffs' artificially defined markets.

1106.1. For example, by the calculations of Plaintiffs' own expert, revenues of ad exchanges from "indirect open-web display advertising" in the United States have doubled from $50 million a month in January 2018 to over $100 million a month by the end of 2022. PTX-1262A; *see also* PTX-1239A; 9/20/24 AM Tr. 124:9-126:4 (Lee).

1106.2. Similarly, by Plaintiffs' expert's own calculations, the number of "open-web display impressions" served monthly by publisher ad servers in the United States has risen from around 450 billion in January 2018 to almost 600 billion by the end of 2022. PTX-1277A; *see also* PTX-1236A (worldwide impressions served by publisher ad servers have increased from approximately 1.3 trillion impressions a month in January 2018 to over 1.6 trillion impressions a month by the end of 2022); 9/20/24 AM Tr. 126:11-127:16 (Lee).

1107. As Plaintiffs' own expert Dr. Abrantes-Metz testified, output expansion is procompetitive. 9/18/24 AM Tr. 51:23-52:11 (Abrantes-Metz). While Professor Simcoe testified that one would expect to see "reductions in output" "when prices are higher than they would be in a competitive market," 9/18/24 PM Tr. 9:17-10:17 (Simcoe), on cross examination, he

acknowledged that there has been a net output increase in "open-web display advertising" impressions, 9/19/24 AM Tr. 71:11-14 (Simcoe).

1108. Google has contributed to the output expansion in the display advertising market. For example, innovations in real-time bidding increased spending on display advertising because real-time bidding promoted competition among advertisers for a particular impression. *Supra* ¶¶ 111. Other product innovations such as the Unified Pricing Rules and sell-side Dynamic Revenue Sharing have enabled matches that otherwise would not have happened. *Supra* ¶¶ 965, 974; 9/16/24 PM Tr. 72:24-73:10 (Weintraub) (agreeing that UPR may have expanded output).

1109. Google has also contributed to output expansion in the ad tech ecosystem by investing in initiatives that promote trust across the ecosystem, which in turn increases display advertising to the benefit of all participants. In the aftermath of the 3ve ad fraud scheme, which represented an "existential" threat to Google's ads business and the display advertising ecosystem, Google made a conscious effort to "grow the pie" for all participants in the ecosystem. 9/24/24 PM Tr. 73:17-74:6 (Bjorke); DTX-476 at 5 (2017 Google slide deck proposing long-term strategy to address ad fraud). Google would "address ad fraud across the entire ecosystem" rather than just "grow the slice" for Google by addressing ad fraud in its "own tools alone," DTX-476 at 5—even though building safety and security for the entire ecosystem would be "clearly more work for Google," 9/24/24 PM Tr. 75:21-25 (Bjorke).

1110. Google has decided to build the ecosystem, not just the quality of its own tools, for multiple reasons.

1110.1. First, any ad tech business depends on user trust and confidence in the entire ecosystem. Otherwise, advertisers would not want to invest and would not shift their budgets to display advertising from more traditional forms of

advertising like cable television 9/24/24 PM Tr. 73:17-74:6, 74:19-75:20 (Bjorke); DTX-476 at 6 ("Hypothesis: Cleaning up Ecosystem far better than just improving [Google's products].").

1110.2. Second, in order to keep Google's own systems safe, it needs to "cut off funding for the bad guys," which in turn requires addressing ad safety and security across the ecosystem. So long as bad actors continue to make money, they continue to innovate and evade detection, making it even harder for Google to protect its own network. 9/24/24 PM Tr. 74:19-75:20 (Bjorke); *see also id.* at 73:17-74:6 (Bjorke).

1110.3. Third, Google's pursuit of this strategy benefits Google's own customers, who can connect to non-Google products. As Bjorke explained: "if we couldn't help clean up the whole ecosystem, there would be so much fraud in that third-party ecosystem. Even if we were able to keep our closed ecosystem reasonably clean, we would be exposed when" Google advertisers "bought from third-party exchanges." 9/24/24 PM Tr. 76:1-8 (Bjorke).

1111. One way that Google has contributed to the safety and health of the entire ecosystem, not just its own tools, is the development of Ads.txt ("Authorized Digital Sellers"), a tool to fight fraud that Google shared with the entire display advertising ecosystem. 9/19/24 PM Tr. 19:15-20:13 (Levitte).

1111.1. Ads.txt is a simple text file that publishers can upload to publicly list the ad tech providers that are actually authorized to sell their inventory. Advertisers can reference the file to ensure that they are buying a publisher's inventory

only from the publisher's authorized partners. 9/24/24 PM Tr. 77:7-19 (Bjorke).

1111.2. To view a publisher's ads.txt file, anyone can go to a publisher's website and type in "/ads.txt" after the web address. For instance, to check the authorized sellers for the Staunton News Leader, a user can go to "www.newsleader.com/ads.txt." 9/24/24 PM Tr. 78:8-25 (Bjorke); Bjorke DX 1.5; Bjorke DX 1.6, Bjorke DX 1.7; Bjorke DX 1.8. The Staunton News Leader's ads.txt page lists several authorized sellers and resellers of the News Leader's ad inventory, including Google and many of its competitors: Facebook, Rubicon, Yahoo, AppNexus, Taboola, PubMatic, Criteo, and Index Exchange. 9/24/24 PM Tr. 79:7-12 (Bjorke); Bjorke DX 1.5; Bjorke DX 1.6, Bjorke DX 1.7; Bjorke DX 1.8.

1112. Google developed the ads.txt standard and helped to drive its adoption across the industry, including engaging with many publishers, such as the Financial Times, to explain and test the standard with them. 9/24/24 PM Tr. 77:3-6, 79:13-80:8, 84:12-17, 86:2-11 (Bjorke).

1113. Later, Google also identified the need for and co-authored app-ads.txt, the app version of ads.txt that performs the same function but for apps. DTX-1016 at 36 (2020 Google slide deck discussing ads.txt).

1114. Ads.txt has had a significant effect on the display advertising ecosystem, eliminating "a $50 billion fraud opportunity." 9/24/24 PM Tr. 80:9-14 (Bjorke). Ads.txt helped eliminate domain misrepresentation, which bad actors 3ve and Methbot used to impersonate legitimate publishers. *Id.* at 77:20-78:7 (Bjorke). As explained by Bjorke, "this little simple text file has basically closed the door on this type of fraud. Domain misrepresentation as a fraud vector

no longer exists in this space." *Id.* at 80:9-14 (Bjorke). After the implementation of Ads.txt, it would have been impossible for 3ve and Methbot to operate the way they did. *Id.* at 80:15-19 (Bjorke).

1115. Google has also expanded output by launching user privacy initiatives that enhance trust in the ads ecosystem, which in turn increases display ad spending. 9/25/24 PM Tr. 128:8-11 (Borgia); *see also* DTX-1132N at 15 (2021 Google slide deck stating users expect privacy and have concerns about "risks of data collection" may block ads).

1116. Since the earliest years of its display ads business, Google has prioritized the privacy of digital content viewers. DTX-101 at 5 (2012 Google email: "Lead the industry in terms of user-privacy innovations. Most importantly, users should remain firmly in control, for example, with the ability to easily block unwanted ads.").

1117. Following that principle, in 2023 Google launched My Ad Center, a user tool to control the types of ads they see and limit the information Google's ad tech tools can use to serve ads to them. DTX-1182 at 2 (2022 Google Ads Safety Report); 9/25/24 PM Tr. 127:4-12, 130:6-13 (Borgia).

1117.1. Through My Ad Center, a user can turn off ads personalization entirely. 9/25/24 PM Tr. 127:24-128:7 (Borgia). If a user turns personalization off, Google does not rely on any information about the user in order to deliver an ad. 9/25/24 PM Tr. 128:23-129:10 (Borgia).

1117.2. If a user turns personalization on, the user can tailor their ad experience by preferencing certain ad topics or excluding others. For example, a user can elect not to receive ads relating to certain brands or sensitive topics like alcohol or gambling. 9/25/24 PM Tr. 128:23-130:5 (Borgia).

1117.3. By enabling users to indicate their ad preferences, My Ad Center helps advertisers maximize return on their investment by reaching the right users, and not wasting their money on the wrong ones. Increased advertiser return on investment in turn increases spending on publisher inventory. 9/25/24 PM Tr. 128:11-22 (Borgia).

1118. In 2023, Google also launched the Ads Transparency Center, a searchable hub for verified advertiser's ads.

1118.1. The Ads Transparency Center permits users, researchers, and other stakeholders to access information about the ads run on Google's platforms. DTX-1182 at 2 (2022 Google Ads Safety Report); 9/25/24 PM Tr. 122:15-20 (Borgia).

1118.2. Through the Ads Transparency Center, any user served an ad through Google's tools can report the ad as inappropriate or learn more about the advertiser that bought the ad. 9/25/24 PM Tr. 122:15-20, 123:11-124:24 (Borgia).

1118.3. The Ads Transparency Center also promotes trust, and by extension ad spending, in the ad tech ecosystem by enabling users to learn about the advertisers that served ads to them. 9/25/24 PM Tr. 122:21-123:7 (Borgia); DTX-1186 at 10. Advertisers, particularly lesser known brands, can more easily establish legitimacy and trust with users, and publishers benefit from increased ad spend when advertisers' return on ad spend improves. 9/25/24 PM Tr. 125:2-12 (Borgia).

1119. Even though Google has engaged in many acts that expand output, Plaintiffs' experts did not put forth any opinion about the proportion of scale Google achieved through output expansion as opposed to through allegedly anticompetitive conduct. For example, Professor Simcoe's model of a but-for world does not differentiate between impressions AdX won as the result of procompetitive output expansion and impressions won at the expense of rivals. 9/19/24 AM Tr. 72:12-25 (Simcoe).

1120. Resisting the undeniable evidence of output expansion in display advertising, Plaintiffs argue that output expansion can still be consistent with monopoly power, citing examples of monopolized industries that exhibited increased output. Plaintiffs' Demonstrative AG. The critical distinction between Plaintiffs' examples and this case is that, here, only 10% of the increased display advertising industry is going to Google. DTX-1928. And even that amount is overstated because 50% of Google's increased display advertising revenue is attributable to ad spend on YouTube, which is outside of Plaintiffs' alleged market. Accordingly, no more than 5% of increased industry output accrues to the portion of Google's business Plaintiffs' allege to be anticompetitive. 9/26/24 PM Tr. 94:20-97:1 (Israel).

1121. At the same time that industry output has increased, Google's share of U.S. display ad spend has decreased over the last decade. DTX-1928. That is not consistent with an industry dominated by a monopoly. As one publisher representative testified when asked if Google's ad tech is "dominant": "I think they're a large player. I don't know if dominance in the advertising space or display advertising space is necessarily something I'd say about anything these days." Deposition of Ken Blom Tr. 39:25-40:2, 40:4-8.

2. Google's Products Are Quality Differentiated and Improving in Quality.

1122. Throughout the period of time Plaintiffs allege that Google has monopolized the alleged markets, Google has continuously invested in improving and differentiating the quality of its products along multiple dimensions. Those investments in quality are not consistent with the conduct of a monopolist dominating a market without competition. 9/26/24 AM Tr. 157:22-158:18 (Israel); 9/26/24 PM Tr. 65:4-7 (Israel) ("competition can be a force that means that firms are incentivized to improve product quality in order to capture sales and increase profits"). As a result of Google's investments, the quality of Google's products has steadily improved over the same period of time that Plaintiffs claim Google has been a monopolist.

1123. Advertiser Demand: Google has invested in the quality of AdX by expanding the advertiser demand available through AdX. 9/19/24 AM Tr. 31:19-32:9 (Simcoe) (agreeing that "a key dimension of quality for ad exchanges is the installed base of buyers and sellers to which they connect").

1123.1. Google's 39-person exchange platforms team is devoted to convincing major demand-side platforms to purchase on AdX. 9/20/24 PM Tr. 81:3-82:1 (Sheffer). To convince these buying tools to purchase on AdX, Google presents the publisher inventory it has to offer, "the quality of it, the reach of it," and "the different types of formats." *Id.* at 82:2-15 (Sheffer). The buying tools that the team has successfully brought in include The Trade Desk, Amazon, Yahoo!, Liftoff, and Baidu, a "very large Chinese company." *Id.* at 81:3-23 (Sheffer). These tools are all competitors to Google, but Google encourages them to bid into AdX and compete against Google's own buying tools to benefit its advertisers. *Id.* at 82:16-83:3 (Sheffer).

1123.2. Today, publishers selling through AdX can reach not only Google Ads and DV360, but also hundreds of non-Google buying tools that are referred to as Authorized Buyers. 9/23/24 AM Tr. 32:2-33:11 (Korula) (examples including Criteo, AppNexus, The Trade Desk, MediaMath, and others). Authorized Buyers "go through a vetting process" in order to "get access to all of the AdX inventory" made available by publishers. In other words, they receive the same access to AdX inventory that Google Ads or DV360 do. *Id.* at 33:3-11 (Korula).

1124. Similarly, Google has repeatedly expanded the number of exchanges—in particular, rival exchanges—that publishers can connect to using DFP so that they can access more advertiser demand than what is available through Google's own AdX. 9/23/24 AM Tr. 32:2-41:9 (Korula) (publishers using Google Ad Manager are free to sell to non-Google sources of demand).

1124.1. When Google built Open Bidding, it connected DFP directly to real-time bids from more than 25 ad exchanges, including exchanges that testified at trial (Index Exchange, OpenX, Magnite, and PubMatic). 9/23/24 AM Tr. 39:17-22 (Korula). A publisher can choose to connect to all these other exchanges without calling AdX at all. 9/10/24 AM Tr. 99:8-11 (Layser).

1124.2. Not only does Google make it possible to connect to competitors, but Google affirmatively helps publishers connect to rival exchanges. Google helps publishers enter into contracts with the exchanges that participate in Open Bidding because it wants to "better address[] publishers' needs." 9/23/24 AM Tr. 40:13-41:9 (Korula) ("Publishers want to work with these exchanges. And

we thought we would design this product in a way that made it as easy as possible for them to do so effectively.").

1124.3. In addition to Open Bidding, publishers can also use DFP to sell to header bidding tools that access bids from over 100 other ad exchanges. There is no limit on the number of competitor exchanges publishers can connect to using DFP. 9/23/24 AM Tr. 34:19-38:16 (Korula).

1125. The testimony of publishers at trial demonstrated that one of the benefits publishers derive from DFP is their ability to sell through many exchanges from one tool.

1125.1. NewsCorp, a DFP user, receives bids from Index Exchange, PreBid, Rubicon, OpenX, Media.net, PubMatic, Criteo, TripleLift, and Amazon DSP. 9/10/24 AM Tr. 79:17-80:18 (Layser).

1125.2. The Daily Mail, which sells all of its inventory using DFP, receives bids from PubMatic, Xandr, Index Exchange, Magnite, and Triple Lift. 9/18/24 PM Tr. 133:17-19 (Wheatland).

1125.3. Gannett, which also uses DFP, receives bids from more than 20 demand sources, including Xandr, Criteo, Index Exchange, OpenX, PubMatic, and Magnite. 9/9/24 AM Tr. 75:6-10, 82:15-83:10 (Wolfe).

1125.4. Buzzfeed, which uses DFP, receives bids from 20 to 30 exchanges, including Magnite, PubMatic, Index Exchange, OpenX, and Amazon. Deposition of Ken Blom Tr. at 114:24-116:11, 116:13-117:14; *see also* DTX-1616 (Buzzfeed ads.txt file).

1125.5. Mediavine, which uses DFP, [redacted]

[redacted] Deposition of Eric Hochberger Tr. 22:4-6, 22:10-17, 22:19-22 (sealed testimony referenced at 9/25/24 PM Tr. 161:3-6 (Hochberger)); *see also id.* at 175:16-179:25 (Hochberger); DTX-1733 (identifying Mediavine partners including Amazon Publisher Services, Index Exchange, Kargo, Magnite, OpenX, PubMatic, Xandr, Yieldmo, Criteo, and The Trade Desk's OpenPath, among others).

1126. Fighting Invalid Traffic: Google has dedicated significant resources to improving the safety and security of Google's tools. DTX-371 at 2 (2017 Google document highlighting that Google's "historical value proposition relies on an integrated solution" that includes "security and anti-spam protection."); *supra* ¶¶ 733-768.

1126.1. Google has numerous teams dedicated to ad safety and security that total thousands of employees. One of those teams, the Ads Privacy and Safety team ("APAS"), sits within Google's ads business and handles all aspects of work related to privacy, safety, and ads integrity. 9/24/24 PM Tr. 45:22-24 (Bjorke); Bjorke DX 1.1; Bjorke 1.2. The APAS team alone represents over 700 Google employees. *Id.* at 47:20-22 (Bjorke).

1126.2. Beyond APAS, Google also has teams that work across the entire organization on safety and who are embedded within various substantive teams, such as Trust and Safety. 9/24/24 PM Tr. 45:7-21, 46:10-16 (Bjorke); *see also* Bjorke DX1.2.

1127. Within APAS is an Ad Traffic Quality (informally known as "AdSpam") team with hundreds of Google employees who detect and combat invalid traffic. 9/24/24 PM Tr. 47:3-22 (Bjorke); DTX-214 at 1 (2015 AdSpam strategy document). In 2022 alone, Google invested

between $100 to $150 million in the AdSpam team, 9/24/24 PM Tr. 50:17-25 (Bjorke), even though the AdSpam team does not generate revenue directly for Google, *id.* at 51:1-9 (Bjorke). Google continues to invest in the team because it "protects the integrity of the ads products and protects the long-term sustainability of Google's ads business." *Id.* at 51:1-9 (Bjorke).

1128. Monitoring and stopping invalid traffic has significant benefits for advertisers and publishers.

1128.1. Invalid traffic harms advertisers by wasting their money on ads that are not seen or clicked on by real or intentional users. 9/24/24 PM Tr. 48:10-22 (Bjorke). If ad tech tools do not monitor inventory quality, advertisers or their advertising agencies end up expending resources "to identify problematic inventory." 9/9/24 AM Tr. 110:21-111:13 (Lowcock) (advertising agency witness spent "half of [his] time" identifying invalid inventory).

1128.2. Invalid traffic harms publishers by diverting advertisers' budgets away to bad actors. 9/24/24 PM Tr. 49:5-14 (Bjorke).

1128.3. In the long-term, invalid traffic also hurts all participants in the advertising ecosystem by causing mistrust. DTX-476 at 3 (2017 Google deck indicating "Fear of ad fraud is limiting display and video online programmatic spend."); DTX-214 at 1 (2015 AdSpam Strategy document); 9/27/24 AM Tr. 20:18-25 (Pauley) (Vox Media believes that "marketers and advertisers are spending too much of their digital marketing dollars in places . . . and in channels that expose them to fraud, poor performance or brand unsafe environments").

1129. Google's investments in invalid traffic detection include a sophisticated automated review system that is continuously updating, as well as dedicated data scientists and domain experts who manually review ad traffic. *Supra* ¶¶ 760, 765.

1130. As Bjorke, AdSpam's Director of Product Management explained, these investments are baked into Google's pricing. "We look at fighting fraud as an integral part of our product. It's a key part of what you get when you advertise with Google." 9/24/24 PM Tr. 56:6-17 (Bjorke). Google, by its own policy, does not benefit from transactions that involve invalid traffic. *Id.* (Bjorke). If Google discovers invalid traffic, it will refund the advertiser and does not charge a revenue share. *Id.* at 55:20-56:5 (Bjorke).

1131. Ads Safety and Brand Safety: Ads safety, which includes brand safety, is another key quality differentiator for all three key stakeholders in the ad tech transaction.

1131.1. Users: If a user is harmed in some way by a display ad, they will not want to interact with that ad in the future. 9/25/24 PM Tr. 103:1-15 (Borgia).

1131.2. Advertisers: By extension, safety is also critical for advertisers. If "the ads ecosystem is unsafe, if users are unwilling to click on their ads, then advertisers are unable to reach the users that they wish to reach, and their ROI goes down." 9/25/24 PM Tr. 103:16-23 (Borgia). A publisher representative confirmed that "brand safety is table stakes" for advertisers because "the audience that they're reaching is usually the most important" objective. Deposition of Ken Blom Tr. 81:12-82:3.

1131.3. Publishers: Ad safety is critical for publishers because, if ad safety impacts an advertiser's ROI, then a publisher will not be able to monetize its content successfully, and in turn may not be able to continue making content at all.

9/25/24 PM Tr. 103:24-104:5 (Borgia). In addition, ad safety policies protect publishers from harmful or inappropriate ads that do not suit the publisher's content. *Id.* at 103:24-104:5 (Borgia).

1132. As with invalid traffic, Google does not charge an extra fee specific to its significant ads safety investments, which include manual and automatic filtering as well as enforcement of policies. *Supra* ¶¶ 745-753. Instead, the billions of dollars Google has invested in ad and brand safety are baked into the price of Google's products. 9/25/24 PM Tr. 120:4-7 (Borgia).

1133. Support and Service: As explained above, Google has invested in considerable support personnel and services for both large and small customers on the buy side and the sell side. That support includes troubleshooting, advice on improving outcomes, and collection of customer feedback. *Supra* ¶ 17; *see also* DTX-1429N at 5 (2023 Google deck stating "Strategic Value Adds" include "Google services").

1134. As a representative of Buzzfeed testified, after Buzzfeed arrived "late" to display ads, Buzzfeed found AdX to be "a natural best way to start getting into programmatic" not just because of the demand available, but also because AdX "can get us up to speed as fast as humanly possible." Deposition of Ken Blom Tr. 110:5-24. AdX was "successful" in delivering "incremental growth" and assisting Buzzfeed in hitting revenue goals. *Id.* at 111:3-112:89 (Blom).

1135. A 2017 News Corp comparison of the service and support offered by Google against AppNexus concluded that Google offered better support for DFP. Google had "proven to be one of the best partners to work with and have a highly responsive account team." DTX-404 at 8. News Corp concluded that "the scale and reach of Google allows them to be a major value-added strategic partner, with a major support presence in all markets." DTX-404 at 8.

1136. Scale: One result of Google's investments in quality differentiation is that, as Google's products attract more customers, the scale it obtains improves the quality of its products even more. For example, greater scale improves publisher monetization and advertiser return on ad spend because customers are connected to more "liquidity and growth." 9/20/24 PM Tr. 159:13-21 (John).

1137. Further, Plaintiffs' own expert opined that Google's significant transaction volume improves the quality of its products. 9/16/24 PM Tr. 11:15-12:4, 18:11-21 (Weintraub); *see also* 9/20/24 AM Tr. 112:5-10 (Lee) ("Scale is important for the competitiveness of an ad tech product and can help improve quality."). According to Professor Weintraub, Google's transaction volume enables it to run experiments to increase win rate, build and train "critical" algorithms, and "have more resources to innovate and invest in things like product quality." 9/16/24 PM Tr. 16:8-17:6, 17:15-18:10 (Weintraub); *see also* 9/12/24 PM Tr. 102:16-23 (Goel).

1138. Customer Outcomes: Google's investments are working. Over time, Google's customers are deriving more value from the same Google tools.

1139. For advertisers using Google Ads, the cost per click—or amount of money spent for each user engagement—has declined from about $0.55 in 2014 to about $0.25 in 2022. DTX-1897; 9/26/24 AM Tr. 166:18-167:3 (Israel) ("there's a pretty dramatic decline over time in what advertisers are paying per click"). Even Professor Lee's chart reflecting Google Ads cost-per-click, which purports to correct for issues he perceived in Dr. Israel's chart, shows that cost-per-click has gone down from about $0.37 in 2012 to about $0.25 in 2022. PTX-1461 (excluding mobile app ads and controlling for changes in the composition of impressions across device types over time); 9/20/24 AM Tr. 108:19-109:9 (Lee).

1140. In addition, click-through rates for Google Ads advertisers have increased significantly from ~0.2% in 2014 to ~1.2% in 2022, which means that Google Ads is more effectively placing ads in front of the right target audience because users are more willing to click on the ads they are shown. DTX-1896; 9/26/24 AM Tr. 165:22-166:14 (Israel) ("the click-through rate means I bid on and place an ad on an impression, what's the percentage of the time that the person clicks on it," and is "a pretty standard industry metric of quality"). Even Professor Lee's chart reflecting Google Ads click-through rates, which purports to correct for issues he perceived in Dr. Israel's chart, shows that click-through rates have tripled between 2012 and 2022. PTX-1459 (excluding mobile app ads and controlling for changes in the composition of impressions across device types over time); 9/20/24 AM Tr. 107:14-108:7 (Lee).

1141. For publishers using AdX, the average monthly revenue per thousand impressions has increased steadily over time from 2014 to 2022. DTX-1895; 9/26/24 AM Tr. 164:16-165:18 (Israel) ("this is a measure of the quality" and "one indicator of things working well, publishers are making more and more money when they work with AdX").

1142. Individual new features on Google's sell-side products have demonstrably increased revenue for publishers, including Dynamic Allocation paired with real-time bidding, *see supra* ¶ 119; sell-side Dynamic Revenue Sharing, *supra* ¶ 973; and Enhanced Dynamic Allocation. After launch, Enhanced Dynamic Allocation increased publisher revenue by "~950K / day," or "nearly $1M / day in incremental revenue." DTX-405 at 3 (2017 Google overview of Enhanced Dynamic Allocation); *see also* 9/27/24 AM Tr. 21:24-22:16 (Pauley) (Vox Media "made more money as a result of Dynamic Allocation"); DTX-244 at 5 (2015 Google business overview for Vox Media: "Queries and revenue are highly correlated, with a large uptick in Q4 due to DFP launch with dynamic allocation").

1143. Google's ad tech products are thus working particularly well for its advertiser and publisher customers. 9/26/24 AM Tr. 167:4-19 (Israel); 9/20/24 AM Tr. 109:10-110:6 (Lee) (decreasing cost-per-click and increasing click-through rates "are considerations, for sure" when evaluating whether quality has increased).

1144. Though one of Plaintiffs' advertising agency witnesses testified that he has not observed "huge" differences in quality among ad tech tools, 9/10/24 AM Tr. 153:2-154:16 (Friedman), competitors to Google acknowledged that Google's products are popular because they are high quality:

1144.1. Boland, former Vice President at Facebook, agreed that the ways Google achieved a strong market position, as stated in a Facebook document, were that Google has "offered a best in class product"; "continually invest[ed] in product improvements"; "invested heavily in servicing their customers"; and "aggressively priced this tool," including by making it free for small and medium businesses. PTX-1709 at -933 to -934 (2017 Meta strategy document); 9/13/24 PM Tr. 134:6-135:9 (Boland). He further agreed that the reason Google's market share continued to grow was that Google was "the only company still investing heavily in both technology and services. They have the most compelling feature-rich products for every segment of the market." 9/13/24 PM Tr. 136:13-24 (Boland).

1144.2. OpenX lost publisher ad server business to Google because DFP was a "good product" with a better "workflow" and "migration tools" than OpenX's ad server. 9/17/24 PM Tr. 48:9-16, 80:13-20 (Cadogan).

1144.3. A Disney representative testified that Disney ultimately selected Google Ad Manager in an RFP process and views "Google's ad server as a high-quality ad server." 9/17/24 PM Tr. 129:3-15 (Helfand).

3. Google's Pricing Is Flat or Declining as Quality Improves, and Is in Line with Industry Prices.

1145. In the same time period that output has exploded and the quality of Google's products have improved, industry fees have been flat or declining. Industry source eMarketer estimates that between 2014 and 2022, average fees paid to ad tech providers as a percentage of display advertising spend declined from 45.8 percent in 2014 to 42.3 percent in 2022. DTX-1886; 9/26/24 AM Tr. 176:5-16 (Israel) (the all-in estimate of the industry average fee taken out across the stack is about 42% today, fallen from 46%).

1146. Google's fees, in particular, have similarly been flat or declining over the 2014 to 2022 period. DTX-1977 (Israel Table 8: DFP, AdX, and Google Ads Average Prices Over Time); 9/26/24 AM Tr. 175:7-176:1 (Israel) (the total cost of using Google's ad tech tools across the stack has declined from around 33-34% to 31% in 2022). Comparing the industry average full-stack revenue share to Google's full-stack revenue share, "Google is substantially below that eMarketer industry estimate." 9/26/24 AM Tr. 176:2-23 (Israel).

a. Plaintiffs' Analyses of Pricing Fail to Account for Differentiators in Product Quality.

1147. Plaintiffs have conducted no analysis of quality-adjusted pricing, which means they have not accounted for any ways that Google's product quality affects pricing. Plaintiffs' failure to analyze quality-adjusted pricing is fatal to their analyses because, as their own witnesses acknowledge, there are significant quality differentiators between ad tech tools. *E.g.*, 9/27/24 AM Tr. 106:3-5 (Wheatland) (price is "just one of the many factors" that differentiates one ad exchange from another); 9/13/24 AM Tr. 26:12-27:3 (Kershaw) (features that enable ad exchanges to

optimize bids are competitive advantages for exchanges); *see also* Deposition of Ken Blom Tr. 26:4-19 (Buzzfeed values Google Ad Manager because it is easy to use and contains tools and features Google has spent "a lot of time" building for publishers).

1148. One publisher testified explicitly that quality differentiators affect the price it is willing to pay. Mediavine agrees to higher revenue shares with some exchanges because "if someone is going to take a higher take rate but still bid more money for that impression, Mediavine will—ultimately, will make more money." 9/25/24 PM Tr. 167:22-168:8 (Hochberger).

1149. Professor Simcoe, Plaintiffs' price analysis expert, agreed that quality differentiation matters for a pricing analysis. 9/19/24 AM Tr. 10:25-12:16 (Simcoe). Merely charging higher prices does not mean that a firm offering a differentiated product is imposing an overcharge on customers. *Id.* at 112:7-12 (Simcoe) (admitting "a 15 percent increase in price in abstract need not necessarily be an overcharge.").

1149.1. Professor Simcoe identified some quality differentiators for an ad exchange, including "detecting and filtering spam, malware, and fraud"; "data collection and privacy management"; "billing and payments infrastructure"; and "matching publisher inventory to advertiser demand"—all features of ad tech tools that can benefit publishers and advertisers. 9/19/24 AM Tr. 11:24-12:16 (Simcoe); *see also* 9/27/24 AM Tr. 101:8-14; 103:24-106:2 (Wheatland) (ad exchanges differ in the speed with which they "return ad impressions," extent to which "they return higher prices" and "beat" other exchanges, "the rev share" they charge, their "reporting functionality," whether they have "direct DSP integration," and their "ad quality due to superior curation policies"); Wheatland DX 2.

1149.2. According to Professor Simcoe, the price charged by an ad exchange, including Google's, must "reflect relative performance along these dimensions." 9/19/24 AM Tr. 12:17-24 (Simcoe). When asked "if one exchange had superior level of these features, that would be priced in in the real world; correct?," Professor Simcoe answered "yes," adding that "in a market, demand for differentiated products reflects the characteristics of the products, and demand affects pricing." *Id.* at 13:11-20 (Simcoe). In other words, Professor Simcoe agreed that a company with quality-differentiated products can charge higher prices than its competitors. *Id.* at 111:12-18 (Simcoe) ("Q. Okay. You were asked at your deposition: 'Is quality a reason that some firms can charge higher prices than other firms?' And you responded: 'In economics and in differentiated product markets, relative quality is almost definitionally something that can affect prices'; do you recall that? A. Yes.").

1150. Another of Plaintiffs' experts, Professor Lee, also acknowledged that an analysis of price must consider quality. He nonetheless testified that he has considered "quality in all" of his supracompetitive pricing analyses because "market power can be exercised both via an increase in price above competitive levels, as well as reduction in quality below competitive levels." 9/20/24 AM Tr. 100:19-103:12 (Lee).

1151. While recognizing the importance that quality differentiators have on price, Plaintiffs' experts failed to actually account for quality differences in their pricing analyses. *E.g.*, 9/19/24 AM Tr. 37:24-38:6 (Simcoe) ("Q. Did you evaluate any of the quality factors we talked about earlier, like detecting and filtering spam and malware and fraud? Did you look at any of

that? A. I did consider them, yes. Q. Okay. But they're not reflected in your weighted average; right? A. I explained on direct that the—well, what I'll say is no. It's not in the weighted average."); 9/20/24 AM Tr. 100:19-103:12 (Lee) ("there's no such thing as a single quality-adjusted price"); *id.* at 105:4-16 (Professor Lee compared only nominal prices and fees).

1152. As explained above, *supra* ¶¶ 1122-1144, Google has invested in a number of quality differentiators in its products—including the same features identified by Professor Simcoe as quality differentiators—that have borne results. 9/19/24 AM Tr. 11:24-12:16 (Simcoe). Advertisers and publishers using Google's products are experiencing improved outcomes. *Supra* ¶¶ 1138-1143. Yet none of that is accounted for by Plaintiffs' analyses, so Plaintiffs cannot meet their burden of demonstrating that Google's prices are supracompetitive.

b. Pricing Across the Ad Tech Stack

1153. Even in an absolute comparison, without any consideration of quality, Google's prices are lower than its competitors' when viewed across the integrated stack. As Google's expert Professor Chevalier explained, using Google tools to complete a transaction end-to-end costs less than using third party-to-third party tools. 9/25/24 AM Tr. 15:12-25 (Chevalier). As shown in Professor Chevalier's calculations, Google's full-stack revenue shares are considerably lower than the average full-stack revenue share across competitors. DTX-2071A; *supra* ¶¶ 793-794.

1154. Similarly, across Google Ads, AdX, and DFP, the average revenue share on an impression from end to end has been lower than the average fees charged by different combinations of Google buy-side and sell-side competitors in the same time period. DTX-1886 (industry average fee was 42.3 percent in 2022); DTX-1977 (Israel Table 8: DFP, AdX, and Google Ads Average Prices Over Time); 9/26/24 AM Tr. 175:7-176:1 (Israel) (the total cost of using Google's ad tech tools across the stack has declined from around 33% to 34% to 31% in 2022); DTX-1893A;

9/26/24 AM Tr. 173:23-175:5 (Israel) (prices for Google buying tools used with Google's exchange are lower than using most combinations of different third-party tools).

c. Publisher Ad Servers

1155. Taken by component, Google's fees are also low even without quality adjustment.

1156. DFP's ad serving fees are approximately two to three cents per thousand impressions, and have declined over time. DTX-1977; *see also* DTX-1887 (Israel Figure 70: DFP Fee Trends, Feb 2014-Dec 2022); 9/18/24 AM Tr. 71:5-72:16 (Abrantes-Metz) (agreeing that from 2013 to 2020, the low end of DFP's ad serving fees decreased from 2.6 cents per thousand impressions to 2.1 cents per thousand impressions). Calculated as a percentage fee per impression, that number is lower than a 2% revenue share and has dropped from 1.7% to 1.3% between 2014 and 2022. DTX-1977; 9/26/24 AM Tr. 120:18-121:16 (Israel).

1157. Moreover, DFP charges no ad serving fees for publishers that transact below a certain number of impressions per month. In 2022, that meant 86 percent of DFP sellers in the United States paid zero ad serving fees. DTX-1954; 9/26/24 AM Tr. 119:1-16 (Israel).

1158. Even for sellers that are charged ad serving fees, Google often offers significant discounts in order to entice seller business. 9/13/24 AM Tr. 41:17-21 (LaSala) ("We offered discounts quite a bit for our partners."); 9/20/24 PM Tr. 96:3-16 (Sheffer).

1158.1. For example, during a contract renewal negotiation with the publisher Hearst in January 2017, Google offered Hearst a 26% discount on current DFP rates. PTX-453 at -190. In total, Google estimated that the discounts it offered Hearst across both DFP and AdX amounted to $1.24 million in annual cost saving. PTX-453 at -190; 9/19/24 AM Tr. 149:10-22 (Bellack) ("the Hearst contract was up for renewal, and we wanted to win the renewal").

1158.2. Due to these discounts, Google determined that from 2015 to 2018, average ad serving fees on DFP had "trended downward, even as platform value proposition has improved." PTX-611 at -797 (2018 Google strategy review). Average "serving fees declined 20-25%" due to "volume based discounts," increased volume of DFP small business publishers, and "increased platform fee waivers (~$2.7M / month)." PTX-611 at -797. At the same time, "platform value" offered to publishers increased," including through features like "yield optimizations," forecasting, "budget and pacing improvements," unified reporting, and troubleshooting. PTX-611 at -797.

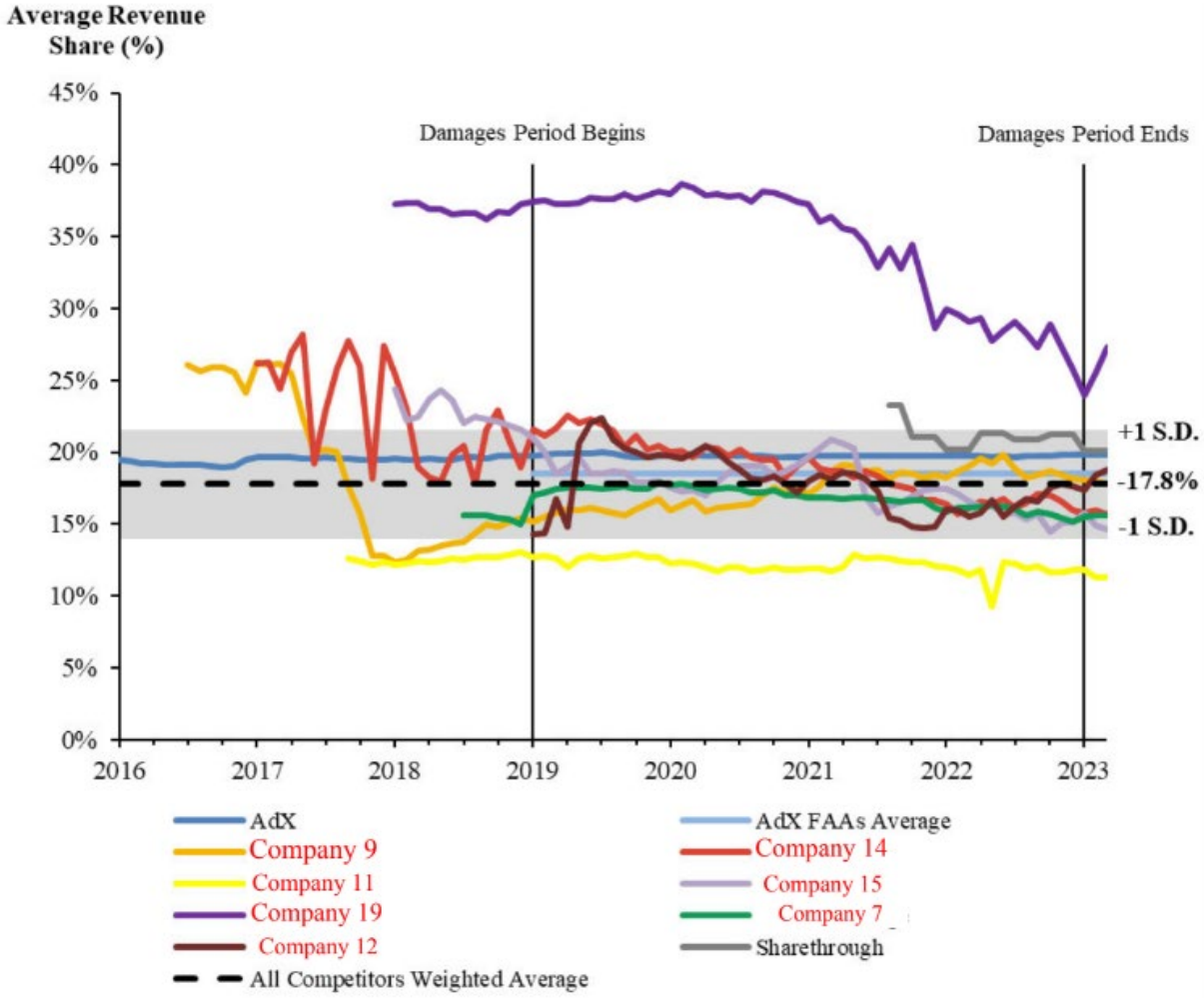
d. Ad Exchanges

1159. As to AdX, the predecessor ad exchange owned by DoubleClick charged a 20% revenue share when it was acquired by Google. Google has not changed that revenue share since. 9/26/24 AM Tr. 133:16-134:8 (Israel); 9/26/24 PM Tr. 67:18-68:2 (Israel); 9/20/24 AM Tr. 97:1-23 (Lee); *supra* ¶¶ 123-130.

(1) Google's AdX Revenue Share Is In Line with, or Lower than, the Shares Charged by Competitors.

1160. As shown below, DTX-2069A, the revenue share that Google charges for AdX is similar to, or lower than, the revenue shares charged by competitor ad exchanges. DTX-1892A; 9/26/24 AM Tr. 171:6-24 (Israel) ("AdX is in the middle of the distribution"); PTX-1280A (Lee Figure 110: Summary of worldwide open-web indirect display take rates among ad exchanges); PTX-1281A (Lee Figure 111: Summary of worldwide open-web indirect display margins among ad networks); [redacted] *see also* 9/17/24 PM Tr. 97:23-98:10 (Cadogan).

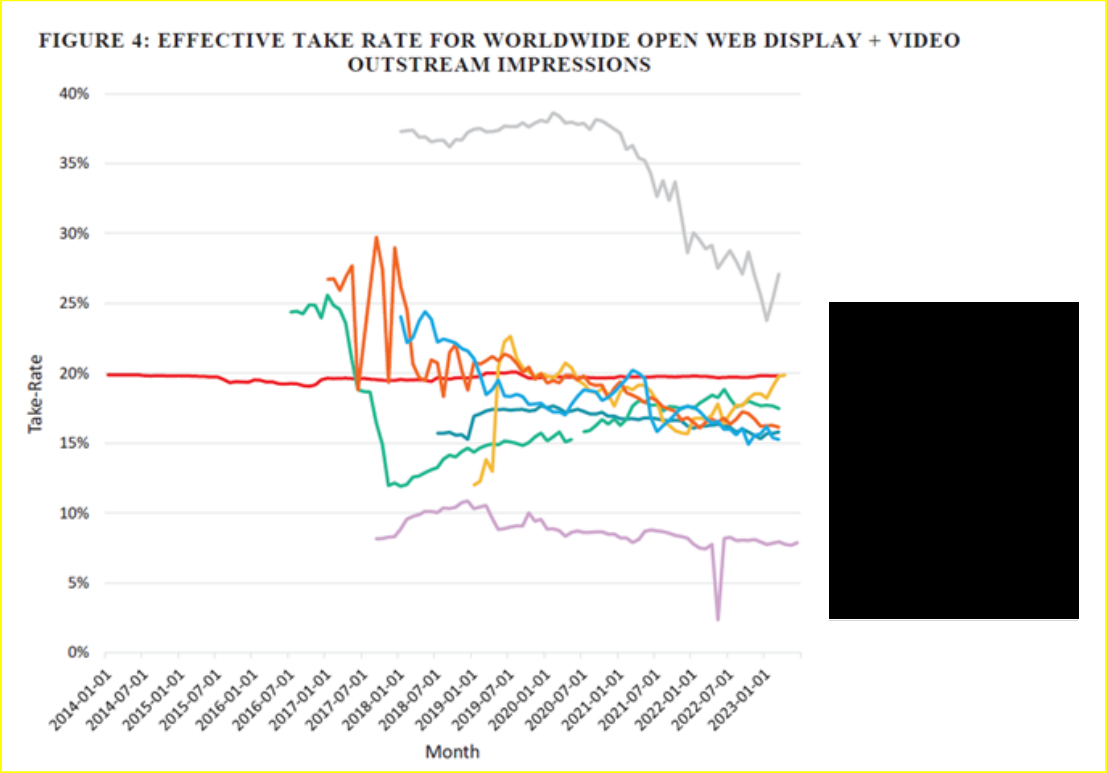
Figure 13. U.S. Monthly Average Revenue Shares by Exchange (Jan. 2016 – Mar. 2023)



1161. Analyses performed by Plaintiffs' own experts demonstrate that Google's revenue share is in line with other exchanges.

1162. As shown below, PTX-1199, four of seven other exchanges analyzed by Professor Simcoe ([redacted] all have had average revenue shares above AdX's for significant portions of the relevant time period. 9/18/24 PM Tr. 55:1-5 (Simcoe); PTX-1199A. Some of these exchanges, such as [redacted] and [redacted] have had an average take rate well above AdX, charging 25% to 30%. PTX-1199. And, as Professor Simcoe acknowledged at trial, Figure

4 from his report demonstrates that [redacted] average revenue share has never been below AdX and has ranged from 25% to close to 40%. 9/18/24 PM Tr. 54:15-22 (Simcoe).



1163. Of the eight exchanges Professor Simcoe analyzed, Google never had the highest price. 9/18/24 PM Tr. 55:19-24 (Simcoe). Yet Plaintiffs are not claiming that the other exchanges charging revenue shares 50% to nearly 100% higher than AdX are charging supracompetitive prices. *Id.* at 55:6-13 (Simcoe).

1164. In order to avoid the fact that AdX's revenue share is in line with competitors', Plaintiffs argued that the AdX revenue share is supracompetitive by comparing that revenue share to a weighted average revenue share of Google's competitors. 9/25/24 AM Tr. 17:1-12, 18:11-14 (Chevalier). They omitted, however, that the weighted average is driven by a single outlier with a notably low revenue share. DTX-2066A; 9/25/24 AM Tr. 23:16-24:22 (Chevalier). When the other individual ad exchanges' revenue shares are compared to AdX's, AdX's share is lower than

some competitors' and generally comparable to the shares of most competitors. PTX-1280A (Lee Figure 110: Summary of worldwide open-web indirect display take rates among ad exchanges); 9/20/24 AM Tr. 110:10-111:9 (Lee) (agreeing that in 2018 four of six firms had equal or higher revenue shares than AdX; in 2019 five of ten firms; in 2020 three firms; and in 2021 and 2022 two firms); DTX-2069A; 9/25/24 AM Tr. 22:9-23:6 (Chevalier).

1165. The New York Times, a publisher customer, agreed that Google's revenue share is comparable to that of its competitors: "[redacted]" Deposition of James Glogovsky Tr. 184:14-25 (sealed testimony referenced at 9/26/24 PM Tr. 143:10-15 (Glogovsky)). Similarly, Mediavine, another publisher customer, testified that the revenue shares of its other exchange partners are both higher and lower than AdX's. 9/25/24 PM Tr. 166:21-168:1 (Hochberger).

1166. Dr. Abrantes-Metz opined that Google's revenue share for AdX is supracompetitive based on internal Google document discussing the AdX revenue share and based on the fact that AdX's revenue share has remained 20%. 9/16/24 PM Tr. 130:3-131:20 (Abrantes-Metz). Beyond reading those documents, Dr. Abrantes-Metz made no attempt to quantify the extent to which 20% is actually supracompetitive. 9/18/24 AM Tr. 71:2-4 (Abrantes-Metz). In other words, Dr. Abrantes-Metz has done no work to rebut the evidence presented by Plaintiffs' and Google's experts demonstrating that Google's AdX revenue share for AdX is comparable to its competitors' and has remained consistent before and after Google allegedly obtained market power.

1167. As explained above, *supra* ¶¶ 1147-1152, any analysis of AdX's revenue share must also consider whether it is justified by its quality and the value the ad exchange provides

advertisers and publishers. 9/12/24 AM Tr. 10:21-11:3 (Srinivasan) ("Through conversations with publishers, it became clear that we did add a lot of value that justified the 20 percent take rate."). As LaSala testified, for the 20% revenue share AdX provides value from "comparing two bids," but also much more—AdX aggregates demand, including both Google and "other third-party demand"; runs "a fair, clean auction against all of those demand sources"; "does sorting and analytics for our customers"; and "provides protections around fraud, malware, around brand protections." 9/13/24 AM Tr. 150:10-151:13 (LaSala).

1168. Moreover, even though Google's revenue share for AdX has remained constant, Google has offered discounted rates to many customers so does not charge every publisher a 20 percent revenue share. 9/18/24 PM Tr. 51:15-22 (Simcoe). Hearst, News Corp, Weather Channel, ESPN, Orange, Fox News, and CBS are just some examples of major publishers that have been able to negotiate a discount on AdX's revenue share and pay less than 20% on open auction impressions. 9/10/24 AM Tr. 74:2-14 (Layser); PTX-453 at -190 (2017 Google email to Hearst); PTX-549 at -086 (2017 Google slide deck about pricing).

(2) Plaintiffs' Expert Professor Simcoe Has Not Reliably Estimated the Amount AdX Purportedly Overcharged.

1169. Plaintiffs' expert, Professor Simcoe, purported to estimate the amount that AdX overcharged because of Google's anticompetitive conduct using two analyses: a Comparables Analysis and an Event Study Analysis. Both are flawed and not capable of reliably estimating AdX's but-for revenue shares.

1170. According to Professor Simcoe, both analyses yielded an overlapping but-for AdX revenue share of 16.2%. Plaintiffs' Demonstrative T; 9/18/24 PM Tr. 32:16-20 (Simcoe).

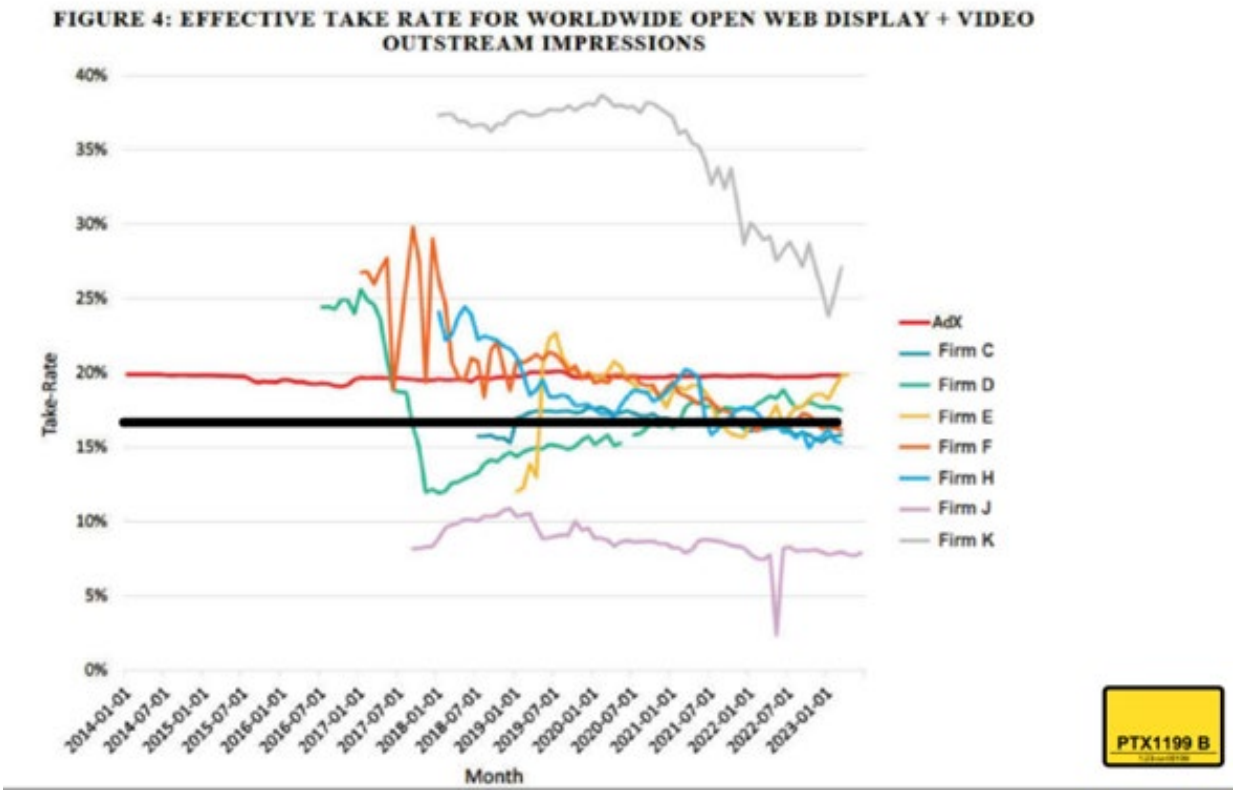
1171. Comparables Analysis: The Comparables Analysis compared AdX's revenue share to the weighted average revenue share of seven competitor ad exchanges. 9/19/24 AM Tr. 35:6-

16, 36:25-37:6 (Simcoe). Professor Simcoe did not include Amazon in his comparables analysis even though his report identified Amazon as operating an ad exchange. *Id.* at 35:10-24 (Simcoe). Professor Simcoe also excluded many other exchanges from his analysis. *Id*. at 35:6-16, 36:25-37:6 (Simcoe) (excluded exchanges included Yahoo, Taboola, MediaNet, Freewheel, Kargo, and others).

1172. Although AdX charges the same 20% revenue share across ad formats and channels, and although Professor Simcoe had data from exchanges for non-"open-web display ads," he did not include them in his analysis. 9/19/24 AM Tr. 39:11-40:2 (Simcoe). Professor Simcoe also did no analysis to understand why in-app ads, which are not the subject of any allegations of exclusionary conduct, yield the same as-is revenue share as "open-web display ads," which are the subject of Plaintiffs' allegations. *Id.* at 41:13-42:10 (Simcoe). In other words, when looking for a comparator for "open-web display advertising" revenue share, Professor Simcoe never considered that a relevant comparator for the AdX revenue share for "open-web display ads" might be the AdX revenue share for in-app ads.

1173. The Comparables Analysis is also flawed and unreliable because the weighted average obscures the wide variation in revenue shares among individual exchanges over time. 9/25/24 AM Tr. 17:21-18:8 (Chevalier). Professor Chevalier compared the AdX revenue share to individual competing exchanges' revenue shares and concluded that AdX's revenue share is "within the ranges of the other exchanges" and "not an outlier relative to other exchanges." *Id.* at 22:16-21 (Chevalier); *id*. at 22:22-23:6 (same conclusion for worldwide and U.S. transactions); *see also* DTX-2069A (Chevalier Figure 13: U.S. Monthly Average Revenue Shares by Exchange (Jan. 2016 – Mar. 2023)).

1174. During trial, PTX-1199B, Google placed a black line representing the 16.2% but-for take rate on top of Professor Simcoe's Comparables Analysis to demonstrate clearly that six of the seven ad exchanges included in Professor Simcoe's analysis—by Professor Simcoe's own calculation—charge, or have charged during portions of the relevant time period, revenue shares above Professor Simcoe's but-for revenue share for AdX. 9/18/24 PM Tr. 56:14-57:21 (Simcoe); 9/25/24 AM Tr. 23:16-24:22 (Chevalier); *see also* DTX-2066A.



1175. Although these other exchanges charge or charged prices above his but-for revenue share, Professor Simcoe did not opine that those other exchanges were charging supracompetitive prices. 9/19/24 AM Tr. 46:5-9 (Simcoe) ("Q. I'm just wanting to be clear for the record that for the six of seven exchanges that you see here that have take rates above 16.2 percent, you are not opining that any of those six are charging super competitive prices; right? A. No, I'm not."). Professor Simcoe attributed the difference between AdX's revenue share and his but-for revenue

share to certain allegedly anticompetitive practices, but did not explain why other exchanges can charge above the benchmark without having engaged in anticompetitive conduct. 9/25/24 AM Tr. 24:1-22 (Chevalier).

1176. Professor Simcoe's Comparables Analysis also did not account for quality differences between exchanges, 9/19/24 AM Tr. 37:24-38:14 (Simcoe), such as any benefits of scale that were obtained through procompetitive conduct, *id.* at 51:23-52:14 (Simcoe); *see also* 9/25/24 AM Tr. 24:23-25:13 (Chevalier).

1177. Professor Simcoe also acknowledged that the AdX revenue share has remained consistent both before and after Google allegedly obtained market power in the asserted ad exchange market, and consistent with the revenue shared charged by DoubleClick when Google acquired it. 9/26/24 AM Tr. 133:16-134:8 (Israel). Professor Simcoe agreed that his analysis does not show Google increasing prices after it allegedly obtained market power. 9/18/24 PM Tr. 52:13-53:13 (Simcoe) ("Google's price in the ad exchange market is constant over time. That's true.").

1178. Professor Simcoe's Comparables Analysis is also flawed because it is sensitive to reasonable adjustments. 9/25/24 AM Tr. 25:16-26:16 (Chevalier).

1178.1. For example, the difference between the AdX revenue share and the but-for revenue share produced is cut in half when the analysis is conducted with U.S. transactions instead of worldwide transactions. 9/25/24 AM Tr. 27:11-18 (Chevalier). Professor Simcoe's own "robustness" check showed a but-for revenue share of 17.8%—only two percentage points lower than AdX's "as-is" average revenue share of 19.8%. 9/19/24 AM Tr. 47:22-48:11 (Simcoe). Professor Simcoe was forced to admit that this "robustness" check showed a

"real difference" between the results of his comparables study and robustness check. *Id.* at 50:13-21 (Simcoe).

1178.2. Adjusting Professor Simcoe's Comparables Analysis to compare full stack revenue shares eliminates the estimated overcharge entirely. 9/25/24 AM Tr. 29:6-16 (Chevalier).

1179. Event Study Analysis: Professor Simcoe's Event Study Analysis, which purported to analyze the number of impressions won by AdX before and after the shift in 2019 to a Unified First Price Auction, 9/18/24 PM Tr. 12:7-13:13 (Simcoe), is also flawed and does not reliably estimate but-for revenue shares for AdX.

1180. Professor Simcoe's Event Study was based on the unsupported assumption that AdX won more impressions after the 2019 launch—without lowering revenue share—only because of Google's alleged anticompetitive conduct. 9/25/24 AM Tr. 31:13-32:2 (Chevalier); *id.* at 32:25-33:7 (Chevalier) (Professor Simcoe did not conduct an empirical analysis to attempt to link the alleged tying conduct to the increase in AdX impressions).

1180.1. The Event Study did not account for the possibility that AdX won more impressions due to any other reason, such as AdX's quality advantages, advertiser or publisher benefits associated with UPR, or Google's simultaneous introduction of the Unified First Price Auction. 9/25/24 AM Tr. 32:6-19, 33:10-39:1 (Chevalier). Because Professor Simcoe's model ignored these important factors that might have caused an increase in AdX impressions won after UPR and UFPA, his Event Study Analysis overestimates the impact of the alleged anticompetitive conduct on AdX's revenue share.

1180.2. Nor does the model account for the possibility that UPR and UFPA expanded output instead of winning impressions at the expense of rivals. 9/19/24 AM Tr. 72:19-25 (Simcoe); *see also* 9/25/24 AM Tr. 39:2-14 (Chevalier). Professor Chevalier adjusted the Event Study to separately analyze the growth of AdX impressions and of impressions on rival exchanges. The increase in AdX impressions did not coincide with an offsetting decrease in impressions on competing exchanges. Instead, the data were consistent with output expansion. 9/25/24 AM Tr. 39:10-23 (Chevalier); *see also* 9/19/24 AM Tr. 70:2-6 (Simcoe) (acknowledging the market experienced a net output expansion following UPR and UFPA). Professor Simcoe's failure to account for the procompetitive output expansion that followed the launch of UPR and UFPA led him to incorrectly attribute the increase in AdX's impressions after UPR solely to the alleged anticompetitive conduct. 9/25/24 AM Tr. 39:24-40:5 (Chevalier).

1181. Professor Simcoe's Event Study Analysis relied on another erroneous assumption that, out of the changes Google made simultaneously in 2019—UFPA, UPR, and deprecation of "last look"—the "only one under which we would expect to see or predict to see an increase in the number of impressions won on AdX" was UPR. 9/18/24 PM Tr. 16:10-22 (Simcoe). Professor Simcoe offered only three pieces of evidence in support, none of which actually justified his assumption. 9/19/24 AM Tr. 55:10-63:9, 108:5-109:9 (Simcoe).

1181.1. First, Professor Simcoe claimed that the removal of "last look" decreased the number of impressions won by AdX, but he did not independently analyze whether this was true. 9/19/24 AM Tr. 54:7-55:3 (Simcoe). The data

Professor Simcoe relied on for this assumption were based on removing "last look" in a "second-price auction" and did not measure the impact in a first-price auction, but "last look" was deprecated in a first-price auction. PTX-1035 at -359 (September 2019 Google slide deck on auction changes: "This impact is measured in a 2P auction state comparing performance with and without last look"); 9/19/24 AM Tr. 56:9-24 (Simcoe).

1181.2. Second, Professor Simcoe cited the revenue equivalence theorem as evidence that impressions won would not change between a first-price and second-price auction. 9/19/24 AM Tr. 58:25-59:19 (Simcoe). Professor Simcoe was forced to admit that the theorem only applies to revenue, not impressions, so is not actually relevant to his assumption about the number of impressions won. 9/19/24 AM Tr. 60:9-11, 101:17-102:5 (Simcoe).

1181.3. The final piece of evidence Professor Simcoe relied on was a Google internal analysis he characterized as concluding, in September 2019 contemporaneous to the UPR launch, that UPR would result in increased impressions for AdX. 9/19/24 AM Tr. 77:5-25 (Simcoe). Professor Simcoe misdated the email, which is from September 2018 and therefore is not a contemporaneous analysis of UPR but a prediction predating the launch by a year. *Id.* at 108:8-25 (Simcoe).

1181.4. Professor Simcoe also failed to reconcile statements in his cited materials that contradict his assumption. For example, Google anticipated that the move to a first-price auction—not just UPR—would increase in the number of impressions won by AdX. 9/19/24 AM Tr. 63:15-66:1 (Simcoe); PTX-1035

at -358 ("GDA/DV3/Auth. Buyers get direct access to final 1P auction, improving competitiveness against external 1P demand"), -361 (change to first-price auction expected to result in "+43% impressions" for AdX Buyers).

1182. Professor Simcoe's Event Study failed to account for a number of additional facts: the beta stage of UPR that happened before the full rollout, 9/19/24 AM Tr. 69:17-70:2 (Simcoe); how UPR affected output for in-app, native or CTV ads that are transacted on AdX, *id.* at 70:3-6 (Simcoe); and how the characteristics of various exchanges could vary across time and therefore also affect impressions won, *id.* at 73:2-6, 73:23-74:2 (Simcoe) (for example, his model cannot control for a competitor going public during the event study period).

1183. When Professor Simcoe's Event Study is adjusted to examine revenue growth instead of impressions, AdX did not experience a statistically significant change in revenue following UPR at all. 9/25/24 AM Tr. 42:21-45:6 (Chevalier). By Professor Simcoe's own terms, that suggests AdX does not charge a supracompetitive price.

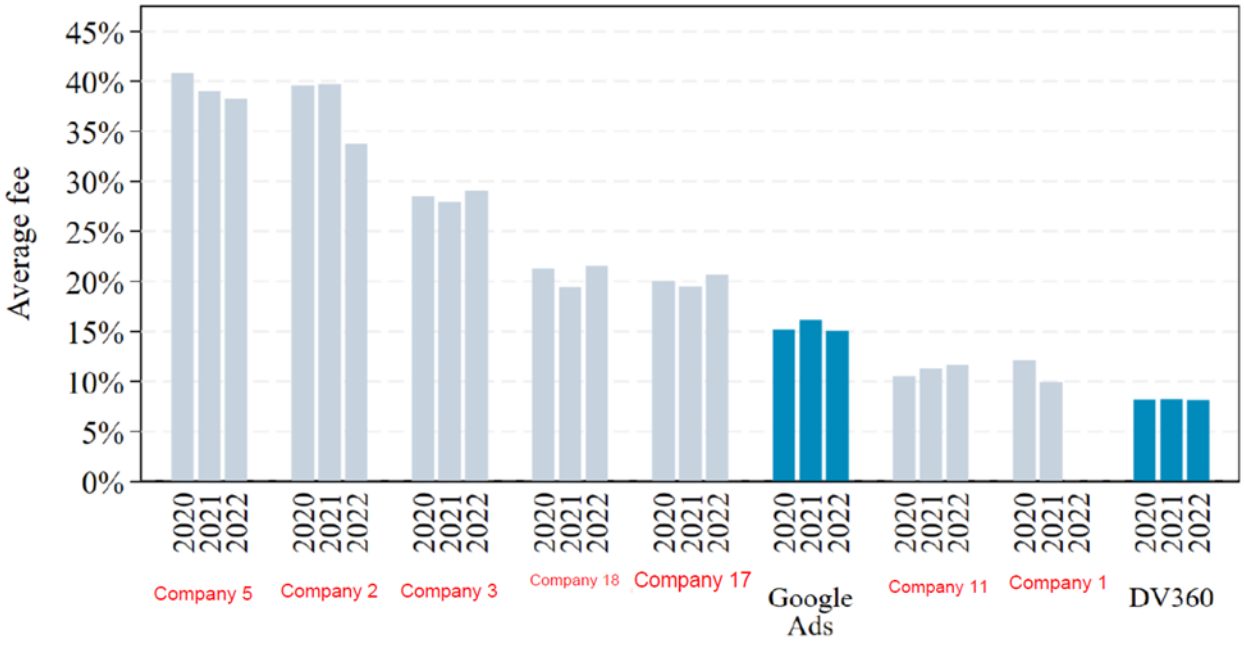
e. Buying Tools

1184. Looking only at the tools within Plaintiffs' alleged "advertiser ad network" market, Google's fee is substantially lower than its competitors'. Plaintiffs' alleged market currently contains only Google Ads and Criteo, which charges more than double Google Ads' revenue share. Israel DX 2; 9/26/24 AM Tr. 171:25-172:15 (Israel). Plaintiffs' alleged market also previously included Facebook Audience Network when it sold third-party website ads, and Facebook Audience Network similarly charged a significantly higher revenue share. PTX-580 at -815 (2018 Meta email: Meta Audience Network "is a different business model to" Facebook/Instagram "because we share revenue with the publisher. Whilst we take 100% of revenue on" Facebook/Instagram, "we operate at a 31% margin on" Audience Network.); 9/26/24 PM Tr.

118:5-120:17 (Israel) (Facebook's buy-side tool Facebook Audience Network charges substantially more than Google Ads).

1185. Looking at both of Google's buy-side tools, DTX-1891A, the average fees for Google Ads and DV360 are systematically lower than for many of Google's buying tool competitors. 9/26/24 AM Tr. 173:12-17 (Israel) ("DV360 is at the bottom of the distribution," and "Google Ads is also toward the bottom").

Figure 74: Advertiser Buying Tool Average Fees, 2020-2022



1185.1. For example, The Trade Desk, a significant buying tool competitor, charges higher all-in fees than Google's buying tools. The Trade Desk charged a 20% revenue share in 2019, with additional fees for audience data, fraud and brand safety, contextual targeting, onboarding, bid shading, cross-device targeting, and more. DTX-1053N at 9 (2021 Google competitive analysis of The Trade Desk); 9/25/24 PM Tr. 69:12-70:16 (Stewart) (The Trade Desk's "all-in" fees are higher than Google's fees).

1185.2. In 2015, Jay Friedman of Goodway Group told advertisers that "Google and its channel partners' rates are very competitive for a full-stack product with an integrated DSP." 9/10/24 PM Tr. 27:7-24 (Friedman).

4. Google's "Open-Web Display Advertising" Business Does Not Show Any Signs of Monopoly Profits.

1186. Google's DVAA—or display, video, apps, and analytics—business is the part of Google's business, split out for financial tracking purposes, that is focused on "ad monetization of third-party publisher and exchange inventory," which is the subject of Plaintiffs' allegations in this case. 9/26/24 AM Tr. 8:21-24 (Mok). That business does not show signs of monopoly profits.

1187. For purposes of tracking profits and losses ("P&Ls") between 2017 and 2023, the DVAA business included both ad tech tools included in Plaintiffs' markets, such as Google Ad Manager and Google Ads, and tools Plaintiffs have excluded from their markets, including AdMob, AdSense, DV360, and Campaign Manager 360. 9/26/24 AM Tr. 11:5-11 (Mok); *see also* DTX-1508 at 8 (November 2022 Google P&L presentation).

1187.1. While the DVAA business started tracking its P&Ls at an aggregate level, by 2021 the P&Ls were broken out by product and recast back to 2020. Breaking the P&Ls into products was "not at all" a reflection of how the products competed in the overall ad tech ecosystem, but was instead done "to try and drive more insight and tie it better to how we were internally organized where there was a clear business leader." 9/26/24 AM Tr. 12:2-8 (Mok).

1188. For the years 2015, 2016, and 2017, Google's DVAA business was not profitable. DTX-510 (2018 Google Ads P&L); Mok DX 1.

1188.1. In 2015, the business had an operating loss of $126 million. Mok DX 1; 9/26/24 AM Tr. 14:7-9 (Mok).

1188.2. In 2016, the business had an operating loss of $784 million. Mok DX 1; 9/26/24 AM Tr. 14:10-11 (Mok).

1188.3. In 2017, the business had an operating loss of $67 million. Mok DX 1; 9/26/24 AM Tr. 14:12-13 (Mok).

1189. Even these operating loss numbers are likely conservative.

1189.1. The unrebutted testimony of Mok, former Finance Director of the display ads business, was that these losses were likely understated because the costs in the P&Ls were not "fully cost loaded"—in other words, not fully represented—at the time. 9/26/24 AM Tr. 16:11-17:5 (Mok).

1189.2. Because Google's P&Ls reflect accounting profits rather than economic profits, economic profits would reflect even greater losses. 9/26/24 AM Tr. 110:19-113:17 (Israel) ("For those years, 2015 through 2017 where we saw where the operating return was negative, then we have a conclusion we can reach that the economic profit would be even more negative.").

1190. The losses sustained by Google's display ads business in these years are inconsistent with Plaintiffs' allegations that Google had monopoly power. 9/26/24 AM Tr. 112:2-25, 114:4-19 (Israel) ("Those years when they're negative, it stands out to me that they're negative and the economic profits would be even lower. That's not what I would see generally in a situation where there's allegations of monopoly.").

1191. For 2018 and 2019, the DVAA business turned a small profit. DTX-856 (2020 Google Ads P&L); Mok DX 1.

1191.1. In 2018, the business had an operating profit of $649 million, a 3.9% operating profit percentage (profit divided by booked revenue). Mok DX 1; 9/26/24 AM Tr. 15:4-8 (Mok).

1191.2. In 2019, the business had an operating profit of $1.2 billion, a 6.6% operating profit percentage. Mok DX 1; 9/26/24 AM Tr. 15:12-24 (Mok).

1192. The profit numbers for 2018 and 2019 are likely overstated because they reflect accounting profits, not economic profits. 9/26/24 AM Tr. 110:19-113:17 (Israel).

1193. Mok's unrebutted testimony was that the increase in profits in the DVAA business in 2018 and 2019 was driven by an increase in revenue from serving app ads, which are excluded from the alleged markets and conduct allegations in this case. 9/26/24 AM Tr. 15:15-18 (Mok). In other words, Google's increase in profits did not derive from serving "open-web display ads."

1194. By 2020, the DVAA business had broken out its P&Ls on a product-by-product basis. Consistent with the 2018 and 2019 figures, as depicted below, Mok DX 2, the 2020 through 2023 numbers show small profits on a product-level and aggregate basis. DTX-512N (2018 Google P&L).

Display Product-Level P&Ls Operating Profits

	AdMob	AdSense	Google Ad Manager	Google Ads	DV360	CM360	Total
2020	[redacted]						
2021							
2022							
2023*							

Actuals through August 2023

1195. In these years, the majority of the DVAA business's profits were attributable to products excluded from Plaintiffs' alleged markets.

1195.1. At least fifty percent of the DVAA business's profits came from AdMob, which serves in-app ads. 9/26/24 AM Tr. 19:8-20 (Mok); *see also* PTX-939 at -009 (showing "apps" as an emerging business line in 2018 with "high revenue growth potential"; in contrast to "web" which is "established" ad has "relatively low growth potential"). Again, that means at least 50 percent of Google's revenue was driven by a tool that is not even within Plaintiffs' alleged markets.

1195.2. Another 15 percent of DVAA profits in these years was driven by AdSense, a Google sell-side product that supports indirect sales to, among others, Google Ads advertisers but is excluded from Plaintiffs' markets. 9/26/24 AM Tr. 19:21-23 (Mok).

5. Plaintiffs Cannot Demonstrate Harm Resulting from Google's Conduct.

a. Plaintiffs' Expert Professor Lee Has Not Demonstrated Harm to Competition from Google's Conduct.

1196. Plaintiffs' expert Professor Lee asserted that Google's conduct harmed "open-web" publishers and advertisers in three ways: by sustaining higher prices, by degrading quality, and by reducing innovation. 9/19/24 PM Tr. 142:1-25 (Lee). But Professor Lee did not quantify any harm to advertisers or publishers. 9/20/24 PM Tr. 12:1-15 (Lee).

1197. Plaintiffs' only evidence of harm in the form of higher prices is an experiment from 2014, prior to the time that Plaintiffs allege Google had market power. 9/20/24 PM Tr. 9:3-10:24 (Lee) ("Q. Other than that experiment a decade ago, did you rely on—did you rely on any quantitative information or do your own quantitative analysis to show that higher take rates would cause higher advertising prices? A. That's the one I recall sitting here today.").

1198. Aside from the fact that Plaintiffs have not demonstrated that Google's fees have gone up (if anything, as explained above, evidence suggests they have gone down, *supra* ¶ 1146), Professor Lee's testimony is limited to opining that the harm to publishers in the form of higher fees resulted from fees that were "materially higher," where he defined "materially higher" as "not *de minimis*." 9/20/24 PM Tr. 11:14-25 (Lee).

1199. As to quality, Google's products have improved in quality. For example, advertiser click-through rates have gone up while cost-per-click has gone down, and publisher revenue has increased. *Supra* ¶¶ 1138-1141.

1200. Finally, Professor Lee did not analyze the rate of innovation in any of the three alleged markets. 9/20/24 PM Tr. 12:16-13:15 (Lee).

b. Plaintiffs' Expert Professor Simcoe Has Not Demonstrated Harm to Competition from Google's Conduct.

1201. Professor Simcoe claimed to have modeled the effects of three of the allegedly anticompetitive acts (Google Ads-AdX exclusivity, AdX-DFP exclusivity, and UPR). 9/19/24 AM Tr. 14:5-18 (Simcoe).

1202. Professor Simcoe did not—and insists he could not—quantify the effects of each separate piece of anticompetitive conduct. 9/19/24 AM Tr. 15:5-16:1 (Simcoe). Thus, if the Court declines to find that any one of the three alleged acts are anticompetitive, Professor Simcoe's analyses cannot aid the Court in evaluating anticompetitive effects because Professor Simcoe's model would be measuring lawful, competitive effects. *Id.* at 16:5-17:2 (Simcoe). As Professor Simcoe acknowledged, there is only one legal tying claim in the case. *Id.* at 17:3-6 (Simcoe). Even if the Court only declined to find unlawful the one "tie" alleged by Plaintiffs, Professor Simcoe's analysis would be of no utility to the Court.

1203. One of the core assumptions of Professor Simcoe's but-for world was not only unsupported, but contradicted by the other data presented at trial. Professor Simcoe assumed that, in a but-for world, there would be no "tie" between Google Ads and AdX so advertisers on Google Ads would be able to use a single buying tool to multi-home among exchanges—implying that, in the current world, advertisers are unable to multi-home across exchanges if they use Google Ads. 9/19/24 AM Tr. 18:6-13 (Simcoe).

1203.1. When pressed on this assumption, Professor Simcoe first insisted that, by and large, advertisers do not multi-home "when they're using Google Ads." 9/19/24 AM Tr. 20:12-13 (Simcoe). It became clear, however, that not only had Professor Simcoe never used Google Ads, *id.* at 18:22-25 (Simcoe), he had absolutely no idea whether and to what extent Google Ads users multi-

home—even though the evidence demonstrates multi-homing, *supra* ¶ 663. 9/19/24 AM Tr. 19:1-6 (Simcoe) (Q. Okay. And you've not done any study of how advertisers actually multi-home; correct? A. Well, I've seen evidence that advertisers, not necessarily on Google Ads, use different exchanges. So I'm not sure what you mean by study. I haven't tried to measure the extent of multi-homing by various advertisers.").

1203.2. Professor Simcoe eventually acknowledged that Google Ads advertisers can bid on multiple exchanges via Google Ads and that he had not tried to measure the number of bids made through Awbid. 9/19/24 AM Tr. 20:25-21:20 (Simcoe). When shown tables from other expert reports in the case that he had reviewed, Professor Simcoe further acknowledged that Google Ads advertisers, including large, well-known companies and the FAAs, already multi-home across buying tools. *Id.* at 24:5-18, 26:12-21 (Simcoe) ("I would agree that those advertisers bid using different tools."); DTX-2532A (Respess Figure 16: AdX Revenues and AdX Actual Take for FAA Pathways January 25, 2019 - January 24, 2023); DTX-2533A (Israel Table 1: AdX Spending Patterns for Selected Advertisers, 2019-2022).

1204. A second core assumption of Professor Simcoe's but-for world was that AdX "would be able to submit real-time bids into third-party publisher ad servers, making alternatives to DFP more attractive." 9/19/24 AM Tr. 28:21-29:5 (Simcoe) ("alternatives to DFP" refers to rival ad servers).

1204.1. Professor Simcoe acknowledged, consistent with every witness's characterization of the conduct in this case as refusals to deal with rivals, that

when he talks about the "near exclusivity of Google Ads demand to AdX," he is considering a but-for world in which Google gives "rivals more access to Google customers" and takes on "the technical work . . . that would make its products interoperable with its rivals." 9/19/24 AM Tr. 33:2-34:8 (Simcoe).

1204.2. Professor Simcoe admitted he has no idea how much the technical work to build interoperability would cost; nor has he even tried to analyze it. 9/19/24 AM Tr. 30:13-25 (Simcoe). In other words, in his but-for world Google would need to do some undetermined amount of technical work at an undetermined cost in order to share its customers with its rivals.

1205. Professor Simcoe's analysis also failed to even attempt to analyze what proportion of Google's scale is due to procompetitive conduct.

1205.1. As he admitted, Professor Simcoe's Comparables Analysis does "nothing to disaggregate any pro-competitive benefits of scale." 9/19/24 AM Tr. 51:23-52:1 (Simcoe).

1205.2. Similarly, for his Event Study, Professor Simcoe identified an ad exchange's customer base as a "dimension of quality." 9/19/24 AM Tr. 31:22-32:9 (Simcoe). But he admitted he cannot "disentangle" this dimension of quality—i.e., growth of a customer base—from the "alleged exclusionary conduct." *Id.* at 32:10-19 (Simcoe). In other words, he did not quantify what portion of Google's scale came from procompetitive conduct to grow Google's customer base and improve the quality of its tools as opposed to the allegedly exclusionary conduct.

1205.3. Without analysis of Google's procompetitive conduct or benefits, Professor Simcoe's but-for world envisions Google giving rivals more access to Google customers, which could in turn eliminate the benefits of Google's integrated ad tech stack. 9/19/24 AM Tr. 33:2-9 (Simcoe); *supra* ¶¶ 732-784.

C. The Display Advertising Industry Is Constantly Evolving, and No One Can Predict How the Tools Will Change in the Future.

1206. Plaintiffs' markets and claims ignore both the long, fiercely competitive history of display advertising, which has "evolved a lot in the last 18 years," and the "rapidly changing" future of display advertising. As witnesses explained:

1206.1. Korula: "It's a rapidly changing business. It's evolved very considerably over the last decade. We are constantly trying to find ways to make the product better." 9/23/24 AM Tr. 48:13-49:1 (Korula).

1206.2. Stewart: In 20 years of working in advertising, "digital advertising has advanced so much." "The data—the capabilities of digital advertising are far beyond what they were certainly back then." 9/25/24 PM Tr. 28:6-15 (Stewart).

1206.3. Sheffer: "A lot of the companies that are operating across this entire ecosystem have changed and morphed their offerings and have shown up in multiple different places across this ecosystem. So this is a snapshot. It's a representative snapshot of an industry that has evolved a lot in the last 18 years." 9/20/24 PM Tr. 62:9-17 (Sheffer).

1206.4. Goel (PubMatic): PubMatic is "confronted by rapidly changing technology, evolving industry standards, and consumer preferences." 9/12/24 PM Tr. 134:9-135:12 (Goel).

1206.5. 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." 9/13/24 PM Tr. 82:6-18 (Creput).

1206.6. Oliphant (U.S. Census Bureau): Oliphant testified that digital had changed very much between the 2010 Census and 2020 Census. 9/23/24 PM Tr. 74:1-3 (Oliphant); *see also* DTX-1343 at 38 (2018 Census presentation listing the "changing video landscape," "emergence of social platforms," and "shift in digital buying process and technology" as trends for the Census to consider for the 2020 Census as compared to the 2010 Census).

1207. Witnesses in the industry likewise testified that, in light of the dynamic history of display advertising, it is impossible to predict how the industry will evolve in the future.

1207.1. Dederick (The Trade Desk): "Q. Are you able to predict what is going to happen competitively to The Trade Desk within the next five years? A. No. Q. How about in the next two years? A. No. Q. Ten? A. No." 9/12/24 PM Tr. 30:13-19 (Dederick).

1207.2. Casale (Index Exchange): "Q. It's your general view, even this year, that the world of programmatic ad tech is dynamic and unpredictable? A. Yes. Q. And that it continues to encounter numerous transformational events that impact ad tech? A. I would agree with that statement." 9/9/24 PM Tr. 21:2-7 (Casale).

1207.3. Friedman (Goodway Group): "The programmatic and social evolution is not even 15 years old," and "we're only in the beginning innovative phases for

digital advertising with a lot more to come." 9/10/24 PM Tr. 48:18-49:2 (Friedman).

1207.4. Goel (PubMatic): "Q. And now certainly, Mr. Goel, are you able to predict what's next in this digital ecosystem, what's going to happen in the next five years? A. Not accurately." 9/12/24 PM Tr. 150:7-10 (Goel).

1208. This Court should reject Plaintiffs' misrepresentations and misunderstandings of the past as a basis to dictate the future, especially when the evidence actually showed a healthy, dynamic, and competitive market.

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

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

GOOGLE LLC'S PROPOSED FINDINGS OF FACT
RELATING TO TRIAL WITNESSES

REDACTED VERSION

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PROPOSED FINDINGS OF FACT RELATING TO TRIAL WITNESSES[1]

1. At trial, witnesses from the following categories testified either live or through deposition video or read-in[2]: current Google employees, former Google employees, advertisers, advertising agencies, publishers, competitors to Google, expert witnesses on behalf of Google, and expert witnesses on behalf of Plaintiffs.

2. No witness called by Plaintiffs demonstrated how the Google products at issue in this case actually worked. Only witnesses called by Google did.

3. Google presented the majority of the witnesses who testified at trial as corporate representatives of publishers: Facebook, Microsoft, The New York Times, Vox, Buzzfeed, and MediaVine.

4. Plaintiffs called only three publisher witnesses live, all represented by the same outside counsel: Stephanie Layser, formerly employed at The Daily Mail and News Corp; Matthew Wheatland, a representative of The Daily Mail; and Tim Wolfe, a representative of Gannett. The Daily Mail and Gannett have filed suit against Google in the Southern District of New York asserting allegations that relate to Google's display ads business. 9/9/24 AM Tr. 55:24-56:11, 99:5-100:2 (Wolfe); 9/18/24 AM Tr. 150:1-3 (Wheatland). The same attorney, John Thorne, represents both The Daily Mail and Gannett in their lawsuit against Google in the Southern District of New York. *E.g.*, ECF No. 138, No. 1:21-md-3010 (S.D.N.Y.) (on behalf of Associated

[1] Paragraphs in this document are cited to in the Proposed Conclusions of Law as "Witnesses FOF."

[2] For witnesses who testified through deposition video, citations to their testimony are to the deposition transcript that was provided to the Court. For witnesses who testified through deposition read-in, but sealed portions of the deposition were not read in court, citations to their sealed testimony are to the deposition transcript that was provided to the Court. In all other instances, citations to the testimony of witnesses who testified through deposition are to the trial transcript.

Newspapers, a subsidiary of The Daily Mail); ECF No. 589, No. 1:21-md-3010 (S.D.N.Y.) (on behalf of Gannett). In this case, John Thorne also represented Matthew Wheatland and The Daily Mail, Tim Wolfe and Gannett, and News Corp. Dkt. 407 (notice of appearance on behalf of News Corp); 9/27/24 AM Tr. 80:3-23 (Wheatland).

5. Plaintiffs did not call corporate representatives from some of the most significant household names offering integrated display advertising tools that support both the buy-side and the sell-side: Amazon, Microsoft, or Facebook. In addition, Google, not Plaintiffs, called a representative of Criteo, another significant display ad competitor that offers an integrated ad tech stack.

6. Most of Google's competitors called as live witnesses by Plaintiffs—OpenX, Index Exchange, The Trade Desk, PubMatic, and Magnite (formerly known as Rubicon Project)—have representatives that sit on the board of Prebid, a key Google competitor. 9/17/24 PM Tr. 96:12-97:13 (Cadogan). Prebid is an organization of ad tech companies that "collectively and community own[s]" the header bidding technology they developed (also called Prebid). 9/12/24 PM Tr. 164:2-24 (Kershaw); *see also* 9/13/24 AM Tr. 27:19-28:11 (Kershaw). As Kershaw, Prebid's founder, testified, Prebid directly competes with Google's sell-side offerings, including Open Bidding. 9/13/24 AM Tr. 10:19-11:8, 31:16-21 (Kershaw). In addition, Stephanie Layser, who testified about her experiences as a former employee of News Corp, personally sat on the board of Prebid when she was at News Corp. 9/10/24 AM Tr. 8:10-14 (Layser). Another of Plaintiffs' witnesses, Tom Kershaw, was the founder and former Chairman of the Board of Prebid. 9/12/24 PM Tr. 163:16-23 (Kershaw).

7. In some instances, Plaintiffs expressly avoided calling the witnesses they had deposed as corporate representatives of third parties pursuant to Federal Rule of Civil Procedure

30(b)(6). Instead, Plaintiffs opted to call former employees who had never been deposed in this case: Stephanie Layser, formerly at News Corp; Brian Boland, formerly at Facebook; Tim Cadogan, formerly at OpenX; and Tom Kershaw, formerly at Rubicon Project.

8. Plaintiffs called no advertiser witnesses, live or through deposition, to testify about the extent to which advertisers substitute across advertising channels and formats, or the benefits they receive from Google's integrated platforms. The only advertisers that the Court heard from—Brian Bumpers (Zulily), Courtney Caldwell (ShearShare), and Kendall Oliphant (U.S. Census Bureau)—were called by Google.

9. Of the three advertising agency representatives that Plaintiffs called live, Joshua Lowcock has testified twice within one year on behalf of the Department of Justice Antitrust Division in antitrust lawsuits against Google relating to digital advertising. 9/9/24 AM Tr. 80:6-8 (Lowcock). At this trial, he gave sworn testimony that contradicted his sworn testimony at the previous trial. *Id.* at 84:23-85:14 (Lowcock). At each trial, Lowcock's testimony conveniently supported Plaintiffs' allegations in the respective case. Another agency representative, Jay Friedman, met with the Department of Justice's attorneys and offered: "If there are any specific parts of the case that you'd like me to know well, please let me know" and suggested that he "keep to what's legally relevant and beneficial." 9/10/24 PM Tr. 47:7-17 (Friedman). Friedman's advertising agency has partnered with two of Google's competitors that also had representatives testify at this trial, The Trade Desk and PubMatic. 9/10/24 AM Tr. 139:15-20 (Friedman); 9/10/24 PM Tr. 44:12-45:10 (Friedman).

10. Plaintiffs called five expert witnesses on their behalf.

10.1. Professors Rosa Abrantes-Metz and Ramamoorthi Ravi performed little to no quantitative analysis of their own and based their opinions largely on

reviewing Google documents, even though Professor Abrantes-Metz claimed no "additional expertise as an economist in reviewing documents accurately." 9/18/24 AM Tr. 68:18-69:1, 73:11-14, 73:24-74:3, 113:4-8 (Abrantes-Metz); 9/11/24 PM Tr. 19:2-6 (Ravi).

10.2. Professor Timothy Simcoe reviewed just 53 of the over 6 million documents produced in this case and performed an apportionment analysis based on only "6 millionths of 1 percent" of the data he had available. 9/18/24 PM Tr. 40:17-42:22 (Simcoe); 9/19/24 AM Tr. 83:23-84:19 (Simcoe).

10.3. Professor Gabriel Weintraub performed an analysis that the Court correctly described as having "less reliability" because it was not based on any particular experiment. 9/16/24 PM Tr. 108:12-15 (Weintraub).

10.4. Plaintiffs' lead market definition expert, Professor Robin Lee, defined three markets based on tools that transact "open-web display advertising" despite testifying he did not "recall hearing those four words in that order" prior to his work on this case. 9/19/24 PM Tr. 51:22-52:2 (Lee). In defining the alleged product markets, Professor Lee did not perform any quantitative analysis of substitution between ad tech for "open-web display ads" and other ad tech. 9/20/24 AM Tr. 94:18-95:9 (Lee). Professor Lee emphasized that he defined markets for tools, not transactions. 9/19/24 PM Tr. 52:3-11 (Lee); 9/20/24 AM Tr. 31:16-32:7 (Lee). All the tools in his markets transact in other ad channels and formats, yet Professor Lee proceeded to calculate market shares for these tools based solely on a subset of transactions the tools can facilitate—

those in "open-web display ads." 9/19/24 PM Tr. 71:17-25, 90:14-91:2, 119:15-20 (Lee).

11. Google called three expert witnesses on its behalf.

11.1. Professor Judith Chevalier, Professor of Economics and Finance at Yale University, testified about her opinions regarding Professor Simcoe's conclusions relating to AdX's revenue share. 9/25/24 AM Tr. 11:12-23, 12:9-14, 12:18-13:3 (Chevalier).

11.2. Dr. Mark Israel, presently President of Compass Lexecon, has been engaged over 100 times as a consulting expert in the areas of economics or competition economics, including on behalf of the Federal Trade Commission, 9/26/24 AM Tr. 35:15-18, 36:2-11 (Israel). He testified about his conclusions relating to market definition, market power, and Google's conduct and its effects on competition, *id.* at 37:13-38:18, 157:21-158:18 (Israel).

11.3. Professor Paul Milgrom, Professor of Economics at Stanford University, a founder of the field of market design, and a Nobel Laureate in the auction theory and invention of new auction methods, 9/24/24 AM Tr. 16:25-20:19 (Milgrom), testified about his conclusions regarding the economic effects of Google's display advertising auction practices, *id.* at 23:8-13 (Milgrom).

12. Plaintiffs did not call a single expert witness to rebut the testimony of Google's experts.

13. The next section provides an overview of the relevant experiences of the witnesses who testified at trial, as well as any particularly salient testimony going to the credibility of the witnesses.

I. Current Google Employees

14. Per Bjorke (live): Per Bjorke has worked for Google's AdSpam team for eleven years and is currently the Director of Product Management of the AdSpam team. 9/23/24 PM Tr. 43:12-20 (Bjorke). The AdSpam team, which is part of Google's larger Ads Privacy and Safety team, works to ensure that "the impressions and the clicks that the advertisers are paying for are valid." *Id.* at 44:23-45:2, 47:23-48:7 (Bjorke). Prior to joining Google, Bjorke worked at Yahoo, where he worked on data processing and analytics for the metrics that Yahoo's ads business used to measure traffic on its digital content. *Id.* at 43:24-44:4 (Bjorke).

15. Alejandro Borgia (live): Alejandro Borgia has been Director of Product Management for the Ad Safety team at Google for over four years. 9/25/24 PM Tr. 101:16-22 (Borgia). Google's Ad Safety team, which sits within its larger Ads Privacy and Safety Team, serves both advertisers and publishers to protect them from safety threats and improve the quality of the match between an advertiser and a publisher. *Id.* at 102:1-3, 104:6-17, 105:8-17 (Borgia). Borgia oversees the development and enforcement of Google's ad safety policies across Google's ad tech tools, including brand safety control measures and user safety and transparency initiatives. *Id.* at 104:6-17, 122:12-20, 127:24-128:7 (Borgia).

16. Marco Hardie (live): Marco Hardie has worked on the buy-side of Google's display ads business for over seven years. He is currently Head of Industry within the Government and Advocacy Group, leading a sales team that sells Google's advertising products to government and advocacy clients. 9/23/24 PM Tr. 108:7-16 (Hardie). Hardie oversees Google's partnerships with government agencies including the Census, Department of Veterans Affairs, Department of Health and Human Services, United States Postal Service, and advocacy groups working on issues such as smoking cessation. Hardie's team supports these agencies to help achieve their advertising and

business goals using Google's advertising tools. 9/23/24 PM Tr. 112:6-14, 113:17-22 (Hardie). In Hardie's role, he works and speaks directly with Google's advertiser customers and with their ad agencies. 9/23/24 PM Tr. 112:19-24 (Hardie).

17. Nirmal Jayaram (live): Nirmal Jayaram has over 12 years of experience as an engineer and manager in the buy-side of Google's display advertising business. 9/17/24 AM Tr. 7:12-20, 106:1-6 (Jayaram). Jayaram is presently a Director of Engineering leading the buy-side engineering team. *Id.* at 105:14-106:6 (Jayaram). He has worked as an engineer on Google's buy-side products, including Google Ads and DV360, since he started at Google as a data scientist, before he advanced to manager and eventually director. *Id.* at 7:12-20, 106:1-6, 106:17-21 (Jayaram). Over the course of his time at Google, Jayaram has been personally involved in approximately 200 to 250 product optimizations or features on Google's buy-side tools. *Id.* at 109:11-15 (Jayaram). Those features include AwBid, buy-side Dynamic Revenue Sharing, and Project Poirot. *Id.* at 115:15-18, 137:4-10, 146:1-12 (Jayaram).

18. Woojin Kim (deposition read-in): Woojin Kim was previously Director of Product Management for Google Ads until February 2017, when he left the Google display ads team. 9/19/24 PM Tr. 29:18-30:1 (Kim).

19. Nitish Korula (live): Nitish Korula has over 10 years of experience as an engineer and manager in the sell-side of Google's display advertising business. 9/23/24 AM Tr. 8:9-9:20 (Korula). He started at Google in the research department, where he collaborated closely with the display ads team. *Id.* at 8:9-13 (Korula). From 2016 to December 2021, Korula formally joined the display ads business, where he was eventually promoted to Engineering Director for Ad Serving and Sell-Side Ad Quality. *Id.* at 8:8-18 (Korula). The Sell-Side Ad Quality team is responsible for "continuously optimizing" "everything that happens in real time from when a user

visits a publisher's website or a mobile app and an ad request is sent to Google which looks at all of the direct sold ads the publisher might have, decides whether to run a programmatic auction, sends bid requests to buyers, receives the bids, runs the auction, applies various optimizations, and then ultimately returns the ad to the user's device." *Id.* at 9:6-17 (Korula). Korula personally worked on the Dynamic Allocation and Enhanced Dynamic Allocation features on Google's tools; led the teams that developed sell-side Dynamic Revenue Sharing; and led the migration to the Unified First Price Auction and Uniform Pricing Rules. *Id.* at 53:16-54:2, 77:11-14, 84:25-85:3, 100:23-101:1 (Korula).

20. George Levitte (deposition read-in): George Levitte previously served as Product Manager for the "AdX buy-side, which provide[d] functionality and tools for third-party demand sources" integrated with AdX. 9/19/24 PM Tr. 18:25-19:5 (Levitte). In that role, he worked on a number of projects, including ads.txt and Open Bidding. *Id.* at 19:9-14 (Levitte).

21. Neal Mohan (live): Neal Mohan worked at DoubleClick before its acquisition by Google, after which he worked in Google's display advertising business in multiple leadership roles. 9/16/24 AM Tr. 5:24-6:12 (Mohan). Prior to Google's acquisition of DoubleClick, Mohan's last position at DoubleClick was Senior Vice President of Strategy and Product Management. *Id.* at 6:24-7:2 (Mohan). Once he moved over to Google, Mohan became the Director of Display Ads Product Management in charge of DFP, AdX, and the Google Display Network. *Id.* at 7:8-25 (Mohan). He subsequently was promoted to Vice President of the display and video ads organization. *Id.* at 8:1-7 (Mohan). Mohan departed Google's display ads business in 2015 for YouTube, and he is presently the CEO of YouTube. *Id.* at 5:24-25, 8:8-10 (Mohan).

22. Jessica Mok (live): Jessica Mok served in various finance roles for Google's display advertising business from January 2017 to August 2023. 9/26/24 AM Tr. 8:10-24 (Mok).

Her roles included Finance Manager, Senior Finance Manager, and eventually Finance Director of the entire display ads business. *Id.* at 9:6-11 (Mok). In connection with her roles, Mok served as a financial strategic advisor for the display ads business and prepared the business's profit and loss statements. *Id.* at 9:12-25 (Mok).

23. Aparna Pappu (deposition read-in): Aparna Pappu previously worked at DoubleClick and joined Google after the DoubleClick acquisition in 2008. 9/18/24 AM Tr. at 200:20-201:9 (Pappu). Pappu eventually led the engineering teams responsible for AdX, DFP, and AdSense before she left Google's display ads team in 2018. *Id.* at 201:10-202:16 (Pappu).

24. Scott Sheffer (live): Scott Sheffer has worked over 18 years at Google in various leadership roles in the sell-side of the display advertising business. 9/20/24 PM Tr. 45:23-46:4 (Sheffer). He started as a manager in the AdSense online sales and operations team, was promoted to leading the global AdSense online sales team in 2010, and was promoted to Vice President in 2013. *Id.* at 47:5-11 (Sheffer). Currently, Sheffer is the Vice President for Global Partnerships Sell-Side Monetization at Google. In that role, he leads the team that works with Google's "publisher, developer, and other partners to implement and utilize" Google's "sell-side monetization tools." *Id.* at 44:25-45:15 (Sheffer). His customers include "publishers, developers, broadcasters of all sizes around the world, from folks who do weekend blogging all the way through large app developers, large brand-name publishers." *Id.* at 45:16-22 (Sheffer). Sheffer is personally in "regular contact" with those publishers to discuss topics such as "business opportunities" and "technical plans for the future." 9/20/24 PM Tr. 71:10-24 (Sheffer); *see also id.* at 72:7-11 (Sheffer) (the Court permitting Sheffer to testify to "his understanding" of "the trend in the relevant industries").

25. Sarah Stefaniu (live): Sarah Stefaniu is a Global Products Solution Lead for Privacy and Regulations with the Google Marketing Platform. 9/23/24 PM Tr. 4:14-22 (Stefaniu). Presently, Stefaniu works on privacy initiatives relating to Google's buy-side products, DV360 and Campaign Manager 360 (an ad serving and measurement platform). *Id.* at 4:23-5:14 (Stefaniu). Stefaniu first started at Google in February 2018 as an account manager for Google Ads supporting the Large Customer Sales group, where she worked with clients such as Amazon, Conde Nast, Penguin Random House, HarperCollins, The New York Times, Wall Street Journal, and the Social Security Administration. *Id.* at 7:4-19, 11:2-4, 13:5-10, 14:3-10, 14:14-17 (Stefaniu). In connection with her roles at Google, Stefaniu has personally used the Google Ads and DV360 interfaces. *Id.* at 6:2-4, 10:4-9 (Stefaniu).

26. Adam Stewart (live): Adam Stewart has 33 years of advertising experience, with 14 years at the Discovery Channel and 18 years at Google. 9/25/24 PM Tr. 27:7-14 (Stewart). In his 33 years of experience, Stewart has personally observed the evolution of display advertising over time. *Id.* at 28:6-15 (Stewart). Stewart is currently a Vice President at Google and is responsible for Google's advertising partnerships with large customers in the automotive, home and personal care, food and beverage, consumer technology, media and entertainment, and government and advocacy businesses. *Id.* at 26:16-21, 27:21-28:5 (Stewart). In connection with his role, Stewart speaks directly with Google's customers seeking to market themselves on a weekly and sometimes daily basis. *Id.* at 26:24-27:3 (Stewart). Stewart also supervises approximately 500 Google employees, who all speak directly with Google's advertiser customers. *Id.* at 27:4-6 (Stewart).

II. Former Google Employees

27. Jonathan Bellack (live): Jonathan Bellack worked at DoubleClick before it was acquired by Google and, from 2008 to 2018, as a manager on the sell-side of Google's ad tech business. 9/19/24 AM Tr. 117:7-10, 119:1-24 (Bellack). Bellack first joined DoubleClick as a product manager on DFP in 2004. *Id.* at 117:22-118:3 (Bellack). After Google acquired DoubleClick in 2008, Bellack became a Product Manager Leader at Google responsible for DFP and AdX. *Id.* at 119:5-16 (Bellack). In that role, Bellack "supported" and oversaw the building and release of Open Bidding, Google's competitive response to header bidding. *Id.* at 143:8-23 (Bellack). Plaintiffs elicited during their examination that Google's culture generally was characterized by robust discussion; Bellack explained that other Google employees might not agree with his statements, including one exhibit Plaintiffs heavily rely upon, which contained what he described as "late night jetlag ramblings." *Id.* at 155:10-165:12 (Bellack); *see* PTX-367 at -463 (2017 internal Google email chain). Plaintiffs elicited, for example, that "there were a wide range of opinions about header bidding" and Bellack's acknowledgement that "others" disagreed with his opinions about header bidding. 9/19/24 AM Tr. 135:14-20 (Bellack).

28. Brad Bender (live): Brad Bender worked in the ad tech industry for many years, including as an executive in Google's ad tech business for over a decade. Prior to joining Google in 2008, Bender worked for DoubleClick before it was acquired by Google. 9/11/24 AM. Tr. 9:8-10 (Bender). After joining Google, Bender was responsible for the Google Display Network, which is now known as Google Ads. *Id.* at 9:11-10:5, 43:3-9 (Bender). From 2008 to 2019, his area of responsibilities grew to include other buying tools, including what is now known as DV360, and, by 2018, Google's entire display ads business. *Id.* at 9:11-11:18 (Bender). Bender left the Google display advertising business in November 2019. *Id.* at 12:3-7 (Bender).

29. Sam Cox (deposition read-in): Sam Cox was a Group Project manager at Google for four-and-a-half years, when he was responsible for DFP and AdX. 9/19/24 PM Tr. 15:5-20 (Cox).

30. Chris LaSala (live): Chris LaSala is currently a member of the faculty at Columbia Business School, where he teaches a course on product management. 9/13/24 AM Tr. 140:13-24 (LaSala). From 2009 to 2022, LaSala worked in Google's ad tech business in various roles, predominantly on the sell-side of the business. *Id*. at 37:2-4, 38:4-10 (LaSala). From 2013 to 2022, LaSala was Managing Director for Global Commercialization with a focus on Google's AdX and DFP products. *Id.* at 38:11-22 (LaSala). In this role, LaSala and his team were responsible for sharing information and product feedback about AdX and DFP between Google's sales, product management, and engineering teams. *Id.* at 38:23-39:6 (LaSala). While working at Google, LaSala also served as an adjunct professor at Duke University's Fuqua School of Business teaching a course on digital platforms. *Id.* at 141:6-14 (LaSala). During their examination, Plaintiffs elicited testimony from LaSala that he advocated for Google's ad tech stack to become a more "closed network model," including Google Ads and DV360 buying more exclusively from Google's sell-side tools, but LaSala testified that his views were "strongly rejected" as Google continued to build interoperability with third-party tools. *Id.* at 82:19-84:11 (LaSala); *see also, e.g.*, PTX-864 at -223; PTX-624 at -169 (examples of documents introduced by Plaintiffs stating LaSala's position).

31. Eisar Lipkovitz (deposition read-in and deposition video): Eisar Lipkovitz was Vice President for Engineering for Google's display ads business from 2014 to 2018. Deposition of Eisar Lipkovitz (Litigation) Tr. 22:8-14.

32. Bryan Rowley (deposition video): Bryan Rowley worked at Google from 2011 to 2019 in various client-facing sales roles on the sell side. He started at Google in 2011 as Strategic Partner Lead, selling ad tech products largely to news publishers. Deposition of Bryan Rowley Tr. 19:14-19, 20:7-21:02. Rowley eventually became Head of Global Strategy and Commercialization, Programmatic Indirect and Ad Serving, and then Head of Global Strategy and Commercialization, Ad Manager and Authorized Buyer. *Id.* at 26:25-27:12, 31:10-14 (Rowley).

33. Scott Spencer (live): Scott Spencer worked on the sell-side of Google's display advertising business and left Google in the beginning of 2023. 9/18/23 AM Tr. 6:19-21, 7:18-8:7 (Spencer). Before working at Google, Spencer worked as a product manager and in various product management roles at DoubleClick. *Id.* at 7:16-23 (Spencer). He joined Google after the DoubleClick acquisition. *Id.* at 8:8-11 (Spencer).

34. Bonita Stewart (deposition read-in): At the time of her deposition, Bonita Stewart had been Vice President of Global Partnerships at Google since 2012. 9/19/24 PM Tr. 17:2-11 (B. Stewart).

35. Rahul Srinivasan (live): Rahul Srinivasan joined Google in the summer of 2016 as a product manager on AdX. 9/12/24 AM Tr. 7:12-19 (Srinivasan). His product management role eventually extended to DFP and AdX. *Id.* at 7:20-8:6 (Srinivasan). Srinivasan was the product manager in charge of Google's rollout of the Unified First Price Auction, Unified Pricing Rules, and related changes in 2019. *Id.* at 19:19-23, 113:20-115:9 (Srinivasan). In that role, Srinivasan led a meeting in April 2019 with Google's publisher partners to discuss Google's changes. *Id.* at 66:25-67:7 (Srinivasan). Srinivasan left the Google Ad Manager team "shortly after" the changes were rolled out. *Id.* at 75:5-8 (Srinivasan). Because he worked on the sell-side, Srinivasan was

not familiar with the buy-side's decisions and the reasons for those decisions. *Id.* at 17:24-18:4, 49:14-18 (Srinivasan).

III. Advertisers:

36. Brian Bumpers (deposition read-in): Brian Bumpers is Marketing Analytics Manager at Zulily, an e-commerce company that sells retail products primarily to moms and children. 9/27/24 AM Tr. 22:22-23:8 (Bumpers). Bumpers is responsible for managing "all the analytics" for the marketing department of Zulily, including "outbound, paid ads, customer experience, analytics." *Id.* at 22:24-23:3 (Bumpers). In 2022, Zulily's ad spend budget was $58 million. *Id.* at 23:12-14 (Bumpers). Zulily advertises its services on channels such as Google and Facebook, the Instagram app, Connected TV, TikTok, Pinterest, Amazon, Snapchat, and Twitter. *Id.* at 23:15-24:20, 27:21-28:5 (Bumpers).

37. Courtney Caldwell (live): Courtney Caldwell is the founder of a small- or medium-sized business called ShearShare, a beauty tech start-up that has won awards for its pioneering service in the industry. 9/25/24 AM Tr. 111:10-18, 115:8-21 (Caldwell). Before she founded ShearShare, Caldwell led digital demand generation and innovation at Oracle. *Id.* at 112:19-113:1 (Caldwell). Caldwell has used Google Ads to advertise ShearShare since 2017, and has used Google Ads in connection with her previous roles since as early as 2001. 9/25/24 PM Tr. 4:9-5:3 (Caldwell). In addition to using Google Ads to advertise, ShearShare also has purchased advertising on Facebook, Instagram, LinkedIn, and TikTok. *Id.* at 7:5-10 (Caldwell).

38. Kendall Oliphant (live): Kendall Oliphant has over seventeen years of experience working for the United States Census Bureau in communications and publicity, with "expertise in" "communications programming, campaign development, and implementation." 9/23/24 PM Tr. 65:9-11, 105:7-11 (Oliphant). For the 2010 Census, Oliphant served as Chief of the Contract

Management Branch for the 2010 Census Publicity Office and managed the Census communications contract covering paid media, partnerships, website development, and more. *Id.* at 66:2-8, 66:15-67:5 (Oliphant). For the 2020 Census, Oliphant also served as the Chief of the Integrated Communications Contract Program for the 2020 Census Management Office. She oversaw "everything related to the contract" including "communications, the management," and "the budget." *Id.* at 65:15-66:8 (Oliphant). Within that role, Oliphant led the paid media purchasing for the 2020 Census campaign, *id.* at 65:19-66:8 (Oliphant), which included purchasing of digital media advertising, *id.* at 67:6-21 (Oliphant). For the 2020 Census, the Census Bureau spent $360 million on paid media, which included purchasing banner ads, rich media ads, streaming video ads, Connected TV ads, and digital out-of-home ads. *Id.* at 81:16-82:4, 82:24-83:4, 86:17-87:10 (Oliphant).

IV. Advertising Agencies:

39. Bo Bradbury (deposition read-in): Bo Bradbury is Senior Vice President, Managing Director at GSD&M, an advertising agency. 9/18/24 AM Tr. 193:12-18 (Bradbury).

40. Jay Friedman (live): Jay Friedman is CEO of the Goodway Group, a marketing services firm that provides traditional advertising, agency services, and marketing consulting. 9/10/24 AM Tr. 129:3-15 (Friedman).

40.1. After Plaintiffs' lawsuit was filed, Friedman met with the Department of Justice's attorneys and offered: "I'm fairly well versed in the suit." "If there are any specific parts of the case that you'd like me to know well, please let me know." Friedman also offered to "keep to what's legally relevant and beneficial." 9/10/24 PM Tr. 47:7-17 (Friedman).

40.2. Friedman testified that he typically uses demand-side platforms and not ad networks, 9/10/24 AM Tr. 140:7-10 (Friedman), but admitted: "You'll have to forgive me in terms of the fact that I don't log into the interface and select ads and I haven't for a while," *id.* at 140:19-23 (Friedman); 9/10/24 PM Tr. 23:8-13 (Friedman).

40.3. Goodway Group has partnered with two of Google's competitors, The Trade Desk and PubMatic—both of whom had representatives testify at this trial. 9/10/24 AM Tr. 139:15-20 (Friedman); 9/10/24 PM Tr. 44:12-45:10 (Friedman).

41. Luke Lambert (live): Luke Lambert is the Chief Innovation and Product Solutions Office for OMD USA, a marketing and advertising firm. 9/13/24 PM. Tr. 25:1-7 (Lambert).

41.1. Lambert testified that the term "open-web display advertising" has been used since the "dawn" of "interactive advertising" in 2008. 9/13/24 PM Tr. 57:8-13 (Lambert). On cross-examination, Lambert was presented with an ordinary course of business presentation his firm prepared for advertisers that listed forms of advertising, but did not contain anywhere the term "open-web display advertising." *Id.* at 55:19-21 (Lambert); *see also* DTX-1151A at 8, 10 (October 25, 2021 presentation titled "FY22 Paid National Media Tactical Recommendation"). On re-direct examination, Lambert attempted to explain that "display" may have meant the same thing as "open-web display," 9/13/24 PM Tr. at 56:24-57:2 (Lambert), but he had previously testified that the word "display" referred to not just banner ads, but also native ads, rich media ads, YouTube ads, Amazon ads, and social media ads, *id.* at 55:4-18 (Lambert).

42. Joshua Lowcock (live): Joshua Lowcock is President of Media at Quad, a marketing experience company that provides advertising agency services, creative agency services, and print production services. 9/9/24 AM Tr. 52:10-20 (Lowcock). Prior to working at Quad, Lowcock worked for Universal McCann, an advertising agency, for eight years in a number of positions. *Id.* at 52:25-53:17, 54:10-24 (Lowcock).

42.1. Lowcock is a two-time government witness who testified for the Department of Justice Antitrust Division in antitrust lawsuits against Google relating to digital advertising twice within one year. 9/9/24 AM Tr. 80:6-8 (Lowcock).

42.2. Lowcock's testimony at trial contradicted his sworn testimony at the *Search* antitrust trial. At trial, during cross examination, Lowcock was asked whether the vast majority of advertising on social media is display, and he answered "no." Under oath at the *Search* trial, he had testified the opposite: "so the vast majority of advertising on social media is display." 9/9/24 AM Tr. 84:23-85:14 (Lowcock).

43. Susan Schiekofer (deposition read-in): Susan Schiekofer is Chief Digital Investment Officer at GroupM, an advertising agency. 9/17/24 PM Tr. at 137:3-6 (Schiekofer). Schiekofer's team at GroupM "works with the client teams to figure out what are the partners that we want to do business with" in order to generate return on investment for advertiser clients. *Id.* at 137:7-16 (Schiekofer).

V. Publishers:

44. Ken Blom (deposition video): Ken Blom is the Executive Vice President of Strategy and Operations at Buzzfeed, Inc. Deposition of Ken Blom Tr. 8:12-19. Buzzfeed, Inc. owns and operates several publisher properties that include desktop web, mobile web, and mobile

apps: Huffington Post, Buzzfeed.com, Tasty.Co and Complex.com. *Id.* at 78:24-79:09, 80:8-16 (Blom). Before working at Buzzfeed, Blom worked at an ad agency called Reprise Media for three to four years. *Id.* at 9:18-24 (Blom). Since joining Buzzfeed in 2012, Blom has led the social discovery team, ad operations team, and eventually the business development and creative branded content teams. *Id.* at 13:16-17 (Blom).

45. James Glogovsky (deposition read-in): James Glogovsky is the current Vice President of Revenue Operations and Analytics at the New York Times. He oversees the New York Times's direct and programmatic digital ads business, print ads business, ad operations, custom pricing, and sales planning. 9/26/24 PM Tr. 122:22-123:6 (Glogovsky). He explained that the "majority" of the New York Times's revenue on display ads comes from direct sales. *Id.* at 129:15-17 (Glogovsky). In 2017, he first joined the New York Times as the Director of Yield responsible for pricing and inventory of the New York Times's direct sales ads business. *Id.* at 122:16-21 (Glogovsky). The New York Times's digital ads business runs ads across its website; apps, which include individual apps for games, cooking, and athletics; podcasts; email; and custom or branded content studio. *Id.* at 123:19-124:20 (Glogovsky).

46. Jeremy Helfand (deposition read-in): At the time of Jeremy Helfand's deposition testimony, he was the Executive Vice President of Advertising and Data Platforms for the Walt Disney Company. 9/17/24 PM Tr. 114:15-18 (Helfand). In his role, he led "the portion of the organization responsible for the development of products and technologies for Disney's advertising business." *Id.* at 114:19-23 (Helfand). Prior to joining Disney, Helfand worked at Hulu, a streaming TV company, from 2018 to 2020 before Hulu was acquired by Disney. *Id.* at 114:24-115:3 (Helfand).

47. Eric Hochberger (deposition read-in): Eric Hochberger is the founder and CEO of Mediavine, a 200-person company that assists independent publishers in monetizing their websites through advertising and owns and operates its own publisher properties. 9/25/24 PM Tr. 160:15-161:2 (Hochberger). Mediavine's customers are primarily "smaller publishers," "such as blogs," that create content independently. *Id.* at 161:8-18 (Hochberger). Mediavine offers a variety of tools for publishers, including website management tools, code that can manage auctions and serve ads, and technology that runs auctions and integrates directly with demand-side platforms. *Id.* at 161:25-162:22, 163:16-20 (Hochberger).

48. Stephanie Layser (live): Stephanie Layser currently works at Amazon Web Services as a "subject matter expert [on] publisher ad tech." 9/10/24 AM Tr. 9:9-11 (Layser). Layser has only worked on the publisher side of the ad tech ecosystem, not the advertiser side. *Id.* at 104:24-105:5, 105:10-12 (Layser). She previously worked at The Daily Mail from 2013 to 2014, *id.* at 6:13-14, and for News Corp from 2017 to 2022, *id.* at 8:15-17 (Layser).

48.1. One of Layser's previous employers, The Daily Mail, is a plaintiff in a related case against Google in the Southern District of New York. *Infra* ¶ 50. Both of Layser's previous employers, The Daily Mail and News Corp, are represented in this case by John Thorne. *Infra* ¶ 50.2.

48.2. During her direct examination, Layser testified only about her experiences at The Daily Mail and News Corp, not Amazon. *E.g.*, 9/10/24 AM Tr. 42:22-43:4, 10:18-21 (Layser).

48.3. For years, Layser has been an outspoken critic of the fact that Google operates some of its ad tech tools for profit. In July 2019, Layser wrote an article in AdExchanger advocating that Google should "contribute AdX to prebid.org,

the industry-regulated header bidding solution and first-price auction." 9/10/24 AM Tr. 102:5-9 (Layser). In a podcast, Layser expressed: "I think there is a general—there is a general problem with community assets . . . being run by companies that are for-profit companies." *Id.* at 103:1-25 (Layser). As she conceded, Layser believes "parts of ad tech," including real-time bidding and the technology for exchanges to compete against each other, "should be community assets." *Id.* at 102:10-18, 104:2-21 (Layser).

48.4. Layser personally sat on the board of Prebid when she was at News Corp. 9/10/24 AM Tr. 8:10-14 (Layser).

48.5. Layser testified that the goals of her former employer, News Corp, "will never align with Google" because both own "a media business." 9/10/24 AM Tr. 63:25-64:2, 70:9-20 (Layser); *see also* DTX-404 at 2.

48.6. On direct examination, Layser testified that Google Ads is "the largest source of unique demand within programmatic display." 9/10/24 AM Tr. 13:13-15 (Layser). On cross examination, however, she admitted that News Corp had never analyzed the revenue "that came from advertisers that used Google Ads and not any other buying tool." 9/10/24 AM Tr. 77:13-21 (Layser) ("I don't even think that would be in the logs.").

49. Ryan Pauley (deposition read-in): Ryan Pauley has at least 10 years of experience in display advertising and is currently the President of Revenue and Growth at Vox. 9/27/24 AM Tr. 6:1-4, 6:10-14 (Pauley). Vox is a digital media company that owns and operates around 18 publisher brands that produce content and sell ads on websites, podcasts, videos, and more. *Id.* at 9:19-10:2 (Pauley). In Pauley's role, he oversees "all the commercial operations" across Vox's

"advertising, subscription, commercial business," as well as "marketing communications" and "events." *Id.* at 6:5-9 (Pauley). Vox has also created Concert, a collection of ad tech tools launched in 2016 that serve "other premium publishers" and sell their inventory to advertisers. *Id.* at 9:2-8, 14:21-15:6 (Pauley). Today, Concert partners with 70 to 80 other publishers, including NBCUniversal, Penske Media, and Conde Nast. *Id.* at 10:16-11:4 (Pauley). On the advertiser side, Concert serves large-scale Fortune 500 brands. *Id.* at 11:22-12:3 (Pauley).

50. Matthew Wheatland (live): Matthew Wheatland is the Chief Digital Officer at The Daily Mail, a news publisher based in the United Kingdom. 9/18/24 AM Tr. 124:6-16 (Wheatland). The Daily Mail has both a website and an app. *Id.* at 133:4-14 (Wheatland). It also makes its content available on social media such as X (formerly Twitter), Facebook, Instagram, Snapchat, and TikTok, where it has become the biggest news publisher on the platform. *Id.* at 154:5-7, 155:4-156:2 (Wheatland). Wheatland was called in Plaintiffs' case-in- chief and also served as Plaintiffs' sole witness in rebuttal.

50.1. The Daily Mail has filed a lawsuit against Google relating to DFP and AdX. 9/18/24 AM Tr. 150:1-3 (Wheatland). In preparation for the lawsuit, Wheatland spoke with The Daily Mail's counsel about "the functionality of ad tech." *Id.* at 183:9-13 (Wheatland). When presented with The Daily Mail's complaint, which contradicts Plaintiffs' allegations in this case by describing Google Ads and DV360 as demand-side platforms, Wheatland responded that he did not "100 percent agree" with The Daily Mail's own complaint. *Id.* at 184:16-185:5 (Wheatland).

50.2. Wheatland was represented at trial by John Thorne, who also represented Tom Wolfe of Gannett and News Corp, the former employer of Stephanie Layser.

Dkt. 407 (notice of appearance on behalf of News Corp); 9/27/24 AM Tr. 80:3-23 (Wheatland). Thorne also represents The Daily Mail and Gannett in connection with their related lawsuit against Google in the Southern District of New York. 9/27/24 AM Tr. 80:3-25 (Wheatland).

50.3. During cross examination in Plaintiffs' rebuttal case, Wheatland was shown a joint Google and Daily Mail business plan that stated: "Savvy publishers have responded by building smart responsive websites and new app interaction models. . . . Publishers need to evolve their advertising as well from boxy banners to flexible and contextually relevant native ads at scale." 9/27/24 AM Tr. 83:24-84:8 (Wheatland). When asked if he agreed that "The Daily Mail is a savvy publisher," Wheatland replied: "I don't know." *Id.* at 84:11-13 (Wheatland). In contrast, during Plaintiffs' case-in-chief, Wheatland had testified that The Daily Mail is "one of the most widely-read newspapers in the UK" and "one of the largest English language newspaper websites in the world," with "roughly 17 million users in the U.S. across our website possessing one of the top ten largest U.S. new websites." 9/18/24 AM Tr. 124:10-16, 125:13-18 (Wheatland). Moreover, Wheatland had agreed on direct examination that he is "aware of a trend in the industry of users spending more time on apps than they do on desktop or mobile web" and that "some apps are very popular." 9/27/24 AM Tr. 64:11-14 (Wheatland).

50.4. On direct examination, Wheatland testified that it is "hugely difficult" to convert web users into app users because using an app requires taking three steps. *Id.* at 65:24-66:10 (Wheatland). On cross examination, when asked to

walk through what extra steps would be required to use an app, Wheatland agreed that three steps are all that is needed either to download an app or visit a website. *Id.* at 87:23-89:6 (Wheatland). He nonetheless insisted that "there's many ways to access our content" but refused to explain whether those other ways to access require more than three steps. *Id.* at 87:23-91:14 (Wheatland) ("I don't think I can give a yes or no in response to that.").

51. Tim Wolfe (live): Tim Wolfe is the Senior Vice President of Revenue Operations at Gannett, a publishing company that operates "about 340 total digital media and news" brands, including USA Today. 9/9/24 AM Tr. 49:8-51:3 (Wolfe). One of those brands is a Virginia newspaper, the Staunton News Leader, which has both a mobile app and a website. *Id.* at 52:13-17, 64:7-14 (Wolfe).

51.1. Gannett is a plaintiff in a "related case" against Google in the Southern District of New York. Wolfe claimed that—despite being the head of all digital revenue at Gannett—he had not read Gannett's complaint, did not know how similar the allegations are to the allegations in this case, and did not know whether Gannett stands to gain financially from its related lawsuit against Google. 9/9/24 AM Tr. 55:24-56:11, 99:5-100:2 (Wolfe).

51.2. Wolfe was represented at trial by John Thorne, who also represented Matthew Wheatland of The Daily Mail and News Corp, the former employer of Stephanie Layser. Dkt. 407; 9/27/24 AM Tr. 80:3-23 (Wheatland). Thorne also represents The Daily Mail and Gannett in connection with their related lawsuit against Google in the Southern District of New York. *Supra* ¶ 50.2.

51.3. On direct examination, Wolfe testified about Gannett's use of ad tech tools, including the process for "how an ad space on a website actually gets filled with an ad," and Gannett's experience switching its publisher ad server to DFP. 9/9/24 AM Tr. 67:24-70:13, 70:24-71:25 (Wolfe). On cross examination, when asked to explain the basic matter of what "user or consumer information" is shared with ad tech tools in order to serve an ad, Wolfe replied: "I don't know specifically." 9/9/24 AM Tr. 92:4-92:20 (Wolfe).

VI. Google's Competitors:

52. James Avery (live): James Avery is CEO and founder of Kevel, an ad tech company that helps "publishers and retailers" serve "advertising across the internet." 9/9/24 PM Tr. 115:11-14, 116:19-23, 119:6-9 (Avery). Avery founded Kevel in 2007, and Kevel first launched its publisher ad server in 2010. *Id.* at 120:9-10 (Avery). Kevel sells APIs that enable companies to build custom in-house ad servers at a fraction of the cost (as low as $80,000) and time (as short as "a couple of weeks") it would otherwise take them to build their own. *Id.* at 151:12-15, 154:17-155:9 (Avery). Kevel's customers include companies like Ticketmaster, Bed Bath & Beyond, Klarna, and Yelp. *Id.* at 155:22-156:4 (Avery).

52.1. Avery admitted that his company, Kevel, could benefit from the relief Plaintiffs seek: if Google is forced to "open up Adx," "it could be good for Kevel." 9/9/24 PM Tr. 166:17-167:24 (Avery).

52.2. Avery met with the Department of Justice at least twice during its investigation of Google and at least once after Plaintiffs filed their complaint,

after which Avery told others that he had "a good, long couple of calls with the Department of Justice." 9/9/24 PM Tr. 167:4-12 (Avery).

52.3. When presented with language on Kevel's website, Avery called his company's representations on its own website "wishful thinking" and "largely marketing." 9/9/24 PM Tr. 153:10-154:16 (Avery).

52.4. On direct examination, Avery testified that he attributes the fact that DFP is the "dominant publisher ad server" to "the tight connection to AdX that other ad servers can't offer." 9/9/24 AM Tr. 150:12-17 (Avery). On cross examination, he admitted that his company, Kevel, "represents to customers that one of the reasons brands use Google's ad server is because it's free to anyone with under 90 million monthly impressions and no other vendor offers such a deal," as well as because "it's reliable both from an infrastructure perspective and a business one." *Id.* at 161:7-11, 162:12-16 (Avery).

53. Brian Boland (live): Brian Boland was formerly Vice President of Advertising Technology and Vice President of Publisher Solutions at Facebook (now called) Meta. Boland left Facebook in November 2020. 9/13/24 PM Tr. 96:23-97:9, 95:23-24 (Boland). Boland spent the "majority" of his 11-year tenure at Facebook "working on advertising," but at some point transitioned to "products and engineering" in Facebook's partnerships organization. *Id.* at 95:9-22 (Boland).

53.1. On direct examination, Boland testified that Facebook was "unsuccessful" in building and deploying the publisher ad server it acquired, LiveRail, because Facebook found it "unfeasible" to compete with Google. 9/13/24 PM Tr. 129:14-21 (Boland). On cross examination, however, when presented with an

email he sent in the ordinary course of business, Boland admitted that a number of other reasons unrelated to Google contributed to LiveRail's failure: "a number of challenges" with integration into Facebook; the "sales pipeline"; "culture clash" between LiveRail and Facebook employees and failure to relocate employees from Romania; and a discovery "that the vast majority of LiveRail inventory was not quality supply." 9/13/24 PM Tr. 140:7-16, 142:3-5, 142:14-23, 143:10-17 (Boland).

54. Tim Cadogan (live): Tim Cadogan is the co-founder and, from 2008 to 2020, former CEO of OpenX. He is presently the Chairman of the OpenX Board. 9/17/24 PM Tr. 45:9-14 (Cadogan). OpenX launched an ad exchange and a publisher ad server in 2008. *Id.* at 45:25-46:8, 46:25-47:2 (Cadogan).

54.1. OpenX has a representative on the board of directors for Prebid, a collection of ad tech companies that "collectively and community" owns and funds the development of a header bidding technology, also called Prebid. 9/17/24 PM Tr. 96:12-19 (Cadogan); 9/12/24 PM Tr. 164:10-15 (Kershaw). OpenX participated in Prebid and worked with Google on its competitor header bidding product, Open Bidding, at the same time. 9/17/24 PM Tr. 95:24-96:5 (Cadogan).

54.2. On cross examination, Cadogan repeatedly inserted his own commentary with no question pending. For example, after Cadogan answered a question about an OpenX ordinary course of business document stating that it had "massive scale global operation in 2017," he interjected: "Q. Okay. We can—you can—I think we are done with that document. A. You know this is a pitch

deck, right, a pitch deck. You know that people tend to do a little chest pumping in pitch decks, right? Q. Can we go to— A. Maybe you don't." *Id.* at 88:8-13 (Cadogan).

54.3. On direct examination, Cadogan testified that OpenX's publisher ad server could not successfully compete against DFP because OpenX could not access real-time bids from AdX. 9/17/24 PM Tr. 51:18-52:12 (Cadogan). Cadogan admitted, however, that "DFP was a good product" with better "workflow" and "migration tools" than OpenX. *Id.* at 48:9-12, 48:17-22 (Cadogan). On cross examination, Cadogan further admitted that OpenX's ordinary course of business documents listed many weaknesses of OpenX's ad server that had nothing to do with access to AdX: "significant discrepancies"; "video ad serving not supported properly"; "lack of support for flexible ad sizes"; and more. *Id.* at 78:11-79:11 (Cadogan). With no question pending, Cadogan attempted to cabin his testimony: "Q. Okay. A. It's like finding a needle in a haystack. Q. I'm sorry, sir? The Court. There's no question, no comments. Let's go." *Id.* at 79:21-25 (Cadogan).

54.4. On direct examination, Cadogan testified that Google's DV360's buying on OpenX's exchange "dropped very, very significantly" in the second half of 2018, which resulted in significant layoffs. 9/17/24 PM Tr. 66:9-22, 70:4-11 (Cadogan). On cross examination, Cadogan was shown an OpenX board meeting deck from 2019 and admitted that DV360's spending on OpenX "actually increased from 2017 to 2018." *Id.* at 71:25-74:4 (Cadogan); *see* DTX-843 at 49.

54.5. On cross examination, Cadogan repeatedly denied that he remembered details of OpenX's business, including on topics that he had testified about. *E.g.*, 9/17/24 PM Tr. 77:4-15 (Cadogan) (testifying about OpenX's inability to compete in the ad server market in 2013, but responding to whether he recalled an analysis of customer churn in ad servers in 2013: "No, of course I don't. It's 11 years ago."), 85:14-17 ("I can't remember"), 90:21-23 (about an OpenX feature, "I don't remember what we called it."), 93:19-24 (about another OpenX feature, "I don't actually remember specifically what that meant at that point.") (Cadogan). Cadogan also testified on redirect examination that he did not "recall" receiving any response from Google to a question he asked about DV360 spending on OpenX. *Id.* at 103:16-19 (Cadogan). Google's review showed that Google did meet with Cadogan regarding his question. *Id.* at 151:21-152:13 (Cadogan).

55. Andrew Casale (live): Andrew Casale is the CEO and co-founder of Index Exchange—a Google competitor. 9/9/24 AM Tr. 106:16-24 (Casale). Founded in 2003 as Casale Media, Index Exchange started as an ad network before becoming an ad exchange in 2011. *Id.* at 109:17-21 (Casale); 9/9/24 PM Tr. 35:1-16 (Casale). Today, Index Exchange has "massive scale" and 550 employees. 9/9/24 PM Tr. 37:5-18, 39:4-8 (Casale).

55.1. Index Exchange has a representative on the board of directors for Prebid. 9/17/24 PM Tr. 97:8-10 (Cadogan); 9/12/24 PM Tr. 164:10-15 (Kershaw).

55.2. During his direct examination, Casale testified that he would characterize Google Ads as "a very large source of demand" with a "unique" "makeup" of advertisers. 9/9/24 AM Tr. 129:18-130:13 (Casale). On cross examination,

Casale was confronted with his deposition testimony that he did not "know much" about Google's advertiser customers and that "there's a lot of mystery" about the Google Ads customers that are placing bids on Index Exchange. Casale conceded both that he has "absolutely no knowledge of" the Google Ads advertiser customers that bid on Index Exchange "beyond the actual bids that are being placed," and that he does not have "a broader understanding of each individual campaign that is run as part of GDN or Google Ads." 9/9/24 PM Tr. 11:19-12:25 (Casale).

55.3. On direct examination, Casale testified about disadvantages of the "waterfall system" with reference to Plaintiffs' Demonstrative G, which depicted Google's AdX as always sitting at the top of the waterfall. 9/9/24 AM Tr. 148:3-15, 150:25-151:6 (Casale). On cross examination, he clarified that he was only "commenting based on the chart" that he was shown by Plaintiffs. In reality, AdX was "absolutely not" always "first in line" because the order of exchanges in the waterfall was "entirely dependent on each individual publisher and their own strategies." 9/9/24 PM Tr. 44:8-24 (Casale). Casale affirmed that the "sequence of the waterfall is set by the publisher," not by Google or anyone else as is implied by Plaintiffs' Demonstrative G. *Id.* at 44:13-18, 44:22-45:4 (Casale).

55.4. On direct examination, Casale testified extensively to the "differences" he perceives between "open-web display ads" and other kinds of ads. 9/9/24 AM Tr. 113:13-118:22 (Casale). During Casale's cross examination, the Court asked him whether, a year ago, he was aware of what the "four-word phrase

'open web display advertising'" meant. Casale admitted that he was not familiar with the phrase prior to the lawsuit: "That was not a well-understood defined category. It's usually 'open web,' and then 'display is separate. So putting them together is just not a common way we speak in ad tech." 9/9/24 PM Tr. 13:18-14:1 (Casale).

56. Arnaud Creput (deposition read-in): Arnaud Creput is a representative of Equativ, a company that launched a publisher ad server in 2005 and now operates a publisher ad server, a supply-side platform, and a demand-side platform. 9/13/24 PM Tr. at 63:8-14, 86:25-87:1 (Creput). In 2022, Equativ reported a record net recurring revenue of 92 million euros, a "record" for the company. *Id.* at 88:5-8 (Creput).

56.1. Equativ has "invested a lot of resources . . . to convince publishers to move from Google to Equativ." 9/13/24 PM Tr. 66:19-21 (Creput). Creput testified that he "wanted" "the antitrust authorities [to] look into the functioning of this market." *Id.* at 86:6-10 (Creput).

57. Jed Dederick (live): Jed Dederick is Chief Revenue Officer at The Trade Desk, a demand-side platform that enables advertisers to buy and place advertising. 9/11/24 PM Tr. 87:21-88:6, 90:1-3 (Dederick). The Trade Desk competes in AdX auctions against advertisers using Google Ads. *Id.* at 107:13-15, 146:22-148:14 (Dederick). Dederick is the only industry representative from the buy-side that Plaintiffs called to testify, even though none of their markets as alleged includes The Trade Desk.

57.1. The Trade Desk has a representative on the board of directors for Prebid. 9/17/24 PM Tr. 97:5-7 (Cadogan); 9/12/24 PM Tr. 164:10-15 (Kershaw).

57.2. Dederick testified easily on direct examination but became a very combative witness on cross examination. *E.g.*, 9/12/24 PM Tr. 14:7-12 (Dederick) ("Q. Okay. If you look at the top of the document where it says 'Competitive Intel Framework,' do you see that? A. I think there's a misunderstanding here. I mean— The Court. No. The question that's on the floor is do you see that heading? And the answer is yes or no. The Witness. Yes.").

57.3. Dederick testified that The Trade Desk does not compete with Google Ads. He even refused to agree that Google Ads and The Trade Desk compete within an auction when they bid on the same auction in the same ad exchange. 9/11/24 PM Tr. 146:16-148:14 (Dederick); *see also* 9/12/24 PM Tr. 13:11-14 (Dederick). In the ordinary course of business, however, The Trade Desk analyzed the Google Display Network (referring to Google Ads) in a "competitive intel framework." 9/12/24 PM Tr. 14:3-24 (Dederick). Similarly, The Trade Desk wrote in an SEC filing that it competes in "the market for programmatic buying for advertising campaigns"—not a market for only demand-side platforms—which is "intensely competitive." *Id.* at 26:4-27:10 (Dederick); *see also* DTX-1484 (The Trade Desk FY2022 10-K). When presented with the statement made in an SEC filing, Dederick attempted to cabin the words his company had written under penalty of perjury as being materially accurate: "I see those words. Significant context." 9/12/24 PM Tr. 26:4-9 (Dederick).

57.4. Dederick refused to agree to the basic proposition that "advertiser spend follows consumer eyeballs." 9/12/24 AM Tr. 168:24-169:14 (Dederick). He

also testified on direct examination that The Trade Desk invested in channels other than "open-web display" because it could not compete with Google. 9/11/24 PM Tr. 100:6-22 (Dederick). During cross-examination, however, Dederick had to admit that The Trade Desk had told investors that it was investing in non-"open-web display" areas, such as Connected TV and digital audio, because of a shift in "where consumers are spending their digital time." 9/12/24 AM Tr. 164:19-166:7, 168:13-23 (Dederick); 9/12/24 PM Tr. 6:4-12 (Dederick).

57.5. Dederick testified on direct examination that Google's Open Bidding product "decimated header bidding." 9/11/24 PM Tr. 143:3-6 (Dederick). On cross examination, Dederick was presented with statistics demonstrating dramatic growth in header bidding since the launch of Open Bidding. *Id.* at 46:15-25 (Dederick); *see* DTX-1898. In response, Dederick claimed that when he previously used the term "header bidding," he referred only to "a very specific header bidding implementation that was popularized in 2016 and 2017"—a distinction that no other witness, from either side, testified to at this trial. 9/12/24 PM Tr. 46:15-47:23 (Dederick). Dederick's testimony is contradicted by the repeated testimony of other witnesses, including Plaintiffs' own fact and expert witnesses, that header bidding is "alive and well today." 9/13/24 AM Tr. 32:4-5 (Kershaw); *see also* 9/18/24 AM Tr. 98:1-20 (Abrantes-Metz) (header bidding adopted by 80% of top publishers by 2019); 9/9/24 AM Tr. 155:23-156:9; 9/9/24 PM Tr. 23:3-15 (Casale) (header bidding made exchange market "hypercompetitive").

57.6. Dederick testified that The Trade Desk "explicitly sits on the buy side of the advertising industry." 9/11/24 PM Tr. 87:23-26, 93:7-94:2 (Dederick). On cross-examination, he admitted that The Trade Desk has contracts directly with the sell-side—namely, with publishers that utilize its supply path optimization offering, OpenPath. *Id.* at Tr. 45:11-24 (Dederick).

57.7. Dederick testified that, in conversations with Google, The Trade Desk has "raised concerns" about the terms of AdX auctions. 9/11/24 PM Tr. 109:2-18 (Dederick). When pressed, however, he did not "recall" when the meetings were, with who, or what concerns were discussed at what times. 9/12/24 PM Tr. 34:22-36:22 (Dederick).

58. Omri Farber (deposition read-in): Omri Farber is Lead Product Manager for Meta Audience Network. 9/26/24 PM Tr. 146:20-22 (Farber). He runs the "day-to-day performance reporting end-to-end business of Audience Network from a product and engineering perspective." *Id.* at 146:23-147:3 (Farber). Meta launched Meta Audience Network in 2014 as "a network that connects publishers, i.e., app developers in our case with advertisers and users." *Id.* at 147:15-148:2 (Farber). Meta Audience Network serves between 14,000 and 16,000 publisher customers that monetize their content using Meta Audience Network, and "millions" of advertiser customers. *Id.* at 149:1-13 (Farber).

59. Rajeev Goel (live): Rajeev Goel is the CEO and co-founder of PubMatic. 9/12/24 PM Tr. 56:8-16 (Goel). PubMatic launched publicly in the fall of 2007. *Id.* at 56:22-23, 66:10-11 (Goel). Today, PubMatic's offerings include an ad exchange, a supply path optimization product known as "Activate," and a header bidding solution called "OpenWrap" that compete with Google's products. *Id.* at 56:24-57:2, 143:6-19, 77:22-78:12, 139:12-15 (Goel). In 2023,

PubMatic represented to investors that it is "global scaled, and profitable" and growing at roughly twice the rate of growth in the market. *Id.* at 135:20-24, 136:12-15 (Goel).

59.1. PubMatic has a representative on the board of Prebid. 9/12/24 PM Tr. 139:16-22 (Goel); 9/12/24 PM Tr. 164:10-15 (Kershaw). PubMatic's OpenWrap solution is built on Prebid technology. 9/12/24 PM Tr. 139:16-22 (Goel).

59.2. On direct examination, Goel testified that "based on [his] experience in the industry," he believes that Google's ad exchange take rate is "higher than PubMatic's." 9/12/24 PM Tr. 81:25-82:5 (Goel). He acknowledged that he does not know Google's take rate with certainty but believes it to be 20 percent. *Id.* at 127:4-10, 131:20-25 (Goel). On cross examination, when presented with a PubMatic board meeting presentation, Goel confirmed that PubMatic's take rate for the fiscal year ending in 2018 was actually higher than AdX's, at [redacted]. *Id.* at 131:15-25; *see* DTX-665 at 39.

60. Tom Kershaw (live): Tom Kershaw currently works at Broadcast Music Inc. as Chief Technology Officer. 9/12/24 PM Tr. 159:4-7, 19-21 (Kershaw). From October 2016 to around 2021, Kershaw worked in display advertising at Rubicon Project (now called Magnite). *Id.* at 159:4-7, 160:2-19 (Kershaw). Kershaw has not worked in the ad tech industry for over three years, and he acknowledged that his testimony reflected his personal views, not those of Rubicon Project or Prebid. 9/13/24 AM Tr. 21:20-22 (Kershaw).

60.1. While he was at Rubicon Project, Kershaw helped co-found Prebid together with AppNexus. 9/12/24 PM Tr. 164:25-166:1 (Kershaw). Kershaw was Chairman of the Board of Prebid. *Id.* at 163:16-23 (Kershaw).

60.2. Kershaw agreed that Google's Open Bidding product was a "competing solution" that competed against Prebid, and that Rubicon Project was a competitor to Google's display ads business. 9/13/24 AM Tr. 13:2-7, 31:10-21 (Kershaw).

61. Ben John (deposition read-in): Ben John is Vice President of Engineering at Microsoft. 9/20/24 PM Tr. 120:8-9 (John). John began his career in advertising at AppNexus in January 2013, where he started as Head of Engineering for Web Services, was promoted to Senior Vice President of Engineering for Buy-Side Systems, and eventually became the Chief Technology Officer. *Id.* at 120:12-121:1 (John). After AT&T acquired AppNexus, John moved to AT&T, where AppNexus's offerings became known as Xandr. *Id.* at 120:14-16 (John). At AT&T, John was the Chief Technology Officer of Xandr, and he maintained that role at Microsoft after Microsoft acquired Xandr before he was eventually promoted to Vice President of Engineering. *Id.* at 120:8-18, 9-11 (John).

62. Brian O'Kelley (deposition video): Brian O'Kelley founded AppNexus, which first offered an ad exchange, in 2007. Deposition of Brian O'Kelley Tr. 57:22-23, 64:9-11, 64:15-65:06. Since then, AppNexus has built tools that serve both the buy-side, such as a demand-side platform, and the sell-side. *Id.* at 194:5-14, 252:21-253:7 (O'Kelley). For example, around 2014, AppNexus bought a publisher ad server that still exists today and has achieved "a good amount of success." *Id.* at 76:09-77:08, 189:7-16, 260:17-19 (O'Kelley).

62.1. From as early as 2010, Microsoft invested $42 million into AppNexus and was AppNexus's "largest client by revenue," paying more than $50 million as a client. Deposition of Brian O'Kelley Tr. 195:14-23, 196:2-5, 196:4-10, 205:5-8, 205:11. O'Kelley had an ownership stake in AppNexus that

benefited from AppNexus's partnership with Microsoft. *Id.* at 205:13-15, 206:15-17, 206:21-23, 207:1-2, 207:5 (O'Kelly). AppNexus's end-to-end ad tech stack has since been acquired by Microsoft. *Id.* at 210:21-24, 211:4-5 (O'Kelly).

63. Todd Parsons (deposition video): Todd Parsons has been the Chief Product Officer of Criteo since August 2020. Deposition of Todd Parsons Tr. 9:11-19. Criteo offers both buy- and sell-side products, including a publisher ad server, supply-side platform, and demand-side platform. *Id.* at 9:11-19, 60:20-24 (Parsons); DTX-1420 at 12 (Criteo FY2022 Form 10-K). Criteo describes as one of its "competitive advantages" the fact that Criteo has "the largest commerce data set on the open Internet." *Id.* at 91:9-17, 92:2-3 (Parsons). Before he worked at Criteo, from August 2018 to July 2020, Parsons was the Chief Product Officer at OpenX, where he was "responsible for modernizing OpenX's scale programmatic marketplaces." *Id.* at 9:16-10:6 (Parsons). Before that, Parsons was Chief Product Officer at Social Code, a company that "advised Fortune 500 companies and others on advertising and marketing." *Id.* at 10:7-15 (Parsons).

64. Michael Shaughnessy (deposition read-in): Michael Shaughnessy is Chief Operating Officer of Kargo, which offers a supply-side platform and "transforms standard creatives and creates bespoke experiences for the largest advertisers, as well as the best publishers." 9/19/24 PM Tr. 38:23-39:1, 39:15-17 (Shaughnessy).

VII. Google's Expert Witnesses:

65. Professor Judith Chevalier (live): Professor Judith Chevalier, William S. Beinecke, Professor of Economics and Finance at Yale University, testified on behalf of Google as an expert in econometrics and industrial organization, with a particular interest in "the economic effects of new technologies." 9/25/24 AM Tr. 11:12-23, 12:9-14 (Chevalier). Professor Chevalier was

previously an assistant professor in the Harvard University Department of Economics and a professor at the University of Chicago Graduate School of Business. DTX-2535. Professor Chevalier is also a Research Associate at the National Bureau of Economic Research. DTX-2535. Professor Chevalier testified about her opinions regarding "Professor Simcoe's conclusion that there was an overcharge in AdX due to Google's anticompetitive conduct." 9/25/24 AM Tr. 12:18-13:3 (Chevalier).

66. Dr. Mark Israel (live): Dr. Mark Israel is currently President of Compass Lexecon, where he has been doing various forms of competition economics antitrust work since 2008. 9/26/24 AM Tr. 34:24-35:14 (Israel). Dr. Israel testified on behalf of Google as an expert in economics and industrial organization, *id.* at 36:12-21 (Israel), and testified about his conclusions relating to market definition, market power, and Google's conduct and its effects on competition, *id.* at 37:13-38:18, 157:21-158:18 (Israel). Dr. Israel received his Ph.D. in economics from Stanford University, as well as his masters and undergraduate degrees in economics. *Id.* at 34:24-35:14 (Israel). After receiving his Ph.D., Dr. Israel taught economics and business strategy at the Kellogg School of Management at Northwestern University for eight years. *Id.* at 34:24-35:14 (Israel). While there, he gained experience doing applied competition antitrust work. *Id.* at 34:24-35:14 (Israel). Dr. Israel has been engaged as a consulting expert in the areas of economics or competition economics over 100 times, including on behalf of the Federal Trade Commission. *Id.* at 35:15-18, 36:2-11 (Israel); DTX-2537. He has published over 25 publications in academic journals, primarily in competition economics. 9/26/24 AM Tr. 35:19-36:1 (Israel); DTX-2537.

67. Professor Paul Milgrom (live): Professor Paul Milgrom, Professor of Economics at Stanford University and Nobel Laureate, testified on behalf of Google as an expert in economic theory, auctions, and market design. 9/24/24 AM Tr. 16:25-20:19 (Milgrom); DTX-2536.

Professor Milgrom presented his conclusions regarding "the economic effects of Google's online display advertising auction practices." 9/24/24 AM Tr. 23:8-13 (Milgrom).

67.1. Professor Milgrom is one of the founders of the field of market design. 9/24/24 AM Tr. 18:17-19:2 (Milgrom). In 2020, he received a Nobel Prize in economics for improvements to auction theory and invention of new auction methods. *Id.* at 20:7-13 (Milgrom). His work has been cited over a hundred thousand times, including by Plaintiffs' expert witnesses Professors Ravi and Weintraub. *Id.* at 19:11-23 (Milgrom).

67.2. In addition to his academic work, Professor Milgrom also founded Auctionomics, a company that provides consulting and software in connection with high-stakes auctions. 9/24/24 AM Tr. 21:11-17 (Milgrom). Through Auctionomics, Professor Milgrom has advised Google's display advertising competitors, including Yahoo and OpenX, about market design relating to display advertising. Professor Milgrom co-invented OpenX's patented auction design. *Id.* at 21:24-22:12 (Milgrom). Professor Milgrom has also provided advice on market design and auction theory to public sector clients across the world. From 2011 to 2016, the Federal Communications Commission hired Professor Milgrom to lead the design work on "the most complicated auction project in history"—facilitating $30 billion of transactions to buy television broadcast rights, reorganize them into a smaller number of channels, and sell the cleared spectrum to mobile broadband companies. *Id.* at 22:13-23:7 (Milgrom).

VIII. Plaintiffs' Expert Witnesses:

68. Dr. Rosa Abrantes-Metz (live): Dr. Abrantes-Metz, managing director at Berkeley Research Group, testified on behalf of Plaintiffs as an expert in industrial organization. 9/16/24 PM Tr. 114:3-115:6; PTX-1781. She conceded that she is not an expert in digital advertising. 9/18/24 AM Tr. 68:6-8 (Abrantes-Metz). Dr. Abrantes-Metz testified to her opinions regarding the effects of Google's conduct on competition. 9/16/24 PM Tr. 115:14-21 (Abrantes-Metz).

68.1. Methodology: Dr. Abrantes-Metz's methodology to reach her opinions was to review documents, including "other evidence" that she "read outside of the discovery record." 9/18/24 AM Tr. 68:18-69:1 (Abrantes-Metz). As she admitted, she is not claiming any "additional expertise as an economist in reviewing documents accurately." *Id.* at 113:4-8 (Abrantes-Metz).

68.2. "With a few exceptions," Dr. Abrantes-Metz did not conduct any independent quantitative analysis. In particular, she made no attempt to quantify any adverse effects on advertisers or publishers. 9/16/24 PM Tr. 118:14-25 (Abrantes-Metz); 9/18/24 AM Tr. 73:11-14 (Abrantes-Metz); *id.* at 73:24-74:3 (Abrantes-Metz). Dr. Abrantes-Metz justified her failure to conduct an independent analysis on the basis that "there's plenty of evidence." *Id.* at 73:15-20 (Abrantes-Metz). But, even when reviewing other evidence, Dr. Abrantes-Metz did not conduct any inquiry into the analyses or the bases for others' results. For example, she cited results of what was referred to as "Goodman's model" in an email and called them a "forecast" of effects of Google's conduct, but on cross examination Dr. Abrantes-Metz admitted she did not know what "Goodman's model" was. 9/18/24 AM Tr. 111:20-113:8;

see DTX-85. As Dr. Abrantes-Metz herself volunteered: "I take the documents as they are." 9/18/24 AM Tr. 113:4-8 (Abrantes-Metz).

68.3. How Products Work: Dr. Abrantes-Metz misunderstood how the technologies at issue in this case work, but she nevertheless opined on their effects on competition. For example, Plaintiffs' own computer science expert, and other witnesses and documents at trial, all established that the Unified Pricing Rules required the same floor to be set for all exchanges, including AdX. 9/11/24 AM Tr. 131:2-7 (Ravi); 9/24/24 PM Tr. 19:18-22 (Milgrom); 9/23/24 AM Tr. 102:2-4, 113:1-11 (Korula); DTX-701 at 26 (Presentation on "The Unified Auction" at a Google Top Partners event, April 18th, 2019). Only Dr. Abrantes-Metz testified that, based on her review of "documents," she understood the Unified Pricing Rules to permit publishers to set lower price floors only for AdX. 9/18/24 AM Tr. 122:20-123:2 (Abrantes-Metz) ("My understanding of UPR is that it forbids publishers from flooring AdX higher within DFP, not to floor AdX lower.").

69. Professor Robin Lee (live): Professor Lee, professor of economics at Harvard University, testified on behalf of Plaintiffs as an expert in economics and industrial organization. 9/19/24 PM Tr. 43:7-15 (Lee). Professor Lee's CV does not show any prior experience analyzing competition within the display advertising industry. PTX-1778. Professor Lee testified to his opinions regarding the markets alleged by Plaintiffs, "the extent of Google's market power in these markets," and harm to competition. 9/19/24 PM Tr. at 44:22-45:9 (Lee).

69.1. Market Definition: Professor Lee concluded that three markets for ad tech tools for "open-web display advertising" are proper markets, but he admitted

he did not "recall hearing those four words in that order" prior to his work on this case. 9/19/24 PM Tr. 51:22-52:2 (Lee). Nor does Professor Lee recall seeing any Google or third-party documents that analyze market shares based on those four words in that order. 9/20/24 AM Tr. 69:15-70:9 (Lee). Similarly, although Professor Lee concluded that a market for "advertiser ad networks" is a proper market, he does "not recall hearing those three words in that order prior to this case." *Id.* at 137:12-15 (Lee).

69.2. Omission of Header Bidding from Market Definition: Professor Lee testified that header bidding has "made it easier to multi-home across exchanges," which can in turn "intensify competition" "among exchanges participating in header bidding." 9/20/24 AM Tr. 10:25-11:13 (Lee). He also agreed that Google's "nightmare scenario"—that publishers could use header bidding to connect large demand sources like Amazon—had already come to pass. *Id.* at 8:25-10:14, 13:11-20 (Lee). Yet, just minutes after this testimony, Professor Lee refused to "agree that header bidding has caused vibrant competition amongst ad exchanges." *Id.* at 12:11-13 (Lee).

69.3. Professor Lee also acknowledged that header bidding impacts competition among "advertiser ad networks," ad exchanges, and publisher ad servers, testifying that header bidding is "used to facilitate real-time competition among ad exchanges and demand sources" and "could pose a threat to DFP's market power." 9/20/24 AM Tr. 25:25-27:15 (Lee). Again, minutes later, he nonetheless refused to agree that header bidding is "a competitive threat" in the ad exchange or publisher ad server market. *Id.* at 27:10-24 (Lee).

69.4. Market Power: Professor Lee testified on direct examination that Google has possessed "substantial" market power "likely since at least 2015." 9/19/24 PM Tr. 45:24-46:5 (Lee). On cross examination, he clarified that he is not providing an opinion as to whether Google possessed market power in any relevant market before 2015. In fact, he was unable to "draw a line" as to a precise date in or after 2015 when Google did acquire market power. 9/20/24 AM Tr. 90:6-92:3 (Lee). Despite these admissions, in Professor Lee's presentation to the Court, he relied upon pre-2015 documents as direct evidence of Google's market power. *E.g.*, PTX-188 (2014 Google presentation titled "Ads Platform Pricing Review"); 9/19/24 PM Tr. 82:15-84:16 (Lee) (discussing PTX-188); PTX-1808A (2014 Google document regarding Google Ads margin); 9/19/24 PM Tr. 108:13-109:25 (Lee) (discussing PTX-1808A).

69.5. Market Share: Professor Lee testified that he has defined markets for tools, not markets for the underlying transactions. 9/19/24 PM Tr. 52:3-11 (Lee); 9/20/24 AM Tr. 31:16-32:7 (Lee). As he agrees, the tools in his markets transact both "open-web display ads" and non-"open-web display ads." 9/19/24 PM Tr. 62:20-24 (Lee); 9/20/24 AM Tr. 63:11-66:5 (Lee). However, when Professor Lee calculated market shares for Google's tools, his calculations included only a subset of the transactions, "open-web display ad" transactions, facilitated by each tool. 9/19/24 PM Tr. 71:17-25, 90:14-91:2, 119:15-20 (Lee).

69.6. Professor Lee attempted to explain this inconsistency using an analogy to gas stations: according to Professor Lee, to measure a gas station's market share, an economist would not include revenues generated from sales of chips. 9/19/24 PM Tr. 63:22-64:3, 72:1-17 (Lee). But "open-web display ads" and other ads are not the same as chips and gas. Chips are not reasonable substitutes for gas. By even Professor Lee's own admission, "open-web display ads" have "some degree of substitution" and "competition for advertiser spending" with non-"open-web display ads." 9/20/24 AM Tr. 33:12-34:5 (Lee). None of Plaintiffs' expert witnesses, including Professor Lee, performed any quantitative analysis of substitution between ad tech for "open-web display ads" and other ad tech. 9/20/24 AM Tr. 94:18-95:9 (Lee).

69.7. Barriers to Entry: Professor Lee testified that even Meta and Amazon face "significant entry barriers if they want to build a publisher ad server." 9/20/24 AM Tr. 14:10-16 (Lee); 9/20/24 PM Tr. 22:5-15 (Lee). Demonstrating the absurdity of Professor Lee's statement, Meta made $50 billion in display advertising revenue in the United States in 2022, and Amazon $8.3 billion. DTX-1925 (Lee Figure 112: U.S. Meta Display Ad Revenue, 2008-2022); DTX-1926 (Lee Figure 113: U.S. Amazon Display Ad Revenue, 2008-2022).

69.8. Supracompetitive Pricing: Defending his use of the term "quality-adjusted prices" throughout his expert report, Professor Lee testified that he is "considering quality in all" of his pricing analyses. 9/20/24 AM Tr. 100:23-103:12 (Lee). But he conducted no quality-adjusted pricing analyses. All of his price comparisons are based only on nominal fees. *Id.* at 100:19-103:12

(Lee) ("there's no such thing as a quality-adjusted price"); *see also id.* at 105:4-16 (Lee).

69.9. Charts About Exchange Win Rates: Professor Lee was aware that charts he presented to the Court understate the number of auctions won by AdX's competitor exchanges. As Professor Lee acknowledged on cross examination, some of his charts rely on Google Ad Manager data that does not reliably report whether a header bidding exchange won an auction and, if one did, which header bidding exchange won. 9/20/24 AM Tr. 117:7-118:13 (Lee). Professor Lee excluded auctions with uncertain information from his analysis, thereby excluding auctions that header bidding exchanges won. *Id.* at 119:9-123:1 (Lee).

70. Professor Ramamoorthi Ravi (live): Professor Ravi is a professor of operations research and computer science at Carnegie Mellon University. He testified for Plaintiffs as an expert in the field of discrete optimization, which is an area of computer science relating to "optimal allocation" of a discrete number of resources. 9/11/24 AM Tr. 91:10-92:12 (Ravi); PTX-1780. Professor Ravi also has expertise in aspects of digital advertising. He has "designed and taught courses that involve aspects of digital advertising and marketing to graduate students for over a decade"; "written or co-written many papers that talk about" his "research in digital advertising"; and consulted for competitors to Google like Microsoft and InMobi. 9/11/24 PM Tr. 4:16-5:14 (Ravi); PTX-1780. Professor Ravi concluded that "first look," "last look," Project Poirot, and the Unified Pricing Rules "were not implemented in an optimal way to sell these impressions on behalf of Google's customers" and "disadvantaged" Google's competitors. 9/11/24 AM Tr. 93:18-94:9 (Ravi).

70.1. Professor Ravi opined on the effects of the conduct at issue, but he conceded that there were "a lot of changes going on" in Google's products, and that he had not looked at all of them. 9/11/24 PM Tr. 59:3-10 (Ravi). Instead of starting from Google's system and determining what practices to analyze, Professor Ravi started by examining Plaintiffs' complaint and selected the practices to analyze only from what was identified in the complaint. *Id.* at 60:9-16 (Ravi).

70.2. In assessing the effects of Google's conduct, Professor Ravi did not perform any quantitative work. 9/11/24 PM Tr. 19:3-6 (Ravi).

70.3. Professor Ravi also acknowledged during his cross examination—for the first time—that he agreed that Google's acts had effects that helped Google's advertiser customers, publisher customers, and the display advertising ecosystem. *E.g.*, 9/11/24 PM Tr. 41:10-23, 50:11-15, 53:17-20, 84:20-23 (Ravi).

71. Professor Timothy Simcoe (live): Professor Timothy Simcoe, professor at the Boston University Questrom School of Business, testified as Plaintiffs' expert in econometrics and industrial organization. 9/18/24 PM Tr. 4:24-6:9 (Simcoe). Professor Simcoe did not purport to be an expert in display advertising, nor does his CV demonstrate any notable industry, academic, or consulting experience in display advertising. PTX-1782. Professor Simcoe testified to his opinion that Google "overcharged its customers for AdX." 9/18/24 PM Tr. 7:13-21 (Simcoe).

71.1. Methodology: Professor Simcoe's opinions are based on review of only 53 Google-produced documents—out of the more than 6 million produced in this

case—that were selected by Plaintiffs' counsel. 9/18/24 PM Tr. 40:17-42:22 (Simcoe) ("The way I think of it is these are sufficient.").

71.2. Professor Simcoe conducted his apportionment analysis based on "6 millionths of 1 percent" of available data. According to Professor Simcoe, "6 millionths of 1 percent was sufficient." 9/19/24 AM Tr. 83:23-84:19 (Simcoe).

71.3. Professor Simcoe performed two different studies to evaluate AdX's take rate: an event study analysis and a comparables analysis. On direct examination, he testified that he performed "a comparables analysis in this case after" he had already performed his event study analysis. 9/18/24 PM Tr. 28:24-29:13 (Simcoe). But on cross examination, he first testified that he ran both analyses "simultaneously," before finally admitting, when pressed: "I think I knew the weighted averages for the comparables before I had the final results of the event study." 9/19/24 AM Tr. 52:20-53:5 (Simcoe). In other words, contrary to his testimony on direct examination, Professor Simcoe admitted he already knew the results of his comparison of AdX's pricing to its competitors' before he finalized the results of his event study analysis.

71.4. Incorrect Citations to Evidence: In his report, Professor Simcoe cited an internal Google email exchange to support his opinion that the shift to a first-price auction would have little impact on Google's impressions won. *See* PTX-695. In his report, Professor Simcoe described the email as dated September 2019 and thus a contemporaneous report of what Google believed to be the effects of its shift to the Unified First Price Auction. In reality, as

Professor Simcoe was forced to acknowledge on cross examination, the email is dated September 2018—at least a year before Google implemented the Unified First Price Auction and therefore not contemporaneous with the September 2019 changes. 9/19/24 AM Tr. 61:9-63:9, 108:19-25 (Simcoe); *see* PTX-695.

71.5. Professor Simcoe cited a Google document as evidence that the removal of "last look" "led to a lower win rate for AdX." 9/19/24 AM Tr. 55:15-56:8 (Simcoe). As Professor Simcoe admitted, "last look" was removed at the same time that Google transitioned to a first-price auction. *Id.* at 53:22-25, 56:21-24 (Simcoe). On cross examination, Professor Simcoe was directed to an asterisked note at the bottom of the cited document stating that the document estimated only the impact of removing "last look" in a second-price auction. 9/19/24 AM Tr. 56:9-20 (Simcoe); *see* PTX-1035 at -359 (2019 Google Presentation titled "Changes to AdManager, AdMob auction").

71.6. Elsewhere in his report, Professor Simcoe also cited a document as evidence that the Unified Pricing Rules led to an increase in AdX impressions of 6.48 percent and total revenue of 4.25 percent. When presented with the cited document, Professor Simcoe could not find numbers supporting this claim. 9/19/24 AM Tr. 77:17-78:21 (Simcoe).

71.7. Adjustment for Quality: According to Professor Simcoe, his research "sits at the intersection of innovation and economics and industrial organization," so he studies "how economic policy affects the way that firms compete, including through innovation." 9/18/24 PM Tr. 5:14-20 (Simcoe). Despite

his own professional focus on innovation, Professor Simcoe's comparables study comparing AdX's prices to other exchanges' did not evaluate any of the quality factors that affect exchanges. 9/19/24 AM Tr. 37:24-38:14 (Simcoe).

71.8. Definition of "Display Ads": Professor Simcoe's definition of "display ads" in his report was at odds with the definition that Plaintiffs' lead market definition expert, Professor Lee, presented. In a section titled "Display Advertising Basics," Professor Simcoe defined "display ads" to include ads that appear on "websites, mobile apps, and social media" in formats including native and video. 9/18/24 PM Tr. 47:10-49:14 (Simcoe). Notwithstanding his own definition of "display ads," Professor Simcoe's analyses were based on "open-web display impressions" only, which by his own admission "does exclude many of the types of ads that you read." *Id.* at 50:1-51:5 (Simcoe) (agreeing that he excluded "some of the formats that you described from the basic section of my report").

71.9. Similarly, Professor Simcoe listed Amazon as an example of an ad exchange in his report, but excluded Amazon from his comparisons of ad exchange pricing. 9/19/24 AM Tr. 35:10-36:5 (Simcoe); *see also id.* at 36:25-37:6 (Simcoe) (admitting that he also listed TripleLift, Kargo, GumGum, MediaNet, Sonobi, BidSwitch, Taboola, SpotX, EMX, and Freewheel as examples of exchanges, but excluded them from his comparables analysis).

71.10. Pricing Across the Full Stack: In arriving at his conclusion that Google's price was too high, Professor Simcoe testified that he would not analyze the price across the full ad tech stack—even though that is the cost that is borne by

publishers and advertisers to facilitate an ad. 9/18/24 PM Tr. 43:23-44:9 (Simcoe). Yet, when Professor Simcoe presented to the Court an analysis of the "apportionment of the harm" of AdX's overcharge, he did analyze the full stack, recognizing that AdX's price is divided "between AdX's customers, publishers and advertisers." 9/18/24 PM Tr. 10:8-12 (Simcoe).

71.11. Professor Simcoe claimed that analyzing the price across the entire ad tech stack was like "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." 9/18/24 PM Tr. 44:22-45:7 (Simcoe). On cross examination, Professor Simcoe admitted that combining the prices of two unrelated products is not a good analogy for analyzing prices across the integrated stack because prices charged across an integrated stack make up one single transaction, whereas "you don't need an apple to eat an orange." *Id.* at 45:5-7 (Simcoe).

71.12. Google Ads Customers Multi-Homing: Professor Simcoe presented an analysis of a but-for world in which there "is no exclusivity between Google Ads" and AdX, concluding that without this "tie" advertisers on Google Ads could "multi-home." 9/18/24 PM Tr. 8:4-14 (Simcoe); 9/19/24 AM Tr. 18:6-13 (Simcoe). As Professor Simcoe acknowledged, his analysis assumed that Google Ads advertisers do not multi-home "with some very minor exceptions." 9/19/24 AM Tr. 20:2-11 (Simcoe). On cross examination, Professor Simcoe admitted that his assumption is not based on "any study of how advertisers actually multi-home." Professor Simcoe had not even "tried

to measure the extent of multi-homing by various advertisers." *Id.* at 19:1-6 (Simcoe). Nor had he ever personally used Google Ads. *Id.* at 18:21-25 (Simcoe).

71.13. When pressed on his assumption, Professor Simcoe continued to maintain that Google Ads advertisers "can't multi-home" "when they're using Google Ads." 9/19/24 AM Tr. at 20:12-22 (Simcoe). Professor Simcoe was confronted with data demonstrating that large companies that purchase advertising do in fact multi-home on Google Ads and other third-party buying tools. DTX-1970A. Though he resisted acknowledging data that contradicted his assumption, Professor Simcoe finally agreed that "large companies that buy ads" using Google Ads can and do multi-home. 9/19/24 AM Tr. 23:15-24:18 (Simcoe) ("Q. So to the extent there's multi-homing between Google Ads' advertisers and third-party buying tools, it's not limited just to very small companies; correct? A. So what I was trying to explain is that— The Court. No. Wait. I'm sorry. That question is very direct. It's not—the question is whether or not the buying that you're seeing here is coming from large companies. All right. It's either yes or no that the companies are large or they're not large in your view. The Witness: Yes. These are large companies that buy ads.").

71.14. Strategic Complementarity: Professor Simcoe testified on direct examination that his estimates of Google's overcharge are conservative because of the theory of "strategic complementarity": "when one firm raises its price, so do the others." 9/18/24 PM Tr. 31:12-32:4 (Simcoe). On cross examination,

Professor Simcoe admitted he had done no quantitative analysis of strategic complementarity and had not tried to "measure the strength of the strategic complementarities." 9/19/24 AM Tr. 112:16-113:3 (Simcoe). If anything, Professor Simcoe's own analyses contradict his theory that other ad tech providers would raise their prices because Google's price is purportedly high. According to a graph he created, one "particularly large" non-AdX exchange with "many, many more impressions" than others has continued to charge a price "well below" Google's. *Id.* at 93:5-16 (Simcoe).

72. Professor Gabriel Weintraub: Professor Gabriel Weintraub, professor at the Stanford Graduate School of Business, testified on behalf of Plaintiffs as an expert in operations, data science, and market design with a focus on digital platforms. 9/16/24 PM Tr. 6:5-11 (Weintraub); PTX-1779. Professor Weintraub was chief economist to AppNexus, an ad tech company, for two years, and has taught courses on online marketplaces for the Stanford Graduate School of Business and Columbia Business School. 9/16/24 PM Tr. 5:12-24 (Weintraub); PTX-1779 at 5. Professor Weintraub testified to his opinions relating to "the impact of Google's conducts, if any, on market participants with a particular emphasis on estimating, quantifying the impact on rival scale." 9/16/24 PM Tr. 6:13-18 (Weintraub).

72.1. Effects of Scale: On direct examination, Professor Weintraub presented an analysis he performed regarding the time required for different ad exchanges to run experiments. 9/16/24 PM Tr. 14:7-15:16 (Weintraub). The data he presented were not based on "an experiment that Google actually ran." *Id.* at 58:4-9 (Weintraub). The Court stated regarding this analysis: "The problem is that it's not based on a specific experiment that was done; it's a

conglomerate of them. And I think that gives it less reliability." *Id.* at 108:12-15 (Weintraub).

72.2. Effects of Google's Conduct: To calculate the effects of Google's conduct on rival exchanges, Professor Weintraub performed two different analyses based on different assumptions. 9/16/24 PM Tr. 30:8-20 (Weintraub). On cross examination, Professor Weintraub admitted that he had presented only the analysis that returned larger numbers for the effects of Google's conduct, and had not shown in his demonstratives or testified about the other analysis at all. *Id.* at 66:10-20 (Weintraub). The two analyses returned significantly different numbers—for effects of "last look," for example, 14.25 percent as opposed to 2.25 percent. *Id.* at 68:4-8 (Weintraub).

72.3. Professor Weintraub attempted to harmonize the disparate results returned by his two analyses by testifying that, in his expert report, he had stated that 14.25 percent, not 2.25 percent, was the "right" estimate of the effects of "last look." 9/16/24 PM Tr. 68:16-21 (Weintraub). However, his report actually stated that there are reasons to believe any gains to AdX from "last look" "primarily" come at the expense of rival exchanges, not that 14.25 percent is correct. *Id.* at 69:20-70:2.

72.4. Display Advertising Ecosystem: During cross-examination, Professor Weintraub was presented with a figure from his expert report, which he had described in his report as follows: "I provide a simplified illustration of the buy-side and sell-side of the ad tech ecosystem in Figure 1 that follows." 9/16/24 PM Tr. 110:21-24 (Weintraub); *see* Weintraub DX 1. When asked if

he "created" this chart, Professor Weintraub testified that he did not "personally" create it and did not remember "the details of the entire process on how" the chart came to be included in his report. *Id.* at 111:12-112:3 (Weintraub).

IX. Google Witness Testimony Concerning Plaintiffs' Motion for Adverse Inference

73. Before trial, Plaintiffs filed a motion seeking an adverse inference that they characterized as seeking relief on the basis of allegedly "spoliated chats." ECF No. 1116 at 3. The next section describes testimony relevant to the allegations in Plaintiffs' motion, which encompassed multiple topics in addition to allegedly "spoliated chats."

74. Beginning in November 2019, Google issued legal holds to employees following its receipt of a Civil Investigative Demand from the United States Department of Justice. ECF No. 1169, Appendix A. When Google employees received legal holds in connection with this matter, they were instructed to save all substantive conversations relating to the topic of the legal hold. 9/11/24 AM Tr. 89:14-17 (Bender). Google produced in camera to the Court the legal holds issued to the current and former Google employees that testified in this case. The Court observed after reviewing the legal holds: "I do agree that the amount of detail that's in those holds—first of all, I can assure the government, they were very thorough. **They said everything, everything, everything needs to be turned over.**" 9/12/24 PM Tr. 174:25-175: 15.

75. One form of communication that some Google employees used for their work was a Google Chat tool. 9/18/24 AM Tr. 25:13-18 (Spencer). Chat conversations could be either "history on" or "history off." *Id.* at 25:20-25 (Spencer). If the Chat setting was "history on," the conversation would be preserved for 30 days. ECF No. 1203-8, 1203-9. If the Chat setting was "history off," the Chat would be deleted after 24 hours. 9/18/24 AM Tr. 26:1-3 (Spencer); *see also*

ECF No. 1203-8, 1203-9. When Google employees received legal holds in connection with this litigation, they were instructed to save all substantive Chat conversations by making "sure the settings preserve the messages," such as "switching to history on for chat." 9/13/24 AM Tr. 120:16-21 (LaSala); *see also* 9/11/24 AM Tr. 89:14-17 (Bender) (litigation hold "said if you engage in substantive conversation, then you should save" the chat).

76. As established by the testimony of multiple Google witnesses at trial, most Google employees did not use Chat conversations for substantive discussion.

76.1. Bender: "In general, I wasn't engaging in substantive conversations over chat. And so the way I would use chat, because we were geographically dispersed, it's more like bumping into someone in the hall and saying, hey, we should talk." 9/11/24 AM Tr. 89:2-13 (Bender).

76.2. LaSala: "I used chat more for hallway-like conversations. Like, I used it as an environment where—an environment where we would sort of exchange ideas, and you know, shoot the, you know, so-to-speak." 9/13/24 AM Tr. 129:185-130:21 (LaSala). "Chat was, like, mostly quick hit sort of things." *Id.* at 130:5-17 (LaSala).

76.3. Jayaram: Acknowledging that there may have been "some substantive chats," Jayaram testified that his "regular use of chats was for logistical purposes," such as "coordinating with the teams and so on and so forth." 9/17/24 AM Tr. 102:16-103:9 (Jayaram).

76.4. Spencer: "My general practice was not to use chats for substantive conversations." 9/18/24 AM Tr. 26:23-27:5 (Spencer).

76.5. Pappu: "Chat was more chitchat," and "ad hoc chats . . . are informal kind of not super relevant in some sense." 9/18/24 AM 204:13-205:16 (Pappu).

77. To the extent that Google employees did regularly use Chat conversations to discuss substantive topics, they tried in good faith to follow Google's instructions to turn history on for substantive conversations.

77.1. Korula: "Q. And this chat includes discussion of substantive issues, not merely something like scheduling a meeting; correct? A. That's right. Q. You actually turned history on; is that right? A. In this chat? Q. In general. A. Oh. Generally speaking, I have done, particularly after receiving a litigation hold notice." 9/23/24 AM Tr. 136:6-14 (Korula).

77.2. LaSala: "I tried my hardest" to turn history on for substantive Chat conversations after receiving a legal hold. 9/13/24 AM Tr. 139:20-140:4 (LaSala).

78. Google witnesses confirmed that, consistent with Google's legal hold instructions to preserve all documents, they did not act with intent to deprive Plaintiffs, or anyone else, of substantive information.

78.1. Bender: When asked about a 2016 Chat conversation that long predated any legal hold or obligation to preserve in this case, Bender testified that he had no intent "to keep the subject of the chat away from regulatory scrutiny or investigative discovery." 9/11/24 AM Tr. 70:23-71:2 (Bender).

78.2. Srinivasan: Srinivasan testified that "the intent behind" him reminding other Google employees about Google's Communicate With Care policy was to

"make sure we frame our intent accurately."[3] 9/12/24 AM Tr. 152:2-8 (Srinivasan). Internal Google documents about the Communicate with Care policy state the same goal. *E.g.*, PTX-850 at -663 ("To help ensure that what we write accurately reflects our intent, here are a few quick guidelines."); PTX-1777 at -850 ("This is not about 'hiding stuff' or not pointing out something that may need fixing. Speaking up is a core company value.").

78.3. LaSala: LaSala admitted that, in "unusual" instances, he may have made a mistake and not turned history on for a substantive Chat conversation after receiving a legal hold because he was trying to "do things in a way that were different than how I had done them for a decade." 9/13/24 AM Tr. 138:2-140:4 (LaSala). But he "tried [his] hardest not to" make any mistakes: "To the extent I made a mistake a couple times, it was not intentional. It was not to hide anything. It was to—everything was written down everywhere." *Id.* at 139:10-19 (LaSala).

79. To the extent that any Google employees made a mistake and did not comply with legal hold instructions to turn history on for a substantive Chat conversation, the substance of that Chat conversation would very likely have been memorialized in a different document or communication that would have been preserved.

[3] Plaintiffs asked two witnesses whether they were ever told that disciplinary action could be taken if they did not follow Communicate with Care guidelines. Both repeatedly testified they could not recall receiving such an instruction. 9/12/24 AM Tr. 104:14-17 (Srinivasan); 9/23/24 AM Tr. 167:11-14, 168:14-169:20 (Korula)

79.1. Bender: "It's possible that" Bender used a Chat conversation for a substantive purpose, but "likely we would have moved those to another form factor, such as a meeting, a document or an email." 9/11/24 AM Tr. 31:12-16 (Bender).

79.2. LaSala: Compared to Chat, which was "mostly quick hit sort of things," "email was like reasonably well thought out still could be wonky, sloppy. And then documentation would be the most thoroughly constructed." 9/13/24 AM Tr. 129:15-130:21 (LaSala). As the Court confirmed, documentation referred to "a standalone document," "like a slide deck or a Word document." *Id.* 130:5-17 (LaSala); *see also id.* at 131:7-21 (LaSala) (the Court noting that LaSala testified at his deposition that "the more structured I thought something needed to be, I would drop it into an email or document").

79.3. LaSala also testified: "We documented—I think it's proved by all of this—every decision that we made. The lead-up debating to the decision, the actual decision, the implementation plan with the decision. **The one thing I do know is that we were really good at documenting and debating.**" 9/13/24 AM Tr. 138:2-139:19 (LaSala). As he continued: "**Everything was written down everywhere.**" *Id.* (LaSala).

80. Google employees received "Communicate with Care" training, and none of the Google witnesses who testified at trial recall being told in the course of that training that they should label sensitive information as "privileged and confidential."

80.1. Bender: Bender, when asked whether "the instructions you got through Communicate With Care was to mark things as confidential and privileged for sensitive topics," responded: "As far as I recall, it would have been largely

in two buckets. One is if you have a question for a lawyer, you would try to ensure that the appropriate lawyer was on the email, and insofar as that was legal kind of communication, that would be privileged. There were other cases when there was work product that was directed by the legal team, and that would be another case where I think attorney/client privilege would have been warranted." 9/11/24 AM Tr. 78:14-25 (Bender).

80.2. Mohan: Mohan generally labeled communications as privileged only if "there might be a question that might come up that might be a legal related question or what have you." 9/16/24 AM Tr. 122:16-123:4 (Mohan).

80.3. Jayaram: Jayaram denied receiving training that he should "copy lawyers on sensitive business communications and write privileged and confidential." 9/17/24 AM Tr. 100:4-100:22 (Jayaram) ("No, that's not how I remember the training.").

80.4. Bellack: Bellack labeled an email forwarding a news article to a lawyer as privileged and confidential because he "wanted Sara" (the lawyer) "to be aware of this article." 9/19/24 AM Tr. 128:10-129:7 (Bellack). Bellack copied a lawyer into another email because he "wanted Ted's" (the lawyer's) "point of view on this discussion because it was discussing pricing which relates to contracts, and, therefore, might have had a legal implication." *Id.* at 129:25-130:22 (Bellack). As Bellack explained, he "had worked with Ted for a long time by now. I think saying 'bringing Ted into this for the legal POV' was a shorthand way of saying, hey, Ted, what do you think about this email?" *Id.* (Bellack).

81. Google employees were aware that they played no role in deciding whether documents they labeled "privileged and confidential" would be withheld from production in an investigation or litigation; nor did they change their practices regarding use of the "privilege and confidential" label after receiving a litigation hold.

81.1. Korula: "Q. When you received a litigation hold in this matter, did you change your practices with respect to attorney/client privilege? A. No, I don't believe that I did. Q. Did you ever mark a document or communication attorney/client privilege in order to keep that document from being used in litigation against Google? A. I did not. And it's my understanding that my marking such a document wouldn't affect whether it was disclosed or not." 9/23/24 AM 176:11-20 (Korula).

81.2. Jayaram: "Q. Now, Mr. Jayaram, do you have anything to do with what remains redacted, what is actually withheld on the basis of privilege versus what's produced? A. No. Q. Again, are you an engineer? Yes." 9/17/24 PM Tr. 43:15-20 (Jayaram).

82. Consistent with the nature of privilege determinations, Google attorneys assessed whether each document was privileged based on applicable legal standards for what constitutes an attorney-client communication or attorney work product—not based on whether a non-lawyer had labeled a document as "privileged and confidential." As a result, Google produced to Plaintiffs numerous documents labeled by non-lawyers as "privileged and confidential," including a number of documents that were then introduced as exhibits at trial. *E.g.*, DTX-184, DTX-549, PTX-699, DTX-829, PTX-715, PTX-719, PTX-734, PTX-784, PTX-791, PTX-815, PTX-819, PTX-864, PTX-884, PTX-929, PTX-1507.

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