UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

UNITED STATES OF AMERICA et al.,	)	
Plaintiffs,	)	
v.	)	**Case No. 20-cv-3010 (APM)**
GOOGLE LLC,	)	
Defendant.	)	
STATE OF COLORADO et al.,	)	
Plaintiffs,	)	
v.	)	**Case No. 20-cv-3715 (APM)**
GOOGLE LLC,	)	
Defendant.	)	

MEMORANDUM OPINION

TABLE OF CONTENTS

INTRODUCTION 1
PROCEDURAL HISTORY 5
FINDINGS OF FACT 7
I. PARTIES AND RELEVANT NONPARTIES 7
A. Parties 7
B. Key Third Parties 9
II. GENERAL SEARCH ENGINES 13
A. Overview 13
B. How a GSE Works (Greatly Simplified) 14
C. Types of Queries 16
D. Search Engine Results Page 19
E. The Expense of Developing and Maintaining a GSE 21
F. GSE Distribution 24
1. Default Distribution *24*
2. Other Search Access Points *31*
G. The Importance of Scale 34
H. Artificial Intelligence 39
I. User Data and Privacy 43
III. GOOGLE SEARCH 46
A. Product Development 46
B. Branding 47
C. Internal Quality Studies 48
IV. OTHER PLATFORMS 50
A. Special Vertical Providers 50
B. Social Media Platforms 55
V. THE DIGITAL ADVERTISING INDUSTRY 57
A. Search Advertisements 57
1. Search Ads on GSEs *59*
2. SVP Search Ads *67*
B. Display Ads 67
C. Social Media Ads 70
D. The Marketing Funnel 72
E. Shifting Spend 76

F. Text Ads Auctions (Also Greatly Simplified) 81
1. Pricing Knobs 83
2. Increasing Text Ads Prices 85
3. Limiting Advertiser Control 93
G. SA360 98
VI. THE RELEVANT CONTRACTS 101
A. Browser Agreements 101
1. The Google-Apple Internet Services Agreement 101
2. Mozilla-Google RSA 115
3. Other Browser Agreements 118
B. Android Agreements 118
1. Mobile Application Distribution Agreements 118
2. Revenue Share Agreements 123
3. Mobile Services Information Agreements 133
CONCLUSIONS OF LAW 134
I. LEGAL FRAMEWORK 134
II. MONOPOLY POWER: GENERAL SEARCH SERVICES 136
A. Principles of Market Definition 137
B. General Search Services is a Relevant Product Market. 140
1. Peculiar Characteristics and Uses 140
2. Industry or Public Recognition 144
3. Unique Production Facilities 146
4. Google's Proposed Query Product Market 147
C. Google Has Monopoly Power in the General Search Services Market. 152
1. Direct Evidence 154
2. Indirect Evidence – Market Share 156
3. Indirect Evidence – Barriers to Entry 157
4. Google's Counterarguments 161
III. MONOPOLY POWER: ADVERTISING MARKETS 165
A. Search Advertising Is a Relevant Market, But Google Does Not Have Monopoly Power in It. 166
1. Search Advertising Is a Relevant Product Market. 166
2. Google Does Not Have Monopoly Power in the Search Ads Market. 180
B. Google Has Monopoly Power in the General Search Text Ads Market. 185

1. General Search Text Ads Is a Relevant Product Market. *185*
2. Google Has Monopoly Power in the General Search Text Ads Market. *189*
C. The Evidence Does Not Support a Market for General Search Advertising. ... **191**
IV. EXCLUSIVE DEALING **197**
A. "Competition for the Contract" Is No Defense. **198**
B. The *Microsoft* Exclusive Dealing Framework Is Applicable. **203**
C. The Challenged Agreements Are Exclusive. **204**
1. Browser Agreements *204*
2. Android Agreements *210*
V. EFFECTS IN THE MARKET FOR GENERAL SEARCH SERVICES **214**
A. The Exclusive Agreements Cause Anticompetitive Effects in the General Search Services Market. **214**
1. The Exclusive Agreements Foreclose a Substantial Share of the Market. *216*
2. The Exclusive Agreements Have Deprived Rivals of Scale. *226*
3. The Exclusive Agreements Have Reduced Incentives to Invest and Innovate. *236*
B. The Exclusive Agreements Do Not Result in Procompetitive Benefits. **248**
1. Benefits in the Market for General Search Services *248*
2. Benefits in Other Markets that Redound to the Benefit of the Search Market *252*
3. Cross-Market Benefits *255*
VI. EFFECTS IN THE MARKET FOR GENERAL SEARCH TEXT ADVERTISING **258**
A. The Exclusive Agreements Foreclose a Substantial Share of the Market. **258**
B. The Exclusive Agreements Allow Google to Profitably Charge Supracompetitive Prices for Text Advertisements. **259**
C. The Exclusive Agreements Have Allowed Google to Degrade the Quality of its Text Advertisements. **263**
D. The Exclusive Agreements Have Capped Rivals' Advertising Revenue. **264**
VII. SA360 ..... **265**
A. The Sherman Act Imposes No Liability on Google for Its Refusal to Grant Feature Parity to Microsoft Ads on SA360. ..... **266**
B. Plaintiff States Have Not Proven that Google's SA360 Conduct Had Anticompetitive Effects. **271**
VIII. INTENT AND SANCTIONS **272**
A. The Court Need Not Make a Finding of Anticompetitive Intent. **274**
B. The Court Declines to Impose Sanctions. **275**
CONCLUSION **276**

INTRODUCTION

The general search engine has revolutionized how we live. Information that once took hours or days to acquire can now be found in an instant on the internet with the help of a general search engine. General search engines use powerful algorithms to create what seems like magic. Enter a search query, and the general search engine will retrieve, rank, and display the websites that provide the exact information the user seeks at that very moment. And it all happens in the blink of an eye.

General search engines make money by selling digital advertisements. Type the words "running shoes" into a general search engine, and sellers of running shoes will compete with one another in a split-second auction to place an advertisement on the results page, which if clicked takes the user directly to the seller's website. This is a highly effective way of reaching consumers. It is also an incredibly lucrative business. In 2021, advertisers spent more than $150 billion to reach users of general search engines.

For more than 15 years, one general search engine has stood above the rest: Google. The brand is synonymous with search. Once a scrappy start-up founded by two Stanford University students in a rented garage, Google is now one of the world's most valuable companies. Its parent company, Alphabet Inc., today has a market capitalization (the value of its outstanding shares of stock) of more than $2 trillion. Much of that value is due to Google's extremely profitable advertising business.

Google's dominance has gone unchallenged for well over a decade. In 2009, 80% of all search queries in the United States already went through Google. That number has only grown. By 2020, it was nearly 90%, and even higher on mobile devices at almost 95%. The second-place search engine, Microsoft's Bing, sees roughly 6% of all search queries—84% fewer than Google.

Google has not achieved market dominance by happenstance. It has hired thousands of highly skilled engineers, innovated consistently, and made shrewd business decisions. The result is the industry's highest quality search engine, which has earned Google the trust of hundreds of millions of daily users.

But Google also has a major, largely unseen advantage over its rivals: default distribution. Most users access a general search engine through a browser (like Apple's Safari) or a search widget that comes preloaded on a mobile device. Those search access points are preset with a "default" search engine. The default is extremely valuable real estate. Because many users simply stick to searching with the default, Google receives billions of queries every day through those access points. Google derives extraordinary volumes of user data from such searches. It then uses that information to improve search quality. Google so values such data that, absent a user-initiated change, it stores 18 months-worth of a user's search history and activity.

The distribution agreements benefit Google in another important way. More users mean more advertisers, and more advertisers mean more revenues. As queries on Google have grown, so too has the amount it earns in advertising dollars. In 2014, Google booked nearly $47 billion in advertising revenue. By 2021, that number had increased more than three-fold to over $146 billion. Bing, by comparison, generated only a fraction of that amount—less than $12 billion in 2022.

For years, Google has secured default placements through distribution contracts. It has entered into such agreements with browser developers, mobile device manufacturers, and wireless carriers. These partners agree to install Google as the search engine that is delivered to the user right out of the box at key search access points.

Google pays huge sums to secure these preloaded defaults. Usually, the amount is calculated as a percentage of the advertising revenue that Google generates from queries run through the default search access points. This is known as "revenue share." In 2021, those payments totaled more than $26 billion. That is nearly four times more than all of Google's other search-specific costs combined. In exchange for revenue share, Google not only receives default placement at the key search access points, but its partners also agree not to preload any other general search engine on the device. Thus, most devices in the United States come preloaded exclusively with Google. These distribution deals have forced Google's rivals to find other ways to reach users.

Google's dominance eventually attracted the attention of antitrust enforcers—the U.S. Department of Justice and nearly every state's Attorney General. They homed in on Google's distribution agreements and in late 2020 filed two separate lawsuits alleging that the agreements and certain other conduct violate Section 2 of the Sherman Act. According to their complaints, Google has unlawfully used the distribution agreements to thwart competition and maintain its monopoly in the market for general search services and in various online advertising markets.

The proceedings that followed have been remarkable. Discovery began in December 2020 and concluded in March 2023. Millions of pages exchanged hands, Google produced petabytes of data, and the parties deposed dozens of witnesses, including high-ranking executives at some of the world's largest technology companies. The court held a nine-week bench trial starting in September 2023. It heard from dozens of live witnesses, including multiple experts, and admitted over 3,500 exhibits. After receiving extensive post-trial submissions, the court held closing arguments over two days in early May 2024. The lawyering has been first rate throughout.

After having carefully considered and weighed the witness testimony and evidence, the court reaches the following conclusion: Google is a monopolist, and it has acted as one to maintain its monopoly. It has violated Section 2 of the Sherman Act.

Specifically, the court holds that (1) there are relevant product markets for general search services and general search text ads; (2) Google has monopoly power in those markets; (3) Google's distribution agreements are exclusive and have anticompetitive effects; and (4) Google has not offered valid procompetitive justifications for those agreements. Importantly, the court also finds that Google has exercised its monopoly power by charging supracompetitive prices for general search text ads. That conduct has allowed Google to earn monopoly profits.

Other determinations favor Google. The court holds that (1) there is a product market for search advertising but that Google lacks monopoly power in that market; (2) there is no product market for general search advertising; and (3) Google is not liable for its actions involving its advertising platform, SA360. The court also declines to sanction Google under Federal Rule of Civil Procedure 37(e) for its failure to preserve its employees' chat messages.

This decision is organized as follows. The court begins with a brief procedural history. It then sets forth findings of fact. They are followed by the court's conclusions of law regarding the challenged distribution agreements. The court first addresses market definition and monopoly power, then the exclusionary nature of the conduct (including the contracts' exclusivity), and finally the agreements' anticompetitive effects and Google's procompetitive justifications for them. A discussion of the SA360-related conduct follows. The opinion ends with brief sections on anticompetitive intent, as well as Plaintiffs' request for sanctions. The court has included as an Appendix a list of the names and titles of all witnesses whose testimony is cited in the decision.

PROCEDURAL HISTORY

On October 20, 2020, the U.S. Department of Justice, joined by 11 States ("U.S. Plaintiffs"), commenced *United States v. Google*, 20-cv-3010 (APM). *See* Compl., ECF No. 1. Pursuant to authority conferred by 15 U.S.C. § 4, U.S. Plaintiffs alleged that Google had violated Section 2 of the Sherman Act by unlawfully maintaining its monopoly in three product markets by entering into exclusive agreements to secure default distribution on nearly all desktop and mobile devices in the United States. *See generally* Am. Compl., ECF No. 94. The alleged markets are general search services, search advertising, and general search text advertising. *Id.* ¶¶ 88–107. U.S. Plaintiffs advanced three Section 2 claims, each corresponding to an alleged market. *Id.* ¶¶ 173–193. They sought a finding of liability, an injunction against the challenged conduct, and structural relief necessary to cure any resulting anticompetitive effects. *Id.* ¶ 194.

On December 17, 2020, 38 States ("Plaintiff States") joined together to bring *State of Colorado v. Google*, 20-cv-3715 (APM) [hereinafter *Colorado v. Google* Docket]. They filed suit pursuant to Section 16 of the Clayton Act, 15 U.S.C. § 26, in their sovereign or quasi-sovereign capacities as *parens patriae* on behalf of the citizens, general welfare, and economy of each of their states. The *Colorado* complaint adopted the allegations in the U.S. Plaintiffs' complaint but supplemented it in three ways. Compl., *Colorado v. Google* Docket, ECF No. 3 [hereinafter *Colorado* Compl.]. First, Plaintiff States alleged a third advertiser-side market for general search advertising but not one, as U.S. Plaintiffs had, for search advertising. *Id.* ¶¶ 56 n.3, 82–89. Second, they asserted exclusionary conduct by Google that targeted specialized vertical providers, or SVPs. *Id.* ¶¶ 168–189. Third, Plaintiff States claimed that Google had engaged in further exclusionary conduct by using its proprietary advertising platform, SA360, to harm competition

in all proposed markets. *Id.* ¶¶ 144–167. Plaintiff States similarly sought declaratory and injunctive relief. *Id.* ¶ 233.

On January 7, 2021, upon Plaintiff States' motion, the court consolidated the two cases for pretrial purposes, including discovery. Order, *Colorado v. Google* Docket, ECF No. 67. The court subsequently consolidated the cases for trial as well. *See* Status Conf. Tr., ECF No. 609, at 10–14. The parties also jointly asked to bifurcate the liability and remedies phases, and the court agreed to do so. *See* Order, ECF No. 264.

Discovery closed on February 23, 2023. Soon after, U.S. Plaintiffs moved for sanctions under Rule 37(e) for Google's failure to preserve relevant chat messages among its employees. Pls.' Mot. for Sanctions, ECF No. 512. The court deferred ruling on the motion pending the presentation of evidence relevant to that issue at trial. Order, ECF No. 610, at 2.

Google also moved for summary judgment in both cases. *See* ECF Nos. 451, 452. The court granted in part and denied in part Google's motions. It entered judgment for Google as to U.S. Plaintiffs' claims related to Android Compatibility Commitments and Anti-Fragmentation Agreements, Google's voice-activated assistant and other "Internet-of-Things" devices, and the Android Open-Source Project. *See United States v. Google LLC*, 687 F. Supp. 3d 48, 78–84, 85–87 (D.D.C. 2023). It also entered judgment in favor of Google on Plaintiff States' theory that Google's targeting of SVPs caused anticompetitive effects in the proposed markets. *Id.* at 78–83. The court permitted the remaining claims to proceed to trial.

Trial commenced on September 12, 2023. Both sides presented exhaustive evidence in support of their various claims and defenses. Dozens of witnesses, including numerous Google employees, third-party witnesses, and several experts, testified live and were subject to lengthy

cross-examination. The parties entered thousands of exhibits and designated certain deposition testimony into the trial record. Trial concluded just over nine weeks later on November 16, 2023.

Following trial, each group of Plaintiffs and Google filed separate post-trial briefs, as well as affirmative and responsive proposed findings of fact and conclusions of law. Those submissions ran into the thousands of pages. Finally, the court held two days of closing arguments on May 2 and 3, 2024.

FINDINGS OF FACT

I. PARTIES AND RELEVANT NONPARTIES

A. Parties

1. Plaintiff United States of America, along with Plaintiffs Arkansas, California, Florida, Georgia, Indiana, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Montana, South Carolina, Texas, and Wisconsin—**U.S. Plaintiffs**—filed the lawsuit captioned *United States v. Google*, 20-cv-3010 (APM). *See* Am. Compl. at 2–3.

2. Separately, Plaintiffs Colorado, Nebraska, Arizona, Iowa, New York, North Carolina, Tennessee, Utah, Alaska, Connecticut, Delaware, District of Columbia, Guam, Hawaii, Idaho, Illinois, Kansas, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Dakota, Vermont, Virginia, Washington, West Virginia, and Wyoming—**Plaintiff States**—filed the lawsuit captioned *State of Colorado v. Google*, 20-cv-3715 (APM). *See Colorado* Compl.

3. Alphabet Inc. is the California-based parent company of a collection of businesses, the largest of which is Defendant Google LLC (**Google**). UPX8085 at 851.[1] Google was founded

[1] This opinion uses the last three digits of Bates numbers on an exhibit to cite the specific pages that support a finding of fact.

in 1998 by two students from Stanford University, Larry Page and Sergey Brin, who left school to create Google, which is a general search engine (GSE). Trial Tr. at 7292:21–7293:1 (Raghavan) [hereinafter Tr.]. A GSE is software that produces links to websites and other relevant information in response to a user query. *See infra* Part II. What started in a rented garage is today one of the world's largest companies. The Chief Executive Officer (CEO) of Alphabet and Google is Sundar Pichai. Tr. at 7638:2-12 (Pichai).

4. Although Google began as a GSE, today its core services include a suite of applications widely used on mobile and desktop devices, including Gmail, Google Drive, Google Maps, Google Photos, Google Play, and YouTube. *Id.* at 7717:2-12 (Pichai); UPX8085 at 852.

5. In 2008, Google developed **Android**, an open-source operating system for mobile devices. *See* Tr. at 7652:1–7653:11 (Pichai). An open-source system allows third-party developers to create new smart devices and technologies by customizing the Android system to the device or technology. *See id.* at 7653:2-3 (Pichai) ("[Y]ou can just take the open source project and do whatever you want with it without ever talking to Google"); *id.* at 9414:25–9415:3 (Rosenberg) ("Being open source, [Android is] customizable. It [i]s something that someone could take with its underlying capabilities and then build on top of and add capabilities to."). Today, hundreds of millions of mobile devices in the United States run on the Android operating system. UPX639 at 266.

6. Also in 2008, Google launched **Chrome**, a web browser. Tr. at 7646:5-7 (Pichai). A web browser is software that allows users to access websites on the internet, among other things. *See* M. Baker Dep. Tr. at 23:1–27:8. Chrome was designed to increase the speed and seamlessness of web navigation by users. Tr. at 7649:11–7650:2 (Pichai). "Chromium is the underlying engine

which powers Chrome," and it is fully open source, like Android. *Id.* at 7648:21–7649:5 (Pichai). Google is the default search engine on Chrome. *Id.* at 7650:5-9 (Pichai).

7. Google also acquired an online advertising platform, DoubleClick, in 2008, which it developed into what today is known as **SA360**. *Id.* at 1235:5-12 (Dischler); PSX1109. SA360 is a search engine marketing tool, which allows advertisers to purchase digital advertisements across multiple platforms. Tr. at 1234:2–1235:4 (Dischler); *see also infra* Section V.G.

8. In 2022, Google reported Search+ revenues over $162 billion. UPX8085 at 879, 899 (including "other Google owned and operated properties like Gmail, Google Maps, and Google Play"). Between 2014 and 2021, Google's Search+ revenues more than tripled, with gross margins ranging from 76–82% annually. *See* UPX7002.A. The vast majority of Alphabet's revenues (nearly 80%) come from digital advertisements, and historically the largest component has been ads displayed on Google's search engine results page. *See* UPX8085 at 878–89; UPX342 at 824 (attributing approximately 66% of the "company's revenue and $ growth for 10+ years" to search advertising).

B. Key Third Parties

9. **Apple Inc.** is a California-based company that "designs, manufactures[,] and markets smartphones, personal computers, tablets, wearables[,] and accessories, and sells a variety of related services." UPX8105 at 172, 175. Those products include the iPhone, iPad, and Mac personal computers (PCs). *Id.* at 175. Each of these devices runs on an Apple-developed, proprietary operating system: iOS for iPhones, iPadOS for iPads, and macOS for Mac computers. *Id.* Unlike Android, Apple's operating systems are not open source. *See* Tr. at 9841:25–9842:5 (Murphy). Apple's products all come preloaded with its proprietary web browser, Safari. *Id.* at

632:9-10 (Rangel). In 2022, Apple's market capitalization was at least $2.8 trillion. UPX8105 at 173.

10. **Microsoft Corporation** is a Washington-based company whose products include an operating system called Windows, a web browser called Edge, and various devices, including PCs and tablets. UPX8094 at 517, 521, 530–31. In 1998, Microsoft licensed a third-party GSE, MSN Search, for use on its devices. Tr. at 3545:11-21 (Nadella). In 2005, Microsoft created its own GSE, which was then known as Live Search. *Id.* at 3547:3-24 (Nadella). In 2009, Microsoft launched **Bing**, a GSE. *Id.* at 3548:4-5 (Nadella). Microsoft has invested nearly $100 billion into search over the past two decades. *Id.* at 3510:3-7, 18-21 (Nadella). Bing's search and news advertising revenue totaled $11.6 billion in 2022. *See* UPX8094 at 612. The CEO of Microsoft is Satya Nadella. Tr. at 3487:2-6 (Nadella). Microsoft's revenues in 2022 were over $198 billion, with a market capitalization of $2.5 trillion. UPX8094 at 559, 517.

11. **Mozilla Corporation** is a California-based company that developed an open-source web browser called Firefox for both desktop and mobile devices. JX31 at 612, 633. Today, Mozilla's share in the desktop browser market is about 10% and negligible in the mobile market. M. Baker Dep. Tr. at 127:24–128:8, 134:9-20. In 2018, Mozilla generated $435 million in revenues. *Id.* at 285:12-16 (discussing UPX979 at 414).

12. **DuckDuckGo (DDG)** is Pennsylvania-based web services company founded in 2008. Tr. at 1937:4-7 (Weinberg). It offers a product that is an integrated browser and GSE. *Id.* at 1962:6-12, 1963:3-16 (Weinberg). Gabriel Weinberg is the founder and CEO of DDG. *Id.* at 1937:2-3 (Weinberg). DDG does not produce its own search results or search advertisements. It syndicates both from Microsoft. *Id.* at 3510:8-11, 3520:13-22 (Nadella). DDG attempts to

differentiate itself from other GSEs through a focus on user privacy. *E.g.*, *id.* at 1937:14-20, 2150:13-18 (Weinberg).

13. **Yahoo** is a California-based provider of general search services and was an early market leader in general search. UPX1053 at 121; Ramalingam Dep. Tr. at 23:2-12. In 1998, the year that Google was founded, Yahoo already had hundreds of millions of users. UPX1053 at 121. By 2009, however, Yahoo had stopped crawling the web and producing its own search results. Instead, it reached a data-sharing and syndication agreement with Microsoft, which provided that the two companies would combine their search engine user data (primarily to compete with Google) and, going forward, Yahoo's search results would be delivered by Bing. *See* DX271; Tr. at 3520:13–3522:9 (Nadella). Yahoo also has popular subject-specific, or "vertical," products, such as Yahoo Sports and Yahoo Finance. Ramalingam Dep. Tr. at 24:14–25:11.

14. **Neeva** was a California-based company incorporated in 2017 that introduced a new GSE in 2019. Tr. at 3670:1-5, 3670:24–3671:1 (Ramaswamy). Neeva was founded by Dr. Sridhar Ramaswamy, a veteran Google Search executive. *Id.* at 3667:3–3669:14 (Ramaswamy). One of Neeva's distinguishing features was that it was a subscription-based service that did not serve advertisements. *Id.* at 3675:22–3679:16 (Ramaswamy). Although Neeva initially licensed Bing's search infrastructure to respond to all queries, by 2022 Neeva responded to about 60% of queries using its own systems, relying on Bing for the remainder. *Id.* at 3739:14-16, 3776:14-21 (Ramaswamy). In May 2023, Neeva shut down and was acquired by Snowflake Inc., an enterprise data company. *Id.* at 3675:1-6 (Ramaswamy). It no longer exists as a GSE. *Id.* at 3675:5-19 (Ramaswamy).

15. **Branch** is a California-based software company that was founded by Stanford graduate students in 2013. *Id.* at 2892:7-24 (Austin). Branch created a search engine for

applications using "deep linking" technology, which allows users to search across pages of mobile applications on a particular device and navigate to relevant application results. *Id.* at 2893:18–2894:18, 2897:3-15 (Austin). This "app search engine" required "work[ing] individually with every app company [to] get them to send [] the actual pages inside of the app," which entailed "build[ing] the one-on-one relationship with the app [and] hav[ing] them develop, write custom code." *Id.* at 2898:2-9 (Austin). Unlike a GSE, Branch's product does not index the web and (in its presently deployed version) does not deliver web results. *Id.* at 2957:3-15, 2956:16-24 (Austin); *see also infra* Section VI.B.2.d.

16. **Samsung Electronics Co. Ltd.** is a Korea-based original equipment manufacturer (OEM) of smartphones and other mobile devices that run on the Android platform. *See* UPX639 at 266; Baxter Dep. Tr. at 34:14. Samsung devices "represent the primary competitor to the iPhone in key monetizing regions, such as the US[.]" UPX639 at 266. Samsung develops mobile applications that it preloads onto its devices, including a browser known as S Browser and an app store called the Galaxy Store. Baxter Dep. Tr. at 83:10-24, 91:4-7. Samsung also invests in novel products through its innovation arm, Samsung Next. Tr. at 4485:3-12, 4485:22–4486:14 (Chang).

17. **Motorola Mobility LLC** is an Illinois-based OEM of smartphones that run on the Android platform. JX39 at 794. Motorola and Samsung together manufacture the majority of Android devices in the United States. Tr. at 775:2-5 (Kolotouros). Google acquired Motorola but later sold it to Lenovo Group Ltd. Christensen Dep. Tr. at 15:12-14, 142:12-18.

18. **AT&T Mobility LLC** is a Georgia-based mobile carrier that provides wireless services that connect mobile devices to cellular networks. JX91 at 742. AT&T also sells devices directly to consumers. Ezell Dep. Tr. at 28:4-12. Roughly 30% of the smartphones that it distributes are Android devices. *Id.* at 29:8-25. The other 70% are Apple devices. *Id.*

19. **T-Mobile US, Inc.** is a Washington-based mobile carrier that provides cellular services and sells mobile devices directly to consumers. JX95 at 687–88; Tr. at 9313:24-25 (McCallister). Approximately half of the phones sold by T-Mobile run on Android, and the other half are Apple devices. Giard Dep. Tr. at 23:16–24:7.

20. Cellco Partnership, doing business as **Verizon Wireless**, is a New Jersey-based mobile carrier that provides cellular services and sells mobile devices directly to consumers. JX93 at 487–88; Tr. at 9313:24-25 (McCallister). It distributes roughly twice as many Apple devices (70%) as Android devices (30%). Tr. at 1102:21-23 (Higgins).

II. GENERAL SEARCH ENGINES

A. Overview

21. Google, Bing, Yahoo, DDG, Ecosia, and Brave are GSEs. *See, e.g.*, *id.* at 2168:1-4 (Giannandrea); *id.* at 1031:2-10 (Higgins); *id.* at 1942:11-17 (Weinberg); *id.* at 8201:23-24 (Reid). There is "relatively limited [user] overlap between the general search engines." *Id.* at 8728:23-24 (Israel).

22. Bing is Google's largest general search competitor today. *Id.* at 8094:8-10 (Raghavan). It is the only rival that crawls the web and generates its own search results. The next two largest search engines, Yahoo and DDG, syndicate their search results from Bing. *See id.* at 3520:13-25 (Nadella).

23. By 2009, 80% of all general search queries, whether entered on a desktop computer or mobile device, flowed through Google. *Id.* at 4762:4-12 (Whinston) (discussing UPXD102 at 48); *e.g.*, UPX472; *see also* Tr. at 203:21–204:5 (Varian) (Google began measuring its search share against other GSEs monthly in 2009). That percentage had increased from 80% to 89.2% by 2020. Tr. at 4761:14–4762:8 (Whinston) (discussing UPXD102 at 47).

24. Google's share of search queries on mobile devices was even higher at 94.9% in 2020. *Id.* at 4762:19–4763:2 (Whinston) (discussing UPXD102 at 49); *see also* UPX476 at 668 (Google's internal share calculation of 98% of mobile GSE queries in 2019). The percentage on desktop devices was 84%. *See* UPX476 at 668.

25. Google's second-place rival, Bing, receives roughly 6% of all search queries. Tr. at 4761:12-14 (Whinston) (discussing UPXD102 at 47). Bing (5.5%), Yahoo (2.2%), DDG (2.1%), and other rivals (0.9%) together see less than 11% of all queries. *Id.* Their numbers are even lower on mobile devices. *Id.* at 4762:19–4763:2 (Whinston) (discussing UPXD102 at 49) (Bing (1.3%), Yahoo (2.1%), DDG (1.5%), and others (0.2%)). Bing's market share has never risen above 12%. *See id.* at 4762:4-12 (Whinston) (discussing UPXD102 at 48).

26. Bing sees more desktop queries than mobile queries because it has greater distribution on Windows desktop devices, where it is the default GSE on the preloaded Edge browser. *See id.* at 3096:14-18 (Tinter).

B. How a GSE Works (Greatly Simplified)

27. "A general search engine is a tool that you use to search the worldwide web using queries." *Id.* at 2167:3-4 (Giannandrea). A GSE attempts to answer all queries by "provid[ing] search results that are relevant to those queries." *Id.* at 8093:10-12 (Raghavan); *id.* at 182:6-8 (Varian). "The primary source of information for Search is the web." UPX194 at 552.

28. The first step in developing a search engine is to crawl the web. *Id.* at 552; Tr. at 1774:20-22 (Lehman); *id.* at 2206:14-15 (Giannandrea) ("[S]tep one [of] building a general search engine would be to take a copy of as much of the web as you can."). GSEs crawl the web using a "crawling bot," which "starts with a list of websites[.]" Tr. at 2206:17-20 (Giannandrea). The bot "crawls the HTML on those websites and then it looks at the links inside of those web pages and

then recursively crawls them." *Id.* And, because websites "are constantly changing and the web is constantly growing," GSEs "constantly recrawl the web to index new content." UPX194 at 552–53.

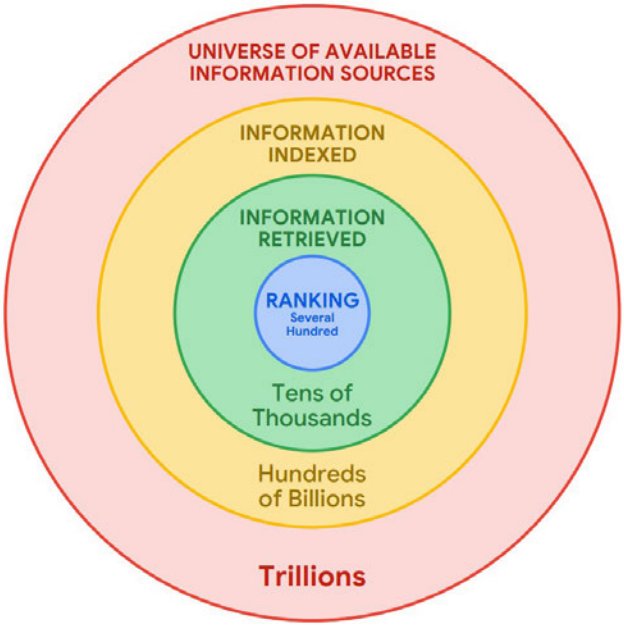
29. The results of the web crawling are organized into an index. An index is "a database essentially of the whole web that's publicly available that can be returned if [a] user asks for it." Tr. at 2656:17-18 (Parakhin). The development of an index is "a crucial piece of the puzzle," because if a site is not in the index, it will not be presented to users in response to a query. *Id.* at 6303:20-25 (Nayak); *id.* at 2210:21 (Giannandrea) ("What you include in the index matters a lot[.]"). Thus, the more sites in an index, the better. *Id.* at 2212:4 (Giannandrea). Today, only Google and Bing create fulsome web search indexes that generate accessible results. DDG indexes portions of the web to create its own search "modules." *Id.* at 1939:2–1941:16 (Weinberg). And Apple maintains an index of about [redacted] billion websites, although it does not presently plan to use that index to offer a results page. *Id.* at 2212:9-14 (Giannandrea); FOF ¶ 302.

30. An index is only useful if the GSE understands what the user is seeking with a query. GSEs "aim to identify spelling errors, annotate the query with synonyms, mark multi-word concepts, generate terms related to the query, and more." UPX213 at 715. Google does this in many ways: through its spelling and synonyms functions, using "query-based salient terms" (QBST) that are likely to show up in a responsive document, and semantic tools, such as query clustering and segmentation. *Id.* at 715–16; *see also* UPX870 at .016–.017.

31. The GSE then must retrieve and rank websites responsive to the query. Common queries can yield a nearly infinite number of potentially responsive sites, so the GSE must include a retrieval system that narrows the volume of responsive links to tens of thousands, as opposed to millions. Tr. at 6331:7-15 (Nayak). The GSE then must rank these several thousand results. It

first must decide which results are worth scoring at a more granular level, and then score those hundreds of sites to determine which top 10 or so should be surfaced to the user. *Id.* at 6331:13–6332:11 (Nayak); *infra* Section II.G.

32. The above-described culling and sorting process by which a GSE produces search results is illustrated below:



DXD17 at 2.

C. Types of Queries

33. A GSE can supply information from a broad variety of sources, covering nearly any topic. Tr. at 8708:16-20 (Israel) (agreeing that GSEs "can handle virtually any type of query"). Thus, it is "the first place that you can turn to," and "a place that you go to for the vast majority of your information needs." *Id.* at 3670:6-18 (Ramaswamy); *see also id.* at 6511:11-23 (Whinston) (same); *id.* at 7027:23-25 (J. Baker) ("[A] general search user can get satisfactory responses to multiple queries from multiple sources, all without switching sites."); *id.* at 10471:17-25 (Oard)

("[M]ental process is costly[] and . . . people may just not know about where things are."); *cf. id.* at 8717:17-18 (Israel) ("If I don't know the best source, I may have to try various ones.").

34. Google classifies its queries by subject matter, and it has developed more than two dozen "level-one" classifications. *Id.* at 7029:2-16 (J. Baker) (discussing PSDX11 at 17). Users tend to use a GSE for a short period of time to search for a particular topic and then allow time to pass before using a GSE to search for a different topic. Put differently, users do not typically search multiple different subject matters during an unbroken time period. *Id.* at 8419:9-15 (Israel) (discussing DXD29 at 25) (78% of users searched within only one vertical in a short period). Yet, if viewed over a longer period, users frequently turn to GSEs to search for a broad variety of topics. *See id.* at 7029:17–7031:11 (J. Baker) (discussing PSXD11 at 19) (showing based on Google sessions data from 2019 and 2021 that nearly 65% of "sessions," defined in the study as a 24-hour period, involved users searching in more than one classified segment).

35. Many users begin their online information gathering journeys on GSEs. An analysis by U.S. Plaintiffs' expert Dr. Michael Whinston found that 77% of search sessions on Windows desktop devices began on GSEs. *Id.* at 4614:12-24 (Whinston). That 77% figure is arguably lower on mobile devices, on which users are more likely to start searches directly within an application instead of a GSE. *See id.* at 5875:19–5876:9 (Whinston).

36. There are two general types of queries on GSEs: noncommercial and commercial.

37. A noncommercial query is one in which the user seeks to retrieve information that the GSE does not attempt to monetize by delivering a search advertisement. 80% of Google's queries are noncommercial in nature. *Id.* at 8396:16–8398:17 (Israel); UPX10 at 053 n.6.

38. Commercial queries, as the name implies, are queries that the GSE perceives are an expression of commercial intent by the user and constitute the remaining 20% of Google's queries.

Tr. at 8396:16–8398:17 (Israel); UPX10 at 053 n.6. Typically, such a query seeks information on a product or a service. GSEs often serve advertisements on a search engine results page in response to a commercial query. *See infra* Section V.A.1. Like Google, only about 20–30% of Bing's queries are commercial and show ads. Tr. at 3645:13–3646:2 (Nadella).

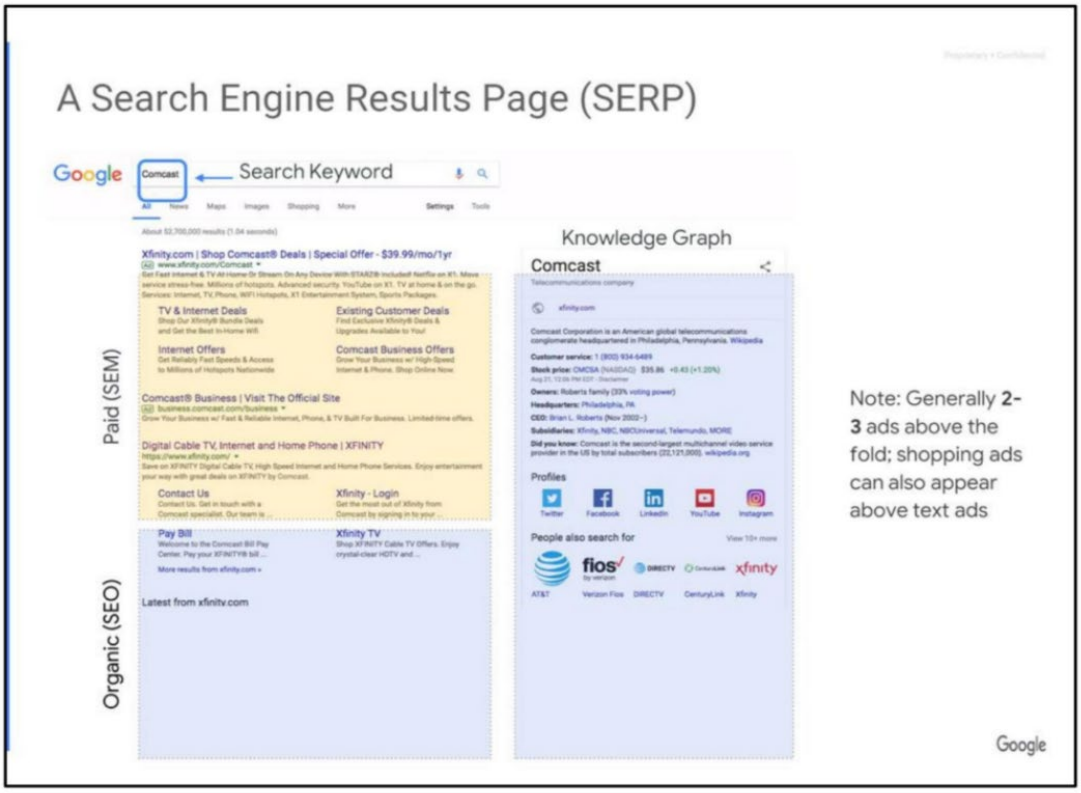
39. Navigational queries, which can be either commercial or non-commercial, are a type of query that reflects a user's intent to navigate directly to a particular website. *Id.* at 185:11-19 (Varian). GSEs may or may not serve ads on a navigational query. An example of a navigational query is "Amazon," which may express the user's intent to go to Amazon.com. *See id.* at 8721:12-13 (Israel) ("[O]ne use of a general search engine[] is as this vehicle to take me to other sites."). Users often enter navigational queries. In fact, at a given time, Google's top five queries by query volume are navigational queries, UPX342 at 859, and nearly 12% of all Google queries are navigational queries, Tr. at 8748:22–8749:1 (Israel) (calculation reflected in Whinston Expert Report at 64); *id.* at 8748:25–8749:1 (Israel) (the volume of navigational queries is "significant"). Navigational queries are unique to GSEs, because only a GSE's results page supplies a user with organic links used to navigate to another website. *See id.* at 4616:23-25 (Whinston) (specialized vertical providers are "not sending you off to other sites" because "they don't have a broad index of the web"); *see infra* Section IV.A.

40. The number of general search queries has grown dramatically over the last decade, especially on mobile devices. *See* Tr. at 8442:17–8443:2 (Israel) (discussing DXD29 at 45) ("[O]utput is more than double over this 10-year time period."); *id.* at 7248:4-10 (J. Baker) (discussing PSXD12).

D. Search Engine Results Page

41. GSEs produce information responsive to a query on a search engine results page, or SERP. The SERP "provid[es] links to websites drawn from a broad index of the web as well as provid[es] additional information[.]" *Id.* at 4610:21-22 (Whinston); *id.* at 7026:20-22 (J. Baker).

42. Most SERPs contain some mixture of advertisements, organic links, and vertical offerings. A sample SERP is illustrated below.



UPX1 at 533.

43. Organic links, or "blue links," are unpaid search results that allow a user to navigate directly to a website. Tr. at 2221:15-19 (Giannandrea); *id.* at 6509:25–6510:1 (Nayak). A GSE determines which links to present by sorting through indexed webpages and presenting relevant results. *See* UPX8104 at 165; *see also supra* Section II.B; *infra* Sections II.G & II.H.

44. Paid advertisements are typically generated in response to a commercial query and usually appear at the top of a SERP. *See* UPX1 at 533. Multiple types of advertisements can appear on a SERP, but the two primary ones are general search text ads (which resemble organic results but are labeled "sponsored" on Google) and shopping ads (which typically consist of a product photograph, vendor identity, and price information). *See infra* Section V.A.1.

45. A vertical offering is a category of specialized information that is accessible to users without leaving the SERP. Tr. at 2336:14-16 (Giannandrea); *id.* at 6509:7-21 (Nayak). Examples of verticals include information about flights, hotels, and restaurants. Such information is usually acquired from third parties and is referred to as "structured data." *Id.* at 8224:18–8225:6 (Reid). Structured data can come from several sources: specialized vertical providers (like online travel sites), users, merchants, or GSE employees in the field. *Id.* Much of "th[is] information is not even on the web." *Id.* at 8224:24-25 (Reid). Another example of structured data is a "knowledge graph," which is a database containing useful information about people, places, and things, as well as the connections among them. *See* Moxley 30(b)(1) Dep. Tr. at 17:17-20; UPX1 at 533.

46. GSEs enter into data-sharing agreements with partners (usually specialized vertical providers) to obtain structured data for use in verticals. Tr. at 9148:2-5 (Holden) ("[W]e started to gather what we would call structured data, where you need to enter into relationships with partners to gather this data that's not generally available on the web. It can't be crawled."). These agreements can take various forms. The GSE might offer traffic to the provider in exchange for information (i.e., data-for-traffic agreements), pay the provider revenue share, or simply compensate the provider for the information. *Id.* at 6181:7-18 (Barrett-Bowen).

47. As of 2020, Microsoft has partnered with more than 100 providers to obtain structured data, and those partners include information sources like Fandango, Glassdoor, IMDb,

Pinterest, Spotify, and more. DX1305 at .004, 018–.028; *accord* Tr. at 6212:23–6215:10 (Barrett-Bowen) (agreeing that Microsoft partners with over 70 providers of travel and local information, including the biggest players in the space).

48. In some limited instances, providers have expressed discomfort with new or continued partnerships with Bing due to its smaller scale. Tr. at 6187:20-24 (Barrett-Bowen). For example, [redacted], an online travel company, refused to share its information with Bing given its limited distribution. *Id.* at 6188:5-10 (Barrett-Bowen). Bing, however, has data agreements with other travel providers, including major airlines and platforms like Booking.com, Expedia, and TripAdvisor. *Id.* at 6212:25–6213:11, 6214:1-2 (Barrett-Bowen); *see id.* at 2678:5-9 (Parakhin); DX1305 at .018–.028. On another occasion, [redacted], a provider of [redacted] information, asked for a financial commitment from Bing, as the amount of traffic provided through the existing Bing-[redacted] data-for-traffic agreement was insufficient. *See generally* Tr. at 6198–6204 (Barrett-Bowen). Bing did not agree to [redacted] terms, in part due to Bing's budgetary constraints, and that partnership ceased. *Id.* at 6204:13-17 (Barrett-Bowen).

49. As a third example, Bing displays [redacted] information from a single partner—[redacted] The "sole reason" for this is Bing's small scale. *Id.* at 6190:4-12 (Barrett-Bowen). Since the [redacted] industry "is just not a big category" for Bing, it makes sense for Bing to partner with a single provider to obtain as much data as possible, rather than "fragment[] it amongst other partnerships[.]" *Id.* at 6190:14-23 (Barrett-Bowen).

E. The Expense of Developing and Maintaining a GSE

50. Constructing a GSE is an extremely capital- and human-resource intensive endeavor. *See id.* at 4765:17-20 (Whinston); *id.* at 3700:14-16 (Ramaswamy) (describing the

building of a search index as a "Herculean problem"). Developing just the technical infrastructure alone requires billions of dollars. *Id.* at 1651:12-25 (Roszak).

51. A competitive analysis performed by Google illustrates the point. In late 2020, Google estimated how much it would cost Apple to create and maintain a GSE that could compete with Google. Google "estimate[d] that the total capital expenditures required [for Apple] to reproduce [Google's technical] infrastructure dedicated to search would be in the rough order of $20[billion]." UPX2 at 392–93; Tr. at 1644:8-20 (Roszak). Google further estimated that, if Apple needed only half of Google's infrastructure to produce a competitive GSE, it would have to spend $10 billion to get it off the ground, plus $4 billion annually in technical infrastructure. UPX2 at 393. On top of that, if Apple could sustain a business with only one third of Google's engineering and product management costs, it still would cost Apple $7 billion annually. Seven billion dollars was equal to more than 40% of Apple's total research and development expenditure in 2019. *Id.*

52. The cost of maintaining a fully-integrated GSE once built runs into the billions of dollars. In 2020, Google spent $8.4 billion to operate its search engine (excluding revenue share payments). This expense is attributable to a variety of inputs. By way of example, the "petabytes" of user data that Google maintains are "expensive to store[.]" Tr. at 7824:2-3 (Fox); *id.* at 6337:20-21 (Nayak) ("[T]he cost of processing the data goes up if we're talking about large amounts of data."). Certain highly effective ranking mechanisms, such as artificial intelligence-driven models, are computationally more expensive than others because they are costly to train and require significant engineering capabilities. *See id.* at 1931:17-20 (Lehman); *id.* at 6447:11-16, 6452:1-8, 6452:15-19 (Nayak); *id.* at 8278:15-18, 8281:13-24 (Reid).

53. Adding features to the SERP also dramatically increases costs. UPX266 at 985 (explaining that "[f]eatures are even more incrementally expensive," such as including web search and video search on a single SERP, which costs about five times more per query than web search alone). There are many other contributing costs.

54. Apple itself has estimated that it would cost $6 billion annually (on top of what it already spends developing search capabilities) to run a GSE. Tr. at 2295:9-16 (Giannandrea); UPX460 at 177.

55. But building and maintaining a GSE is only half of the cost equation. Monetizing a GSE is also an expensive proposition. In 2020, Google spent $11.1 billion to operate its search ads business. By comparison, it spent $8.4 billion on search (excluding revenue share payments). Tr. at 4764:12-20 (Whinston) (discussing UPXD102 at 52). In 2020, Bing earned only $7.7 billion *total* in search ads revenue. *Id.* at 4765:4-6 (Whinston) (discussing UPXD102 at 52).

56. As result of the extraordinary resources required to build, operate, and monetize a GSE, venture capitalists and other investors have stayed away from funding new search ventures. *Id.* at 2261:11-19, 2268:6-7 (Giannandrea) (stating that "a startup could not raise enough money . . . to build a very good, large-scale search engine" because "to build a competitive project is very expensive"); UPX240 at 507 (internal Apple document written by Giannandrea stating that "the reason a better search engine has not appeared is that it's not a [venture capital] fundable proposition even though it's a lucrative business"); Tr. at 3510:24–3512:7 (Nadella) (describing Silicon Valley's view of venture funding of search as the "biggest no fly zone").

57. New investment has not poured in despite the promise of high profit margins in general search. *See* UPX635 at 352 (Apple executive noting that "there aren't so many businesses

on the planet that have such high marginal profit[] on incremental revenues"); FOF ¶ 8 (describing Google's revenues).

F. GSE Distribution

58. Search providers have multiple channels to make accessible, or distribute, their GSE to users on mobile and desktop devices. They include but are not limited to: (1) the search bar integrated into browsers; (2) search widgets on Android device home screens; (3) search applications; (4) preset bookmarks within the default browser; (5) downloading an alternate browser; and (6) direct web search (i.e., navigating to www.google.com or www.bing.com). These channels of distribution are known as search access points.

1. Default Distribution

59. The most efficient channel of GSE distribution is, by far, placement as the preloaded, out-of-the-box default GSE. That access point varies by device. On Apple products, it is the integrated search bar in the Safari browser (and to some extent, Apple's voice assistant, Siri, and on-device search, Spotlight). Tr. at 632:9-10 (Rangel); *infra* Section VI.A.1.a. On Android devices, it is the search widget (prominently displayed at the center of the device's home screen) and the search toolbar in the Chrome browser. *See infra* Section VI.B.1. The Chrome browser typically appears on the home screen of Android devices either in the "hotseat"—that is, the row of applications at the bottom of the home screen—or in a folder on the home screen along with other Google applications. Tr. at 797:7-17 (Kolotouros); *see infra* Section VI.B.1. And, on Windows desktop computers, the default access point is the integrated search bar in the Edge browser. Tr. at 3096:14-18 (Tinter). Google is the default GSE on all of these access points except on Edge, where the default GSE is Bing. *Id.* at 540:4-12, 632:6-8 (Rangel).

60. Other browsers, which are not preloaded on devices but can be downloaded, also use an integrated search bar. *Id.* at 1963:3-12 (Weinberg) (DDG); M. Baker Dep. Tr. at 189:3-12 (Firefox). Google is the current default search engine on Firefox. From 2014 through 2017 it was Yahoo. *See infra* Section VI.A.2.a. On Firefox, a drop-down menu allows users to select a non-default search provider for the next search without changing the default search engine. M. Baker Dep. Tr. at 92:11-25. This is called the "this time, search with" feature. *Id.* Those options include SVPs, like Amazon. *Id.* (listing Bing, Amazon, or DDG as options).

61. Default settings can be changed by the user. On all major browsers, users can navigate to the browser's settings and change the default to their preferred GSE. *See, e.g.*, M. Baker Dep. Tr. at 61:1-4 (Firefox); Tr. at 2630:3–2631:15 (Cue) (discussing DXD6) (Safari); *id.* at 7650:10-17 (Pichai) (Chrome). No browser allows a user to change the default GSE to a specialized vertical provider, such as Amazon, or to a social media platform. *Id.* at 7426:21–7427:4 (Raghavan).

62. Notwithstanding the option to switch, the default remains the primary search access point. Roughly 50% of all general search queries in the United States flow through a search access point covered by one of the challenged contracts. *See id.* at 5755:6-11 (Whinston) (discussing UPXD104 at 34–36). Of that 50%, 28% of those queries are entered into search access points covered by the Google-Apple Internet Services Agreement, 19.4% through Google's agreements with Android OEMs and carriers, and 2.3% through search access points on third-party browsers, such as Mozilla's Firefox. *See id.*

63. Another 20% of all general search queries in the United States flow through user-downloaded Chrome, which defaults to Google. *Id.* at 5762:22–5763:13 (Whinston) (discussing UPXD104 at 37).

64. Thus, only 30% of queries in the United States run through a search access point that does not default to Google. *See id.* at 5762:22–5763:13 (Whinston) (discussing UPXD104 at 37). (To be clear, those 30% of searches are not all run on GSEs other than Google. A large percentage of those searches still are entered into Google, but through channels other than the default search access points, such as user-downloaded Google Search app or a search on www.google.com.)

65. That users overwhelming use Google through preloaded search access points is explained in part by default bias, or the "power of defaults." The field of behavioral economics teaches that a consumer's choice can be heavily influenced by how it is presented. *Id.* at 526:7-21 (Rangel) (describing the concept of "choice architecture"). The consensus in the field is that "defaults have a powerful impact on consumer decisions." *Id.* at 526:22-25 (Rangel).

66. According to U.S. Plaintiffs' expert, Dr. Antonio Rangel, whose testimony the court credits, "the vast majority of individual searches, or queries, are carried out [by] habit," because search is a high frequency activity done on a familiar device that provides an instant response. *Id.* at 543:2-9 (Rangel) ("Habits develop very strongly in those situations of high repetition and immediate feedback."); *see also id.* at 543:14-19 (Rangel) ("When a consumer encounters their devices for the first time and they start searching, they start searching with the default search engine, which for many of them is the case. . . . If that search engine that is the default generates adequate experiences, the consumer will get habitized to that."). A 2020 Google study confirmed this. A group of iOS users were asked what app they would choose to open a link in an email: Chrome, the Google Search app, or Safari? Regardless of the option the user selected, their leading rationale for doing so was "Habit/Regular Usage." UPX757 at 628.

67. Individuals often are not aware that they are acting out of habit. Tr. at 542:4-12 (Rangel). Consequently, when users are habituated to a particular option, they are unlikely to deviate from it. As Google's behavioral economics team wrote in 2021: "Inertia is the path of the least resistance. People tend to stick with the status quo, as it takes more effort to make changes." UPX103 at 214; *see also* UPX171 at 190 (2015 Google study based on 26 user interviews; almost half of the users (12) did not notice a surreptitious change from Google to Bing on their iPhone; "People expressed interest (but not huge urgency) to switch back to Google"); Tr. at 7677:5–7682:19 (Pichai) (discussing UPX172, a 2005 letter from Google to Microsoft stating that "most end users do not change defaults").

68. Many users do not know that there is a default search engine, what it is, or that it can be changed. Tr. at 548:24–549:3 (Rangel); *id.* at 9942:7-10 (Murphy); *see* UPX123 at 469, 485 (2007 Google study showing that the default homepage on a browser is "[c]onfigurable by user but very few know/care to change it" and that "[u]sers do not always make an active, deliberate choice of a" search engine); PSX216 at 126 (2016 Google-internal email identifying "one fundamental issue [a]s that users on Edge don't even realize they aren't using Google"); UPX66 at 73 (2018 Google study showing substantial user confusion regarding which browser and GSE was in use); UPX2051 at 520 (2020 Google study showing that over half of iPhone users in the United States were "unsure" which GSE powered Safari and concluding that users are "often unaware they're using Google").

69. Even users who "are not in this habitual mode and [] try to change the default will get frustrated and stop the process" if there is "choice friction." Tr. at 547:5-16 (Rangel). "Choice friction" refers to the concept that subtle challenges or barriers make it increasingly more difficult

to implement a change. *Id.* at 554:5-16 (Rangel). "[T]he more choice friction it takes to change the defaults, the sticker the defaults are." *Id.* at 554:20-21 (Rangel).

70. The amount of choice friction varies and depends on many factors. For instance, default effects are weaker when the product is of poor quality or is unknown to users. Consumers "start thinking about switching more if the experience is unsatisfactory" or if they have, "over years, developed a very strong preference for a [rival] brand[.]" *Id.* at 548:15-20 (Rangel). By contrast, default effects are stronger when the user is satisfied with the product. *Id.* at 650:22–651:9 (Rangel).

71. The type of device matters as well. Default effects are stronger on mobile devices, as opposed to desktop computers, in part because of the smaller interface. *Id.* at 625:21-23 (Rangel); *id.* at 6311:1-8 (Nayak) ("I think the most salient difference between mobile and desktop is in the user experience. . . . The mobile device has very limited real estate. . . . Whereas, the desktop device, of course, has a lot of real estate to provide your search experience. . . . It's just a very different experience."); *id.* at 9764:6-12 (Murphy) ("[M]obile screens are smaller, hard to change the default, as compared to a PC where the screen is bigger[.]"); *id.* at 3498:14-19 (Nadella) ("[C]hanging defaults today is . . . toughest on mobile platforms because . . . they're locked up on the browser that is allowed, they're locked up with app store access. So there are many, many sort of friction points on mobile operating systems."). Also, switching certain default settings on an Android device is arguably harder than on an iPhone. *See* UPX171 at 186 (iPhone user study participants were "able to switch back with relatively little effort" to Google from Bing); Tr. at 559:23–561:16 (Rangel) (discussing UPXD101 at 25–35) (replacing the Google Search Widget with Bing's rival widget is a 10-step process).

72. Google understands that switching on mobile is more challenging than on desktop. To illustrate, in 2016 and 2020, Google estimated that if it lost the Safari default placement, it would claw back more search volume on desktop than on mobile. *See* UPX142 at 886 (2016) (Google would recover only 30% on iOS but 70% on MacOS); UPX148 at 826 (2020) (same, projecting 60–80% query loss on iOS); *see also* UPX84 at 728 (2016) ("User behavior is more heavily influenced by default settings on mobile and tablet[.]"); UPX139 at 119 (2020) ("People are much less likely to change [the] default search engine on mobile.").

73. Google appreciates that increased choice friction discourages users from changing the default. *See* UPX103 at 214 (2021 Google document from Google's Behavioral Economics Team stating that a "[s]eemingly small friction points in user experiences can have a dramatically disproportionate effect on whether people drop or stick"); UPX848 at 612 ("[Y]ou want to think about each step, as small as it might be, and see if there is a way to eliminate it, delay it, simplify it, default it."); UPX172 at 731 ("[O]f the tiny fraction of end users who try to change the default, many will become frustrated and simply leave the default as originally set[.]").

74. A GSE's placement as the default thus drives search volume through that access point. Tr. at 3689:21-24 (Ramaswamy) (testifying that "the convenience of easy accessibility and tapping into . . . engrained default behaviors are the deciding factors when it comes to whether a search engine gets lots of usage"); *id.* at 7674:6–7675:21 (Pichai) ("[B]ecause you're taking existing users, and by giving them more convenient access points, you're making them search more. . . . Done correctly, and if you're putting a product out in front of users which users like and want to use, yes, defaults can make a difference."). In 2017, over 60% of all queries entered on Google flowed through defaults. UPX83 at 967; *see id.* (60% of iOS queries were through the

Safari default, and 80% of Android queries were through defaults secured by the distribution deals). Far fewer users search directly on Google's website.

75. Google recognizes that securing the default placement is extremely valuable for monetizing search queries. In 2017, Google estimated that its default placements drove over half (then 54%) of its overall search revenue, a percentage that had grown since 2014. UPX83 at 968. For devices manufactured by Samsung—the largest Android OEM—80% of search revenue earned on those devices in 2016 flowed through default placements secured by the MADAs (Chrome and the Google Search Widget). *See* UPX639 at 266; UPX660 at 369. In 2019, about 50% of all search revenue on Android devices flowed through the Google Search Widget. UPX0316 at 906. In 2020, Google's internal modeling projected that it would lose between 60–80% of its iOS query volume should it be replaced as the default GSE on Apple devices, UPX148 at 826, which would translate into net revenue losses between $28.2 and $32.7 billion (and over double that in gross revenue losses), UPX1050 at 887. And in a 2015 presentation, Google expressed confidence in its standing among Apple users, but warned that its position "is still very vulnerable if defaults were to change." UPX171 at 186.

76. Neeva exemplifies the importance of search distribution through a readily accessible channel. Neeva secured the capital and human resources needed to build a search engine. Tr. at 3671:4–3672:13 (Ramaswamy). Although it initially syndicated search results from Bing, it eventually crawled the web, built an index, and developed a ranking model, which relied heavily on artificial intelligence technology, to generate its own search results for about 60% of its queries. *Id.* at 3775:9–3776:21, 3739:14-16 (Ramaswamy). But Neeva was unable "to be even a default provider on things like the major browsers or operating systems," which "was what made [its founders] conclude that it was hard to have Neeva consumer search as a viable business." *Id.*

at 3701:1-7 (Ramaswamy). The reason "why Neeva failed . . . was simply because [it] could not get enough users to be in that state where they regularly used Neeva." *Id.* at 3712:10-12 (Ramaswamy); *id.* at 3677:2-3, 3700:25–3701:7 (Ramaswamy) (testifying that more users on Neeva would result in greater revenues through subscription fees); *id.* at 3724:18-21 (Ramaswamy) ("[I]f a well-funded and exceptionally talented team like Neeva could not even be a provider on most of the browsers, I don't see that as the market working.").

2. Other Search Access Points

77. There are access points other than the default that can be used to distribute a GSE, but those channels are far less effective at reaching users. That is due in part to users' lack of awareness of these options and the "choice friction" required to reach these alternatives. FOF ¶¶ 65–73.

78. Users can download search applications on Apple devices from the App Store or on Android devices from the Google Play Store. Tr. at 1538:1-4 (Roszak); *id.* at 617:15-22 (Rangel). But to reach such applications, a user would have to (1) know the application exists and (2) download it. Those points of choice friction reduce the effectiveness of a search app as a channel of distribution. To illustrate the point: Google receives only about 10% of its searches on Apple devices through the Google Search App (GSA). *Id.* at 9758:16–9760:1 (Murphy) (discussing DXD37 at 52); *id.* at 2494:22-24 (Cue) ("[M]ost people are sitting on a browser, they don't really want to go search on an app or a different app from that standpoint."). (Google does not suffer from this problem on Android devices. GSA is preloaded on all Android devices sold in the United States.) *See id.* at 791:25–792:2 (Kolotouros); *see also infra* Section VI.B.1.

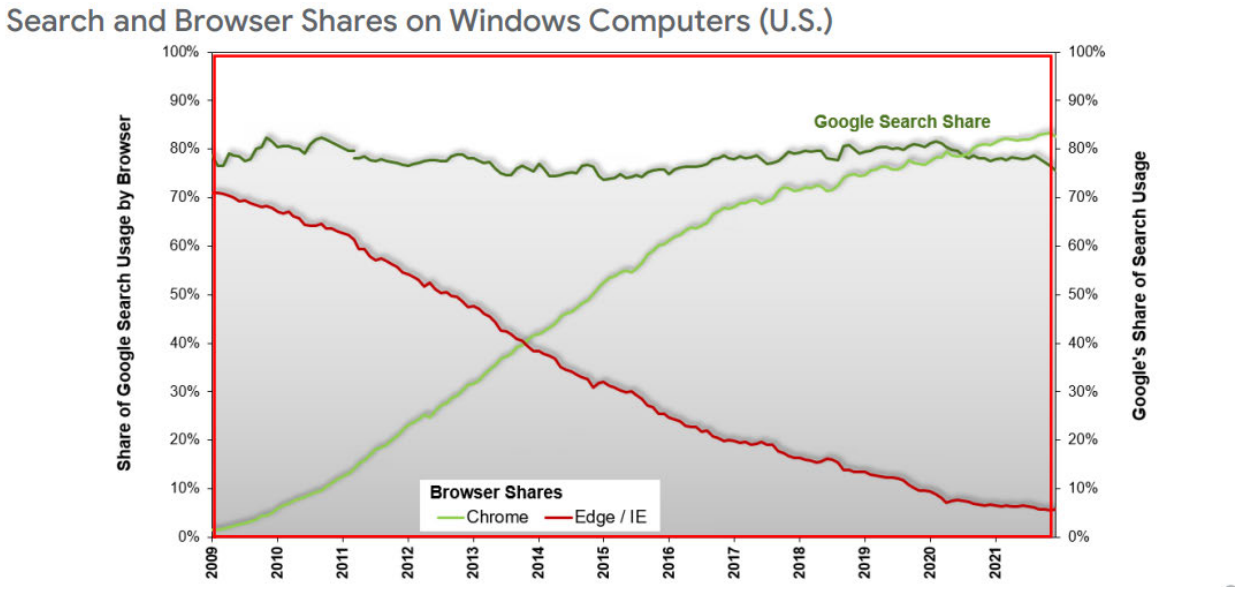
79. Google recognizes that the user-downloaded GSA is an ineffective way to reach users. A 2018 internal study revealed that over 35% of iOS users did not know they could

download GSA, and most of those who were aware of GSA did not want to install it. *See* UPX139 at 149. Over half of Safari users had not installed GSA, and of those that *had* installed it, over 80% still preferred using Safari. *Id.* at 150.

80. Another non-default search access point is the bookmarks page on a browser. *See* Tr. at 10195:21–10196:3 (Murphy) (discussing DXD37 at 47). The Safari "Favorites" page, for instance, contains preloaded icons to access Google, Bing, and Yahoo. *Id.* A user also can add a new search engine on that page. But few consumers use this channel, as it first requires finding the Favorites page in a new Safari tab, which requires an "extra click[.]" *Id.* at 10101:19–10102:21 (Murphy). Google itself receives only 10% of its searches on Safari through the bookmark. *Id.* at 9758:16–9760:1 (Murphy) (discussing DXD37 at 52).

81. Users also can reach GSEs by downloading an alternative browser from an applications store or the web. For example, a user can download Chrome, Edge, or DDG onto an Apple device. This, too, is not an easily accessible search point, as it involves similar choice friction as acquiring a search application. Google receives only 7.6% of all queries on Apple devices through user-downloaded Chrome. *Id.*

82. To be sure, downloads of an alternative browser occur with greater frequency on Windows desktop computers. On such devices, Edge is the default browser and Bing is the default search engine. *Id.* at 3096:14-20 (Tinter). Yet, Google's search share on Windows devices is 80%, with most of the queries flowing through the Chrome default, which means Chrome was downloaded onto the device. *See id.* at 9737:9-21 (Murphy) (discussing DXD37 at 36, 38). Google's dominance on Windows cannot, however, be attributed simply to the popularity of Chrome. Google had an 80% search share on Windows when Chrome first launched, and that share has remained steady ever since (see below).



DXD37 at 38.

83. Google's dominance on Windows does not, however, undermine the power of defaults. Google's strong product quality and brand recognition likely weakened the effectiveness of defaults on Windows devices before the introduction of Chrome. FOF ¶ 70 (switching the default is more common when the default has inferior product quality and branding). The popularity of Chrome over time only fortified that dominance. *See* Tr. at 9739:10-17 (Murphy) (discussing DXD37 at 38).

84. The power of defaults *is* evident, however, from the share of Bing users on Edge. Bing's search share on Edge is approximately 80%; Google's share is only 20%. *Id.* at 5744:24–5745:20 (Whinston) (discussing UPXD104 at 29). Even if one assumes that some portion of those Bing searches are performed by Microsoft-brand loyalists, Bing's uniquely high search share on Edge cannot be explained by that alone. The default on Edge drives queries to Bing.

85. Finally, users can navigate directly to the GSE on the web to conduct searches—for example, by entering google.com or bing.com in a browser search bar. *Id.* at 1633:1-8 (Roszak). This is known as an "organic" search. But few users search in this way. On Apple

devices, Google receives less than 5% of its query volume through organic searches. *Id.* at 9758:16–9760:1 (Murphy) (discussing DXD37 at 52). On Android devices, that number is only 10%. Sept. 19, 2023 (Sealed Session) Tr. at 23:25–27:2 (Yoo).

G. The Importance of Scale

86. Early on, Google understood that the information gleaned from user queries and click activity were a strong proxy for users' intent and that such information could be used to deliver superior results. *See* UPX251 at 870 ("[M]ost of the knowledge that powers Google, that makes it magical, ORIGINATES in the minds of Google users."); *id.* at 871 ("As people interact with the search results page, their actions teach us about the world."); UPX203 at 906 ("If a document gets a positive reaction, we figure it is good. If the reaction is negative, it is probably bad. Grossly simplified, this is the source of Google's magic.").

87. Greater query volume means more user data, or "scale." As the most widely used GSE in the United States, Google receives nine times more queries each day than all of its rivals *combined* across all devices. The disparity is even more pronounced on mobile. There, Google receives *nineteen* times more queries than all of its other rivals put together. *See* Tr. at 4761:6-24, 4762:19–4763:2 (Whinston) (discussing UPXD102 at 47, 49).

88. There are different types of user data. Click data, for example, includes the search results on which a user clicks; whether the user returns to the SERP and how quickly; how long a user hovers over SERP results; and the user's scrolling patterns on the SERP. *See* UPX4 at .004. From such data, a GSE learns not only about the user's interests but also the relevance of the search results and quality of the webpages that the user visits. Tr. at 1767:215–1771:22 (Lehman) (discussing UPX4 at .004).

89. Another type of user information is query data. GSEs accumulate query data to, among other things, learn what information users are looking for. Google's scale means that it not only sees more queries than its rivals, but also more unique queries, known as "long-tail queries." To illustrate the point, Dr. Whinston analyzed 3.7 million unique query phrases on Google and Bing, showing that 93% of unique phrases were only seen by Google versus 4.8% seen only by Bing. On mobile, where Google has more scale, the disparity was even higher. *See id.* at 5785:12–5788:1 (Whinston) (98.4% of unique phrases seen only by Google, 1% by Bing; 99.8% of tail queries on Google not seen at all by Bing) (discussing UPXD104 at 44).

90. Google has used its scale advantage to improve the quality of its search product. At every stage of the search process, user data is a critical input that directly improves quality.

91. *Crawling.* GSEs must determine the order in which they crawl the web. User data helps GSEs determine which sites to crawl, because it allows general search providers to understand the relative popularity of various sites. *Id.* at 2207:7-9 (Giannandrea). User data also helps GSEs determine the frequency with which to crawl websites. *Id.* at 10274:16–10275:1 (Oard). "Freshness," or the recency, of information is an important factor in search quality. GSEs "need to know how to recrawl [sites] to make sure that [they] do at all times have a reasonably fresh copy of the web that you are looking at." *Id.* at 6310:2-5 (Nayak); *see* UPX870 at .013 ("If we build too infrequently, our users could miss out on important news or get stale results[.]"). Popular sites, like the *New York Times*, are worth crawling more often than less visited sites. Tr. at 2207:3-6 (Giannandrea).

92. *Indexing.* While click data is "not particularly important for indexing," query data is: GSEs need to ensure that their index covers queries that are frequently entered. *Id.* at 2211:13-17 (Giannandrea). *But see id.* at 10274:16-21 (Oard) (opining that click data helps Google "decide

whether to keep those pages . . . [or] future pages in the index or not"). User data also helps determine where a webpage resides within the larger index. *Id.* at 10274:22–10275:1 (Oard). Google divides its index into tiers. *Id.* Each page is assigned to a tier based on how fresh it needs to be, and the fresher tiers are rebuilt more frequently. *Id.*

93. *Retrieval and Ranking.* Because humans are imperfect, so too are their queries. Google relies on user data to decipher what a user means when a query is typed imprecisely. For example, user data allows Google to identify misspellings and reformulate queries using synonyms to produce better results. *Id.* at 8088:15-24 (Gomes) (spelling, synonyms, and autocomplete use query data to improve); *id.* at 2273:3-15 (Giannandrea) ("reformulation," which is when a user misspells a query and then re-enters it with another spelling, is important to improve spell check); UPX224 at 914 (Google built its spelling technology by "look[ing] at all the ways in which people mis-spell words in queries and text all over the web, and us[ing] that to predict what you actually mean").

94. Google scores potentially relevant results to determine the order in which they are placed, or ranked, on the SERP. Scoring is done using a number of signals and ranking systems, which are technologies that attempt to discern the user's intent and thus identify the most relevant results for a particular query. *See* UPX204 at 243; Tr. at 1764:1-25 (Lehman). Many of these signals, discussed below, rely on user data.

95. Query-based Salient Terms, or QBST, is a Google signal that helps respond to queries by identifying words and pairs of words that "should appear prominently on web pages that are relevant to that query." Tr. at 1807:25–1808:10 (Lehman) (e.g., "1600 Pennsylvania Avenue" and "White House"). QBST is a "memorization system[]" that helps the GSE

"understand facts about the world[.]" *Id.* at 1838:11-25 (Lehman). It is trained on about 13 months of user data. *Id.* at 1808:14-20 (Lehman); UPX1007 at 371.

96. Navboost is another signal that pairs queries and documents through memorizing user click data. Tr. at 1838:11-25 (Lehman). It allows Google to remember which documents users clicked after entering a query and to identify when a single document is clicked in response to multiple queries. *See* UPX196 at 175; Tr. at 1806:2-15 (Lehman) (describing functions of Glue, a "relative" signal to Navboost); *id.* at 2215:3-4 (Giannandrea) (NavBoost "was considered very important"). Prior to 2017, Google trained Navboost on 18 months of user data. Tr. at 6405:15-25 (Nayak). Since then, it has trained Navboost on 13 months of user data. *Id.* Thirteen months of user data acquired by Google is equivalent to over 17 *years* of data on Bing. *See id.* at 5793:14-23 (Whinston); *id.* at 10350:8–10351:8 (Oard) (same) (discussing UPXD105 at 50).

97. More recent ranking signals developed by Google rely less on user data. Those include RankBrain, DeepRank, RankEmbed, RankBERT, and MUM. *See* UPX255 at .010; UPX2034. Known as "generalization" systems, these signals "may not be so good at memorizing facts, but they're really good at understanding language." Tr. at 1846:18-22 (Lehman). Such systems are "designed to fill holes in [click] data"; they allow Google to generalize from situations where it has data to situations it does not. *Id.* at 1896:2-19 (Lehman).

98. Although these newer systems are less dependent on user data, they were designed with user data and continue to be trained on it, albeit using less volume. *See id.* at 1845:12-21 (Lehman) (discussing UPX255 at .010–.011) (older signals use up to 1 trillion examples, whereas newer algorithms require only 1 billion); UPX226 at 483 ("Learning from this user feedback is perhaps the central way that web ranking has improved for 15 years.") (discussing BERT and

RankBrain); *see also* Tr. at 2652:11-14 (Parakhin) ("The more data of this nature we have, the more we can train algorithms to be better in predicting what is good and what is bad.").

99. MUM is a large language model (LLM), or "a computational system that tries to, in some way, capture patterns in language." Tr. at 1912:22-23 (Lehman). Whereas RankBERT "exhibited fairly weak performance" on newer scoring metrics, MUM "achieved essentially human-level performance." *Id.* at 1915:10-20 (Lehman). MUM is trained on a subset of the web corpus, as well as some click training data, to allow it to "understand the structure of language and acquire some kind of reasoning abilities." *Id.* at 1919:8-14 (Lehman); *id.* at 6358:8-20 (Nayak).

100. Google has also developed three newer LLMs: LaMDA, PaLM, and PaLM2. LaMDA was released in 2021 and is focused on conversation; PaLM and PaLM2 expanded on LaMDA and have more capabilities. *Id.* at 6363:22–6364:3 (Nayak). These systems were not built with user data. *Id.* at 6364:13-22 (Nayak).

101. Google has also developed a Search Generative Experience, which leverages artificial intelligence (AI) in search. *Id.* at 6364:4-12 (Nayak). This experimental product "add[s] generative AI into the search results to enhance them[.]" *Id.* at 8217:3-5 (Reid); *see infra* Section II.H.

102. The more recent LLM signals did not replace Navboost and QBST in ranking. Tr. at 1931:21-24 (Lehman); UPX190 at 740 ("Navboost remains one of the most power ranking components historically[.]"). Nor did they render the generalization systems obsolete. *See* Tr. at 6366:21–6367:10 (Nayak); *see also* FOF ¶¶ 114–115. LLMs are used as "additional signals that get balanced both against each other as well as against other signals[.]" Tr. at 6367:5-7 (Nayak).

103. Traditional systems like Navboost can also beat out LLMs (and even generalization systems) in certain aspects of SERP production, like freshness. UPX214 at 696; UPX256 at 185.

104. To be sure, there are diminishing returns to user data, but that inflection point is far from established. And, in any event, user data does not become worthless even after the point of diminishing returns. *See* Tr. at 10078:7-9 (Murphy) ("[T]here's pretty much always diminishing returns, but that doesn't mean they're not valuable even after some diminishing returns have set in."); *id.* at 6337:8-18 (Nayak) ("[T]he value you get from every additional piece of data starts falling," but the overall value "continues to increase a little bit.").

105. Google continues to maintain significant volumes of data—despite the expense of storing it—because its value outweighs that cost. *See id.* at 6337:17-25 (Nayak) ("[A]s you get more data, it's more expensive to process."); *id.* at 10349:24–10350:7 (Oard) ("[T]he cost of keeping and using this data goes up with the amount of data that we keep. The value goes up as well. And at some point, if the value were to decline to the point where it wasn't worth the cost, people would stop doing it[.] . . . [T]here's a sweet spot where you would stop doing it, and Google hasn't stopped doing it yet."); *id.* at 10079:9-10 (Murphy) ("I would presume if they maintain it and it's costly to maintain it, there's a reason they maintain it.").

106. For GSEs with little scale, even a small amount of data can result in meaningful improvements. *Id.* at 10347:7-10 (Oard) ("And when you have very little, then not only do you get better, but you keep getting better at a faster and faster rate up to some point where the rate at which you're getting better starts to slow down."); *id.* at 2047:21–2048:3 (Weinberg) ("[W]e lack the scale to do as much experimentation as we want[.]").

H. Artificial Intelligence

107. "Artificial intelligence is the science and engineering of getting machines, typically computer programs, to exhibit intelligent behavior." *Id.* at 6339:18-20 (Nayak). One application of AI enables computers to understand and solve problems without human intervention.

108. For instance, AI researchers have sought to program "computers to directly understand a document or a passage just based on the words." *Id.* at 1909:5-6 (Lehman). These sorts of programs are known as LLMs or machine-learning models. *See id.* at 2667:25–2668:4 (Parakhin) ("A large language model is the closest that humanity came to producing actual artificial intelligence. It is a system that can look at written text or images, and reason over it and provide answers in a human readable flowing sort of language.").

109. Beginning in 2015, Google increasingly began to incorporate AI technologies into its search processes. *Id.* at 6341:18–6342:11 (Nayak). Around that time, Google published "a family of deep neuralnets that are called transformers that . . . take an input and spit out an output[.]" *Id.* at 7403:9-17 (Raghavan). This technology, which is incorporated into signals like MUM, allowed Google to rely on less user data and still improve its ranking of search results. FOF ¶¶ 97–101.

110. For instance, AI technology has accelerated search quality with respect to spelling corrections or semantically related concepts, without relying on user data. Tr. at 3697:7-17 (Ramaswamy). Neeva leveraged machine learning to develop its spell-correction technology, as opposed to relying entirely on user data. *Id.* at 3781:23–3783:20 (Ramaswamy). And if a user were to query "vacuum cleaner for a small apartment with pets," Google's transformer technology helps discern "whether the user wants an apartment, a vacuum cleaner[,] or a pet[.]" *Id.* at 7405:5-11 (Raghavan); *see also* UPX197 at 211 (discussing impact of machine learning on relevance).

111. AI technologies have the potential to transform search. Tr. at 3696:11–3697:21 (Ramaswamy) ("AI enables search engines to do things that are not really conceivable in a return-a-set-of-links model, which is what commercial search engines generally do today."). Recently, Google and Bing have incorporated generative AI technology into their SERPs by providing "AI-

powered answer[s]," which do not rely on user data to produce. *Id.* (generative AI can supplement user data by offering different SERP functionality beyond organic links, such as an "AI-powered answer"). Such answers also can come in the form of AI chatbots, such as Bing's BingChat (now Copilot) and Google's Bard (now Gemini). *Id.* at 8272:9-24 (Reid). The input could be an image or words, and the output may be similarly varied. *Id.* at 7404:8-11 (Raghavan). Neeva also relied on AI-generated search results to differentiate itself from other GSEs and used AI to develop a search product with less user data. *See id.* at 3696:11–3697:21 (Ramaswamy).

112. The integration of generative AI is perhaps the clearest example of competition advancing search quality. Google accelerated and launched its public piloting of Bard one day before Microsoft announced BingChat, the integration of ChatGPT's generative AI technology into Bing to deliver answers to queries. *Id.* at 8272:4-7 (Reid); *id.* at 2670:10–2671:9 (Parakhin). (describing BingChat).

113. AI also has applications in search advertising. "Natural language understanding is a subfield of artificial intelligence" that seeks to "understand what it is a user is trying to get done, going back to the intent." *Id.* at 7376:1-3 (Raghavan). Google applies natural language understanding to its search advertising to better discern user intent and deliver an optimally responsive advertisement. *Id.* at 7376:3-21 (Raghavan).

114. Despite these recent advances, AI has not supplanted the traditional ingredients that define general search. *See* UPX197 at 211 ("There is a lot more to web ranking for which [machine learning] seems much less appropriate."). And it is not likely to do so anytime soon. Tr. at 7531:23–7532:8 (Raghavan) ("I view this as a journey, not as something that happened overnight. And I think what we in the industry have to figure out is how to use the AI . . . tools to do a better and better job of defining the user's intent and giving just the perfect answer. And what I've seen

so far is one more step. I think there's a few more steps to go, and I expect that in time, for instance, you will see these language models be able to service queries not only from typewritten prompts, but voice queries, image, camera, as well. And that's a journey that we're still early on."); *id.* at 7530:7-8 (Raghavan) ("It's not the case . . . that everything we do in ten years will be through" LLMs.); *id.* at 7530:9-18 (Raghavan) (Google has no plans to stop crawling and indexing the web in the foreseeable future nor will it stop presenting users with organic links on the SERP); *id.* at 7665:23-25 (Pichai) ("Now with artificial intelligence, I think we are again in the early stages of completely rethinking what's possible for our users.").

115. Importantly, generative AI has not (or at least, not yet) eliminated or materially reduced the need for user data to deliver quality search results. *Id.* at 3697:17-21 (Ramaswamy) ("[T]he middle problem of figuring out what are the most relevant pages for a given query in a given context still benefits enormously from query click information. And it's absolutely not the case that AI models eliminate that need or supplant that need."); *id.* at 1931:21-24 (Lehman) (MUM "definitely" did not replace traditional data-based signals, like Navboost and QBST). When asked to predict how search engines will work in five or 10 years, Google's former Distinguished Software Engineer, Eric Lehman, testified that while it may be diminished in the future, "there will still be a role for user data[.]" *Id.* at 1924:18–1925:22 (Lehman). This is in part because "deep learning systems are much harder to understand." *Id.* at 6366:21-22 (Nayak). It thus remains vital for Google to "have an infrastructure that [it] understand[s]," i.e., traditional ranking signals. *Id.* at 6366:21–6367:10 (Nayak) ("[T]here is no sense in which we have turned over our ranking to these systems. We still exercise a modicum of control over what is happening and an understandability there.").

I. User Data and Privacy

116. Google recognizes that users increasingly care about the privacy of their online activity. *See generally* UPX1069. *See* Tr. at 7471:5-25 (Raghavan); *id.* at 8994:22–8995:1 (Fitzpatrick) ("[E]xpectations around privacy from our users from, frankly, society across the tech industry, have evolved pretty significantly."); *id.* at 8995:13-16 (Fitzpatrick) (noting that "focus on privacy as a topic has really elevated and increased" recently). So do browser developers, *see id.* at 2484:6-11 (Cue) (Apple); M. Baker Dep. Tr. at 117:8–118:7 (Mozilla), and other GSEs, Tr. at 3677:19–3679:16 (Ramaswamy) (Neeva); UPX720 at 249–53 (DDG).

117. Google has a Privacy, Safety, and Security team that focuses, among other things, "on both building proactive privacy protections into [Google] products, as well as building technical privacy protections into [the] systems and infrastructure," and "keeping users safe in [Google] products." Tr. at 8989:19-24 (Fitzpatrick). Google surveys users about its privacy offerings. *See, e.g.*, DX183 (2020 study assessing user trust related to privacy).

118. When Google makes decisions about privacy-focused features, rivals' privacy offerings are "something [Google] keep[s] an eye on" as one of "many" data points." Tr. at 8998:1-4 (Fitzpatrick). Google several times has considered undertaking privacy initiatives after looking to rivals. *See, e.g.*, UPX811 at 420 (comparing Google to DDG and recommending Google adopt certain features); UPX794 at 146 (same).

119. But Google also considers the business case for making privacy-focused changes. UPX501 at 520 (2019 email from Raghavan stating that merely because "people care increasingly about privacy" and "DDG is making a lot [of] noise about it," it did not mean that Google needed "a product change"); *see* Tr. at 7411:17-21 (Raghavan) ("And the team that came forward with the proposal said we need to do exactly what [DDG's] doing. And my pushback was maybe we do,

maybe we don't, but I'd like to see the data on the impact on users, and on our ability to build a good search and search ad system.").

120. Google believes that there is a trade-off between search quality and user privacy. *See* Tr. at 8998:1-7 (Fitzpatrick) ("But when we're designing, whether it's a product overall, a new feature, or a privacy control or capability, end of the day the question is: How do we do what's right for our users?"); *id.* at 7475:1-2 (Raghavan) (agreeing that an incognito mode feature could be accomplished "[a]s a technical matter," but "[t]hat doesn't make a good product design"); UPX500 at 518 ("DDG might also not be the best model for Google users' privacy needs[.]"); UPX501 at 520 ("I want to see evidence that there's a real impact on Google users, attributable to" privacy.).

121. The degree of privacy a GSE offers reflects a series of individual design decisions. Whether to track a user's sessions data is one such decision. According to Google, tracking user sessions is "measurably beneficial to the user experience, including things like []in-session use of context to improve results." Tr. at 9035:22–9036:1 (Fitzpatrick). Such data also helps to tailor the advertisements that Google delivers to a user. *See id.* at 7457:23–7458:9 (Raghavan); *id.* at 9069:15-23 (Fitzpatrick). DDG, on the other hand, anonymizes user click data and does not track user sessions. *Id.* at 2050:24–2051:7 (Weinberg). It therefore cannot discern whether multiple searches are the same user performing different actions. *Id.* at 2051:3-7 (Weinberg); *id.* at 1944:14-18 (Weinberg) ("[I]f 100 people search for cat pictures today, we don't really know whether it's like one person or 100 different people.").

122. How a GSE uses IP addresses is another design decision. Google logs IP addresses and uses them to customize search results. *See, e.g.*, *id.* at 1772:22–1773:15 (Lehman) ("[K]nowing a person's . . . location can sometimes help understand what it is they're looking

for."); *id.* at 1778:16-18 ("[I]n general, showing people search results that are appropriate to their location for a certain query is important[.]"). DDG, in contrast, does not log IP addresses. Instead, it "use[s] the location that [it] get[s] via the IP address, and then [it] throw[s] it away after the search is done." *Id.* at 2085:25–2086:1 (Weinberg).

123. Google also logs IP addresses to enhance security. *Id.* at 7413:25–7414:10 (Raghavan) (Google logs IP addresses to detect and combat botnets and fraudulent clicks). DDG "had developed [its] own click fraud systems" that do not require logging of IP addresses. *Id.* at 2069:10-11 (Weinberg); DX621 at 100.

124. Another question of privacy design is whether to invite users to "sign in." Google does so because it believes such functionality improves search results and overall search engine quality. *See* Tr. at 3737:5-8 (Ramaswamy) (personalization improves search quality). DDG does not have an option for users to "sign in" to its platform. *Id.* at 1944:14-15 (Weinberg) ("[E]very time you search on DuckDuckGo, it's like it's your first time[.]").

125. How much user data a GSE retains also is a measure of privacy. Google chose to retain 18 months, even though some survey data suggested users preferred a shorter retention period. UPX996 at 978 (49% of users surveyed would prefer that Google stored one month or less data, and 74% wanted Google to store their data for under one year). The decision to retain 18 months of a user's data versus fewer months was largely arbitrary. Tr. at 9013:9-18 (Fitzpatrick) (While Google "felt like it was important to have a default that was greater than that one-year boundary to allow for . . . annual seasonality [of information] to still be preserved," the decision to default to 18 months (as opposed to 13 months) was because 13 "felt like a really weird number" and 18 months "just felt a little . . . better.").

III. GOOGLE SEARCH

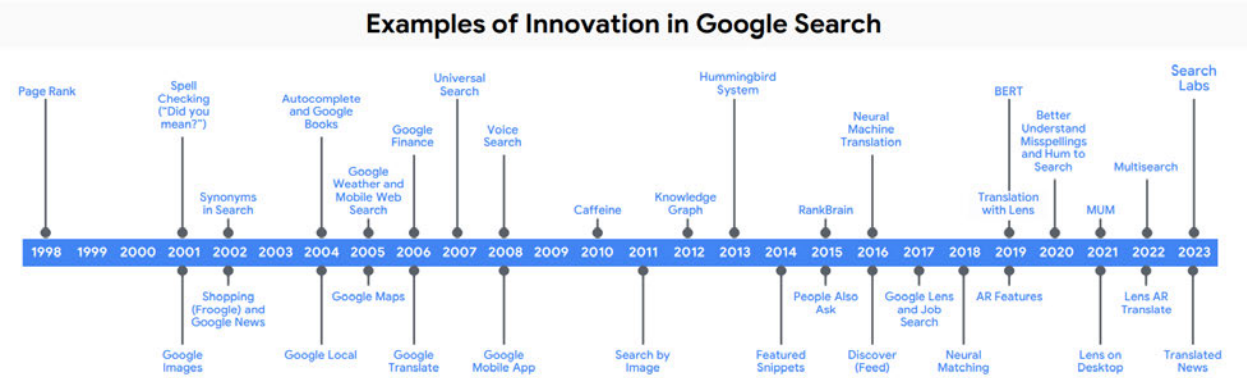
A. Product Development

126. Google is widely recognized as the best GSE available in the United States. *See, e.g.*, *id.* at 2586:1-2 (Cue) (Apple) ("Google still has the best search engine by far[.]"); DX547 at .002 (Mozilla) ("Google is the clear winner when it comes to product experience and what users want.") (internal quotation marks omitted); Christensen Dep. Tr. at 146:19-23 (Motorola) ("We have a positive opinion about Google Search, as do most consumers I think. It's – it's fast. It's reliable. It performs well for consumers' intended purchase in our opinion."); Giard Dep. Tr. at 33:2-3 (T-Mobile) (Google "provides customers with the best overall device experience[.]"); DX385 at 239 (AT&T) ("Google generates more query volume and monetizes search at higher rates than Bing and Yahoo[.]"); *accord* Tr. at 9429:3 (Rosenberg) (Google) ("[W]e think Search is best in class.").

127. Although Google significantly outperforms all rivals on mobile devices, Bing's search quality on desktop measures up to Google's. *See* Tr. at 6048:12-15 (Whinston) (Bing's quality "is very close on desktop" to Google); UPX238 at 667 ("Bing is comparable on desktop . . . and leads in several desktop verticals[.]"); UPX260 at 681 (Bing is comparable to Google for desktop result relevance and outperforms Google on desktop for overall preference).

128. Google's superior product quality rests in part on its numerous innovations over the years, as depicted below. *See* Tr. at 9899:21–9900:6 (Murphy) (discussing DXD37 at 140).

Google Has Made Continual Investments That Expand the Use of Search



DXD37 at 140.

129. "In analyzing potential changes to its Search product, Google considers the needs of users. Google recognizes that it exists in a competitive landscape and if it does not satisfy users' information needs, users will access information from other search providers (general or otherwise). Google does not, however, consider whether users will go to other specific search providers (general or otherwise) if it introduces a change to its Search product." UPX6019 at 365–66.

B. Branding

130. The fact that "Google is used extremely highly across the world . . . contribute[s] to brand formation." Tr. at 672:20-21 (Rangel); *id.* at 7780:23-24 (Pichai) ("Our brand gets validated by being present as a default in iPhones."). Google also built brand loyalty and recognition by offering a high quality product. *Id.* at 5921:22–5922:5 (Whinston); *id.* at 8397:21-22 (Israel) ("Google is building a brand reputation by how well it provides searches.").

131. Google has long recognized that "the affinity of the Google brand was something that was valued by users[.]" *Id.* at 361:17-18 (Barton); *see* UPX93 at 904 ("Several factors are believed to affect the choice [of a GSE], including . . . brand strength[.]") (2007); UPX171 at 186

("Our brand is in good standing among iPhone users" based on "[k]ey satisfaction and brand affinity metrics[.]") (2015).

132. Perhaps the best example of Google's brand is that the public uses the term "Google" interchangeably with internet search. "[T]o search is to Google. Google is a verb." Tr. at 623:20-21 (Rangel); *see also id.* at 672:14-23 (Rangel) (same); *id.* at 4769:10-16 (Whinston). Moreover, a search for "google.com" is one of the most frequently entered search queries on Bing. *Id.* at 2745:21-25 (Parakhin).

133. Google's strong brand also benefits its partners. *See id.* at 7780:21-23 (Pichai) ("Apple benefits and sells more iPhones by having their brand associated with the quality . . . [of] Google Search.").

C. Internal Quality Studies

134. In 2020, Google assessed the impact of degrading aspects of its search quality for about three months, specifically its large ranking components (e.g., Navboost, Synonyms). *See* UPX1082 at 294. The experiment tested a quality decline of 1 IS point, a measure of search quality equivalent to the loss of two times the information contained on all of Wikipedia. *See id.*; Tr. at 6323:12-17 (Nayak) ("If we took Wikipedia out of our index, completely out of our index, then that would lead to an IS loss of roughly about a half point."); *id.* at 4771:4–4773:9 (Whinston) (describing this experiment). This quality-reduction experiment correlated with only a 0.66–0.99% decline in global search revenue. UPX1082 at 294. In short, this study demonstrates that a significant quality depreciation by Google would not result in a significant loss of revenues. *See id. But see id.* at 6329:22-25 (Nayak) ("[I]f you made much larger IS changes, the relationship might not stay linear. It might become nonlinear. There might be inflection points where if you make search much worse, for example, you might actually lose a lot more traffic[.]").

135. Google has at times tracked its competitors' market shares or standing by identifying other GSEs and comparing Google to those rivals. *See* UPX399 at 965–66 (2014 document referring to Google, Bing, and Yahoo); UPX475 at 744 (2018 email chain and attachment calculating market share against other GSEs); UPX268 at 182 (2020 slide deck comparing Google, Bing, DDG, Qwant, and Ecosia).

136. When Google evaluates its own quality, it does so by conducting side-by-side experiments with other search engines. *See* Tr. at 6466:4-18 (Nayak) (discussing UPX2033) (describing side-by-side Google-Bing analysis with respect to queries relating to COVID-19). These studies involve IS4 rating systems that use human raters to compare results. *Id.* at 8099:4-25 (Gomes). In the past, Google has compared its latency and search results quality (using IS differences) to Bing's. *See id.*; *id.* at 6457:13-21 (Nayak) (discussing UPX2022, a 2017 document comparing Google and Bing's relative latency); *id.* at 7771:12-25 (Pichai). Google engages in an ongoing evaluation of Bing as part of its work. *Id.* at 8099:23-25 (Gomes).

137. Latency measures the speed with which a GSE returns search results and is an important quality metric. *Id.* at 1345:15-17 (Dischler). In 2017, Google analyzed its latency relative to Bing and determined that, for certain popular queries on Google, 25% of the time, the SERP took more than three seconds to load. UPX2026 at 122. Bing was "dramatically faster[.]" *Id.* at 123. Its first result arrived sooner 98% of the time. *Id.* This translated to about 300 milliseconds faster than Google. UPX2022 at 590. In response, Google launched Project Folly, "an attempt at instituting a set of projects and policies and processes to decrease latency." Tr. at 6458:12-19 (Nayak). The project was a success. *Id.*

138. Google has also evaluated its privacy protections and IS metrics compared to those of DDG. *Id.* at 8099:17-19 (Gomes) (Google "use[s] IS4 and human raters to compare against competitors like" DDG).

139. Google does not compare latency or IS scores with social media platforms like TikTok "because they're very different experiences." *Id.* at 6467:8-14 (Nayak); *id.* at 8100:4-8 (Gomes) (IS ratings comparison with Facebook is "not something that [Google] could do easily"). The same is true with respect to specialized vertical providers like Amazon. *See id.* at 8100:1-3 (Gomes).

140. That said, Google has assessed the competitive threat posed by specialized vertical providers and social media platforms. For instance, in 2021, Google sought to understand whether younger users relied on social media instead of Google for search; the study concluded that youth have different behaviors that drive their desired search experience, one of which is increased importance on receiving recommendations from individuals. *Id.* at 8206:24–8208:11, 8249:23–8250:25 (Reid). Among "Generation Z" participants (defined as participants between the ages of 18–24 who use TikTok daily), 63% reported that they use TikTok as a search engine. DX241 at .032. And a 2015 Google User Experience Research study concluded that Google users frequently used specialized vertical providers' mobile applications. *See* DX62A at .027–.028.

IV. OTHER PLATFORMS

A. Special Vertical Providers

141. Specialized vertical providers, or SVPs, are platforms that respond to queries centered on a particular subject matter. Tr. at 8626:5-12 (Israel). Examples of SVPs include Amazon, Expedia, and Yelp. *See id.* at 1031:14-18 (Higgins); *id.* at 2169:3-8 (Giannandrea).

142. Most SVPs do not respond to noncommercial queries, although there are exceptions, e.g., Wikipedia. *Id.* at 8396:23–8397:3 (Israel).

143. SVPs are not GSEs. *E.g.*, *id.* at 8098:4-6 (Gomes).

144. Once a user is on an SVP's site, the SVP facilitates navigation "only to sites in their segment where [the user] can make a transaction," with some exceptions. *Id.* at 7032:18-23 (J. Baker). This is known as a "walled garden" model, where the platform has proprietary, structured data that is not available on the open web. *Id.* at 8100:11-14 (Gomes). Thus, an SVP like "Amazon is not a competitor for nav[igational] queries." *Id.* at 8749:3 (Israel); *see also id.* at 1492:18-22 (Dischler) ("Google offers the full web, to the extent that Google has access to it. Amazon offers the products that are available at Amazon. It's possible that some products available at Amazon are not available via Google's access on the web, and Amazon may have their own unique inventory.").

145. Home Depot, for instance, maintains a product catalog of goods that it sells both online and in stores. *Id.* at 5115:4-11 (Booth); *see also id.* at 8395:14-24 (Israel) (discussing DXD29 at 17) (Home Depot is an SVP in the shopping vertical). Users of Home Depot's digital platforms can use them to purchase those goods but not navigate to a product-maker's website to make a direct purchase there instead. *See id.* at 5115:12-14, 5128:22–5129:4 (Booth); van der Kooi Dep. Tr. at 79:11-12 ("It is a search on what is available in the catalog.").

146. Fact witnesses with industry experience agree that SVPs are different from GSEs. *See, e.g.*, Tr. at 1031:20–1032:2 (Higgins) (stating GSEs involve "anything that's available on the web," while SVPs are "specifically focused on a domain"); *id.* at 2168:5–2169:11 (Giannandrea) (does not consider SVPs to be GSEs); *id.* at 3670:12-13 (Ramaswamy) (GSEs are "best defined in contrast to a specialized search engine"); *id.* at 5230:21-23 (Dijk) (Booking.com is not a GSE).

147. Fact witnesses with industry experience also agree that an SVP could not substitute for a GSE as a default search engine. *Id.* at 2171:10-13 (Giannandrea) (agreeing that "users, when they put something in the URL bar of Safari, they have an expectation that it's going to go to a general search engine"); *id.* at 1032:7-20 (Higgins) (stating that he would not recommend that an SVP be set as a default search engine on a Verizon device, because "consumers would like to have some search capability on their devices, and the preference would be for a general as opposed to a specific vertical"); *id.* at 7425:25–7426:14 (Raghavan); M. Baker Dep. Tr. at 217:3-15, 218:8-9 ("The user experience trying to use general search with only Amazon would not be good.").

148. Plaintiff States' expert, Dr. Jonathan Baker, provided an example. If a user enters a query for "UFOs" on Google, they will be presented with nearly 2 billion search results. But that same query on Amazon yields only around 10,000 results, all of which are products for purchase. And if a user searches on Expedia or HomeAdvisor for "UFOs," they will receive no results. Tr. at 7031:21–7032:6 (J. Baker) (discussing PSXD11 at 21).

149. Google's own employees recognize that SVPs are not GSEs. *See id.* at 8098:4-6 (Gomes); UPX911 at 875 ("Amazon is not considered a search site."); Tr. at 183:13-18 (Varian) (agreeing that "Amazon, Apple, and Facebook don't provide general-purpose search engines"); *id.* at 484:20–485:4 (Varian) (Amazon's search results are narrower than Google's "[b]ecause they use different algorithms, different datasets, different history, different understanding of users").

150. Nevertheless, both Google and other GSEs compete against SVPs for certain commercial queries in vertical offerings, such as travel and shopping. *See* Tr. at 3646:3-11 (Nadella); *id.* at 5883:16-22 (Whinston); *id.* at 8202:1-6 (Reid) (listing Amazon, DoorDash, OpenTable, Yelp, and TripAdvisor as competitors for shopping and food queries); *id.* at 7310:5–7312:4 (Raghavan); *see* UPX8085 at 854 ("We face formidable competition in every aspect of our

business, including, among others, from . . . vertical search engines and e-commerce providers for queries related to travel, jobs, and health, which users may navigate directly to rather than go through Google[.]"). Google's internal documents reflect differentiated analysis for "traditional Search engines such as Bing, Yandex, DuckDuckGo and alike" versus "[v]ertical search and apps analysis (including Amazon, Booking, etc.)[.]" UPX483 at 295.

151. Google views competition from SVPs as "intense for commercial clicks." UPX343 at 845. A 2020 Bank of America study reported that 58% of users search Amazon first when they seek to make an online purchase, as opposed to only 25% who go first to Google, demonstrating Google's secondary status as a starting point for users with high commercial intent. Tr. at 8425:15–8426:8 (Israel) (discussing DXD29 at 28). Google thus perceives Amazon as posing a risk of siphoning queries away from Google. DX126 at .019.

152. Microsoft recognizes that "if Bing or Google were not doing vertical searches well, or at least not having organic results that people could click to get to vertical search engines," users might bypass GSEs and instead search directly on Amazon from the outset. Tr. at 3649:23–3650:6 (Nadella). *But cf. id.* at 1942:18-21 (Weinberg) (DDG does not consider Amazon or other SVPs to be competitors that users are likely to switch to or from).

153. Even for overlapping queries, GSEs and SVPs can serve as complementary search platforms. As Dr. Baker opined, "it wouldn't be surprising if, for example, a search user entered a query for red shoes on a general search firm, saw a link to a shopping SVP, and then clicked on it and entered a search for red shoes there. That would be a natural thing to expect." *Id.* at 7035:9-13 (J. Baker); *accord id.* at 7435:5-7 (Raghavan) ("Prime members who in any way intend to shop at Amazon might come to Google and do a lot of research before they do it.").

154. For that reason, studies conducted by Google's expert Dr. Mark Israel regarding query overlap do not show that SVPs like Amazon and Yelp belong in the same product market as Google. *See id.* at 8406:5–8407:4 (Israel) (discussing DXD29 at 20) (analysis showing that a query sample of Google's top 25 non-navigational shopping queries attracts more queries weekly on Amazon (3.7 million) than Bing (0.4 million)); *id.* at 8411:3-13 (discussing DXD29 at 21) (finding that Yelp's local query volume is higher than Google's and much higher than Bing's); *see also id.* at 8401:4–8404:15 (Israel) (discussing DXD29 at 18) (analyzing the percentage of searches on GSEs as compared to SVPs for particular verticals).

155. SVPs are often reliant upon GSEs for traffic. *See id.* at 3534:7-23 (Nadella); *id.* at 2645:13-18 (Parakhin); *id.* at 7032:7-15, 7033:13-21 (J. Baker). For instance, Dr. Baker's analysis demonstrated that 33–88% of SVPs' online traffic (depending on the vertical) flows through GSEs, either via organic links or advertisements. *Id.* at 7033:18-21 (J. Baker) (discussing PSXD11 at 25). Although this analysis omits traffic through mobile applications, the conclusion is bolstered by Google's own analysis showing that "Amazon" was Google's fourth highest query by volume in 2018. *See* UPX342 at 859.

156. For this reason, SVPs are top advertisers on GSEs. Tr. at 9209:1-10 (Holden) (travel SVPs like Booking.com and Expedia are some of Google's largest advertisers); *id.* at 4615:11-16 (Whinston) ("[I]f you go and you look which are the biggest advertisers on Google, which are the biggest advertisers on Bing, the answer is specialized search engines. And what it's reflecting is that there's a bunch of traffic they think they can't get directly, you know, otherwise they wouldn't be spending the money to try to get referrals."); *id.* at 5116:3-8 (Booth) (Home Depot is a "large" purchaser of ads on Google, spending "hundreds of millions of dollars"); *see also infra* Section V.A.1.

157. Empirical research—performed by Google—demonstrates that use of SVPs is complementary, rather than cannibalistic. In other words, there is no evidence that increased use of SVPs correlates with a diminished use of Google or other GSEs. *See* UPX344 at 058; UPX436 at 005. For instance, Google's 2019 Project Charlotte study showed that users who were members of SVP loyalty clubs (e.g., Amazon Prime) or who otherwise engaged with SVPs were *more* likely to enter queries on Google. Tr. at 7430:2–7435:20 (Raghavan). Similarly, a 2018 Google analysis concluded that Android users who were active on the Amazon application yielded $2.31 per user in incremental search revenue for Google. UPX335 at 694. More recently, a 2020 Google study found a positive correlation between Amazon application use and query volume on Google, ultimately determining that a user's adoption of any of six major SVP applications—Amazon, eBay, Walmart, Pinterest, Spotify, or Twitter—was related to increased revenues and queries on Google mobile, with no significant change on desktop behavior. Tr. at 8733:1–8738:19 (Israel); PSX562 at 966, 977.

158. SVPs do not view themselves as competing with general search, although they may compete with GSEs' vertical offerings. *See, e.g.*, Tr. at 6580:1-15 (Hurst) (Expedia competes with Google's travel verticals, but not its search product, because users "can't generally search for most of the things [one] search[es] Google for on Expedia . . . Expedia['s] product literally does not work for what I assume is the overwhelming majority of Google general search.").

B. Social Media Platforms

159. Users go to social media platforms primarily to interact with others and view photos and videos. *Id.* at 5392:19-24 (Jerath); *cf. id.* at 6943:19-21 (Amaldoss) ("I can say people go to social media for entertainment and Twitter for entertainment. They're not going there to collect

information."). People tend to engage with social media properties for longer sessions than with GSEs. *See id.* at 1408:3-20 (Dischler).

160. Examples of social media platforms are Facebook, Instagram, Twitter, Snapchat, LinkedIn, Pinterest, and TikTok. *Id.* at 3928:2-14 (Lowcock); *id.* at 4840:23-25 (Lim).

161. Industry participants do not consider social media sites to be GSEs. *See, e.g.*, *id.* at 5243:6-8 (Dijk) (TikTok); *id.* at 183:13-18 (Varian) (Facebook).

162. On TikTok, users do not have to enter a query to view content. *Id.* at 7419:16-18 (Raghavan). Instead, they "scroll through a video feed that's based on an algorithm of their engagement with past videos[.]" *Id.* at 7419:23–7420:1 (Raghavan). TikTok does have a search functionality, but if users enter a query on TikTok, the results page only displays content already on TikTok and does not contain links or information from the open web. *Id.* at 7420:22–7421:7, 7421:22-25 (Raghavan). As compared to Google, the user experience on TikTok is "quite different, that's clear." *Id.* at 7424:17-18 (Raghavan).

163. Google's internal studies suggest that younger users may be increasingly using social media for search-related needs. *Id.* at 8202:24–8203:5 (Reid); DX241 at .010 ("63% of daily TikTok users aged 18 to 24 stated that they use TikTok as a search engine in the last week."). The majority of Google users are not in that narrow age range. Tr. at 8261:15–8362:20 (Reid).

164. Still, Google views social media sites like Facebook, Instagram, and TikTok as competitive threats. *See id.* at 7386:23–7387:13 (Raghavan); *see also id.* at 1412:23-25 (Dischler) (Instagram's ad revenue growth is "seen as a competitive threat" by Google); UPX8085 at 854 ("We face formidable competition in every aspect of our business, including, among others, from . . . social networks, which users may rely on for product or service referrals, rather than seeking information through traditional search engines[.]"). For example, Google's Senior Vice President

of Knowledge and Information Products, Dr. Prabhakar Raghavan, explained that TikTok is growing more rapidly than Google, in part due to "an extremely compelling product, especially for a younger demographic." Tr. at 7393:2-15 (Raghavan); *see also id.* at 7401:9-11 (Raghavan) (describing "TikTok's rise" as "mercurial," and stating that he "expect[s] it to grow again at the expense of some of the others").

165. The evidence does not show, however, that increased use of social media corresponds to a decrease in use of Google. In fact, a 2009 Google study showed that users who increase their use of Facebook tend to use Google more often, not less. UPX902 at 020.

V. THE DIGITAL ADVERTISING INDUSTRY

166. The digital advertising industry has grown rapidly in the last decade and a half. *See* Tr. at 1393:8-18 (Dischler) (describing "hundreds" of digital advertisers, such as "Meta, with their Facebook and Instagram properties; Amazon; Microsoft; Apple; Snap; various display networks. Netflix has now created an ad platform which is growing very quickly"); *id.* at 1394:2-12 (Dischler) (discussing DX3243); *id.* at 8553:4–8554:14 (Israel) (discussing DXD29 at 120) (digital advertising revenue has grown from about $20 billion in 2008 to over $200 billion in 2021, more than a ten-fold increase).

A. Search Advertisements

167. Search advertisements are a form of digital advertising. Search advertisements are paid, or "sponsored," postings published in response to a user's query on a search platform. *Id.* at 1173:15-16 (Dischler). Search advertisements appear on GSEs and SVPs, as well as occasionally on social media platforms.

168. A "signal" within the context of search advertising is an indicator of a consumer's intent to purchase a good or service. *Id.* at 404:25–405:16 (Varian).

169. Search ads are the product of a uniquely strong signal because they are delivered in response to a user's query. *See* UPX910 at 753 ("The vast majority of our profits come from search ads, because the signal from a query is s[]o strong."). "The big idea is that when you search for a product or service, chances are you're interested in purchasing that product or service." UPX428 at .010.

170. This signal is all the more powerful because it represents the user's declared intent in real time, that is, at the moment the intent is manifest. *See* UPX910 at 753 (a query for "tennis racquet" is a "strong indicator of interest in buying a tennis racquet," and "[m]uch stronger than what you searched [] three days ago," "[o]r what article you read yesterday"); UPX26 at 764 ("Search ads are an effective form of advertising since queries are a strong signal of user interest and intent and the ads appear immediately after the query is entered."); Daniels Dep. Tr. at 31:4-8 (search consumers express "clear intent").

171. As a result, advertisers view paid search as particularly efficient at driving conversions. *See, e.g.*, Tr. at 4854:23–4855:1 (Lim); UPX441 at 802 (JPMorgan Chase email: "Search can drive acquisition based on some of the strongest intent signals made available[.]"); Daniels Dep. Tr. at 31:13-19 (search customers express "the clearest preference" in the digital marketing ecosystem); Alberts Dep. Tr. at 45:18–46:16 ("[P]aid search can be an incredibl[y] powerful way to get in front of the consumer who is . . . actively looking to make a purchase or looking to sign up or enroll."); *see also infra* Section V.D (describing differences in intent among users on various ad channels). A conversion typically is a sale or, for some goods or services, a new account or enrollment. Tr. at 4842:7-8 (Lim); *id.* at 5121:1-5 (Booth).

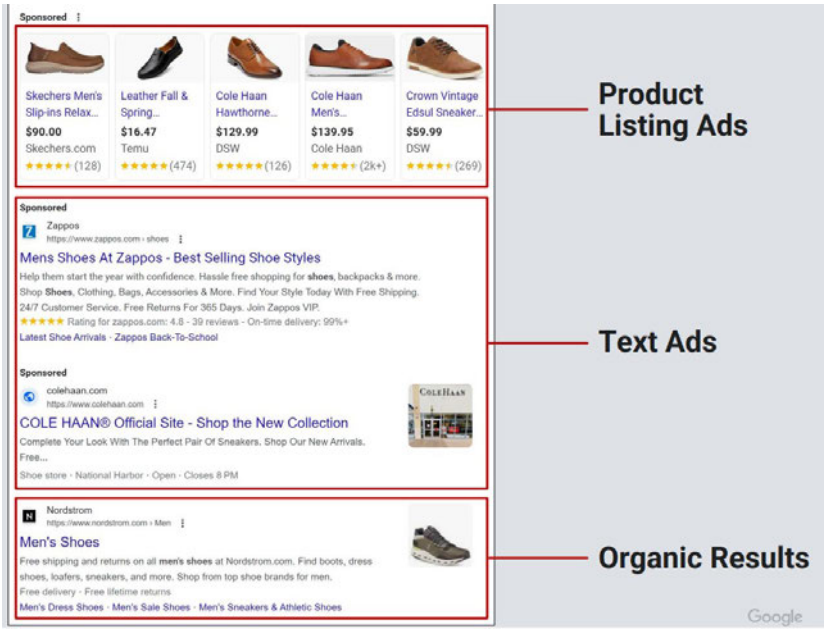
1. Search Ads on GSEs

172. GSEs earn revenue through the sale of search ads. *Id.* at 361:21–363:16 (Barton); *id.* at 1138:2-5 (Dischler) (the majority of Google's revenue is ad revenue). When a user clicks on a GSE search ad, they are taken to an advertiser's website or platform and encouraged to complete a sale or some other indicia of conversion. *Id.* at 1398:11-12 (Dischler).

173. There is a direct relationship between a GSE's scale and its monetization of search advertising. *Id.* at 2646:18-22 (Parakhin). More users on a GSE means more queries, which in turn means more ad auctions and more ad revenue. *See, e.g.*, *id.* at 5142:3-13 (Booth); *id.* at 6595:12-25 (Vallez); Stein Dep Tr. at 185:14-22.

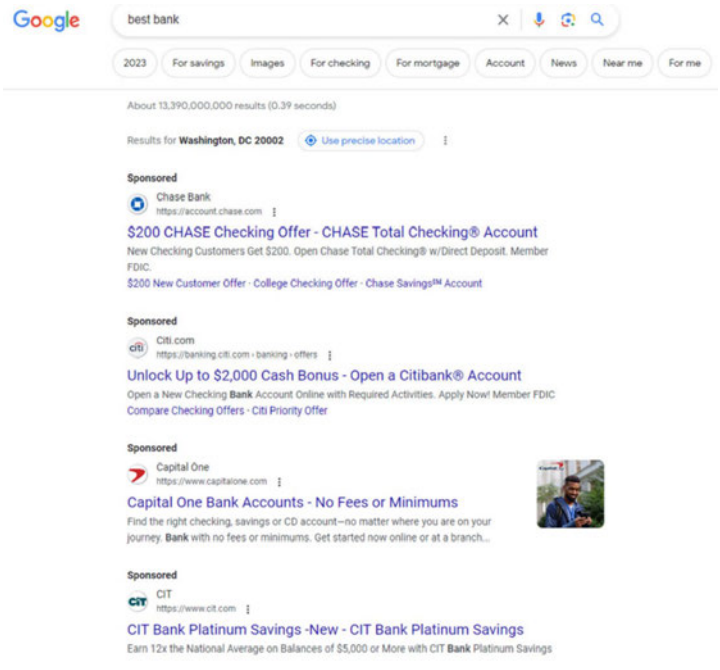
174. Google does not serve ads in response to all queries. FOF ¶¶ 37–38. It does so only in response to queries that convey a "commercial intent," which Google assesses by determining whether an advertiser is willing to pay for an ad in response to the query. Tr. at 1170:11-13, 1171:23–1172:1 (Dischler).

175. There are two primary types of search ads sold on GSEs: (1) general search text ads and (2) shopping ads, or product listing ads (PLAs). *Id.* at 1177:2-4 (Dischler). The figure below illustrates how those ad types can appear on a SERP. Other types of ads that appear on SERPs include local ads, hotel ads, and other travel ads. *Id.* at 1346:14-23 (Dischler).



DXD3 at 2.

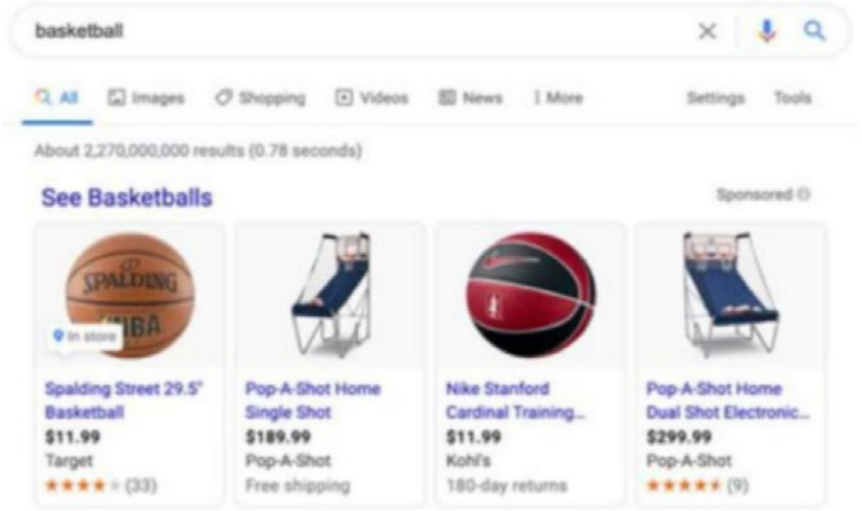
176. As shown, text ads resemble the organic links on a SERP. When a user types in a query, text ads generally appear at the top of the SERP with a designation indicating that they are paid advertisements. On Google, that designation is the word "Sponsored." *See id.* Occasionally, a text ad will include an image. *See* Tr. at 408:7-9 (Varian).



UPXD13. As depicted in the two prior images, the number of text ads served can vary based on the query. Google's policy, however, is to serve no more than four text ads on a SERP. *See* Jain Dep. Tr. at 262:16–263:11 (discussing UPX746).

177. PLAs, also known as "[s]hopping ads[,] are designed for retail advertisers," that is, sellers of tangible goods. Tr. at 1353:3 (Dischler); *id.* at 3998:7-9 (Juda). "The reason why is because when users are shopping, they often want to see pictures and prices and other relevant information about products." *Id.* at 1353:4-6 (Dischler).

178. Google developed PLAs both to meet this consumer need and to compete with Amazon's retail offerings. *Id.* at 1354:3-15 (Dischler). A depiction of shopping ads on a SERP appears below.



UPX32 at 145.

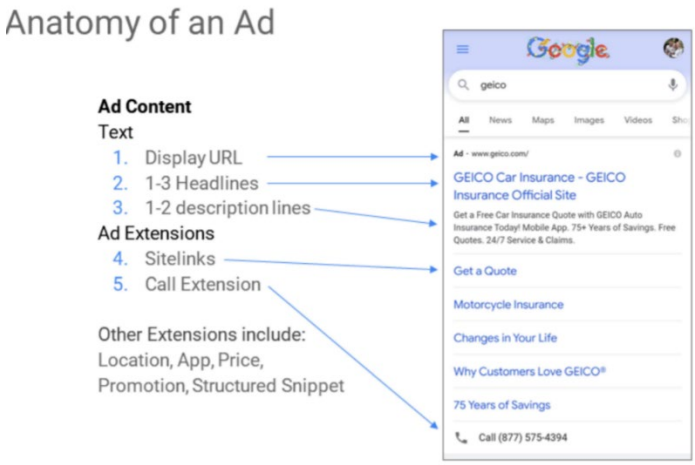
179. Text ads differ from PLAs in several ways. Text ads can be used to advertise almost any product or service. So, virtually any seller can advertise using a text ad. *See* Tr. at 408:10-13 (Varian); *id.* at 3810:25–3811:5 (Lowcock); *id.* at 3995:11–3996:9 (Juda). PLAs, however, are used to market only tangible goods. *Id.* at 3811:22-24 (Lowcock).

180. A significant portion of Google's search advertisers can purchase a text ad, but not a PLA. *Id.* at 1180:7-24, 1183:13-19 (Dischler); *id.* at 4251:2-9 (Juda) ("[P]roduct listing ads only appear on searches that are more retailer product oriented."); *id.* ("[S]ince text ads offer a more free-flowing way for advertisers to target searches, they will sort of run the whole gamut of the kinds of searches that they may show against."). For example, a financial institution like JPMorgan Chase purchases text ads but not PLAs. *Id.* at 4848:1-11 (Lim). Moreover, many of Google's top advertisers by ad spend are online travel companies that do not purchase PLAs. *See* PSX867.002.

181. Text ads are thus the predominant form of advertising on Google, whether measured by revenue or number of advertisers. Tr. at 1180:25–1181:13, 1476:25–1477:5 (Dischler). In 2020, text ads made up about 80% of Google's search ads by revenue. *Id.*; *id.* at 1282:9-11 (Dischler). In terms of ad types, 52.8% of ad dollars spent on Google come from advertisers who purchase only text ads; 46.9% is generated from advertisers who purchase both text ads and PLAs; and a mere 0.1% is originated by PLA-exclusive advertisers. *Id.* at 4649:5-15 (Whinston) (discussing UPXD102 at 37); *accord* PSX867.003 (54.7% of revenue comes from advertisers who purchase only text ads versus 45.1% from advertisers who buy both text ads and PLAs). When measured by number of advertisers, 92.5% of Google's advertisers purchase only text ads, 5.5 % purchase PLAs and text ads, and 2% purchase only PLAs. PSX867.003; *accord* Tr. at 1476:25–1477:5 (Dischler).

182. Advertisers have significant control over the "copy" of a text advertisement. Tr. at 423:15-20 (Varian); *id.* at 3810:13-23 (Lowcock); *id.* at 1184:16–1185:1, 1185:13-15 (Dischler) ("Q. Would you agree that a text ad gives an advertiser more control when their ad appears on a search engine results page? A. It does."). For example, advertisers can tailor the text of the advertisement to include a heading and description or add "extensions" such as additional site links

or contact information. *See* UPX12 at .005; Tr. at 1180:3-6 (Dischler). These are sometimes known as "formats." Tr. at 4791:1-4 (Whinston); *see id.* at 5128:4-18 (Booth) (discussing PSXD2, Home Depot's use of an extension to promote a Labor Day sale).



UPX12 at .005.

183. By contrast, advertisers have less input into the final copy of a PLA. Tr. at 1185:2-15 (Dischler); *id.* at 5133:9-10 (Booth) ("There are fewer controls or ability to be able to custom tailor a product listing ad or a shopping ad."). Google generates PLAs using machine learning, based on inventory information provided by the advertiser. *Id.* at 1185:4-6, 1353:7-11 (Dischler) ("The retail advertisers will provide us with a product feed that has structured information which is analogous to an ad creative[.]").

184. Advertisers also have more control over text ads because they are purchased through keywords. A query that includes an advertiser's selected keywords might trigger an advertisement from that source. *Id.* at 1185:16-19 (Dischler). Advertisers do not select keywords when buying PLAs. *Id.* at 1185:20-22 (Dischler). "Shopping campaigns rely on the feeds for letting the engines know when it is relevant to serve [the] product." UPX926 at 698. "Since Shopping campaigns are not keyword-based, the information included in [the] product titles and

descriptions will be the main source of what the engines will be crawling before serving ads." *Id.* at 699. *But cf. id.* at 701 (advertisers can use negative keywords to target PLAs); *infra* Section V.F.3.b (discussing negative keywords).

185. Both text ads and PLAs are sold using an auction, although those auctions are different. Tr. at 1197:9-13 (Dischler); *id.* at 3812:9-12 (Lowcock); *see infra* Section V.F (describing text ads auctions). In 2017, Google considered and rejected a combined auction for text ads and PLAs. *See* UPX1013 at .003 (deciding against integration in part because "user intent and advertiser value is different across the units, and as a result advertisers are not bidding on the same thing on Shopping and Text ads"). At present, changes to pricing of text ads auctions does not impact the pricing of PLA auctions. Tr. at 1203:21-24 (Dischler).

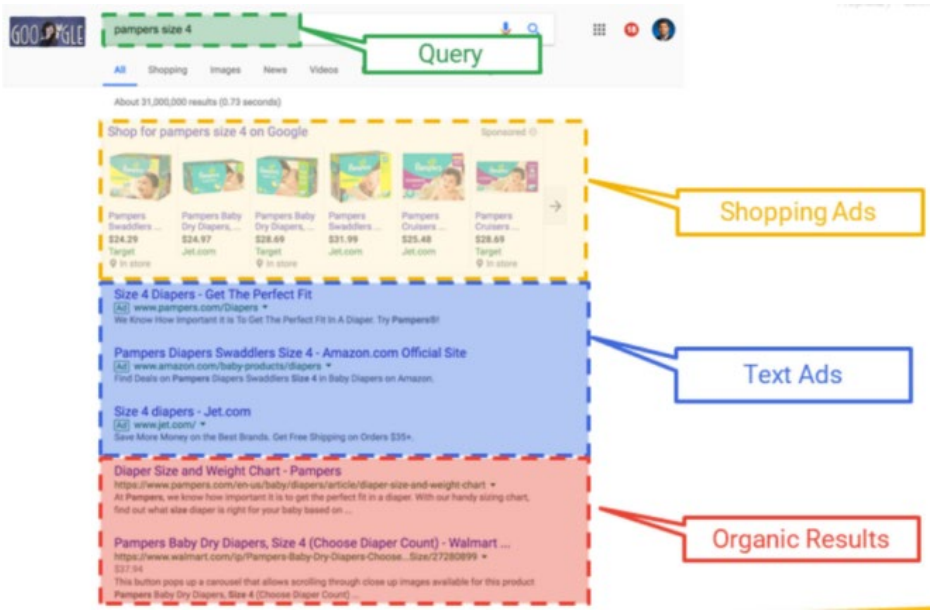
186. Both text ads and PLAs are sold on a cost-per-click (CPC) basis. "[T]he advertisers only pay[] if the user clicks on a link within their ad." *Id.* at 1195:14-16, 1177:5-20 (Dischler); UPX1 at 538–39. PLAs cost less than text ads. *See* UPX1013 at .003 ("While PLAs are a great user experience and provide a great deal of advertiser value, the CPCs tend to be lower than text ads."); Tr. at 4650:2-20 (Whinston) (discussing UPXD102 at 39) (concluding that "text ads are more expensive than PLAs" and while "PLA prices have been flat or, if anything, a little decreasing, [] text ad prices have been going up"); *cf. id.* at 4782:23–4783:2 (Whinston) (discussing UPXD102 at 65) (opining that the CPC of text ads has doubled between 2013 and 2021).

187. Google views text ads and PLAs as different products. Tr. at 423:12-14 (Varian); *id.* at 1188:10-16, 1188:25–1189:1 (Dischler) ("[F]rom the perspective of Google, shopping ads and text ads are different products."); PSX191 at 722 ("Shopping and Text Ads are different products with different goals."); *id.* at 723 ("Today these two formats are siloed in their own world

and don't compete[.]"); UPX1084 at 477 (slides summarizing differences between text and shopping ads); UPX440 at 590 ("[W]e believe that both supplement each other and provide useful information to the user."). Accordingly, Google has separate teams for text ads and PLAs, and those teams have different goals. Tr. at 1188:25–1189:3 (Dischler); *id.* at 1498:9-16 (Dischler) (Google plans to continue selling text ads and PLAs as separate products).

188. Retail advertisers, however, often have the same goal when using both types of ads, which is to drive sales. *Id.* at 1183:22-25, 1190:4-8 (Dischler). Accordingly, retail advertisers "often will relatively allocate their budgets on text ads or shopping ads in order to achieve that objective at the lowest possible cost and highest effectiveness." *Id.* at 1355:5-9 (Dischler); *infra* Section V.E.

189. Because tangible goods can be advertised using either a text ad or PLA, both ad types sometimes will appear on the same SERP. Certain retail advertisers attempt to purchase both to maximize their visibility on a given SERP. For example, if a user searches for a particular branded product (e.g., see below entering the query "pampers"), the brand can attempt to "own the SERP" by purchasing the top placements for both text ads and PLAs. *See* Tr. at 5137:14-17 (Booth) ("[T]he SERP has got limited real estate, and so the more that we can take up that real estate, the higher consideration we would have for somebody to select one of our ads.").



UPX12 at .003.

190. Google recognizes that some advertisers use text ads and PLAs together to maximize their SERP "real estate." *See* Tr. at 1354:18–1355:5 (Dischler); UPX464 at 155 (PLAs "[c]omplement[] text ads to increase an advertiser's 'shelf space' on SERPs[.]").

191. An advertiser may also purchase its rivals' branded keywords to "conquest" by diverting rivals' potential customers towards its platform. *See* Tr. at 3864:19–3865:25 (Lowcock). Conquesting thus is most effective through text advertising, which uses keywords. *See id.* at 4846:23–4847:8 (Lim) ("branded keywords" are those that contain a firm's "owned and operated terms"); *id.* at 5131:22-25 (Booth) (text ads are better suited to branded keywords, as a query for "Home Depot" is too general to assign to a single product).

192. Google's market share in the text ads market measured by ad spending is 88%. *See id.* at 4777:21–4779:6 (Whinston) (discussing UPXD102 at 62). Of those text ad dollars, 45% comes from text ads that are displayed in response to a query entered into a default search access point covered by Google's distribution agreements. *Id.* at 5772:20–5773:2 (Whinston) (discussing UPXD104 at 39).

2. SVP Search Ads

193. SVPs also display search ads, which are almost exclusively PLAs. SVP PLAs also use a feed-based system to select ads. *See* Alberts Dep. Tr. at 39:22-40:13 (describing Amazon and Target as serving PLAs "powered by product feeds").

194. In order to place a search advertisement on an SVP, "the client needs to have their product or services available for purchase on the[] online retailer websites." Tr. at 3854:13-15 (Lowcock); *see, e.g.*, James Dep. Tr. at 105:20-23 ("[A]n Amazon-sponsored product ad would require the . . . advertiser . . . to be selling that product on Amazon."). A user that clicks on a search ad delivered on an SVP thus will remain on the platform, unlike a click of a GSE search ad that takes the user to the advertiser's website. *See* Tr. at 485:11-13 (Varian); *id.* at 1398:4-10 (Dischler) ("One particular feature of Amazon's product ads is that since they're also the platform on which products are sold, it means that they can close the loop, which means that anytime a conversion happens, when a purchase event happens, it happens on Amazon."). SVPs like Amazon take a "cut" of the final sale, which drives their profits. *See* DX501 at .015–.017.

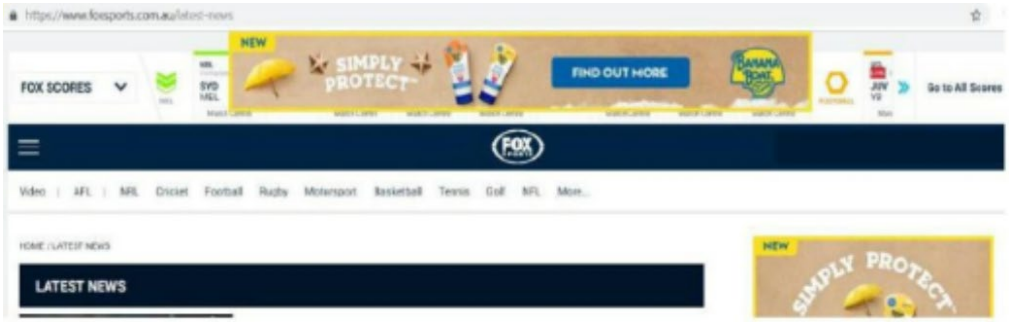
195. As a consequence, a firm that does not sell on an SVP also will not advertise on it. For example, because Home Depot does not sell goods on Amazon, it does not purchase search ads on Amazon. Tr. at 5124:10-23 (Booth).

196. As of 2023, Google estimates that Amazon's revenues are larger than Google's in retail advertising. *Id.* at 1403:20-21 (Dischler) (discussing DX231 at .003).

B. Display Ads

197. A display advertisement is an image or video that appears on a website. *Id.* at 4848:17-22, 4857:3-5 (Lim). One type of display ad is a banner ad, which is depicted below at

the top and side of the image. *Id.* at 1195:19-25 (Dischler); UPX274 at 841. If a user clicks on a display ad, they will be directed to the advertiser's website. *See* UPX8089 at 398.



UPX274 at 841.

198. Display ads only run on a website if the site is supported by software that enables the ad's placement. For Google Ads that software is the Google Display Network. UPX8056 at .002. Many websites do not have display advertising on them. Tr. at 1193:13-18 (Dischler). Display ads do not appear on a SERP. *Id.* at 1193:19-21 (Dischler).

199. Display ads are priced based on the impressions that the advertisement receives. "An impression is the delivery of an ad," which indicates "a high probability that the user has seen the ad." *Id.* at 3821:13, 19-20 (Lowcock). The advertiser pays for a display ad whenever it shows up on a user's screen. *Id.* at 1177:15-17 (Dischler); UPX1 at 538 ("An impression is counted each time your ad is shown."). The metric used to price display ads is known as cost-per-mille (or CPM), which is a fixed price per thousand impressions. UPX26 at 770; Tr. at 1194:16–1195:13 (Dischler). Display ads sold through Google are priced through auctions that are distinct from those used for text ads or PLAs. *See* Tr. at 4006:23-25 (Juda). Display auctions are first-price auctions, where the top bidder wins the ad placement and pays its bid price. UPX6032 at 655–56.

200. Display ads are well-suited for creating brand awareness. UPX26 at 764 ("Display ads . . . aim to build brand recognition[.]"). For instance, if an individual "see[s] a display ad for

a new fuel-efficient Toyota, [they] might think, 'Gee, maybe it's time to buy a new car.'" Tr. at 454:13-20 (Varian) (quoting UPX411 at 638).

201. Because a display ad is not served to a user in response to a query, advertisers rely on various other signals, both from the ad publisher and the user, in determining where to place a display ad. Advertisers can elect to place display ads to appear on content-relevant websites (e.g., an ad for a mixer next to an article on baking) or on specific websites. UPX26 at 769. As for user signals, *see id.* at 764, advertisers look to place display ads on content-relevant or industry-related websites that the user has visited or whose ads on which the user has clicked, UPX428 at .011; Tr. at 1418:4-8 (Dischler) ("The users'[] interest can be signaled in any number of ways, whether it's visiting a website, whether it's subscribing to a TikTok channel of a golf influencer or in any number of ways.").

202. A particularly valuable form of display advertising is "retargeted" display ads. An advertiser uses a consumer's activity on the advertiser's website to tailor a later-appearing display ad on another website. To illustrate, "[a] retargeted ad would occur, for example, when you bought a product and there was a complimentary product that was associated with that. So, you could buy a product like ski boots and it would suggest ski equipment or ski mittens." Tr. at 455:6-9 (Varian). A retargeted display ad can be delivered only *after* the consumer has visited the advertiser's website. *Id.* at 455:25–456:5 (Varian).

203. The placement of a retargeted display ad is most valuable within the first hour after the user visits the advertiser's website. UPX26 at 764–65. The value of a retargeted ad diminishes as the time increases from the user's visit to the website, because the user is less likely to possess the intent that they had when visiting the site. Tr. at 456:6-17 (Varian). Take, for instance, a user who visits Best Buy's website and looks at flat-screen TVs but does not make a purchase. A

retargeted display ad featuring a brand of flat-screen TV will be less effective as time goes on from when the user visited the Best Buy website.

204. Privacy initiatives can also limit the effectiveness of such targeting techniques. Retargeting data is collected using "cookies" or data about an individual's prior web activity: "The way this works is that an advertiser or agency presents an ad and a list of [] cookies to an ad server network and the network displays the ad to the cookies on the list, if and when these cookies show up on particular website." UPX413 at 735. Cookies can be limited by third parties. For instance, after Apple made privacy changes to a new version of iOS, Meta's ability to serve retargeting ads was made "much harder or potentially even not possible in some circumstances." Levy Dep. Tr. at 172:18-24.

205. Retargeted display ads cannot replace search ads. *See* Tr. at 5220:11-22 (Booth).

C. Social Media Ads

206. Social media advertisements are essentially display ads that are integrated into a social media feed. *See id.* at 5392:3–5393:9 (Jerath); *id.* at 3839:23–3840:2 (Lowcock); van der Kooi Dep. Tr. at 260:21–261:2.

207. One of the largest providers of social media ads is Meta, which owns Facebook and Instagram. The bulk of Facebook's social media ads are not considered search ads, although "a very small percentage" do qualify. Tr. at 8772:13-16 (Israel); *id.* at 458:4-5 (Varian). Facebook has roughly twice as many advertisers as Google. *Id.* at 1407:4-11 (Dischler). Other social media channels include TikTok, LinkedIn, Snapchat, and Pinterest. *Id.* at 4840:23-25, 4860:6-13 (Lim).

208. Social media users spend a significant amount of time engaging with the platform, which can provide a greater opportunity for advertisers to engage with potential customers. *Id.* at 1407:23–1408:20 (Dischler). Advertisers use social ads "[m]ainly [for] awareness, engagement,

and, in some instances, acquisition" where possible. *Id.* at 4841:9-10, 4860:15-22 (Lim). Social media ads have "a distinctly different role . . . than paid search" ads. *Id.* at 4841:11-12 (Lim); *see also infra* Section V.D.

209. Because social media ads are not displayed in response to a query, social media platforms rely on various other signals of a user's intent to determine which ads to display. Tr. at 1369:18–1370:1 (Dischler) (noting that Facebook's ads do not use keywords). Those include accounts or channels the user follows, the length of engagement, user clicks on products shown on the feed, etc. *Id.* at 1418:4-7 (Dischler).

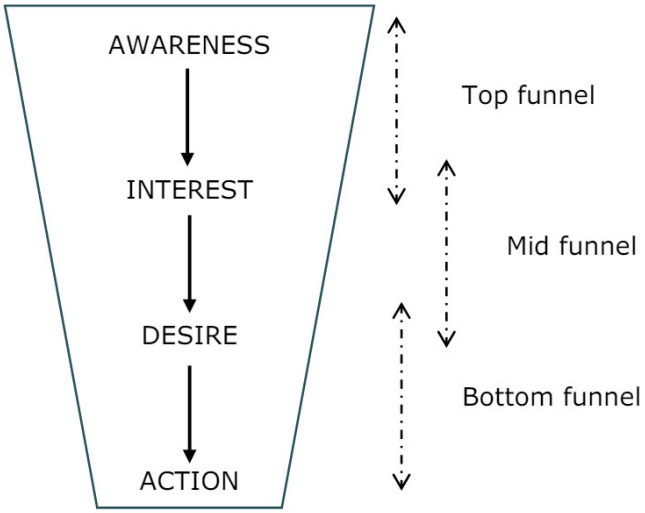
210. Social media is a growing destination for advertisers. Meta has been wildly successful in selling social ads on Facebook and Instagram. Between 2018 and 2021, for example, Meta's ad revenue grew by about 150%. *See* UPX1019 at 530. And while TikTok's growth as an ad platform is in its infancy, evidence suggests that it may be particularly well-suited for targeting younger demographics. DX241 at .010 ("Nearly 50% of Gen Z say they use TikTok, IG for shopping, compared to just 15% of older users.").

211. Google responded to the dramatic growth in social media ad spend with a new advertising product called "Discovery Ads," or Demand Gen ads. Discovery ads are placed within a user's feed on YouTube or Gmail. Tr. at 1196:15–1197:5 (Dischler); UPX33 at 117. Discovery ads were partially modeled after social media ads on Instagram and Facebook to compete with Meta's offerings. Tr. at 1197:3-8 (Dischler); UPX29 at 541 ("Google has no *direct* competitor to Facebook's ad offering[.]"). Discovery ads are not sold on SERPs. Tr. at 1196:22-24 (Dischler).

D. The Marketing Funnel

212. Advertisers use the different ad channels described—search, display, and social media—to accomplish different marketing goals, sometimes within the same campaign. Those objectives often are correlated to the ad channel's unique features.

213. "The purpose of advertising is to capture consumers' attention and drive them through to a point of conversion, and conversion is to purchase a product or service." *Id.* at 3815:6-9 (Lowcock). Marketing professionals in industry and academia have used a "funnel," pictured below, as a visual depiction of the consumer journey from awareness to purchase.



UPXD103 at 7; Tr. at 3815:11-13 (Lowcock) (summarizing the funnel as "[d]riving awareness, capturing intent, driving consideration, and driving a decision to purchase").

214. The upper funnel focuses on generating consumer inspiration and awareness of the product. Tr. at 5121:16-25 (Booth) (e.g., "getting people thinking about performing a [home-improvement] project"); *id.* at 3816:10-11 (Lowcock). In the middle is the consideration phase, where the consumer evaluates a class of products or a particular product. *Id.* at 5122:9-10 (Booth); *id.* at 3817:24–3818:2 (Lowcock) ("The middle part of the funnel is to try and drive some sort of

. . . behavior so to learn more about the product or service."). The lower funnel seeks to persuade a user to carry out a transaction (e.g., a sale or other metric of conversion). *Id.* at 5121:21-25 (Booth); *id.* at 3818:3-8 (Lowcock).

215. Another way to think about the funnel is in terms of "push" and "pull" ads. "[P]ush ads are essentially an advertiser putting a message out there when a consumer isn't necessarily even looking for something. Pull ads tend to [function when] somebody goes to Google or goes to Bing, is actively looking for something, [advertisers] have the opportunity to be able to respond to that query." *Id.* at 5123:3-11 (Booth) ("So push [] is we're sending our message out. Pull means we're bringing people in who are already in market."); *id.* at 6588:13-20 (Vallez) ("We generally think about search as pull," and "[p]ush ads are generally more what we call upper funnel. They're more video, display, that type of media, social media.").

216. "The customer journey is complex. Consumers don't consume media in a silo, so they experience media across all channels." *Id.* at 3815:2-5 (Lowcock).

217. Marketers view different ad channels in terms of their relative strength at achieving objectives along the funnel. Generally, display ads are superior at establishing product awareness, whereas search ads are more effective at driving conversions. "One way to think about the difference between search and display/brand advertising is to say that search ads help *satisfy* demand, while brand advertising helps to *create* demand." UPX411 at 638 (2008 internal Google email written by Hal Varian) (internal quotation marks omitted) (emphasis added); UPX459 at 871 (same); UPX439 at 112 (same); *accord* Tr. at 1174:20-23 (Dischler) ("If you want to get very broad, to reach a diffuse audience like someone used for TV, the search results page is a less optimal channel because it is [] more focused.").

218. Display ads therefore are considered more effective upper-funnel tools and search ads more effective lower-funnel tools. Tr. at 3816:1-11, 3816:25–3817:1, 3819:12-17 (Lowcock) ("Display advertising is primarily intended to drive or create demand and drive awareness," while "[s]earch advertising is there to capture intent after you have driven awareness."); *id.* at 6586:24-25 (Vallez) ("[S]earch is more often than not the last step, one of the last steps in that journey."). Search ads can be effective for upper-funnel goals, *see, e.g.*, James Dep. Tr. at 269:22–270:7, but that is not how advertisers largely conceive of them, *see* Tr. at 6881:20–6882:24 (Amaldoss) (discussing PSXD10 at 17) (summarizing based on a subset of record documents and testimony, 64% of advertisers view display ads to be higher up in the funnel than search ads, and 0% consider display to be below search). Google acknowledges that "[w]hen running Display ads, [advertisers] might not reach those who are actively searching for what" is offered. UPX8056 at .002; *see also* UPX8089 at 398 ("While the Search Network can reach people while they search for specific goods or services, the Display Network can help you capture someone's attention earlier in the buying cycle.").

219. Social media ads can be used at multiple stages of the funnel, Tr. at 4861:3-4 (Lim); Ramalingam Dep. Tr. at 151:7-11, but the marketing industry views them primarily as "push ads" to drive brand and product awareness, Tr. at 6588:23–6859:2 (Vallez) (describing social media ads as "push," not "pull" ads, "because the consumer is not intentionally trying to pull information, . . . they're usually getting a feed that's being presented to them, different options, [] which may or may not be relevant to the context which they're in"); *id.* at 4861:24–4864:1 (Lim) (JPMorgan Chase spends three times as much in paid search as in social, all of which is used for lower-funnel goals, whereas its social media spend is targeted to various stages of the funnel); *id.* at 6513:1-5 (Hurst) (Expedia spends on social media for the purpose of "buying an audience"); Dacey Dep.

Tr. at 291:18-22 ("The intent of the user is very different and it's a more passive user on paid social; whereas, in search, the intent is significantly higher and we can monetize it in a completely different amount."); Tr. at 5123:24–5124:1 (Booth) (identifying social media ads as push ads "in some cases").

220. For some industries, however, like clothing and cosmetics, social media ads can be effective for lower-funnel purposes. DX703 at 704 (Revlon advertising strategy placing social media in the awareness and consideration phases, alongside search in the latter); Tr. at 4892:16-18 (Lim) ("[I]f you're a direct consumer, fashion brand, you may consider paid social lower in the funnel than a bank.").

221. Advertisers often use different ad channels as complements as part of a "full-funnel strategy." Tr. at 5122:1-20 (Booth) ("What we try to do or what most advertisers try to do is try to nurture that consumer journey by showing them a bunch of options, presenting that in display or social, and then ultimately leading them down that transaction path."); *id.* at 4894:15-17 (Lim) ("[M]ore often than not, it's a combination of everything that you're doing that's driving that outcome."). Google itself touts the importance of a "full-funnel" strategy. UPX8051 at .005 (2022 Google record concluding that "full-funnel marketing has never looked better or been more critical to business success").

222. The marketing funnel is neither "dead" nor has it become "obsolete" because of the emergence of digital marketing and new ad technologies. *See* Tr. at 5649:2-13 (Jerath) (discussing DXD14 at 37). Industry witnesses consistently testified that they continue to use the funnel to shape marketing strategies, even on digital platforms. *See id.* at 3815:11-15, 3816:12-20 (Lowcock) (IPG); *id.* at 4857–4892 (Lim) (JPMorgan Chase); *id.* at 5121:1-10 (Booth) (Home Depot); *id.* at 5238:9–5239:3 (Dijk) (Booking.com); *id.* at 6512:1–6513:24 (Hurst) (Expedia); *id.*

at 6585:25–6589:2 (Vallez) (Skai); Alberts Dep. Tr. at 45:18–47:8 (Dentsu); Dacey Dep. Tr. at 98:3-22 (TripAdvisor); Daniels Dep. Tr. at 19:14-23 (Thumbtack); James Dep. Tr. at 23:13–24:3 (Amazon); Levy Dep. Tr. at 104:11-18 (Meta); Lien Dep. Tr. at 186:5-15 (Marin); Ramalingam Dep. Tr. at 148:5–151:18 (Yahoo); Soo Dep. Tr. at 285:3–287:11 (OpenTable); Stoppelman Dep. Tr. at 83:4–84:19 (Yelp); Utter Dep. Tr. at 284:11–285:218 (Microsoft).

223. Even Google has recently and repeatedly recognized the continued vitality of the marketing funnel. *See* UPX427 at 030 (2019); DX241 at .010 (2021); UPX8051 at .002 (2022) (Google essay touting "full-funnel" strategies using Google Ads); *cf.* Tr. at 1413:10–1414:22 (Dischler) (contending that the funnel is "obsolete" but agreeing that advertisers use it "informally"); *id.* at 7791:7-16 (Pichai) (describing the funnel).

224. Large advertisers typically organize themselves along ad channels, with different teams and distinct budgets based on ad channel. *See, e.g.*, Tr. at 4839:12-16 (Lim) (JPMorgan Chase has three departments: paid social, search, and programmatic); *id.* at 6590:23–6591:1 (Vallez) (advertisers generally have multiple teams managing different ad channels); James Dep. Tr. at 187:6-9, 190:9-13 (Amazon has different teams and leadership for paid search, social marketing, display, and video); PSX970 at 668 (advertising agency Tinuiti has different teams for paid search and paid social).

E. Shifting Spend

225. An advertiser will "determine the objectives of their advertising campaign on a campaign basis and they set an overall budget for their entire advertising spend." Tr. at 3805:2-4 (Lowcock). From there, the advertiser will determine how to allocate their budget to different channels to meet campaign goals. *Id.* at 3805:5-10 (Lowcock); *see, e.g.*, UPX926 at 683–84 ("Campaign segmentation should be done at a granular level where you can control the investment

amount allocated towards a campaign. Orienting these campaigns with the customer journey is critical so that you can align all assets housed within the campaign to a common and consistent goal."); Tr. at 4857:12-18 (Lim) ("Paid search budgets are for paid search only. Where we have investment mobility would be if you think about just digital or just a programmatic investment for a campaign, we could optimize to or from various different websites within that campaign. But it is not transferable between a programmatic buy across web pages and paid search. They are distinct and different and separate.").

226. One common campaign driver is seasonality: Certain times of year are associated with product popularity and purchases. *E.g.*, DX187 at .069 ("Escape rooms are very seasonal. You're going to see a spike in the summer months, and around the holidays, Christmas. So, a bit of a mixture of seasonality and available impression.").

227. Another driver is return on investment (ROI), or return on ad spend (ROAS), which are metrics advertisers use to evaluate the effectiveness of their ad spend. Advertisers will shift spend to more effective ad channels to maximize their overall ROI. *See, e.g.*, Tr. at 5340:23–5341:5 (Dijk) (ROI is the "key" metric for decision-making); James Dep. Tr. at 35:19-23 (Amazon bases some of its bidding strategies in part on ROI); Tr. at 5141:14-17 (Booth) ("So we would continue to lean our investment into what is producing the greatest return on advertising spend or ROAS, and that's a consistent practice that our teams are always doing."); DX187 at .066 (ROI is "the top factor affecting short term [] and long term [] spend").

228. But it is challenging for advertisers to calculate ROI and ROAS. *See* UPX441 at 803 (privacy measures have made it "more challenging for [JPMorgan Chase's] teams to have real-time access to performance data at a granular level"); Tr. at 3981:14-17 (Lowcock) ("[B]ecause ROI requires confidential client information, . . . the client might not share that data

with us, nor would it then be provided to third parties to optimize ROI."); UPX519 at .001 ("There is no good sense, both within Google and outside, for what the true ROI of advertising channels are (and consequently how they compare).") (2017); UPX506 at .012 ("Overwhelming majority of adv[ertisers are] nowhere closer to measuring ROI," only a "[s]elect few players with the resources can build models" to do so, "but analysis have shown they are all over the place.") (2017).

229. Google believes that advertisers' ability to calculate ROI has improved significantly in the last six years, in part due to the development of AI and new ad channels, such as social media. Tr. at 1385:3-12 (Dischler). Also, now available to advertisers is automated bidding software, which attempts to discern and compare the ROI of different ad types to further the advertiser's business objectives. *See id.* at 1357:7–1358:19 (Dischler). These automated tools shift ad spend between social media ads and search ads on GSEs and SVPs. *Id.* at 1406:4-8 (Dischler). Google has an automated bidding product, Performance Max, that some of its advertisers use (although not many of its largest). *Id.* at 1371:4-11, 1372:5-24 (Dischler).

230. Though advertisers do try to estimate and maximize ROI and ROAS across channels, they do not substitute away significantly from search ads to other channels, like display or social. These channels are less effective at achieving the same marketing goals as search ads. Advertiser witnesses uniformly testified that purchasing search ads on Google is essential to digital ads campaigns because search ads are uniquely able to capture high-intent consumers. *See, e.g.*, *id.* at 3826:14-15 (Lowcock) ("I would go so far as search would be mandatory in any advertising campaign."); *id.* at 4849:6-7 (Lim) ("We think of search as an always-on acquisition driver for the firm."); *id.* at 6506:24–6507:1 (Hurst) ("[T]here isn't a great substitute for the volume of high-intent customers you can find on Google."); *id.* at 5236:24–5237:1 (Dijk) ("Google is kind of the

exclusive, dominant . . . pool of high-intent, new customers for us to find."); *id.* at 6585:25–6587:3 (Vallez) (agreeing that no paid media channel better captures user intent than paid search because search reflects "the moment right when they're about to make a decision"); DX412 at 665 (Kohl's presentation showing search spend as unchanging while other ad types, including display, social, and video, fluctuate); Tr. at 5450:6-10 (Jerath) (discussing UPXD103 at 23) (Booking.com record explaining that "Search and Display Ads are not seen as substitutable to one another . . . because they target users in very different situations/environments," and the "resulting performance is very different"). There is no evidence that advertisers have significantly shifted spend away from search ads at any point.

231. Advertisers rely heavily on search ads for traffic and revenue. When advertisers have experimented by turning off search ads for a portion of queries or products, they have lost revenue. *See* Tr. at 422:22-24 (Varian). In 2020, for example, Home Depot—one of Google's largest advertisers—studied the effects of cutting off paid search on its revenue. When it turned off paid search in [redacted]% of United States markets, its revenue dropped [redacted]%. PSX676 at 240. Home Depot concluded that for every $1 it invested into paid search, it earned over $[redacted] in revenue. *Id.*; *accord* Tr. at 5284:6-8 (Dijk) (Booking.com cannot stop purchasing text ads from Google and sustain its business.).

232. When it comes to general search text ads, advertisers have a fixed budget that largely mirrors the relative market shares of Google and Bing. Tr. at 4869:7-23 (Lim) (90% of JPMorgan Chase's search text ad spend is on Google, 10% is on Bing); *id.* at 5141:23-24 (Booth) ("It's industry standard, probably 90 percent versus 8 to 10 percent on Bing."); *id.* at 6501:11-14 (Hurst) (Expedia's spend allocation is 10 to 1, Google to Bing); UPX441 at 803 (Google is a

"[c]ore partner in search due to overwhelming market share"). Advertisers buy nearly all of their text ads from these two GSEs. Tr. at 4874:10-12 (Lim).

233. Advertisers consistently testified that shifting significant ad spending from Google to Bing would be ineffective (and unwise) because of Bing's lack of scale. *Id.* at 4869:7–4870:11 (Lim) ("Bing doesn't have an equivalent volume so we would be unable to move budgets between those two partners."); *id.* at 4875:19–4876:4 (Lim) (stating "there's [nowhere] else to go" once it maximizes spend on Bing); *id.* at 5143:5-24 (Booth) (Home Depot's 90/10 spend split has remained constant); *id.* at 6533:16-20 (Hurst) ("I don't think there is a way to shift enough spend to Bing to make up for that gap. I'm actually very confident there is not a way to spend that much money in Bing and find all the travelers you had in Google by using one instead of the other."); *id.* at 5282:7-12 (Dijk) ("Q. Are text ads that Booking.com purchases on Bing generally less expensive than on Google? A. Very difficult to say. It depends very much on the keywords and the searches. But as I told to you, it doesn't really matter. I would gladly spend far more with Bing, but I'm constrained because the demand is clearly not there."); *accord* UPX519 at .017 (Google study reflecting that "Bing was mentioned as having good ROI but too low volume for them to seriously invest").

234. For advertisers that purchase both text ads and PLAs, the shifting of spend between those two formats is more common. *See* Tr. at 5181:22–5182:6 (Booth) (Home Depot reshuffles its text ad/PLA spend allocation daily). But only retail advertisers can shift spend from text ads to PLAs. *Id.* at 1493:11–1494:3 (Dischler); *id.* at 7580:9-17 (Raghavan) (stating that the determining factor in whether an advertiser could shift spend from text ads to PLAs is whether their products "have visual appeal").

235. Some of Google's largest advertisers cannot make that shift. Dr. Raghavan agreed that among Google's top 20 queries in the United States in 2018, only three pertained to a physical product for which advertisers could shift spend from text ads to PLAs. *See id.* at 7578:8–7580:17 (Raghavan) (discussing UPX342 at 859).

236. Even for retail advertisers, PLAs are not perfect substitutes for text ads. *See id.* at 5218:23–5219:5 (Booth) (Home Depot would be unable to use PLAs to advertise a storewide sale). *But see id.* at 1356:25–1357:3 (Dischler) ("I believe that they're equivalent. In the view of the advertisers, they're equivalent and substitutable."); *id.* at 1476:20-24 (Dischler) ("[T]he advertiser has a singular business objective which is to sell products, and they could use shopping ads or text ads in order to achieve that business objective for the retail advertisers that are eligible to use shopping ads.").

237. That said, some retail advertisers are increasingly embracing PLAs and spending more of their search ads budget on that channel. *Id.* at 5182:7-21 (Booth) (Home Depot's spend is greater on PLAs than text ads); *id.* at 1356:22-24 (Dischler) ("You know, as advertisers become more comfortable, they've been shifting more budgets to shopping ads versus text ads.").

F. Text Ads Auctions (Also Greatly Simplified)[2]

238. Advertisers do not purchase ads on Google in the same way they do in traditional media, like newspapers (e.g., the cost of a half-page ad) or television (e.g., the cost of a 30-second ad during the Super Bowl). Instead, on Google, advertisers compete with one another through an auction to make an ad purchase. *Id.* at 463:14-16 (Varian). These auctions occur in a split second,

[2] At trial, Plaintiffs repeatedly confronted Google's ad executives with company records containing their own statements, as well as the statements of their colleagues, regarding Google's text ads auctions. In many instances, the witness professed to lack an understanding of the record or sought to contextualize it in highly technical ways. In making these Findings of Fact, the court gives greater weight to the contemporaneous statements contained in the company's internal records, than later trial testimony in which Google employees declined to ratify those statements.

between the time a user enters a query and when the SERP is displayed. Google designs the auction and controls underlying inputs that can affect the ultimate price generated by the auction. *Id.* at 1197:25–1198:4, 1205:12-18 (Dischler); UPX509 at 869 ("We also directly affect pricing through tunings of our auction mechanisms[.]"). Google runs billions of search ads auctions each day. Tr. at 1198:24–1199:5 (Dischler).

239. The auction determines the ads displayed and the order in which they appear on the SERP. *Id.* at 1198:5-17 (Dischler). An advertiser whose text ad appears on a SERP only pays Google if a user clicks on the ad. FOF ¶ 186. A text ad is priced on "cost per click" (CPC) basis. *Id.* The price of a text ad "is determined based on the results of the auction, and the maximum cost per click is specified by the advertiser." Tr. at 1352:13-17 (Dischler). Google sets a "reserve price" for text ads, or a minimum price below which it will not sell the ad. *Id.* at 463:20-25 (Varian); *id.* at 1204:15–1205:3 (Dischler).

240. Google's text ads auction is a classic second-price auction, with modifications. A second-price auction is one where multiple bidders enter the auction, and the winner, instead of paying the price of their highest bid, pays one cent above the first runner-up. *Id.* at 1200:2-21 (Dischler). This makes the "second price," or the runner-up's bid, very important. *Id.* at 1200:22-25 (Dischler). Google runs a second-price auction because it views it as more advertiser-friendly. *Id.* at 4263:12-16 (Juda). It is also more efficient for Google, because when the final price is determined by something other than the top bid, advertisers will not "be constantly trying to move their bids up or down to see if they can get the same outcome for less money," which is burdensome for both advertisers and Google's advertising system (which is responsible for "consuming all these changing bids at all times and processing them"). *Id.* at 4264:1-14 (Juda).

241. An auction winner is not determined solely based its bid. The auction also relies on certain qualitative metrics, including the quality of the ad and the advertiser's website. At a high level, the auction captures both the bid and the qualitative factors in the following formula:

$$\mathbf{LTV = bid \times pCTR - \beta}$$

UPX8 at 054.

242. In this formula, "bid" represents the advertiser's chosen bid; "pCTR," or predicted click-through rate, is a proxy for the ad quality; and "beta" refers to blindness, which tries to approximate future engagement with ads. *Id.*; UPX37 at 200, 202–03; UPX442 at 868. The pCTR is a score between 0 and 1: "[I]f a predicted click-through rate of 0.20 was used in a running shoes query, that would imply that the system thinks there's a one-out-of-five chance that a user is going to click on the ad, or a 20 percent chance." Tr. at 4281:1-4 (Juda). The formula's result is an "LTV" score, which refers to the "long-term" value of the ad. UPX889 at 772–73. The higher the LTV score, the more likely the ad will win an auction. *Id.* at 772.

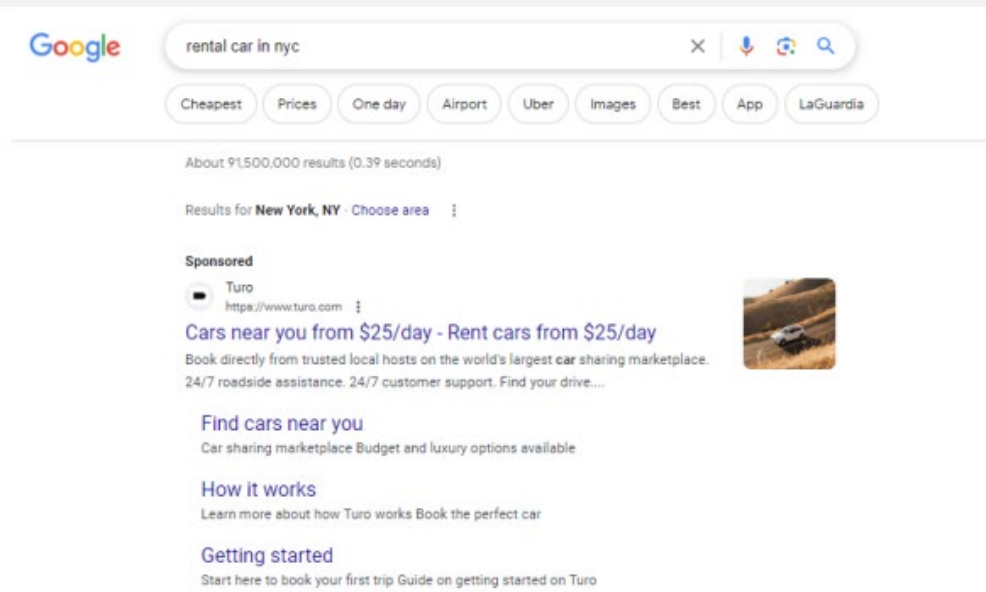
1. Pricing Knobs

243. Google can affect the final price paid for an ad through so-called "pricing knobs" or "pricing mechanisms." *Id.* at 779, 783. Google has used three primary pricing knobs to influence prices: (1) squashing, (2) format pricing, and (3) randomized generalized second-price auction. Google has referred to these levers as "intentional pricing." UPX509 at 869.

244. **Squashing** premiered in a launch that Google code-named "Butternut Squash." *See generally* UPX442. Squashing artificially raises the pCTR of the runner-up, thereby inflating its overall LTV score. UPX889 at 784. This increases the likelihood that the runner-up takes the top spot (even if its bid is not the highest). *See id.* at 784–86; Tr. at 1221:17–1222:10 (Dischler) (squashing tries "to prevent runaway winners and to create a chance for smaller advertisers to

participate in the auction"). But squashing also "[e]ffectively simulates auction pressure" by making the runner-up more competitive, thereby creating upward pricing pressure on the top-rated bidder. That top bidder must pay more to win the auction so as to offset the runner-up's artificially increased LTV score. UPX889 at 784; Tr. at 1386:6-9, 1383:19-21 (Dischler); *id.* at 4281:17–4283:2 (Juda). As a result, on average, the winner of an auction subject to squashing pays more than they would have absent squashing. *See* Tr. at 1222:3-10 (Dischler); *id.* at 8857:2-13 (Israel).

245. **Format pricing** is Google's practice of charging advertisers for "formats," or additional text and links that appear on general search text ads. *Id.* at 4254:3-8 (Juda) (discussing DXD11 at 5, 8). A formatted text ad is illustrated below.



DXD11 at 5 (links entitled "Find cars near you," "How it works," and "Getting started"). Formats allow an advertiser to create a customized and complex ad copy that provides the consumer with more information than an ordinary text ad. When first implemented, formats came at no extra cost to advertisers. *See* UPX430 at 580. But in 2017, Google adjusted the auction to impose price increases for formatted ads, after it determined that "strongly increased format prices" resulted in long-term revenue gains. UPX729 at 979; FOF ¶ 250 (discussing the Gamma Yellow experiment).

246. In 2019, Google developed a randomized generalized second-price auction, or **rGSP**, another ad launch that affected pricing. Tr. at 1222:11-17 (Dischler). Put simply, rGSP occasionally randomly switches the LTV scores of the two top auction entrants, thereby allowing the runner-up to win the auction despite its originally lower LTV score. *Id.* at 1222:18–1223:7 (Dischler); UPX1045 at 422; UPX512 at .009–.010. Much like squashing, rGSP artificially enhances the runner-up's score, creating more competitive auctions and driving up final prices. UPX45 at 840 ("Ads pay a higher price to win with certainty, which increases revenue."); Tr. at 4177:20-25 (Juda) (one way that advertisers can avoid being swapped is to increase their bid to counteract the other LTV score impacts). rGSP replaced format pricing because it was even more effective at driving revenue. *See* UPX512 at .002. Advertisers cannot opt out of rGSP. Tr. at 4302:9–4305:5 (Juda).

2. Increasing Text Ads Prices

247. Many of Google's ad innovations seek to deliver additional value to advertisers and users. *See* UPX430 at 577; UPX45 at 838–39. "[A]nother important objective is the revenue that the platform (Google) makes." UPX45 at 839.

248. Google strategically has used pricing knobs to raise text ads prices. Google's "intentional pricing launches," or "intentional exploration," arose from the concern that it was not capturing in its pricing the full value of the ad to the advertiser. In other words, Google believed that it could increase ad prices because its pricing was below what advertisers would be willing to pay for an ad.

249. That intention is perhaps best captured in a January 2018 strategy document titled "How should AQ think about Pricing," which drew on lessons from past pricing experiments and outlined possible future pricing strategies. UPX509 at 869. The record observed, "[w]e know

there is still significant upside left in the different auction pricing knobs . . . but we've only dared capture[] a small fraction." *Id.* It then asked: "Should we stop working on pricing exploration despite our belief we're leaving money on the table?" *Id.*; *see also* UPX737 at 462 ("[T]he value created . . . was left underpriced," meaning "that the cost of incremental clicks did not rise along with volume following the original click cost curve."); UPX430 at 578 ("[T]here is a lot of opportunity to increase prices for search ads.").

250. Google had learned from earlier ad experiments that small but substantial price increases would generate sustained long-term profits. For example, a study conducted in 2017 termed "Gamma Yellow" sought to evaluate the long-term effects of increased format prices. *See* UPX729 at 979. The experiment exposed 15% of advertisers to "strongly increased format prices" for six weeks. *Id.* Google found that "50% of the initial revenue gains stuck" and "found no evidence of notable format opt-out behaviour." *Id.*

251. In 2017, Google began testing a launch called Momiji. *See generally* UPX36. Momiji sought to determine how much Google could raise prices through format pricing. *See* UPX456 at 274–75; UPX36 at 063, 065–67. Google admitted that it had "no way to say what formats should cost," but it knew that format pricing was the "best knob to engender large price increases." UPX507 at .026. Because it had "no principle to say what the cost should be," Google decided to "follow [its] long term revenue focus." UPX506 at .005 ("So, we follow our long term revenue focus. We put a reasonable price to Top-1 extra clicks and see if advertisers are willing to pay it (if it sticks in an AE). Try to bring the Top-1 headroom down closer to the other position headroom."); *see also* UPX456 at 274 ("We are making this tuning in order to better share in the value that AdWords and formats create, and to raise text ad prices on Google.com."). Acknowledging that it "shouldn't launch" if it thought it would "see large scale format opt out,"

UPX506 at .008, Google nevertheless pushed significant format price increases because its experiments had revealed that advertisers would not drop out in significant numbers, Tr. at 1274:21–1275:3 (Dischler) (Momiji led to an increase in search ads revenue); *see also* UPX36 at 064, 069 (describing Momiji format pricing increases: "We've launched things at 15% and heard nothing" and "[w]e don't see mass opt-out of anything").

252. Similar studies showed that Google could raise prices using squashing without losing advertisers. In a 2017 study code-named "Kabocha," Google determined that squashing was "long term revenue positive[.]" UPX745 at 085. The study showed that the "stickage factor" after price increases "was also [] roughly 50%," meaning Google "expected 50% of gains to stick post advertiser response to the changes introduced[.]" UPX737 at 462.

253. Still, as reflected in the January 2018 strategy document, Google understood that "at any given point in time[,] there is some price or ROI ceiling above which" advertisers may abandon advertising on Google. UPX509 at 869–70. To ensure profits while remaining under the "ceiling," Google outlined four paths, two of which involved no "pricing exploration" (thereby leaving "money on the table") and two of which would continue "price exploration." *Id.* at 871–72. Google appears to have selected "Path 3," which it termed "Control the walk." *Id.* at 872. This is the "scenario under which [Google] believe[d] the ceilings are *still high* and [it] want[ed] to maximize [long-term] revenue." *Id.* (emphasis added). "This sharing of value implies getting closer to these ceilings without passing them, which we need to do in a controlled pricing environment." *Id.* In other words, Google believed that it could raise prices using pricing knobs without losing advertisers—since "ceilings are still high"—thereby growing its revenues. Google proposed that price changes could be made through "[i]ncidental launches throughout the year,"

and "[p]rice adjustments to the new state of the world would be done once or twice a year through dedicated pricing exploration using existing . . . and [h]olistic . . . tools." *Id.*

254. Later launches and studies show that is precisely what Google did. UPX745 at 085 (AION six-month advertiser experiment, from early 2018, demonstrating that Google "can confidently increase format prices" because "there is still large headroom in format pricing"); UPX 737 at 462 (stating that AION's "[s]pend response trends to the 15% change have stabilized at roughly half the initial gains, confirming our belief that there is still room for price tuning"); *id.* at 461–64, 476 (Potiron study, from June 2018, showing that "[f]ine grained squashing" showed the same 50% "stickage" in the long term). Increasing prices through format pricing plainly was a success. When it was replaced by rGSP, format pricing had risen to make up about 20% of Google's text ads revenue, measured per thousand queries (also known as revenue per mille, or RPM). *See* UPX512 at .002 (format pricing comprised about 20% of Google's RPM).

255. The launch of rGSP in 2019 was equally successful. Google's pre-launch experiments indicated that rGSP would increase CPCs for top slot ads on non-navigational queries by 5.91% on PCs and tablets and 4.85% on mobile phones with a long-term "stickage factor" of 40–50%. UPX457 at 258–60. Experiments showed that a 5.74% revenue gain persisted two months after launch. UPX45 at 838; *see also, e.g.*, UPX745 at 085–86 (new launch known as "Stateful Pricing" demonstrated "over $6 billion in *short term* incremental annual revenue in headroom").

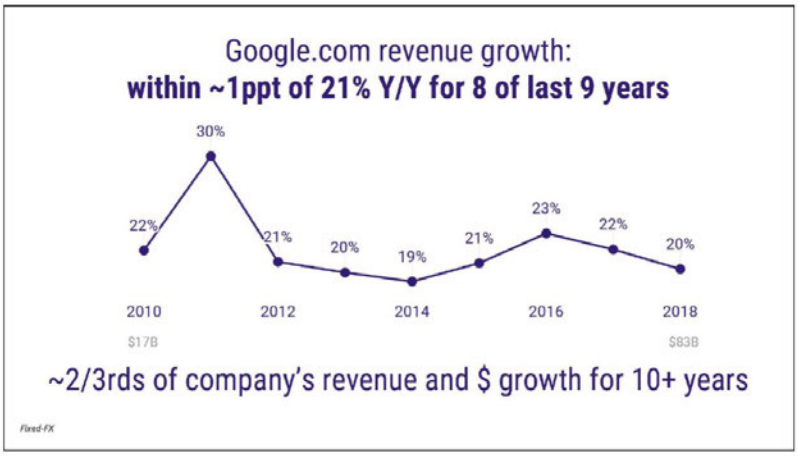
256. In February 2020, Google reported that the rGSP "tuning point," or increased bid, was about 3.7. UPX466 at 939. This meant that in order for the top bidder to keep its position, it would need to bid 370% more than the runner-up to account for the swapped LTV score. *Id.*; Tr. at 4178:8-14 (Juda); *see id.* at 4177:20-25 (Juda) (one way an advertiser may avoid swapping is by

increasing its bid). If that bidder was successful, it would ultimately pay significantly more than it otherwise would have for the same ad placement.

257. Google's records make clear that growing its revenue was a principal goal in launching these price tunings. *See, e.g.*, UPX51 at 228 ("Main goal: Long-term Revenue"); UPX442 at 868 (Google will use its launch "to recover lost revenue from launches which create value for our users and advertisers, but reduce revenue for Google") (squashing); *id.* (Google "wants to continue launching such advertiser value creating launches, but needs a mechanism to help Google share in the value that [the] launches create"); UPX507 at .004 ("Prices could be higher, and we think we would keep the money," because "[r]evenue gain from higher prices > revenue loss from response" by advertisers) (format pricing); *id.* at .010 (describing philosophy as to "[g]et the highest RPM point possible"); *id.* at .027 (ranking format pricing, squashing, and reserves by "effectiveness," measured as increased RPM); UPX430 at 577 (Google adjusts "the parameters of the auction function in order to improve Long Term Revenue. . . . This work has resulted in products which add several billions of dollars in incremental revenue annually."); UPX45 at 837 (rGSP solves the "difficult problem" and "major priority" of "increasing revenue in auctions with low competition[.]").

258. In fact, Google used ad launches to meet revenue goals or make up for perceived deficits in its ad revenue growth. *See, e.g.*, UPX745 at 085 (projecting "+4% RPM from standalone pricing launches" and expecting additional billions in "incremental annual revenue" from format pricing and squashing); UPX456 at 298 (predicting at +1.3% revenue increase). As Dr. Adam Juda, Google's Vice President of Project Management, testified, a positive 20% increase in revenue "was an annual objective that we would try to get to over the course of an entire year." Tr. at 4140:1-20 (Juda); *see id.* at 7549:6-9 (Raghavan) (discussing UPX342 at 824) (same).

259. And Google met that objective year after year. As the below chart shows, Google has enjoyed unusually consistent revenue growth from 2010 to 2018 that hovered at or above the 20% expectation.



UPX342 at 824.

260. If Google grew concerned about meeting its revenue targets, it called for a "Code Yellow effort," where its "top priority" would be to "deliver [] revenue launches" through intentional pricing. UPX738 at 406; *see* UPX733 at 203–04 (describing the Sugarshack format pricing launch, which was used to meet Google's revenue targets in response to a Code Yellow); UPX514 at 386 (describing ad launches implemented to meet Code Yellow revenue goals).

261. Google's pricing decisions also reflected an understanding that increasing its revenue in the ways discussed might occasionally come at a cost (or no improvement) to advertisers. *See* UPX734 at 509 ("cleverer . . . auction pricing" comes "at a cost to advertisers"); UPX507 at .015 ("Sales struggles to explain these [price increases] in terms of user/advertiser value[.]"); UPX889 at 780 (auction pricing mechanisms are "[n]ot designed to increase clicks"); UPX36 at 065 ("[C]urrent system has issues. We're acknowledging the current CPM space is giving them different prices at the same value.").

262. For instance, Google claimed that the *primary* motivation for implementing squashing was to help smaller advertisers, but that is not borne out by the record. Tr. at 1386:10-19 (Dischler) ("The primary reason that we implemented squashing was to prevent certain winner-takes-all dynamics in the auction. What we were finding is that there were a few large advertisers that were kind of winning every auction in a particular category, and we weren't sure actually whether that was a good user experience. It was becoming much harder for the runnerup to break through and show up in the top position."). In fact, after squashing, Google displayed the same ads on about 95% of queries measured by impressions and clicks, generating 88% of its revenue from queries returning the same ads in the top placement. UPX442 at 872. In other words, the overwhelming majority of revenues resulted from the same placements before and after squashing. Moreover, Google measured success not based on improved ranking for smaller advertisers, but by whether a "squashed" auction produced positive revenues for Google. In one record, Google described squashing as "desirable" when CPCs increased, and "undesirable" when they did not due to "reranking." UPX737 at 464. Because squashing produced desirable results 60% of the time, Google believed that "coarse squashing provide[d] overall positive metrics" but was "suboptimal due to these mixed effects." *Id.* Google proposed to further refine squashing to optimize revenues. *Id.* at 464–65.

263. When it made pricing changes, Google took care to avoid blowback from advertisers. For instance, records show that Google had concerns about the impact of transparency on their efforts to increase prices. *See* UPX507 at .015 ("Worry that if we tell advertisers they will be impacted, they will attempt to game us and convince us to abandon the experiment. . . . But, if we don't tell them, they will react more naturally (how they'd react if they believed they couldn't

influence our decision at all)."); UPX519 at .003 ("A sudden step function might create adverse reaction.").

264. Google therefore endeavored to raise prices incrementally, so that advertisers would view price increases as within the ordinary price fluctuations, or "noise," generated by the auctions. *See, e.g.*, UPX507 at .023 (describing a 10% CPC increase as "safe" because it is "within usual WoW noise"); UPX519 at .003 (acknowledging that advertisers would notice a 15% price increase, but "this change is to [be] put in perspective with CPC noise," that is, "50% of advertisers seeing 10%+ WoW CPC changes"); *id.* (comment stating that 15% is "probably an acceptable level of change (from a perception point of view) because these are magnitudes of fluctuations they are used to see[ing]").

265. With respect to format pricing, one Google document states: "A progressive ramp up leaves time to internalize prices and adjust bids appropriately[.]" UPX519 at .003; UPX509 at 870 (stating that "[i]ncremental launches and monitoring should help us manage" the risk that price increases would lead advertisers to "lower[] their bids or modify[] other settings . . . to get back to a given ROI, leading to less revenue for Google than the initial impact hinted to"). Similarly, in 2020, Google raised prices on navigational queries using multiple knobs and recognized that it was "[o]bviously a very large change that we don't intend to roll out at once," instead planning a "[s]low 18 months rollout" to "[l]eave[] time for advertiser[s] to respond rationally[.]" UPX503 at 034; *id.* at 038 ("A slow roll ensures we don't shock the system, gives time for advertisers to respond and us to monitor changes and stop early if needed."); *see also, e.g.*, UPX505 at 312 (prior to implementing squashing, concluding that "[a]dvertisers should perceive AdWords as a consistent system, and not be subject to constant large impacts due to Google changes," in part to

"improve[] advertiser stickiness"); UPX506 at .018 (Momiji slide deck: "Unlikely that advertisers will notice by themselves and respond. However, a bad press cycle could put us in jeopardy.").

266. Google's incremental pricing approach was successful. In 2018 and 2019, Google conducted ROI Perception Interviews, which raised no red flags about advertisers' attitudes as to ad spending on Google. *See generally* DX187; DX119. While advertisers could tell that prices were increasing, they did not understand those changes to be Google's fault. Google's studies revealed that advertisers facing CPC changes "dominantly attribute[d] these shifts to themselves, competition[,] and seasonality (85%)—not Google." UPX1054 at 061; *see also* UPX737 at 464 ("They often attribute these changes to things in the world or what they've done, not just things happening on the backend[.]").

267. When it made these pricing changes, Google did not consider its rivals' text ads pricing. *See* UPX509 at 959 (Dr. Raghavan querying why "all of the discussion on advertisers' reactions to [Google's] pricing changes seem to presume that this is a 2-person game between the advertiser and [G]oogle," even though it is "really 3 players—the advertisers, [Google], and [its] competitors"); *id.* (noting that "the discussion seems insensitive to where else the advertiser could obtain traffic of similar quality and price").

3. Limiting Advertiser Control

268. Google also depreciated the quality of its text ads product in two primary ways: by reducing the information available to advertisers in Search Query Reports and by loosening keyword matches to create more crowded and higher price-generating auctions.

a. Search Query Reports

269. Google began offering Search Query Reports (SQRs) in 2007 to help advertisers determine whether to add new affirmative or negative keywords to their lists. UPX526 at 538;

Tr. at 1481:16-20 (Dischler) ("They use it in order to measure their advertiser effectiveness, or they could use it in order to improve the range of keywords that they use in order to be able to target users that are looking for their products or services."). Google was aware that SQRs were "widely used by advertisers of all segments." UPX526 at 539, 556.

270. Prior to 2020, SQRs included all queries that resulted in an ad click, even if there was only a single click (i.e., the "one-click threshold"). *See generally id.* Ostensibly out of privacy concerns, Google removed the one-click threshold. *Id.* at 543. It did so notwithstanding "substantial" projected data loss for advertisers and knowing that specific major advertisers, like Expedia and Booking.com, had stated they would be harmed. *Id.* at 545, 549.

271. Google's own records show that the privacy rationale was suspect. *See id.* at 525 (email from Dr. Juda questioning whether the proposed trimming of the SQR report "could or should be turned into a [privacy-focused thing] without a lot of thought"); *id.* at 531 ("While a query can contain sensitive information, I have the ability to type anybody's SSN into my search box. Therefore, queries are not PII, even if I am the only person ever to search for your SSN."); *id.* (opining that "even when we do share keywords which are identical to the query and contain sensitive information, I would argue our documentation is accurate"); *id.* at 541 (unnamed commentor stating "queries aren't PII"). Some advertisers, as well as U.S. Plaintiffs' expert Dr. Kinshuk Jerath, also view Google's privacy-related justifications with skepticism. Tr. at 3850:5-7 (Lowcock) ("[I]t would be reasonable to continue to share that sort of information with us without breaching privacy regulations."); *id.* at 5473:13-25 (Jerath) ("[T]his is not a valid reason because the search query reports were never using user level data."). Still, Google decided in the fall of 2020 that all queries must receive 50 cookied impressions daily to appear on an SQR. *See* UPX532 at 566 ("This decision is rooted in Google's treating search query data as personal

data for this use-case, even though Google has reasonable arguments such data [(i.e., queries)] may not be personal data in many instances.").

272. The less fulsome SQRs negatively impacted advertisers, who already have limited insight into how Google's auctions work. *See, e.g.*, UPX519 at .016 (advertisers "would like to see . . . more transparency in the definition of quality"); Tr. at 3850:16-18 (Lowcock) ("[W]e know what price we paid. We have no true visibility in the way that the price is determined and how the auction is conducted."); Alberts Dep Tr. at 213:21–214:6 ("[I]t does limit some of the visibility in some of the terms that are triggering keywords that we would not like to match to."); Tr. at 5174:16-20 (Booth) (same); *see also id.* at 5468:6-21 (Jerath) (additional examples). For instance, JPMorgan Chase estimated that prior to the change, about 5% of the keywords were not visible on SQRs, but afterwards the number rose to 20%. Tr. at 4866:13–4868:10 (Lim) ("It just gave my team less information to work with.").

273. Google did not inform advertisers how the threshold had changed. UPX532 at 568 (internal informational Q&A for press inquiries advised not to reveal the threshold for making the SQR "in keeping with our privacy and security policies"); Tr. at 5222:2-19 (Booth); Alberts Dep. Tr. at 166:17-25. And because advertisers no longer received a report of every query that involved an ad click, advertisers purchased ads on certain queries generating fewer than 50 cookied impressions. *See* Tr. at 5469:18–5471:12 (Jerath) ("They were buying certain queries but they were not being told . . . which queries they're buying," as if you purchased "a product in a supermarket but they don't tell you what you actually bought."); *id.* at 5471:10-12 (Jerath) ("This is data that you're actually buying. This is indeed where your spend is going. You should be entitled to know that at least this is where I spent my money.").

274. Advertisers not only identify the keywords that may trigger participation in an auction, they also can identify so-called "negative keywords," which are keywords that an advertiser selects so as to avoid entry into an auction. Alberts Dep. Tr. at 214:10-21; Tr. at 400:3-7 (Varian) ("[I]t's the advertiser that provides the keywords. Google is seeing if those keywords match the query, and then it's determining that. So it's really the advertisers' choice of keywords that are determining whether it serves an ad."). Without the single-click information, Google thus not only constrained advertisers' ability to withdraw keywords but also to identify negative keywords to remove themselves from undesirable ad auctions. *See* Tr. at 5472:11-24 (Jerath).

b. Keyword Matching

275. Google also reduced advertisers' ability to remove themselves from certain ad auctions by expanding its "keyword matching" functionality. "[T]he typical way that advertisers interact with search advertising is using keywords, which is literally the advertiser [] guessing what the users might be querying, which is very complex. And so doing that for millions of products is sort of an undue burden on advertisers so [Google] came up with an automated system where [it] do[es] more of the matching." *Id*. at 1353:21–1354:2 (Dischler).

276. One way Google does this is through "semantic matching," which tries to "understand[] the meaning of [key]words and replac[e] those with analogous words so that things that mean the same thing in a particular language are treated the same way." *Id.* at 1363:12-16 (Dischler). The chart below depicts how semantic matching works for the keyword "kids clothing."

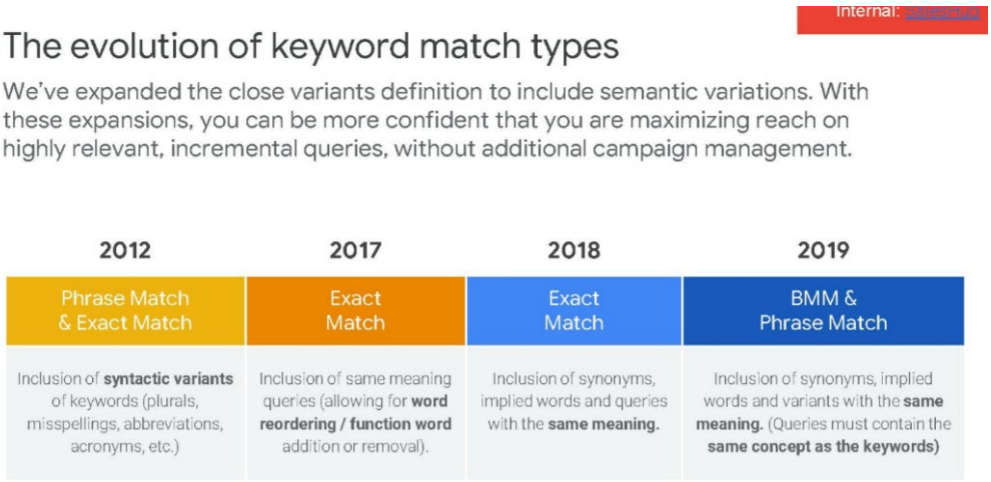
New matches for keyword*: +kids +clothing

kids → children	kids clothing → kidswear	clothing → apparel / outfit
clothing for young child	nikolai kidswear	creative apparel for kids
children's clothing in singapore	tj maxx kidswear	kids outfits
kids clothing canada	kids winter wear for girls	kids apparel in citywalk
best children's clothing brands	sean jean kids wear	
childrens beach clothes	kids wear online	
newborn children's clothing	kidswear outlet	

Note: Table is a sample of matches, not exhaustive.
* Includes both S&R, SNE, and SemPhrase & SemBMM matches (all are new).

DX18 at 721. Another example is correcting misspellings. *See* Tr. at 1365:15-22 (Dischler); *see also id.* at 3848:17-20 (Lowcock) (describing "products like keyword matching and broad match modifier, which means the algorithm of a machine that the search engine is running can look for synonyms or understand what might be associated").

277. Google has changed its keyword matching over time, beginning in 2012. *Id.* at 4283:13–4284:15 (Juda). The narrowest category, "expanded match," initially included only the keyword itself or grammatical variations (e.g., plurals) but today includes misspellings. UPX8055 at .001–.002; Tr. at 5477:15–5478:1 (Jerath) (discussing UPXD103 at 40). When Google began including misspellings as part of "expanded match," about 25% of advertisers (by ad revenue) opted out of the new feature, including many of Google's largest advertisers, like Amazon. UPX518 at 573. Nevertheless, Google removed the opt-out option in 2014, UPX8049 at .003; Tr. at 1478:12-14 (Dischler); *id.* at 4298:6-16 (Juda), despite recognizing that this move would "[r]emove[] control from advertisers," UPX518 at 572. Thereafter, Google continued to expand the keyword match types. *See* UPX31 at 471. There are presently three types: broad match, phrase match, and exact match. UPX8023 at .001.



UPX31 at 471.

278. Because broader matching enters more advertisers into an auction, it leads to thicker auctions (i.e., more auction participants), which creates upward pricing pressure. Tr. at 1477:18-24 (Dischler); *id.* at 4298:22–4299:1 (Juda). As advertisers cannot opt out of matching, the only way to ensure that a certain query does not trigger an ad is to provide a negative keyword. *Id.* at 4297:23–4298:3 (Juda). But identifying negative keywords is a far more cumbersome way for advertisers to avoid undesirable auctions, a challenge made even more difficult with less information from SQR reports. *See id.* at 5472:11-24 (Jerath).

G. SA360

279. A search engine management tool, or SEM tool, enables advertisers to manage advertising campaigns across different online platforms, including GSEs, SVPs, and social media platforms. *Id.* at 1232:13–1233:18 (Dischler). "Native tools" refer to proprietary software products that allow advertisers to make ad purchases directly on the owner's platform. Google's native tool is Google Ads, and Microsoft's is Microsoft Ads. (Since both Yahoo and DDG use Microsoft's search results, they also rely upon Microsoft Ads as their underlying ad technology.) *Id.* at 1229:16-19, 1232:19–1233:6 (Dischler).

280. SEM tools are helpful because they take the application programming interface from native tools and apply them in ways that facilitate management of multi-platform advertising campaigns all in one place. *Id.* at 1234:11-24 (Dischler).

281. Google owns an SEM tool called Search Ads 360, or SA360. *Id.* at 1234:2-4 (Dischler). It was initially developed by a company called DoubleClick, which Google acquired in 2007. *Id.* at 1235:5-12 (Dischler); *id.* at 3668:23-24 (Ramaswamy). Google advertised the SEM tool as "a neutral third party, helping [advertisers] achieve the highest return on investment, regardless of the online channel." PSX1109 at 093. Google continues to maintain that the "aim of the product" is "to be a neutral third party." Tr. at 1236:21-23 (Dischler).

282. Other SEM tool companies include Skai, Marin, and Adobe. *Id.* at 1423:9-10 (Dischler). About one third (31%) of all search ads revenue on Google and Bing flows through SEM tools. *See id.* at 7095:1-24 (J. Baker) (discussing PSXD11 at 73). SA360 is the market leader, with 76% of all SEM tool ad dollars spent on SA360. *Id.*

283. Auction-time bidding (ATB) is a feature available in both the Google Ads and Microsoft Ads native tools. *Id.* at 1230:4-6, 1240:4-7 (Dischler). ATB affords advertisers the ability to adjust bidding strategies in real time during ad auctions. The alternative to ATB—intraday bidding—allows bidding strategies to be updated a few times a day. Because ATB permits advertisers to adjust their bids in real time, it is more efficient than intraday bidding at allocating ad dollars to achieve their highest return. *Id.* at 1230:7–1231:9 (Dischler) ("It's beneficial to advertisers, because it's better than the other alternatives.").

284. ATB has been available on the Google Ads native tool since about 2016. *Id.* at 1231:10-14 (Dischler). It has a high adoption rate, meaning that it is popular among advertisers, in part because it yields an improved ROI. *Id.* at 1231:15-17 (Dischler).

285. By September 2019, ATB was fully integrated into the Google Ads interface on SA360. *Id.* at 4308:9-11 (R. Krueger); PSX386 at 607. It was immensely popular, with an 80% adoption rate and a 15–30% increase in ROI. PSX386 at 607. Google viewed the implementation of ATB into Google Ads on SA360 as a "high-complexity" feature that took between two to three years to accomplish. Tr. at 1425:18-24 (Dischler). When ATB was introduced in SA360 for Google Ads, Microsoft had ATB available only on its native tool. *Id.* at 1240:4-7 (Dischler).

286. In the summer of 2019, Microsoft asked Google to integrate ATB and other features into the Microsoft Ads interface on SA360. *See id.* at 4309:5–4334:13, 4341:6–4345:2 (R. Krueger). Google slow-rolled the request. It instead prioritized continued work on Project Amalgam, which was an effort to overhaul SA360 to introduce it as "a completely new product," including "immediate support for most new Google Ads features and improved support for other channels and search engines, like Microsoft Advertising[.]" DX282 at .001; Tr. at 4468:4-15 (R. Krueger); *see id.* at 4745:4–4746:5-11 (Varia) (discussing DX132 at .005). It also completed the years-long Project Myx, which integrated ATB for Google Ads into SA360. Tr. at 4691:9-15, 4728:7–4729:7 (Varia). Microsoft grew increasingly frustrated by Google's inaction, and it eventually requested a CEO-to-CEO level resolution of the matter. PSX360 at 750. Notwithstanding these efforts, at the time of trial, ATB still was not integrated into the Microsoft Ads interface on SA360. Tr. at 5158:9-24 (Booth).

287. Unlike SA360, other SEM tools offer ATB for Microsoft Ads on their platform. *See id.* at 6643:7-12 (Vallez) (Skai); Heath Dep. Tr. at 47:3–48:8 (Adobe), 83:7–84:16 (Marin).

288. With ATB unavailable for Microsoft Ads on SA360, some advertisers have used other SEM tools or Microsoft's native tool to avail themselves of that feature for their Bing ad

spend. This includes one of SA360's largest advertisers, Home Depot. *See* PSX441 at 903–04; PSX1203 at 992; Tr. at 5161:22–5162:14 (Booth).

VI. THE RELEVANT CONTRACTS

289. Google has entered into search distribution contracts with two major browser developers (Apple and Mozilla); all major OEMs of Android devices (Samsung, Motorola, and Sony); and the major wireless carriers (AT&T, Verizon, and T-Mobile) in the United States. In 2021, Google paid out a total of $26.3 billion in revenue share under these contracts, an expense listed in its financial statements as "traffic acquisition costs," or TAC. UPX7002.A; Tr. at 7577:2,7577:20-24 (Raghavan) (discussing DXD21 at 2). TAC was Google's greatest expense in 2021, almost four times more than all other search-related costs combined. *See* Tr. at 7577:2,7577:20-24 (Raghavan) (discussing DXD21 at 2); UPX7002.A.

A. Browser Agreements

1. The Google-Apple Internet Services Agreement

290. The Internet Services Agreement (ISA) is an agreement between Google and Apple, wherein Google pays Apple a share of its search ads revenue in exchange for Apple preloading Google as the exclusive, out-of-the-box default GSE on its mobile and desktop browser, Safari. *See generally* JX33 (2016 ISA). Apple is a crucial partner to Google, in part due to "Apple's sizeable and valuable user base, for which Apple controls distribution." UPX6024 at 437; Tr. at 9742:1–9743:13 (Murphy) (discussing DXD37 at 40) (over half of all search volume in the United States flows through Apple devices).

a. Current ISA Terms

291. The parties entered into the current ISA in 2016, JX33, and in 2021 extended it for a period of five years until 2026, JX97 at 357. Apple can unilaterally extend the agreement by two

years until 2028. JX97 at 357. After that point, the agreement can be further extended until 2031 if the parties mutually agree to do so. *See* Tr. at 2501:17-25 (Cue). Neither party has the right to unilaterally terminate the ISA prior to its current termination date. JX33 at 800 ("The parties expressly amend the existing ISA Agreement to remove the right of either party to terminate at will[.]").

292. The ISA also requires both parties to cooperate to defend the agreement, including in response to regulatory actions. *Id.* at 801.

293. Two provisions of the ISA are at the heart of the parties' dispute: (1) the default and revenue share provisions and (2) restrictions on Apple's product development.

i. Default and Revenue Share

294. The ISA requires Apple to set Google as the default search engine on Safari for all its devices. *Id.* at 793. Under the ISA, a "Default" search engine is one that "will automatically be used for responding to Search Queries initiated from the Web Browser software, unless the End User selects a different third-party search service." *Id.*

295. "Search Query" under the ISA is defined as any user input seeking information that is entered on Apple's voice assistant, Siri; its on-device search, Spotlight; or Safari. *Id.* Between Siri, Spotlight, and Safari, Apple gets about 10 billion user queries per week. Roughly 80% of those queries are entered into Safari; Siri and Spotlight thus make up a minority of queries. Tr. at 2246:11–2247:9 (Giannandrea).

296. Across all Apple devices, 65% of searches are entered into Safari's default access point, which is the integrated search bar. This means that across all Apple devices, only 35% of all queries flows through non-default search access points. UPX1050 at 894. The numbers are similar for mobile searches: 61.8% of query volume flows through search access points governed

by the ISA, and 38.2% of queries are run through non-default search access points. *See* Tr. at 9758:9–9759:22 (Murphy) (discussing DXD37 at 52). *But cf.* UPX138 at 119 (2018 Google estimate of 80% on iOS). Only 5.1% of all searches on iPhones are conducted on a GSE other than Google. *See* Tr. at 9758:9–9759:22 (Murphy) (discussing DXD37 at 52). So, Google receives almost 95% of all general search queries on iPhones.

297. Queries entered through the Safari default (both mobile and desktop) account for 28% of all queries in the United States. *Id.* at 5763:14-22 (Whinston) (discussing UPXD104 at 36).

298. In return for these default placements, Google pays Apple [redacted]% of its ad revenue on Safari and Chrome, including queries initiated through Safari's default bookmarks. JX33 at 793, 797–98; JX24 at 822. Google pays revenue share on Chrome queries, notwithstanding the fact that Apple does not preload Chrome onto its devices. *See* JX33 at 796–98.

299. In 2022, Google's revenue share payment to Apple was an estimated $20 billion (worldwide queries). Tr. at 2492:22–2493:6 (Cue). This is nearly double the payment made in 2020, which was then equivalent to 17.5% of Apple's operating profit. *Id.* at 2492:2-8 (Cue); *id.* at 5727:20–5728:4 (Whinston) (discussing UPXD104 at 19). Google's 2022 payment under the ISA is more than all of its other revenue share payments combined and is approximately double that combined value. *Id.* at 5727:5-20 (Whinston) (discussing UPXD104 at 19).

ii. Apple's Product Development

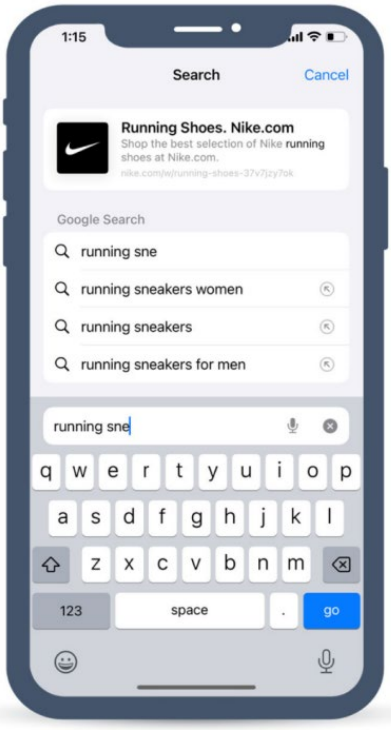
300. Google has long recognized that, if Apple were to develop and deploy its own search engine as the default GSE in Safari, it would come at great cost to Google. *See generally* UPX2. *See* Tr. at 7693:12–7697:12 (Pichai); *id.* at 8094:11–8096:4 (Gomes). For example,

Google projected that without the ISA, it would lose around 65% of its revenue, even assuming that it could retain some users without the Safari default. *See* UPX1050 at 886.

301. Apple has taken steps to grow its capacity in search. In 2018, it hired the former head of Google Search, John Giannandrea, as its Chief of Machine Learning and AI Strategy. Tr. at 2164:18–2165:10 (Giannandrea). Under his leadership, Apple has made a significant commitment to developing certain foundational elements of a GSE, including crawling and indexing the web and creating a knowledge graph. *Id.* at 2244:19–2246:9, 2247:14-16 (Giannandrea); UPX659 at 213. It also has integrated machine learning into its development efforts. UPX1123 at 511. Apple has invested [redacted] of dollars and committed [redacted] employees to search development. Tr. at 2227:18–2229:1 (Giannandrea).

302. Notwithstanding these investments, Apple has decided not to enter general search at this time. *Id.* at 2247:17-21 (Giannandrea). Apple would forego significant revenues under the ISA if it were to do so. UPX273 at 974 (2016 email from Cue to Apple CEO Tim Cook stating that Apple would have to "jeopardize revenue" if it stopped partnering with Google); UPX460 at 176–77 (internal Apple assessment from 2018, which concluded that, even assuming that Apple would retain 80% of queries should it launch a GSE, it would lose over $12 billion in revenue during the first five years following a potential separation from Google). It would also have to undertake the risk of consumer backlash, *see* DX374 at .001 (Giannandrea email stating, "there is considerable risk that [Apple] could end up with an unprofitable search engine that [is] also not better for users"), and forgo investment in other areas of product development, Tr. at 2541:13-17 (Cue) ("And so if we took all of our resources and started spending them on search, sure, we could have competed with Google . . . [b]ut that meant we wouldn't have done other things.").

303. Though it has not launched a full-blown GSE, Apple has introduced and integrated search functionality into its devices. Its Suggestions feature is one example. Apple can determine that a query entered into one of its access points does not qualify as a "Search Query," as defined by the ISA, if that "determination is based exclusively on its intent to provide a superior user experience." JX33 at 793. In practice, this means that Apple can effectively divert certain queries away from Google through a "suggestion." *See* Tr. at 2217:10-16 (Giannandrea). For instance, when a user enters a navigational query into Siri, Spotlight, or Safari, Apple provides a suggested website to the user, which is intended to allow the user to directly navigate to a third-party site and skip the Google SERP entirely. *See id.* at 2217:3–2218:14 (Giannandrea) (discussing UPXD7). Apple also uses its own proprietary search index to identify potentially responsive websites. As depicted below, a user beginning to type "running sneakers" into Safari may be shown a "suggestion" to nike.com, which if tapped will take the user directly to Nike's website. *Id.* at 2217:17–2218:8 (Giannandrea) (discussing UPXD7). Apple collects user data to deliver "suggestions." *Id.* at 2219:18-21 (Giannandrea). Apple views its Suggestions functionality as providing "a much better user experience." *Id.* at 2235:6-7 (Giannandrea).



UPXD7.

304. Google perceived Suggestions as a threat to its search volume. It believed that Apple's "increasing use of their own variety of suggestions to the user [wa]s pushing the user away from completing the search on" Google. UPX309 at 823. This meant that Google could not earn advertising revenue on those queries, which could decrease its overall search revenue on Apple devices. *See* UPX2010 at 527 (Google analysis estimating a query loss of 10–15% of Safari traffic and a revenue loss of 4–10% of iOS Safari revenue based on Apple Suggestions).

305. In direct response, Google negotiated a new term in the 2016 ISA, which required that Apple's implementation of the Safari default must "remain substantially similar" to prior implementations. JX33 at 793 ("**Substantially Similar**" clause); UPX309 at 823 (Suggestions was "why [Google] added into the [ISA] that [Apple] could not expand farther than what they were doing in" 2016 as Google "did not wish for them to bleed off traffic[.]").

306. Apple has broader authority with respect to Siri. It may "determine which user inputs constitute Search Queries that will be provided to Google on any basis," not just superior user experience. JX33 at 794.

307. At present, Apple does not view the ISA as a limitation on its ability to respond to user queries on Suggestions or Siri. *See* Tr. at 2534:24–2535:5 (Cue) ("Q. Was one of Apple's goals in 2015 to increase the number of users search queries Apple could answer on its own? A. . . . We still have that. We're trying to answer more questions on Siri today. So it's still a goal today."); *id.* at 2345:11-23 (Giannandrea) ("Q. [D]id anything in Google's agreement with Apple, with regard to the Safari browser, did that limit in any way Apple's ability to make these Safari suggestions or Siri suggestions? A. No. . . . I didn't believe there was any limit to what we could do with respect to these suggestions.").

308. Another search feature on Apple devices is Spotlight. Spotlight can be accessed on the iPhone by a single downward swipe, which produces a search bar. Spotlight is "intended to be sort of a universal search that looks at your own device, but can look up information further afield," including on Safari. *Id.* at 2204:23–2205:3 (Giannandrea). It is not a GSE, but Spotlight offers links to websites as if entered directly on Safari. *Id.* at 2205:16-21 (Giannandrea). The ISA provides that "Apple shall not be limited in its ability to alter, modify and innovate in Spotlight," but also requires that Apple's "initial implementation of the Spotlight Services for Search Queries within Spotlight shall be generally equivalent to the current implementation of search within Spotlight," though "in future versions of Spotlight, Apple may offer better integrations of the Spotlight Services." JX33 at 794.

309. The ISA also addresses Apple's ability to serve ads. If Apple ever wishes to serve ads on Siri or Spotlight queries or results, it may only do so if it intends "to provide a superior user

experience or align with its general advertising principles." *Id.* at 796. If that threshold requirement is met, Apple is further obligated by the ISA to "offer Google the opportunity to supply such ads or paid listings" before doing so itself. *Id.* This provision has been described as the "**Right of First Refusal**."

310. Apple does not presently advertise on Spotlight, nor does it have any plan to do so. Tr. at 2497:11-25 (Cue) (stating that Apple has "no intentions or plans to put ads on Siri or Spotlight," and "today, we have no intentions to put ads on Siri or Spotlight").

311. Apple also does not "preload any third-party application on [their] devices" and does not intend do so under "any scenario[.]" *Id.* at 2456:2-10 (Cue). Apple previously tried to preload third-party applications on desktop devices, and determined that "it wasn't the best experience[.]" *Id.* at 2456:13:15 (Cue).

b. History of the ISA

312. The ISA did not start out with Google as the exclusive default GSE. The first-ever ISA was signed in 2002. *See* JX1 (2002 ISA). It granted Apple the right to license Google Search, allowing its users to access the Google SERP directly from the "search box" in Apple's web browser. *Id.* at 678. The contract was not exclusive as to either party: Apple could preload rival search engines, and Google could license its search product to other third parties. *Id.* at 679. The five-year agreement allowed for either party to terminate the agreement on certain grounds, and it permitted Apple to unilaterally terminate the agreement for any reason after its first year. *Id.* at 680. The 2002 ISA did not include any payment of revenue share. Cue 30(b)(6) Dep. Tr. at 26:4-7.

313. Around 2005, Google initiated the idea of an exchange of revenue share for default exclusivity after it grew concerned that Yahoo might replace Google. *See* UPX855 at 239–40; UPX992 at 016. Apple did not ask for revenue share. *See* Cue 30(b)(6) Dep. Tr. at 26:8–27:2.

314. The parties subsequently amended the 2002 ISA, providing that Google would pay Apple a one-time sum of $10 million, plus 50% of its annual advertising revenue. JX2 at 818. As consideration, Apple agreed to preinstall Google as the default GSE on Safari, such that it would "automatically be used for web search unless the user selects another search provider." *Id.* at 819. The 2005 amendment was set to terminate after three years, with Apple retaining the right to unilaterally terminate the agreement any time during the last year. *Id.* at 820.

315. In 2007, Apple launched the iPhone. The parties amended the ISA to include the Safari default placement on mobile devices and other platforms. JX4 at 647 (expanding the definition of "software" to include web browser software for iPhones, iPods, Safari for Windows, etc.).

316. The 2007 amendment included two notable amendments. First, it required that "Apple shall not pre-populate the search box with search terms that are not initiated by the end user," but that "queries utilizing auto complete features . . . shall be considered input by the End User." *Id.*; *see* Tr. at 5001:16–5004:15 (Braddi) (describing Apple top hits, Apple Suggestions, and Google suggestions).

317. Second, the 2007 amendment secured Google's default status in the Safari search bar not only on the iPhone but also on various other Apple products, including iPods and Safari for Windows. JX4 at 647–49. The 2007 amendment also made clear that Google would not pay revenue share to Apple if it decided to create a homepage on Safari that included a search service other than Google. *Id.* This term apparently grew out of a worry that Apple might install Yahoo

as a default GSE on a Safari for Windows homepage. UPX672 at 475–76. Apple apparently never implemented such a homepage on any version of Safari, so Google remained the only default GSE on Apple devices.

318. The ISA amendments in 2008 and 2009 were largely without substantive change. *See, e.g.*, JX5 (2008 amendment); JX6 (2009 amendment).

319. In 2009, Apple sought greater flexibility to grant its users access to other GSEs. Apple sought "[t]he option but not the obligation to set Google as the default search provider" and still receive revenue share. UPX605 at 269. Specifically, Apple proposed that it would receive slightly less revenue share for non-default queries (40%) and the full amount (50%) for queries on search access points preset with Google as the default. *See* UPX675 at 249–50 (Apple redline of ISA). Google rejected those terms in large part because Apple "could decide to work with an alternate provider for the desktop/Safari search solution," i.e., use Google as the default for some, but not all, locations or product lines/versions. UPX605 at 270; UPX675 at 250. Apple's requests did not make it into the updated amendments. *See* JX9 (2009 amendment changing the revenue share percentages slightly, with no substantive changes); JX12 (2010 amendment extending the 2002 ISA, as amended, until 2014); Tr. at 4998:3-22 (Braddi) (Apple's requests "got dropped out"). The agreement remained exclusive.

320. In 2012, Apple again sought the flexibility to distribute other GSEs to its users. It sent Google a term sheet requesting that Apple would have "[n]o obligation to use Google search services or to make Google the default" while maintaining its then-revenue share of 50% for all Google searches on Apple devices. UPX570 at 724. Google stood firm that "[i]f they wanted to receive revenue share," Apple had to maintain Google as the exclusive Safari default. Tr. at 5001:8-11 (Braddi). The resulting amendment, entitled the 2014 Joint Cooperation Agreement,

maintained Google as the exclusive default search engine. *See* JX24 at 822 ("Google shall remain the default search engine" in the United States.). The 2014 amendment also provided for the creation of "default bookmarks," which required Apple to include a bookmark for Google Search "prominently displayed on the Safari default bookmarks page" and obligated Google to pay revenue share "for all traffic initiated via the Google search bookmark." *Id.* Apple, however, was not precluded from offering default bookmarks that linked to rival GSEs, and it reached agreements with Bing and Yahoo for bookmark placement. *See, e.g.*, DX962 at .003–.004 (Apple-Microsoft promotional agreement providing that Apple will make Bing readily discoverable, including by preloading it as a default bookmark on Safari). Two years later, Apple and Google entered into the ISA currently in effect.

c. Microsoft-Apple Negotiations

321. Apple and Microsoft occasionally have had discussions regarding installing Bing as the default GSE on Safari. Microsoft has not been successful. *See generally* Tr. at 2508:3–2531:13 (Cue); *id.* at 3500:9–3504:17 (Nadella).

322. In 2015, prior to the signing of the 2016 ISA, Microsoft hoped that Bing might replace Google as the default GSE on Safari. *Id.* at 2508:7-9 (Cue). As part of its pitch, Microsoft claimed that "increased competition between Microsoft and Google enabled by a search partnership [with Apple] is in Apple's long-term economic interests[.]" UPX614 at 112. Microsoft made clear that it was "willing to provide Apple with the majority of profits in a search partnership along with greater levels of flexibility and control over the product experience including user experience and branding," with one example being improved private searching "consistent with the broader Apple value proposition around respecting user privacy[.]" *Id.*

323. Microsoft understood that it "would have to pay and even subsidize the transfer" for the period of transition and was willing to do so for the long term. Tr. at 3502:21–3503:8 (Nadella). Microsoft offered Apple a revenue share rate of 90%, or a little under $20 billion over five years. UPX614 at 113–14. It did so recognizing that "there was going to be a period of turbulence of shift," both as a result of the change and assuming that Google would respond by encouraging users to abandon Safari for its browser, Chrome. Tr. at 3503:22-24, 3504:4-12 (Nadella). When that offer was not accepted, Microsoft proposed sharing 100% of its Bing revenue with Apple to secure the default or even selling Bing to Apple. *Id.* at 2511:14-14, 2530:14-21 (Cue).

324. Microsoft "thought they had great [search] quality and they said that with [Apple's] search volume, they could be even better," but Apple disagreed. *Id.* at 2510:8-11 (Cue). Moreover, Apple was concerned that despite the high revenue share percentage, Bing would not be able to bring in sufficient revenues because it was "horrible at monetizing advertising." *Id.* at 2510:25–2511:11, 2511:24–2512:16 (Cue) ("If you have an inferior search engine, customers wouldn't use it, and so, therefore, I don't know how you could monetize it well.").

325. Apple evaluated the potential financial impact of replacing Google with Bing. *See generally* UPX273. The analysis assumed that Microsoft would initially pay Apple 100% of Bing's revenue share, while Google would continue paying Apple [redacted]% revenue share if retained as the default. *Id.* at 975–76. The analysis showed that if Apple extended the ISA, it would gain about $40 billion from Google in the next five years, and then $70 billion in the following five years. *Id.* at 974. This was double the $20 billion Microsoft offered Apple for the first five years. *Id.* ("Clearly, Microsoft can't commit to these numbers or even anything close to them.").

326. In response to this analysis, Apple's Senior Vice President of Services, Eddy Cue, internally proposed that the only way Apple could make the switch was if Microsoft were to guarantee minimum annual revenues of $4 billion the first year and a stepped increases of $1 billion per year over the next four years, for a total of $30 billion in guarantees. *Id.* Still, even that approach would produce revenues well short (by $10 billion) of Apple's expected earnings if it retained Google as the default. *Id.* ("[T]his doesn't match Google ($30B v. $40B) and provides no protection for the following 5 years[.]"). Cue concluded that a Microsoft-Apple deal would only make sense if Apple "view[ed] Google as somebody [they] don't want to be in business with and therefore are willing to jeopardize revenue to get out. Otherwise it [was a] no brainer to stay with Google as it is as close to a sure thing as can be." *Id.*; Tr. at 2528:13-16 (Cue) ("And so Google's a sure thing. They have the best search engine, they know how to advertise, and they're monetizing really well.").

327. Apple proposed to Microsoft that it guarantee revenues (the record is not clear whether the proposal mirrored what Cue suggested above), but Microsoft balked, which Cue expected. Tr. at 2522:3-19, 2518:18-24 (Cue). Regardless, Apple would not have accepted the deal, even if Microsoft had agreed to a guarantee. According to Cue, there was "no price that Microsoft could ever offer [Apple]" to make the switch, because of Bing's inferior quality and the associated business risk of making a change. *Id.* at 2519:10-11 (Cue); *id.* at 2530:17-19 (Cue) ("I don't believe there's a price in the world that Microsoft could offer us. They offered to give us Bing for free. They could give us the whole company.").

328. Google has also analyzed what Microsoft would need to offer Apple in order to win the Safari default. It called this study "Alice in Wonderland," with Alice referring to Microsoft. *See id.* at 1678:16-20 (Roszak). The analysis concluded that in order for Microsoft to match

Google's financial contribution, it would have to pay Apple 122% of Bing's revenue share just to equal Google's then-33.75% revenue share. *Id.* at 1683:10-13 (Roszak); UPX674 at 914. Google thus determined that "it will not be possible for Alice to match our payments profitably[.]" UPX674 at 914. Accordingly, during ISA negotiations, Google understood that Bing was not a viable option, which minimized Apple's leverage. *See* Tr. at 7772:12–7773:10 (Pichai).

329. Although Apple has never seriously considered Bing as an option, Microsoft perceives that Apple has used Bing "to bid up the price" in its negotiations with Google and extract a higher revenue share from Google. *Id.* at 3505:6 (Nadella). Microsoft CEO Satya Nadella testified that if, hypothetically, Bing exited the market, there would be a real concern as to whether Google would even pay Apple for default status, given the lack of any other option at all. *Id.* at 3505:12-17 (Nadella).

d. DDG-Apple Negotiations

330. DDG, because of its brand emphasis on privacy, on multiple occasions has attempted to convince Apple to switch to DDG as the default GSE on Safari's "private browsing mode," a feature in Safari that provides some additional privacy protections beyond the baseline. *Id.* at 1953:3-11, 1973:16-19 (Weinberg).

331. In 2014, Apple for the first time offered DDG as an alternative default search option on Apple devices. This meant that users could change the default on Apple devices to DDG, if they chose to do so. *Id.* at 1972:22–1973:2 (Weinberg). That same year, DDG made its first pitch to serve as the default in Safari private browsing mode. *Id.* at 1973:3-5 (Weinberg). It continued to propose this idea over the following two years and received its first response from Apple in 2016. *Id.* at 1973:6-7 (Weinberg). DDG periodically met with Apple representatives through

2019, but ultimately Apple declined to make the switch. *See generally id.* at 1974–2046 (Weinberg).

332. Upper-level Apple executives never genuinely considered using DDG as the default in Safari's private browsing mode. *Id.* at 2352:21-23, 2361:7-11 (Giannandrea); *id.* at 2506:25–2507:7 (Cue). This is in part because DDG operates as "a veneer on top of other search engines," as it syndicates its results from Bing. *Id.* at 2352:25–2353:8, 2353:22-25 (Giannandrea); *id.* at 2505:10-14 (Cue); *see* DX375; DX377 at .001 (describing DDG for private browsing as "probably a bad idea"). Apple's senior leadership also views DDG's search quality as inferior to Google's. Tr. at 2353:9-11 (Giannandrea); *id.* at 2506:12-16 (Cue) ("[I]t is not a great search engine. . . . [I]t's not good enough.").

e. Apple's Recent Evaluation of GSEs

333. In 2021, Apple's "Aethon" study demonstrated that, as measured by relevance of results, Google is superior to Bing on all search access points (except desktop queries on Safari). UPX260 at 681. "Google has a much larger lead on Mobile than Desktop[.]" *Id.* Google's relevance advantage was particularly strong for long-tail queries. As to users' overall preferences, Bing outperformed Google on its desktop user interface (for both Safari and Spotlight), but Google tied with Bing as to overall Safari queries and beat out Bing as to Spotlight on mobile. *Id.*

2. Mozilla-Google RSA

334. Google also has a revenue sharing agreement with the browser developer Mozilla, whereby it pays Mozilla [redacted]% revenue share in exchange for the default search placement on the Firefox browser. JX65 at 100, 107. The search access points on Firefox include "the search box" in the browser, "the navigation or location bar," any "search box displayed on a Firefox Startpage," among others. *Id.* at 102–03. If Mozilla implements the "this time, search with" feature on its

mobile application, the revenue share paid under the Google-Mozilla agreement drops from [redacted]% to [redacted]%. *See id.* at 100, 107.

335. Google's 2021 revenue share payment to Mozilla was over $400 million, or about 80% of Mozilla's operating budget. M. Baker Dep. Tr. at 41:18-24; Tr. at 538:7-15 (Rangel) (discussing UPXD101 at 10). Mozilla has repeatedly made clear that without these payments, it would not be able to function as it does today. *E.g.*, DX547 at .002.

336. Under the terms of the current Mozilla RSA, either party may terminate the agreement only upon a breach. *See* JX31 at 628–29.

a. Mozilla-Yahoo Partnership

337. From 2014 through 2017, the default GSE on Firefox was Yahoo, not Google. Tr. at 630:12-17 (Rangel). The Mozilla-Yahoo agreement required Yahoo to pay a minimum annual payment of $375 million, or 70% revenue share, whichever was higher. DX1012 at .007; M. Baker Dep. Tr. at 220:19–221:10.

338. When Mozilla switched the Firefox default GSE from Google to Yahoo, the query volume for each search provider changed. Google's share of queries on Firefox abruptly dropped from between 80–90% to between 60–70%, a 20-point decline. *See* Tr. at 630:12–631:9 (Rangel) (discussing UPXD101 at 55). Yahoo's share, in turn, increased from around 10% to 30% of the Firefox queries. *Id.* Between 2014 and 2017, Google gained back some amount of query share, but never more than 70%. *Id.* When Mozilla reverted the default back to Google in 2017, Google regained its former query share at Yahoo's expense. *Id.*

339. To meet the minimum payment guarantee, Yahoo increased the number of ads it placed on the SERP, degrading the user experience and ultimately resulting in Mozilla changing the default back to Google. M. Baker Dep. Tr. at 236:24–237:9, 239:2-11; *see* UPX898 at 752

("The Yahoo team has been under continual pressure to increase monetization of the SERP, and has been making gradual changes over the last few months, leading to the cumulative experience you see today."); M. Baker Dep. Tr. at 77:18–78:2; Tr. at 6043:14-25 (Whinston).

b. Mozilla's Experiments

340. Mozilla has run experiments to assess a potential switch of the default GSE from Google to a rival. It tends to run these experiments when its agreements come up for renewal. *See* M. Baker. Dep. Tr. at 269:20–270:21.

341. In a 2016 experiment, Mozilla switched the default GSE on both new and existing users from Google to Bing. By the twelfth day, Bing had kept only 42% of the search volume. DX679 at .006. After some additional time, those numbers dropped to 20–35%, depending on certain variables. *Id.* Mozilla's takeaway was that switching the Firefox default to Bing would result in missing revenue targets. *Id.*

342. The same year, Mozilla conducted an experiment switching the default GSE to Yahoo. DX729. Yahoo only retained 16.5% of the total search volume. *Id.*

343. In 2017, Mozilla conducted a similar test, with Bing replacing Google. DX679 at .006. After 14 days, Bing retained 52.3% of search volume. *Id.*

344. From 2021 to 2022, Mozilla once again switched the default GSE to Bing for 0.5% of desktop Firefox users. *See* DX548 at .002. As a result, search volume decreased by 7% and ad clicks went down 13%. *Id.* at .003. Mozilla found: (1) "35.5% of clients who had their default search engine switched to Bing changed their default to another search engine (26% changed to Google, 9% changed to a search engine other than Bing or Google and the remaining kept Bing);" (2) the "64.5% of clients who did not switch away from Bing contributed a much lower percentage

to total search volume and ad clicks than clients who switched back to Google;" and (3) "65% of users who did not retain Bing as their default engine made the change within the first day[.]" *Id.*

345. There is no evidence in the record of Mozilla running any experiments where it switched the default from Google to a non-GSE.

3. Other Browser Agreements

346. Google has comparable agreements with smaller browsers, like Samsung's S Browser, which have been renewed through amendments. *See, e.g.*, UPX5131 (Google-Opera 2012 Contract); UPX5146 (Google-Opera 2021 Amendment); UPX5210 (Google-UCWeb 2017 Agreement); JX71 (Google-Samsung RSA).

347. DDG made its private browsing mode default proposal to other browser developers, including Samsung, Mozilla, and Opera, but none of them moved forward with DDG. Tr. at 2048:9-24 (Weinberg). DDG's impression was that the common concern shared by these browsers was their contracts with Google. *Id.* at 2049:21-24 (Weinberg).

B. Android Agreements

1. Mobile Application Distribution Agreements

348. Google has entered into Mobile Application Distribution Agreements, or MADAs, with all Android OEMs, including Motorola and Samsung, among others. *See, e.g.*, UPX5206 (Sony); JX49 (Motorola); JX37 (Samsung). The MADA is a device-by-device license that allows OEMs to use Google's proprietary mobile applications developed for the Android ecosystem. Tr. at 775:9-14, 781:10-11 (Kolotouros). This suite of applications is referred to as Google Mobile Services (GMS). *Id.* at 775:9-17 (Kolotouros). OEMs pay no fee for the GMS license, but Google requires OEMs to preload certain applications in prominent placements. *See id.* at 9415:16-18 (Rosenberg).

349. The MADAs may be terminated only by a breach by either party. *E.g.*, JX49 at 877–78 (Google-Samsung MADA).

350. As of 2019, about 2.3 billion Android devices were subject to the MADA. UPX129 at 904. Google employees were not aware of any non-MADA Android device sold in the United States. *See* Sept. 19, 2023 (Sealed Session) Tr. at 9:23–10:4, 12:8-10 (Yoo); Tr. at 780:23-25, 791:25–792:2 (Kolotouros). Moreover, there are no Android OEMs that have revenue share agreements but are *not* MADA signatories. Tr. at 777:1-15 (Kolotouros); *see also id.* at 778:5-6 (Kolotouros) ("I would say to the extent the RSA generally does not happen unless an OEM has entered into a MADA, that is correct.").

351. Google views the MADA as securing "baseline distribution of [its] apps on Android[.]" UPX129 at 904. Under the MADA, partner OEMs must preload all 11 GMS applications onto a new device, including the Google Search Widget, Chrome, YouTube, Gmail, Google Maps, and Google Drive, among others. *Id.* at 904–05. Six of these applications, including the Google Search application and Chrome (which both default to Google), cannot be deleted by the user. *Id.* Without a MADA, an OEM cannot distribute any one of these GMS applications. Tr. at 779:10–780:16 (Kolotouros).

352. One of the GMS applications is the Google Play Store, the leading Android app store. *See* UPX129 at 905. Without a MADA, an OEM cannot distribute the Play Store. Tr. at 780:23-25 (Kolotouros). The Play Store contains a set of application programming interfaces (APIs), which support the functionality of all Android applications—both those developed by Google and by third parties. *Id.* at 784:7–786:5 (Kolotouros). A user cannot effectively utilize GMS applications without having the Google Play Store installed, because the GMS apps' APIs

rely on the Play Store's infrastructure. UPX125 at 067; *see* Tr. at 3517:18-19 (Nadella) ("And without [the] Google Play [Store], an Android phone is a brick.").

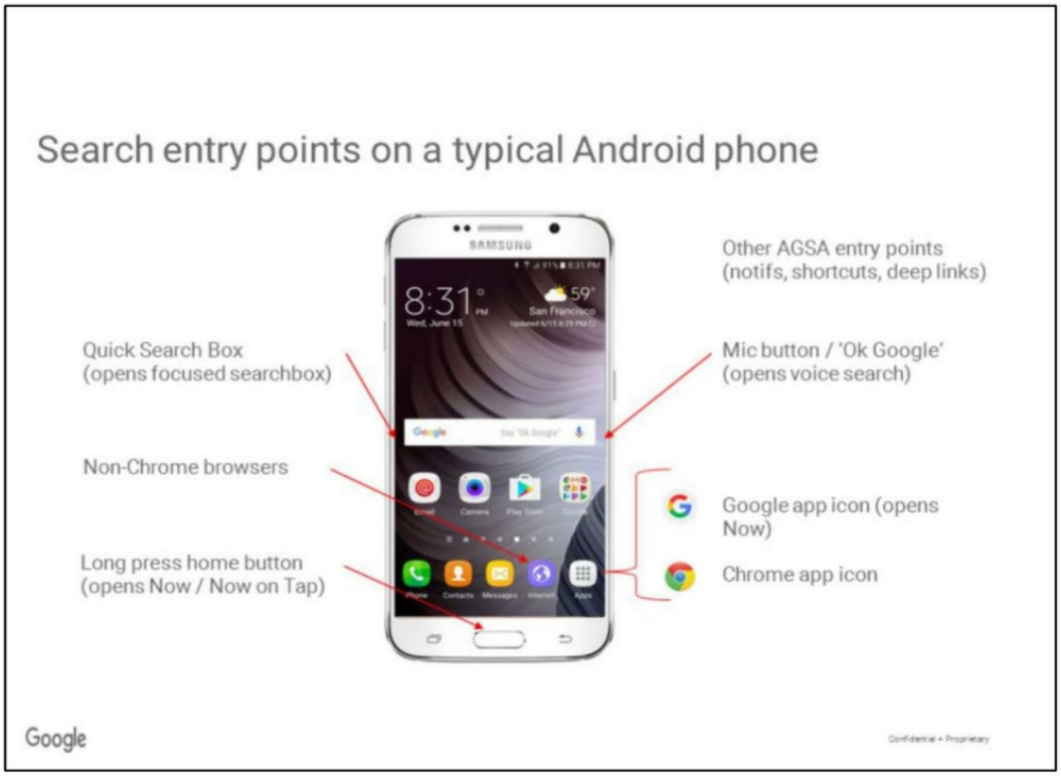
353. The Play Store is not just technically required, but it also contributes significantly to the user experience. Carriers view the Play Store as essential. *See* Tr. at 1025:11-12 (Higgins) ("A device would need to have an app store on it in order to be successful[.]"); Giard Dep. Tr. at 111:18–112:7 (stating the Play Store is "[v]ery important" and "a primary function of allowing customers to access the apps that they want to have [o]n their device"; it "would be extremely difficult for a device to be successful without it"); Ezell Dep. Tr. at 61:1-3 ("[H]aving on the home screen the icon for the Play Store makes sense. It's a core functionality of the device.").

354. Samsung, which preloads its own proprietary app store onto its devices, does not see its "Galaxy Store" as replacing the Play Store. *See* Baxter Dep. Tr. at 91:20-23 ("I can probably count on the number – on one hand the numbers of times that I went into the Galaxy app store. So it was not a real relevant solution."); *see also* UPX1011 at 290 (Google "believe[s] that the cannibalization of Play store revenue due to Galaxy store is none to minimal," given that most of the popular applications present on the Play Store are absent from the Galaxy Store).

355. Even Microsoft signed a MADA (thereby preloading the rival Google Search Widget and Chrome) for its Duo mobile devices because it "needed the license from Google[.]" Tr. at 3117:2-3, 3125:19 (Tinter).

356. Part of the GMS suite of applications is the Google Search Widget (or Quick Search Box). Signatories of the MADA agree to preload and place the Widget on the default home screen of the device. *Id.* at 793:21-23 (Kolotouros). Signatories also receive Chrome, and generally speaking, they agree to place Chrome in the Google applications folder, which appears on the default home screen. UPX141 at 244. The MADA requires the Google applications folder to be

on the default home screen, but it does not require its placement on the dock, sometimes known as the "hotseat," as depicted below. Tr. at 793:15–797:20 (Kolotouros) (discussing default placements).



UPX76 at 184.

357. Although OEMs must preload the Google Search Widget, users can delete it. As of 2016, there were about 200,000 logged widget deletions daily but over 2.5 million daily Android activations. *Id.* at 188.

358. Nothing in the MADA expressly requires an OEM to preload only the GMS applications. *See* Christensen Dep. Tr. at 49:25–50:4. OEMs are, for instance, free to preload a second (or third) browser or search widget.

359. In practice, however, OEMs recognize that preloading more than one of the same search access points, especially in similar prominent positions, is a suboptimal design that would

degrade the user experience. This overloading of apps is known as "bloatware." *See* Tr. at 2456:20–2457:8 (Cue). Even Microsoft avoided adding a Bing search widget on its Duo devices to avoid degrading the user experience. *See, e.g.*, *id.* at 3126:7-10 (Tinter) ("I do remember us having some conversations that from a user-interface standpoint, it would be really confusing if there were two boxes there, and it wouldn't be a good product for the user.").

360. As another example, Samsung already preloads a second browser—its proprietary S browser—on all Samsung devices. Rival browser and GSE providers, like Microsoft, understand that Samsung is extremely unlikely to preload a third browser on Samsung devices. *See* UPX301 at 646 (2019 Microsoft email: "Therefore to take Edge [Samsung] would either need to ship 3 browsers on the device (Samsung browser, Edge, and Chrome) or drop the Samsung Browser. 3 browsers is DOA," or "dead on arrival"); UPX133 at 811 (internal Microsoft analysis: "On browser, [Samsung is] not willing to ship three browsers on the device. This is due to overall concerns about the number of applications pre-loaded on the device and concern about operator push back.").

361. Google recognizes this reality, too. *See* UPX141 at 819 (describing device configuration with two preinstalled browsers and two default widgets as "[a]llowed but not likely"); Tr. at 1528:6-11 (Yoo) ("[F]rom the angle of like a user experience for these devices, what we understood and what we were trying to convey here was that OEMs want to sell devices, they want to be competitive. And we thought that having two widgets was a little too much, so that OEMs are not likely to put two widgets on a device."). Google employees were unable to identify any Android device that is preloaded with two search widgets. Tr. at 1528:17-20 (Yoo); *id.* at 2877:2–2877:7 (Kartasheva); *id.* at 803:9-16 (Kolotouros).

2. Revenue Share Agreements

362. A revenue share agreement, or RSA, is a separate agreement from the MADA. Each RSA generally follows a tiered structure, in which a carrier's or OEM's payment is tied to the degree of device exclusivity. The RSAs are device-by-device, meaning that partners can opt into different tiers based on the device model sold. The RSAs do not prohibit the preinstallation of social networks like Facebook and Instagram. *Id.* at 8689:7-9 (Israel).

363. Although no OEM or carrier is required to enter into an RSA, all do so. It would be irrational for a profit-maximizing firm to sign a MADA but then forgo at least some revenue share under the RSA.

a. Carrier RSAs

364. Google has signed RSAs with each major wireless carrier: Verizon, AT&T, and T-Mobile. Google's agreement with Verizon has three tiers, whereas its contracts with AT&T and T-Mobile only have two and one, respectively. *See* JX93 at 515 (2021 Google-Verizon RSA, outlining three tiers); JX91 at 765 (2021 Google-AT&T RSA, outlining two tiers); JX95 at 695–98 (2021 Google-T-Mobile RSA, describing one tier). All three carrier RSAs may only be terminated should either party breach the contract. *See* JX93 at 508; JX91 at 758–59; JX95 at 704.

365. Google has long viewed RSAs with carriers as essential to securing query traffic on Android devices to the exclusion of rivals. In fact, Google viewed exclusivity on Android devices as "very strategic to Google." UPX134 at 865. In a 2011 email, Google executive Chris Barton wrote about then-existing exclusive distribution deals with T-Mobile, Verizon, and Sprint, "I think this approach is really important otherwise Bing or Yahoo can come and steal away our Android search distribution at any time, thus removing the value of entering into contracts with them. Our philosophy is that we are paying revenue share *in return for* exclusivity." *Id.* at 869.

Another Google employee wrote as part of the same conversation, "The exclusive across all the [A]ndroid search entry points is very strategic to mobile search. [T]he nightmare scenario is for [Microsoft] (or others) to come and scoop us by simply paying more. [W]e know they have shown an appetite to do this in the past and will likely do so again to gain traction." *Id.* at 866. Barton finally added, "We need to incentivize carriers to ship Google using the same approach we at Google have used for many years: 'We will pay for revenue share in return for exclusive default placement.' This contract is an exchange. . . . Without the exclusivity we are not 'getting' anything. Without an exclusive search deal, a large carrier can and will ship alternatives to Google[.] . . . Android is by far the greatest opportunity for Search monetization in mobile over the next years and is very strategic to Google. You can bet that Microsoft and Yahoo will enter into contracts for search on Android through carrier deals if we do not." *Id.* at 865.

i. Verizon

366. Verizon's RSA has three tiers: Core, Qualifying, and Preferred. Google pays Verizon [redacted]% revenue share on devices where the "core" search access points have been preinstalled and defaulted to Google. *See* JX93 at 515–16 (describing the "Core Devices"). Those include Chrome, the Samsung Browser (on Samsung devices only), and the Google Assistant application. *Id.* at 516. Verizon also receives [redacted]% revenue share for old devices that comply with the prior RSA terms (i.e., that are grandfathered in). *See id.* at 515 (describing the "Qualifying Devices"). In exchange for more placements, Google pays more revenue share. The RSA requires Google to pay Verizon [redacted]% revenue share on Preferred Tier devices (a three-fold increase from Verizon's Core Tier), provided that those devices have several other default Google placements. *Id.* at 515, 517. Those include, but are not limited to, the Google Search Widget, Chrome, and the default homepage on the browser. *See id.* at 517.

367. Verizon's "Core Devices" tier was developed through negotiations. Verizon has entered into RSAs with Google for over a decade. "From 2009–2014, Google paid Verizon 40% revenue share," and from 2014–2020, Google decreased the revenue share, paying Verizon 20%. UPX947 at 105.

368. The Qualifying Tier devices earn carriers a [redacted]% revenue share but are only applicable to devices sold during the prior agreement terms and whose configuration conforms to the requirements of the previous agreement. JX93 at 515. Verizon previously earned a 20% revenue share on these Qualifying Tier devices but now only earns [redacted]%. Tr. at 1049:25–1050:4 (Higgins).

369. On June 13, 2017, Verizon purchased Yahoo. *Id.* at 1043:15-18 (Higgins). One of Verizon's goals was to preload certain Yahoo features, including search, onto its devices. *See id.* at 1056:11-15 (Higgins). Verizon raised this with Google in its negotiations for the 2021 Google-Verizon RSA. *See* UPX1026 at 080–81.

370. In November 2018, during RSA negotiations, Verizon shared a redline of the draft RSA with Google, striking out the exclusivity provision, which previously read: "Company will not include on the device any alternative search service that is similar to Google Search." *Id.* at 080. In that same redline, Verizon sought to limit the search access points governed by the RSA to expand its "flexibility for additional search capabilities on devices." Tr. at 1056:5-10 (Higgins); *see* UPX1026 at 081.

371. During those negotiations, Verizon hoped to increase the revenue share it was paid under the RSA. *See* UPX947 at 105 (a "top Verizon Ask[] to Google" was for "Google to increase revenue share to Verizon from 20% to 23%" under the RSA).

372. Despite these asks, Google insisted on the tiered revenue share system in effect at the time. UPX306 at 976–77. It "advised [that] all go-forward agreements with carriers include exclusivity provisions and exceptions cannot be made." UPX642 at 198. Despite Verizon "arguing vigorously . . . to keep [the] contract non-exclusive," *id.*, Google was insistent that Verizon could not preload any other GSE, such as Yahoo Search, and still receive the then-20% revenue share, Tr. at 1075:16-21 (Higgins). In order for Verizon to preload Yahoo onto its devices, it had to accept the much-lower [redacted]% revenue share on those models in the Core Tier, which does not require exclusivity. *See* JX93 at 515.

373. Verizon viewed the [redacted]% revenue share as "punitive." UPX495 at 003. It conducted a "full revenue impact" assessment if it were to either not renew the RSA or renew but accept the Core Tier to allow it to "commingl[e] search" with Yahoo. *Id.* at 003–04. That analysis demonstrated that Verizon's acceptance of the Core Tier revenue share payment would result in a $1.4 billion loss in revenue to the company. UPX304 at 606; Tr. at 1068:3-5 (Higgins). This was both due to the decreased revenue share from Google, as well as Yahoo's revenue projections, which indicated "smaller [revenue] relative to the agreement that [Verizon] had with Google." Tr. at 1090:2-5 (Higgins).

374. As a result, Verizon determined that "the lower revenue from Yahoo [was] not worth it." UPX306 at 976. Instead, it determined that it would preload Yahoo properties that "do not have general search capabilities outside of the app," which would not run afoul of the Preferred Tier requirements. UPX642 at 198. Those properties included vertical offerings such as news, finance, and sports. Tr. at 1093:3-7 (Higgins). Google and Verizon in fact did agree to a carveout in the RSA that would allow for these vertical properties to be preloaded onto Verizon's Android devices, without demoting them from the Preferred to Core Tier. *Id.* at 1095:1-7 (Higgins). Those

vertical properties, however, could not serve as a search access point or otherwise direct users to a non-Google GSE. *Id.* at 1095:13-15 (Higgins).

375. Ultimately, these negotiations regarding Yahoo verticals became moot because Verizon sold Yahoo shortly before the 2021 RSA was executed. *See id.* at 1056:16-18 (Higgins).

ii. AT&T

376. AT&T's RSA is very similar to Verizon's, although it does not have a tier for Core Devices. AT&T may instead choose to enroll its devices in the Preferred Tier, maintain them as Qualifying Devices, or forego any revenue share. *See* JX91 at 765.

377. The RSA requires Google to pay AT&T [redacted]% revenue share on Preferred Tier devices provided that all search access points default to Google and those devices preload the Google Search Widget on the default home screen. *Id.* at 751, 765–68.

iii. T-Mobile

378. T-Mobile's RSA is structured differently than the others. T-Mobile is compensated for the default placements on Qualifying Devices and Preferred Devices through a $[redacted] bounty per device. JX95 at 692, 696. If T-Mobile does not configure a device on an exclusive basis, it is entitled to no bounty at all. *See id.* at 696. In the RSA negotiations, the initial term sheet included a tier-based system, where T-Mobile would earn more revenue share in exchange for exclusivity ("Optimized Tier") and less in exchange for a minimum level of device configuration without exclusivity ("Core Tier"). Giard Dep. Tr. at 328:23–330:25. Google ultimately dropped the Core Tier from the RSA, even though T-Mobile "still wanted to be able to configure devices and receive revenue share from Google for the devices that were nonexclusive," because "Google preferred not to do that." *Id.* at 330:7-11.

379. It is not economically rational for any profit-maximizing carrier to opt for the lower-revenue share option. Consequently, all three major carriers under their current RSAs have enrolled all Android devices sold at the highest revenue tier. Tr. at 1050:18-22 (Higgins) (Verizon, all at Preferred Tier); Ezell Dep. Tr. at 193:5-9 (AT&T, all at Preferred Tier); Giard Dep. Tr. at 39:3-16 (T-Mobile, all distributed devices qualified for bounty).

b. RSAs with OEMs

380. Google also has RSAs with the two primary Android OEMs, Samsung and Motorola. These RSAs cover the relatively small number of Android devices sold directly by OEMs.

381. Under its current RSA, Samsung receives [redacted]% revenue share for devices complying with prior terms. JX71 at 404, 417. Additional incremental revenue share requires Samsung to configure certain search access points to Google. "Core Devices" per the Samsung RSA must have Google set as the default GSE on the S Browser and must not allow users to change the S Browser default from the browser search bar itself (as opposed to the device settings). *See id.* at 401, 426–28. In exchange, Google pays Samsung [redacted]% revenue share on certain search access points for Core Devices. *Id.* at 416.

382. The Samsung RSA also provides for "Enhanced Devices," which requires additional placements beyond the MADA, such as placing Chrome as the default browser (over S Browser) in the hotseat, or dock. *See id.* at 402–03, 422–24. The revenue share paid to Samsung is the same for Enhanced Devices and Core Devices ([redacted]%), but that percentage applies to a broader set of search access points. *Id.* at 402, 416, 422–24.

383. Nearly all Samsung devices sold in the United States are Enhanced Devices. Tr. at 921:5-7 (Kolotouros).

384. Motorola's RSA with Google is structured differently. All devices sold must meet the minimum requirements of the Foundation Tier (preinstallation of Chrome with Google as the default GSE in the device's dock or hotseat). JX62 at 184, 197. Motorola then earns at least $[redacted] monthly in return. *Id.* The Premier Tier requires exclusive preinstallation of Google as the default on all search access points on the device, in return for additional monthly payments. *Id.* at 186–87, 198, 201. Google estimates that the number of Motorola devices sold by the OEM that are subject to this RSA "is north of 95 percent[.]" Tr. at 911:11-19 (Kolotouros).

c. Definitions of Alternative Search Services

385. All current Android RSAs contain a definition of "alternative search services" that limits the partner's ability to preinstall or promote a different GSE. The 2021 Google-T-Mobile and 2020 Google-Motorola RSAs define "Alternative Search Service" as "any search service that is substantially similar to Google Search (as determined by Google in its reasonable discretion)." JX95 at 689 (T-Mobile); JX62 at 177 (Motorola). The 2021 Google-T-Mobile agreement prohibits T-Mobile, on Preferred Devices, from installing any Alternative Search Service or means of navigating to one; marketing any other Alternative Search Service; suggesting an Alternative Search Service to end users; or adjusting settings that would interfere with Google's default search position. JX95 at 696–97. The 2020 Google-Motorola RSA contains similar restrictions. JX62 at 185, 187.

386. The 2009 Google-Verizon RSA defined "General Web Search" as "search functionality that produces search results by searching a large proportion of indexable websites, and where such search results may also include, unless excluded herein, other non-website results. Examples of General Web Search include Google, Yahoo, and Bing search services." JX16 at 678.

387. That contract did not limit partners' ability to preload "vertical and customizable search functionality such as restaurant search, local business search, application search, and video search" onto covered devices and states that those functions are "not General Web Search" within the meaning of the contract. *Id.*

388. The 2021 Google-Verizon RSA defines "Alternative Search Service" as "(a) any web or (b) any on-device search service that in response to queries incorporates multiple vertical search functionalities, and that, in each case of (a) and (b), offers functionality that is substantially similar to Google Search (as determined by Google in its reasonable discretion)[.]" JX93 at 489. This definition expressly carves out "search within a single mobile application that is limited to content within a particular, single or multiple vertical . . . that provides search results that [are] not substantially similar to Google Search (in its reasonable discretion)[.]" *Id.* The 2021 Google-Verizon RSA restricts the installation or promotion of Alternative Search Services, with a limited carve-out for Yahoo verticals, which was never implemented. FOF ¶¶ 371–375.

389. The 2021 Google-AT&T RSA defines "Alternative Search Service" as "any application, product, or service, other than Google Search, which, in response to queries, delivers search results consisting of (a) internet content or (b) content from multiple applications on a Device that [is] owned by entities that are not Affiliates of one another, in each case of (a) and (b), in a manner that is substantially similar to Google Search (as determined by mutual agreement of the Parties in accordance with section 7.2)." JX91 at 743. The AT&T agreement carves out similar functionality to the Verizon agreement, including any vertical content "that provides search results without searching the internet, other mobile applications, or web pages," providing Spotify and Waze as examples. *Id.* The AT&T agreement prohibits AT&T from preloading or otherwise

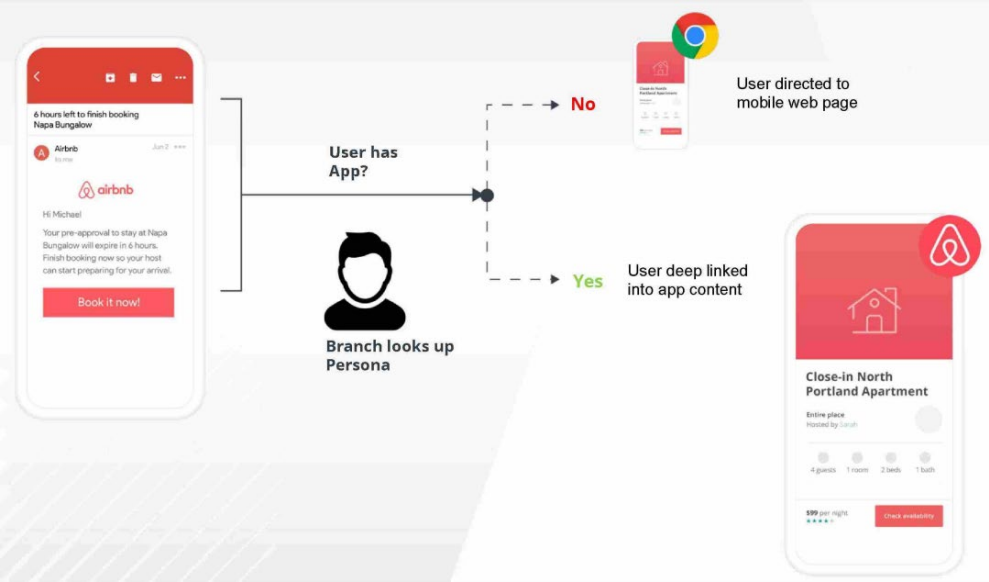
promoting on Preferred Devices any Alternative Search Services, with limited exceptions. *Id.* at 752, 753–54.

390. The 2017 Google-Samsung RSA used to define "Alternative Search Service" as "any web search service that is substantially similar to Google Search." JX41 at 967. That definition was changed in 2020, however, to include "any web or on-device search service (including on-device search that incorporates multiple vertical search functionalities) that offers functionality that is similar to Google Search." JX71 at 394. This change resulted from Samsung's preinstallation of an on-device search technology from Branch, discussed *infra* Section VI.B.2.d. The 2020 Google-Samsung RSA limits Samsung's ability to install or promote Alternative Search Services on Enhanced Qualified Devices, with limited exceptions. JX71 at 403, 405.

d. Branch

391. In 2019, Samsung sought to integrate Branch's deep-linking technology onto its devices. Tr. at 2907:11-20, 2908:1-4 (Austin). That technology primarily enables on-device search of mobile applications, but it also has the capacity to serve limited web search results if a user does not have a relevant mobile application on their device. This web search functionality was known as "Discovery." *Id.* at 2894:9–2895:6, 2900:4-12, 2909:16–2910:14 (Austin).

392. Branch also developed a "Deepview" functionality where, based on partnerships with SVPs, it would allow users who did not have a particular app downloaded to access the SVP's website information directly from the Discovery interface, without reverting to the web. *Id.* at 2916:1-18, 2917:3-13 (Austin).



DX612 at .011.

393. Branch understood the Google-Samsung RSA to be a roadblock to its distribution, as linking to websites could conflict with the agreement. *See* Tr. at 2908:18–2909:2 (Austin). Although Samsung eventually did preinstall Discovery on certain devices, its functionality was diminished. *See id.* at 2910:21-22, 2921:2-8 (Austin) ("Samsung implemented a number of severe product restrictions based on this concept of linking to the web."). Branch was limited to a predetermined list of applications so that Samsung could ensure those applications did not link to the web. *Id.* at 2910:23–2911:9 (Austin). These restrictions affected Branch's ability to monetize Discovery because monetization was driven by user access. *Id.* at 2912:22–2913:20 (Austin).

394. Following this episode, the newly negotiated 2020 Google-Samsung RSA included an amended definition of "Alternative Search Service" as "any web or on-device search service (including on-device search that incorporates multiple vertical search functionalities) that offers functionality that is similar to Google Search." JX71 at 394.

395. AT&T also considered installing Branch's technology. Ultimately, it decided not to partner with Branch after Google refused to clarify whether such a partnership would run afoul

of the RSA. After initially meeting with Branch, AT&T was interested in distributing it, but sought reassurance from Google that if it did so, it would not violate the RSA. Ezell Dep. Tr. at 237:6-19, 239:15-23. AT&T felt that it was not "black and white or cut and dry," and that "there might be some risks associated with" partnering with Branch, because it could be "considered a competing or alternative search," which would require AT&T to "forego[] the Internet search revenue from Google and instead just earn[] this on-device search revenue from Branch." *Id.* at 240:1-5, 242:25–243:9.

396. Ultimately, AT&T was unable to get a clear response from Google, *see* UPX982 at 686–87 (Google referring AT&T back to the "alternative search services" term without a concrete answer), and thus AT&T declined to preload Branch because it was not worth the risk, Ezell Dep. Tr. at 340:20–341:4 ("[T]he way it was reported back to me was that Google indicated they felt that it was inconsistent with the RSA."); *id.* at 247:1–249:9 ("It didn't appear that the economic upside from Branch was significant enough to . . . potentially put at risk a device not being eligible for our Google Search revenue.").

3. Mobile Services Information Agreements

397. In 2021, every wireless carrier entered into a Mobile Services Incentive Agreement (MSIA) with Google, also known as a "go-to-market" agreement, wherein Google pays carriers incentives as consideration for meeting various requirements that are unrelated to search. *See* JX92; JX96; JX94; Tr. at 9460:24–9461:23 (Rosenberg).

398. The MSIAs are separate and apart from the MADAs and RSAs. Tr. at 9376:21–9377:8 (McCallister). They require partners to collaborate with Google as to how the incentive is spent, which goes towards the goal of supporting the sale of Android devices and the Android ecosystem. *Id.* at 9460:24–9461:23 (Rosenberg); *id.* at 9378:23–9379:1 (McCallister).

CONCLUSIONS OF LAW

I. LEGAL FRAMEWORK

"Section 2 of the Sherman Act makes it unlawful for a firm to 'monopolize.'" *United States v. Microsoft*, 253 F.3d 34, 50 (D.C. Cir. 2001) (citing 15 U.S.C. § 2). The offense of monopolization requires proof of two elements: "(1) the possession of monopoly power in the relevant market and (2) the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966).

The D.C. Circuit's decision in *Microsoft* explains how to evaluate claims of monopolization. The first element—"monopoly power in the relevant market"—consists of two inquiries: (1) market definition, both product and geographic, and (2) power within the relevant market. *Microsoft*, 253 F.3d at 51. The plaintiff bears the burden of proof on both. *Id.* The second element—"willful acquisition or maintenance" of monopoly power—involves a burden-shifting inquiry. The plaintiff bears the initial burden of establishing a prima facie case of anticompetitive effects resulting from the challenged conduct. *Id.* at 58. If the plaintiff makes out its prima facie case, the burden shifts to the defendant to "proffer a 'procompetitive justification' for its conduct," that is, "a nonpretextual claim that its conduct is indeed a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal[.]" *Id.* at 59. Finally, "[i]f the monopolist asserts a procompetitive justification . . . then the burden shifts back to the plaintiff to rebut that claim." *Id.* "[I]f the monopolist's procompetitive justification stands unrebutted, then the plaintiff must demonstrate that the anticompetitive harm of the conduct outweighs the procompetitive benefit." *Id.*

The court structures its conclusions of law consistent with *Microsoft*'s analytical framework. After first summarizing the principles governing market definition, *infra* Section II.A, the court in Section II.B addresses whether general search services is a relevant product market, and finding that it is, then evaluates in Section II.C whether Google has monopoly power in that market. In Part III, the court considers the three proposed advertiser-side markets. The court finds that Plaintiffs have established two relevant markets—search advertising and general search text advertising—but that Google possesses monopoly power only in the narrower market for general search text advertising. All parties agree that the relevant geographic market is the United States.

The court then determines whether Google has engaged in exclusionary conduct in the relevant product markets. Plaintiffs' primary theory centers on Google's distribution agreements with browser developers, OEMs, and carriers. The court first addresses in Part IV whether the distribution agreements are exclusive under *Microsoft*. Finding that they are, the court then analyzes in Parts V and VI whether the contracts have anticompetitive effects and procompetitive justifications in each market. For reasons that will become evident, the court does not reach the balancing of anticompetitive effects and procompetitive justifications. Ultimately, the court concludes that Google's exclusive distribution agreements have contributed to Google's maintenance of its monopoly power in two relevant markets: general search services and general search text advertising.

In Part VII, the court evaluates Plaintiff States' additional theory of exclusionary conduct: that Google caused anticompetitive effects in the proposed markets by purposely advantaging its own advertising platform over Microsoft's on its search engine management tool, SA360. The court finds that Google's SA360-related conduct does not give rise to antitrust liability for two

reasons: (1) as a matter of law, Google has no duty to deal with Microsoft and (2) Plaintiff States did not produce evidence of anticompetitive effects.

Finally, in Sections VIII.A and VIII.B, respectively, the court discusses the intent evidence in this case and Plaintiffs' request for sanctions under Rule 37.

II. MONOPOLY POWER: GENERAL SEARCH SERVICES

The Supreme Court has defined "monopoly power" to mean "the power to control prices or exclude competition." *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, 391 (1956). "More precisely, a firm is a monopolist if it can profitably raise prices substantially above the competitive level." *Microsoft*, 253 F.3d at 51. Direct evidence of such pricing power is "rarely available[.]" *Id.* So, "courts more typically examine market structure in search of circumstantial evidence of monopoly power." *Id.* Applying this "structural approach," a court may infer monopoly power "from a firm's possession of a dominant share of a relevant market that is protected by entry barriers." *Id.* Entry barriers are factors "that prevent new rivals from timely responding to an increase in price above the competitive level." *Id.*

Plaintiffs maintain that Google has monopoly power in the product market for general search services in the United States. According to Plaintiffs, Google has a dominant and durable share in that market, and that share is protected by high barriers to entry.

Google counters that there is no such thing as a product market for general search services. What exists instead, Google insists, is a broader market for query responses, in which there is vigorous competition. Google's Post-Trial Br., ECF No. 908 [hereinafter GTB], at 8–15. That market includes a host of other firms that fall outside of Plaintiffs' proposed market, including (1) SVPs like Amazon, Booking.com, and Yelp, (2) social media companies like Meta (which owns Facebook and Instagram) and TikTok, and (3) prominent stand-alone websites, like

Wikipedia. *Id.* These firms answer queries and therefore compete with Google. Secondarily, even if there is a product market for general search services, Google argues that it lacks monopoly power in it. The emergence of other search competitors, Google says, proves that barriers to entry are not as high as Plaintiffs claim.

A. Principles of Market Definition

The court starts with market definition.[3] "[T]he relevant market is defined as the area of effective competition. Typically this is the 'arena within which significant substitution in consumption or production occurs.'" *Ohio v. Am. Express Co.*, 585 U.S. 529, 543 (2018) (quoting AREEDA & HOVENKAMP, FUNDAMENTALS OF ANTITRUST LAW § 5.02 (4th ed. 2017)) (internal quotation marks omitted). A relevant market must include all products that are "reasonably interchangeable by consumers for the same purposes," *Microsoft*, 253 F.3d. at 52 (internal quotation marks omitted), "even though the products themselves are not entirely the same," *FTC v. Sysco Corp.*, 113 F. Supp. 3d 1, 25 (D.D.C. 2015). Courts should combine different products or services in a single market when "that combination reflects commercial realities." *Grinnell*, 384 U.S. at 572.

Whether goods are reasonable substitutes depends on two factors: functional interchangeability and cross-elasticity of demand. *Sysco*, 113 F. Supp. 3d at 25–26. Functionally interchangeable products are those that consumers view as substitutes for each other. *See id.* The products comprising the relevant market need not be entirely the same. So long as "consumers can substitute the use of one for the other, then the products in question will be deemed 'functionally interchangeable.'" *FTC v. Arch Coal, Inc.*, 329 F. Supp. 2d 109, 119 (D.D.C. 2004); *see also du Pont*, 351 U.S. at 393 ("Determination of the competitive market for commodities

[3] While this legal standard is identified as part of the court's discussion of the general search services market, it also applies to the advertiser-side markets discussed in Part III.

depends on how different from one another are the offered commodities in character or use, how far buyers will go to substitute one commodity for another.").

Cross-elasticity of demand turns on consumers' sensitivity to an increase in price. *See Rothery Storage & Van Co. v. Atlas Van Lines, Inc.*, 792 F.2d 210, 218 (D.C. Cir. 1986); *du Pont*, 351 U.S. at 400 ("An element for consideration as to cross-elasticity of demand between products is the responsiveness of the sales of one product to price changes of the other."). That is, "[i]f an increase in the price for product A causes a substantial number of customers to switch to product B, the products compete in the same market." *Sysco* 113 F. Supp. 3d at 25. "The higher these cross-elasticities, the more likely it is that similar products . . . are to be counted in the relevant market." *Rothery Storage*, 792 F.2d at 218.

Courts generally consider two categories of evidence when defining the relevant product market: the "practical indicia" identified by the Supreme Court in *Brown Shoe Company v. United States*, 370 U.S. 294 (1962), and quantitative evidence from expert economists. The *Brown Shoe* "practical indicia" include: (1) industry or public recognition, (2) the product's peculiar characteristics and uses, (3) unique production facilities, (4) distinct customers, (5) distinct prices, (6) sensitivity to price changes, and (7) specialized vendors. *Id.* at 325. According to the D.C. Circuit, "[t]hese indicia seem to be evidentiary proxies for direct proof of substitutability." *Rothery Storage*, 792 F.2d at 218. And while "[t]he *Brown Shoe* practical indicia may indeed be 'old school'" antitrust law, they bind the court. *Sysco*, 113 F. Supp. 3d at 27 n.2.[4]

Quantitative evidence of market definition typically comes in the form of an expert economist conducting a "hypothetical monopolist test." *Id.* at 33 (internal quotation marks

[4] Although some jurists have questioned the continued reliance on *Brown Shoe* to define markets, *see FTC v. Whole Foods Market., Inc.*, 548 F.3d 1028, 1058–59 (D.C. Cir. 2008) (Kavanaugh, J., dissenting), Google has not urged the court to abandon consideration of them, *see* GTB at 6–23; Google's Proposed Conclusions of Law, ECF No. 909 [hereinafter GCL], at 1–13; Google's Resp. Proposed Conclusions of Law, ECF No. 911 [hereinafter GRCL], at 3–7.

omitted). "This test asks whether a hypothetical monopolist who has control over a set of substitutable products could profitably raise prices on those products. If so, the products may comprise the relevant product market." *Id.* None of Plaintiffs' economics experts performed a quantitative hypothetical monopolist test. That is entirely understandable for the proposed general search services market because search is a zero-priced good to the end user. The absence of a price is a feature of the user-side market. *See Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 978 (9th Cir. 2023) (observing that "there may be markets where companies offer a product to one side of the market for free but profit in other ways, such as by collecting consumer data or generating ad revenue").

Pricing, however, is central to the advertiser-side markets. Yet none of Plaintiffs' experts performed a hypothetical monopolist test. The court found this surprising, but its absence is not fatal. There is no legal requirement that a plaintiff supply quantitative proof to define a relevant market. *See McWane, Inc. v. FTC*, 783 F.3d 814, 829–30 (11th Cir. 2015). Authorities cited by Google do not establish otherwise. *See* GTB at 21. For instance, Google accurately quotes an Eleventh Circuit decision, stating that "the broader economic significance of a submarket must be supported by demonstrable empirical evidence." *Jacobs v. Tempur-Pedic Int'l, Inc.*, 626 F.3d 1327, 1338 (11th Cir. 2010) (quoting *U.S. Anchor Mfg., Inc. v. Rule Indus., Inc.*, 7 F.3d 986, 998 (11th Cir. 1993)) (internal quotation marks omitted). But the Circuit's later decision in *McWane* made clear that this is not a hard-and-fast rule. There, the expert's opinion "did not involve an econometric analysis, such as a cross-elasticity of demand study." 783 F.3d at 829. Still, the expert's reliance on qualitative economic evidence was sufficient to define the market, because "there appears to be no support in the caselaw for [the] claim that such a technical analysis is always required." *Id.*

Plaintiffs did offer proof of what they say are "real-world" hypothetical monopolist inquiries conducted by Google, as the company routinely measured the effects of price increases on advertiser demand. The court will discuss what Google calls "intentional pricing" as part of the proposed advertiser-side markets, *infra* Section VI.B.

B. General Search Services is a Relevant Product Market.

The evidence at trial established that general search services is a relevant product market and alternative sources for query information, like SVPs and social media sites, are not adequate substitutes. The *Brown Shoe* practical indicia highlight the unique features of a GSE that make it distinct from other platforms. Of course, not every *Brown Shoe* factor is applicable because general search is a free product, so the court does not consider factors related to pricing. The court first addresses the relevant *Brown Shoe* factors and then responds to Google's counterarguments.

1. Peculiar Characteristics and Uses

"The 'product's peculiar characteristics' refers to the general truth that substitutes in the market often have a strong physical and functional relationship." *Rothery Storage*, 79 F.2d at 218 n.4.

No user could confuse a GSE with an SVP or a social media site. Unlike those other products, GSEs are a gateway to the World Wide Web. FOF ¶ 27. The web itself is often (but not always) the source of the answer to a query. (GSEs also secure query responses from structured data, such as knowledge graphs, current travel information, sports score feeds, etc.). FOF ¶¶ 41–45. Search on a GSE therefore is not constrained by subject matter, inventory, or query type. FOF ¶ 33. Google's own query classification system reflects this reality. It tracks queries in more than two dozen different subject matter areas. FOF ¶ 34. Moreover, 80% of Google's queries are noncommercial in nature. FOF ¶ 37. Also, navigational queries—that is, queries entered for the

purpose of getting to another site on the web (e.g., "amazon," "home depot," "baltimore sun")—are exclusive to GSEs. FOF ¶ 39. Nearly 12% of Google's queries are navigational queries, and according to a 2018 Google weekly query report, its top five queries by query volume were all navigational queries. *Id.*

By contrast, SVPs are "walled gardens," meaning their query responses are derived from structured data available only on that particular platform. FOF ¶ 144. Such data cannot typically be crawled by a GSE. FOF ¶¶ 45, 144. Because a user's search is confined to the SVP's structured data, users cannot use an SVP to navigate beyond the platform. FOF ¶ 144. For instance, Home Depot maintains a vast product catalog of goods that it sells both online and in stores. FOF ¶ 145. Users of Home Depot's digital platforms can purchase those products from Home Depot but cannot navigate to a product-maker's website to make a direct purchase. *Id.* In addition, as the name implies, SVPs are typically "specialized" to a particular subject matter (e.g., Amazon for shopping, Expedia for travel, Yelp for local businesses). FOF ¶¶ 141, 146. Although some SVPs do answer noncommercial queries, most notably Wikipedia, the vast majority do not. FOF ¶ 142. Thus, a user who wishes to acquire different categories of information could not do so from a single SVP and instead would have to take trips to multiple sites. FOF ¶¶ 33, 147. Even then, there are some types of queries—like long-tail queries—for which there may not be an SVP to deliver an answer. FOF ¶ 148.

The product delivered to consumers on a GSE differs significantly from what is produced by an SVP. When a user enters a query into Google or Bing, the result is a search engine results page, or SERP, which contains organic links that enable the user to navigate to other websites. FOF ¶¶ 41, 43. For commercial queries, the Google SERP will include advertisements, which similarly link to other webpages. FOF ¶ 172. And, in some cases, the SERP will contain vertical

offerings, which are built on structured data typically sourced from a third-party on topics such as shopping, flights, and hotels. FOF ¶¶ 42, 45.

On the other hand, SVPs respond to queries with a results page that reflects the data possessed or controlled by the SVP. Although some SVPs contain links that direct a user to a site external to the SVP's platform (such as an online travel aggregator like Kayak), most do not. FOF ¶ 144. Similarly, any advertisements that appear on an SVP's results page link to products or services within its own platform. FOF ¶ 194. Purchases are typically completed within the SVP itself. *Id.* As a result of these distinct features, the business models of GSEs and SVPs are fundamentally different. A GSE seeks to attract users on the promise that it will accurately and efficiently answer any query and monetize the commercial ones through advertising. An SVP must attract a user to its site for a commercial purpose to complete a transaction.

Social media sites differ from GSEs in many of the same ways as SVPs. They too are "walled gardens," primarily driven by user-generated content such as self-uploaded videos on TikTok or photos on Instagram. FOF ¶ 162. Searches on social media only yield results from profiles on the platform and do not display web links to external sites (although social media users can navigate to external web content, such as through a link posted by a user or through an advertisement). *Id.* There was little evidence presented on the efficacy of social media search. The court thus has no reason to believe that search functionality on social media sites is comparable to that offered by GSEs or even SVPs.

Plaintiffs have sought to distinguish GSEs from other platforms as a "one-stop shop" for all manner of queries, and Google challenges that characterization. U.S. Plaintiffs' expert, Dr. Michael Whinston, opined that his analysis of Windows query data demonstrated that 77% of users begin their search journeys on GSEs. FOF ¶ 35. Plaintiff States' expert, Dr. Jonathan Baker,

conducted an analysis of user search behavior, which showed that nearly 65% of user sessions involved searching in more than one vertical. FOF ¶ 34. Dr. Baker claimed that this analysis proved that general search offers "one-stop shop" convenience. *Id.* Google's expert, Dr. Mark Israel, took a contrary position. He opined that "one-stop shopping" is at odds with how people actually search. Google's sessions data showed that during a "visit" to Google—defined as any series of user activity separated by five minutes of inactivity—the median number of queries is one and that the median length of a visit is 20 seconds. That data, he said, is inconsistent with the notion of "one-stop shopping." Tr. at 8418:1–8419:3 (Israel) (discussing DXD29 at 25).

The court does not find the "one-stop shop" analogy to be apt, but that is no obstacle to recognizing a general search services market. The notion of the "one-stop shop" was useful in a case like *Sysco*, where the ability of a purchaser to obtain all of its requirements in one place was more efficient and less costly than having to place orders with multiple specialty providers. *See* 113 F. Supp. 3d at 16 ("Customers value the breadth of product offerings and the opportunity to aggregate a substantial portion of their purchases with one distributor, allowing them to save costs."). That is not exactly how search works. Users do not necessarily do all their querying at once. Users seek information on different subjects over time. By that thinking, Dr. Israel is right that search is not a "one-stop shop."

But that framing is too narrow. Users always can, and do, return to a GSE to fulfill a broad array of informational needs. And they can do so at little or no cost. A user can search for a tennis racket on Google, then purchase the racket on Walmart.com, and then return to Google to find out the dates for the next U.S. Open with little to no friction (and certainly no actual expense). This may not be "one-stop shopping" in a traditional sense, but the GSE is performing a unique function: It is both a reservoir of information and a conduit to other sources on the web. And it

serves that purpose over and over again. No SVP or social media platform can meet user needs in the same way. They therefore are not functionally interchangeable with GSEs.

2. Industry or Public Recognition

Industry or public recognition "matters because [courts] assume that economic actors usually have accurate perceptions of economic realities." *Rothery Storage*, 792 F.2d at 218 n.4. Plaintiffs have presented significant evidence that market participants consider GSEs to be a distinct product with no adequate substitutes.

First, browser developers recognize that GSEs are a distinct product. Browsers contain a default search access point, and only GSEs occupy that position. To install an SVP or a social media site as the default would restrict that key access point to a particular vertical or subset of verticals, creating a poor user experience. FOF ¶¶ 146–147, 149. To that end, browsers allow users to switch the search default only to a GSE and not to an SVP or a social media platform. The available alternative defaults in Chrome, Edge, Firefox, and Safari all are GSEs. FOF ¶ 61. Mozilla recognizes that certain SVPs are frequented by its users, and so it has created a unique feature in the desktop version of Firefox that allows users to perform individual searches with SVPs like Amazon or Wikipedia, using the Firefox toolbar. FOF ¶ 60. But even Firefox does not allow a user to change the default search engine to an SVP. FOF ¶ 61.

Second, Android OEMs and mobile carriers also consider GSEs to be a distinct product. By signing the MADA, every Android OEM has installed a GSE—Google—as its default search access point (whether in the Google Search Widget or Chrome). FOF ¶¶ 59, 350, 363. No Android phone comes with an SVP or a social media platform installed at the default search access point. Not surprisingly then, Google's various RSAs with OEMs and carriers define the term "Alternative Search Service" to include platforms similar to Google. FOF ¶¶ 385–390. Certain RSAs explicitly

exclude SVPs from the definition. *Id.* Thus, the RSAs prohibit partners from preloading Bing, Yahoo, and DDG but permit preloading of Amazon or Instagram.

Third, advertisers consider GSEs to be differentiated from SVPs and social media platforms. The court will have more to say about this in connection with the advertiser-side markets, *see infra* Section III.A.1, but for present purposes it suffices to observe that advertisers do not generally view SVPs and social media to be reasonable substitutes for GSEs.

Fourth, Google itself recognizes general search services as a distinct product and separate market. As already noted, Google is the default GSE on Chrome. (Microsoft does the same with Edge, installing Bing as the preset default.) When Google has evaluated its quality against other platforms, it has done so primarily against other GSEs. FOF ¶¶ 136–138. For instance, Google has assessed its SERP quality and latency alongside Bing and has compared its privacy offerings to DDG. *Id.* While Google has conducted some evaluations of SVP and social media users, *see* Google's Resp. Proposed Findings of Fact, ECF No. 912, ¶¶ 13, 15 [hereinafter GRFOF], its employees have testified that it would be difficult or unhelpful to do side-by-side comparisons with SVPs or social media, because of their differentiated product experiences, FOF ¶ 139.

In addition, internal Google documents show that Google, as early as 2009, tracked its "market share" relative only to other GSEs. *See United States v. H&R Block, Inc.*, 833 F. Supp. 2d 36, 52 (D.D.C. 2011) ("When determining the relevant product market, courts often pay close attention to the defendants' ordinary course of business documents.") (citation omitted). Google has since suspended that practice. The record does not reveal precisely why.

Finally, evidence suggests that the public also views GSEs as a distinct product. Dr. Israel testified that there is "relatively limited [user] overlap between the general search engines." Tr. at

8728:23-24 (Israel). This suggests that users see Google and other GSEs as substitutes, such that using Google obviates a need to use another GSE.

3. Unique Production Facilities

"If a product requires unique production facilities, and the producer raises the price above the competitive level, the ability of other producers to shift resources to make the product would be limited, and the market definition should be likewise limited." *Rothery Storage*, 792 F.2d at 218 n.4. For a zero-cost product like a GSE, this factor is of limited application unless slightly modified to use quality as the relevant variable, instead of price.

Imagine if Google's search quality substantially degraded, whether purposely or through neglect. Would SVPs or social media platforms be able to shift resources to put out a product that resembles a GSE and thereby capture a significant number of dissatisfied Google users? The answer obviously is no. Absent extraordinary cost and expense, neither Amazon nor Meta could become a source for noncommercial or navigational queries. *See infra* Section II.C.3.a. Wikipedia likewise could not become a source for commercial or navigational ones. And even if an SVP or social media firm were willing to make the required intense resource commitments, adapting its platform to perform general search functions would take a long time to materialize. *Cf. Microsoft*, 253 F.3d at 53–54 (stating that substitute products are those that can "constrain pricing in the reasonably foreseeable future, and only products that can enter the market in a relatively short time can perform this function").

* * *

Accordingly, the relevant *Brown Shoe* factors warrant recognition of a general search services market.

4. Google's Proposed Query Product Market

Google urges that the relevant user-side product is query responses, not general search services. *See* GTB at 8. That contention rests largely on the opinions of its expert, Dr. Israel. He observes that whenever a person seeks information online, they make a choice about where to search, whether on a GSE, an SVP, a website, or a social media platform. *See, e.g.*, Tr. at 8398:1-17, 8437:1-23 (Israel). These various sources, although differentiated from GSEs, compete with GSEs for queries and thus act as competitive constraints. GTB at 9. Plaintiffs' user-side market for GSEs, Dr. Israel says, artificially cuts out these market actors, many of whom are Google's primary competitors for users. *Id.* at 10–12. Those include shopping and local SVPs, like Amazon and Yelp, which fiercely compete with Google to attract users. Tr. at 8394:25–8395:9 (Israel).

In one sense, Dr. Israel is not wrong. Google does perceive and respond to competitive pressure from other platforms, particularly SVPs. FOF ¶ 140. After all, Google developed verticals like shopping, flights, and hotels in part to provide users with topic-specific results much like SVPs. *See* GTB at 13; FOF ¶ 45. Still, the court is unpersuaded by Dr. Israel's query-by-query approach to define the relevant market for several reasons.

First, "the relevant market must include all products 'reasonably interchangeable by consumers *for the same purposes*.'" *Microsoft*, 253 F.3d at 52 (quoting *du Pont*, 351 U.S. at 395) (emphasis added); *see also id.* (affirming the district court's exclusion of "information appliances" from the relevant market "because information appliances fall far short of performing *all of the functions of a PC*") (emphasis added). No one disputes that an SVP can serve the same purpose as a GSE for an individual query on a particular subject matter. A user can, for example, use either Google or OpenTable to find a nearby Japanese restaurant, or turn to Google or Amazon to shop for a blender. But no SVP can fulfill a user's varied needs in the same manner as a GSE. Few

SVPs can provide answers to noncommercial queries or take a user to a desired location on the web through a navigational query. And no SVP can answer long-tail queries like a GSE. Thus, an SVP may be reasonably interchangeable with a GSE for a discrete purpose but for not the "same purposes."

Second, "the mere fact that a firm may be termed a competitor in the overall marketplace does not necessarily require that it be included in the relevant product market for antitrust purposes." *FTC v. Staples, Inc.*, 970 F. Supp. 1066, 1075 (D.D.C. 1997). That is the lesson learned from the D.C. Circuit's decision in *Whole Foods* and the district court's decision in *Staples*. In *Whole Foods*, the fact that consumers "cross-shopped" between premium and organic supermarkets and ordinary supermarkets did not require the latter's inclusion in the relevant market. 548 F.3d at 1040 (Brown, J.). Likewise, in *Staples*, the court held that office supply superstores constituted a relevant product market even though consumers also purchased such products through other retail outlets. 970 F. Supp. at 1079. A similar analysis applies here. The fact that GSEs may compete for travel queries against Booking.com, shopping queries against Amazon, and local queries against Yelp does not mean that firms that specialize in certain verticals belong in the same product market as GSEs. The fact that users "cross-query" does not require all online query sources be lumped together in the same market.

To challenge this conclusion, Google points to a 2020 Bank of America study, which asked participants where they begin online shopping searches: 58% responded Amazon, only 25% chose Google. FOF ¶ 151. "But the fact that [two firms] 'are direct competitors in some submarkets . . . is not the end of the inquiry[.]'" *Whole Foods*, 548 F.3d at 1040 (Brown, J.) (quoting *United States v. Conn. Nat. Bank*, 418 U.S. 656, 664 n.3 (1974)). The Bank of America study merely demonstrates that Google and Amazon compete for shopping queries, which comprise a minority

of Google's overall queries by type. FOF ¶ 151; FOF ¶ 38 (80% of queries on Google are non-commercial in nature); *see also* 548 F.3d at 1048 (Tatel, J., concurring) ("That Whole Foods and Wild Oats have attracted many customers away from conventional grocery stores by offering extensive selections of natural and organic products thus tells us nothing about whether [they] should be treated as operating in the same market as conventional grocery stores."). That Google and Amazon have some overlapping users does not, without more, mean they belong in the same product market.

Third, there is nothing improper about aggregating varied query types into a single relevant market. According to Dr. Israel, the "clustering" of different verticals into a single market is appropriate only when the competitive conditions are similar, that is, when information providers are competing to resolve similar user questions, such as those related to travel. *See* Tr. at 8400:6-23 (Israel); *ProMedica Health Sys., Inc. v. FTC*, 749 F.3d 559, 565 (6th Cir. 2014) ("If the [competitive] conditions are similar for a range of services, then the antitrust analysis should be similar for each of them."). He acknowledges that there may be submarkets for travel or shopping or local queries, but he rejects an overarching market that collects those submarkets under the umbrella of general search. *See* Tr. at 8399:7–8400:23 (Israel).

But Dr. Israel's "cluster" market principle does not apply here, because a GSE is better thought of as a "bundle" of offerings. *Cf. Whole Foods*, 548 F.3d at 1039 (Brown, J.) (recognizing a "cluster" market based on "a core group of particularly dedicated, distinct customers, paying distinct prices"). "Unlike cluster markets, which aggregate a number of individual relevant markets, a bundle market is the collection of products or services that comprise the relevant market where customers value suppliers offering a package of goods and benefit from the 'one-stop shopping' experience." Kevin Hahm & Loren K. Smith, *Clarifying Bundle Markets and*

Distinguishing Them from Cluster Markets, 20 ANTITRUST SOURCE 1, 3 (2021). As already discussed, GSEs are not a "one-stop shop" in the same sense as, say, an office-supply superstore (*Staples*) or a broadline distributor (*Sysco*). But they are a distinct product because only a GSE can answer *any* query—including, importantly, noncommercial and navigational queries. *See Grinnell*, 384 U.S. at 572–74 (stating that there is "no barrier to combining in a single market a number of different products or services where that combination reflects commercial realities" and the market concerns "a single basic service" that is "unique," notwithstanding the existence of more specialized competitors). No SVP can match the breadth and comprehensiveness of a GSE. Thus, even if viewed as a "bundle" of search offerings, GSEs comprise a relevant product market.

Finally, the record shows that GSEs and SVPs are complementary goods, undermining Google's contention that users view the two as true substitutes. *Sysco*, 113 F. Supp. 3d at 31 (observing that it "would be improper to group complementary goods into the same relevant market just because they occasionally substitute for one another") (quoting AREEDA & HOVENKAMP, FUNDAMENTALS OF ANTITRUST LAW ¶ 565b (4th ed. 2017)). Dr. Baker demonstrated that SVPs receive between 33% to 88% of their traffic, depending on the subject matter area, through a click on a GSE's SERP, whether through an organic link or an advertisement. FOF ¶ 155. Not surprisingly then, SVPs are Google's top advertisers. FOF ¶ 156. This data shows that users are not uniformly bypassing Google and going directly to SVPs, thus confirming that SVPs do not cannibalize searches on Google.

As evidence that SVPs pose a competitive constraint, Dr. Israel analyzed queries on Google, Amazon, and Bing, and found that for Google's top non-navigational shopping queries, Amazon had a significant query volume (3.7 million, as compared to Google's 5.1 million). FOF ¶ 154. But Dr. Israel's query volume analysis only reveals that users enter a large number of

queries on both Google and Amazon. Unlike most goods, queries are free, so users face no cost constraint when using more than one site. Thus, the fact that large numbers of consumers use both Google and Amazon tells the court little about whether Amazon is "reasonably interchangeable" with Google. (The same is true for Dr. Israel's analysis of queries on Yelp and the Auto, Flights, and Shopping verticals.)

Google's own studies confirm that GSEs and SVPs are complementary goods, not substitutes. Google's 2019 analysis, entitled "Project Charlotte," showed that users who engaged with SVPs were *more likely* to enter queries on Google. FOF ¶ 157. The same is true on mobile applications: A 2020 Google study found a positive correlation between users' activity on SVP applications and query volume on Google, such that a user's adoption of Amazon, eBay, Walmart, Pinterest, Spotify, or Twitter was associated with increased revenues and queries on Google mobile. *Id.* Therefore, although SVPs can and do compete with GSEs for certain types of queries, the evidence does not show that such competition has led to less frequent use of GSEs. Consumers use GSEs and SVPs in a complementary manner to meet their online needs. *See Microsoft*, 253 F.3d at 52 (products that function "only as a supplement to" the proposed product market are not within the market).

With respect to social media platforms, there is little evidence that they actually compete with GSEs for search queries. Google presented an internal study suggesting that 63% of daily TikTok users aged 18–24 reported using the platform to perform searches within the last week, FOF ¶¶ 140, 163–164 (citing DX241), but that percentage alone tells the court little about actual substitution between GSEs and TikTok. Importantly, the study offers no detail on the types of searches performed or the quality of the results. There also is some evidence—albeit dated—that Facebook use correlates to *more* searching on Google. FOF ¶ 165. Thus, although it may be that

there is some growth in search on social media platforms, it is not enough to comprise the "significant substitution" necessary to be grouped into the same product market.

* * *

The court therefore rejects Google's proposed query-response market and instead agrees with Plaintiffs that there is a relevant market for general search services.[5]

C. Google Has Monopoly Power in the General Search Services Market.

The court turns now to address whether Google possesses monopoly power within the market for general search services. "While merely possessing monopoly power is not itself an antitrust violation, it is a necessary element of a monopolization charge." *Microsoft*, 253 F.3d at 51 (citations omitted). "Monopoly power is the power to control prices or exclude competition." *du Pont*, 351 U.S. at 391. "More precisely, a firm is a monopolist if it can profitably raise prices substantially above the competitive level." *Microsoft*, 253 F.3d at 51. Importantly, a firm need not actually have earned monopoly profits or excluded competition to possess monopoly power. "[T]he material consideration in determining whether a monopoly exists is not that prices are raised and that competition is actually excluded but that *power exists* to raise prices or exclude competition when it is desired to do so." *Am. Tobacco Co. v. United States*, 328 U.S. 781, 811

[5] Dr. Whinston suggested that the so-called "*Cellophane* fallacy" explains substitution away from Google to other platforms, like SVPs. *See* U.S. Pls.' Proposed Conclusions of Law, ECF No. 838 [hereinafter UPCL], at 6–7. The *Cellophane* fallacy refers to "the existence of substitution between products resulting from monopoly power rather than reasonable substitutability." *Id.* A commercial environment evincing a "high cross-elasticity of demand may, in some cases, be the product of monopoly power rather than a belief on the part of consumers that the products are good substitutes for one another." *United States v. Eastman Kodak Co*., 63 F.3d 95, 105 (2d Cir. 1995). In other words, the dearth of true substitutes in a heavily monopolized market may lead users to substitute to "highly-differentiated," out-of-market products. *Id.* In those circumstances, "[t]he existence of significant substitution in the event of further price increases or even at the current price does not tell us whether the defendant already exercises significant market power." *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 471 (1992) (quoting AREEDA & KAPLOW, ANTITRUST ANALYSIS ¶ 340b (4th ed. 1988)) (emphasis omitted). The court thinks that the *Cellophane* fallacy has little application here. Amazon is not a "poor substitute" whose use should be understood as evidence of Google's monopoly power. UPCL at 6. All evidence points to consumers viewing Google and Amazon as complementary goods that compete in certain submarkets but not as "reasonably interchangeable by consumers for the same purposes[.]" *du Pont*, 351 U.S. at 395. The *Cellophane* fallacy is thus not applicable.

(1946) (emphasis added). "It is not necessary that the power thus obtained should be exercised. Its existence is sufficient." *Id.* (internal quotation marks omitted).

The possession of monopoly power may be proven through direct or indirect evidence. Direct evidence of monopoly power is rare. "Where evidence indicates that a firm has in fact profitably" raised prices substantially above the competitive level, "the existence of monopoly power is clear." *Microsoft*, 253 F.3d at 51. More often, courts "examine market structure in search of circumstantial evidence of monopoly power." *Id.*; *see id.* at 57 (observing that "direct evidence [is not required] to show monopoly power in any market"). Under this indirect, structural approach, "monopoly power may be inferred from a firm's possession of a dominant share of a relevant market that is protected by entry barriers." *Id.* at 51.

A barrier to entry is "[a]ny market condition that makes entry more costly or time-consuming and thus reduces the effectiveness of potential competition as a constraint on the pricing behavior of the dominant firm . . . regardless of who is responsible for the existence of that condition." *S. Pac. Commc'ns Co. v. AT&T*, 740 F.2d 980, 1001 (D.C. Cir. 1984). "Common entry barriers include: patents or other legal licenses, control of essential or superior resources, entrenched buyer preferences, high capital entry costs[,] and economies of scale." *Image Tech. Servs., Inc. v. Eastman Kodak Co.*, 125 F.3d 1195, 1208 (9th Cir. 1997); *see also United States v. Syufy Enters.*, 903 F.2d 659, 667 (9th Cir. 1990) (observing that a "network of exclusive contracts or distribution arrangements designed to lock out potential competitors" is a barrier to entry). A plaintiff must not only show that such barriers to entry exist, but that those barriers are "significant[.]" *Microsoft*, 253 F.3d at 82.

Certain market behaviors are not inconsistent with a defendant's possession of monopoly power. Evidence that a dominant firm invests in research and development is not antithetical to

monopoly power. "[B]ecause innovation can increase an already dominant market share and further delay the emergence of competition, even monopolists have reason to invest in R&D." *Id.* at 57. The same is true of decreasing price: "[A] price lower than the short-term profit-maximizing price is not inconsistent with possession or improper use of monopoly power." *Id.* (citation omitted). Finally, "[t]he defendant's innocence or blameworthiness . . . has absolutely nothing to do with whether a condition constitutes a barrier to entry" evincing monopoly power. *AT&T*, 740 F.2d at 1001.

Plaintiffs attempt to prove that Google has monopoly power in the market for general search services through both direct and indirect evidence. Although they offer little direct evidence, the indirect evidence supporting the structural approach—a dominant market share fortified by barriers to entry—easily establishes Google's monopoly power in search.

1. Direct Evidence

Plaintiffs' direct evidence is limited. They note that Google's immense revenues and large profit margins, FOF ¶¶ 8, 57, 259, allow it to capture significant surplus from the challenged contracts, *see* U.S. Pls.' Proposed Findings of Fact, ECF No. 839 [hereinafter UPFOF], at 27–28; Tr. at 4775:21-24 (Whinston) ("[T]he size of profits and . . . when firms have a really, really big advantage, that is very likely to coincide with market power."); *id.* at 415:8-10 (Varian) (agreeing that in some cases, "large profit is one indicator of monopoly").

In addition, Plaintiffs point to Google's admission that it does not "consider whether users will go to other specific search providers (general or otherwise) if it introduces a change to its Search product." UPX6019 at 365–66. Google's indifference is unsurprising. In 2020, Google conducted a quality degradation study, which showed that it would not lose search revenue if were to significantly reduce the quality of its search product. FOF ¶ 134. Just as the power to raise

price "when it is desired to do so" is proof of monopoly power, *Am. Tobacco*, 328 U.S. at 811, so too is the ability to degrade product quality without concern of losing consumers, *see* Andrew Chin, *Antitrust Analysis in Software Product Markets: A First Principles Approach*, 18 HARV. J.L. & TECH. 1, 22 n.134 (2004) ("A seller with market power may find it profitable to reduce product quality in the eyes of a captive group of consumers if the seller can thereby reduce production costs or, more generally, if the seller's interests are adverse in some way to the consumers' preferences."). The fact that Google makes product changes without concern that its users might go elsewhere is something only a firm with monopoly power could do. *See Microsoft*, 253 F.3d at 58 (observing that Microsoft's setting "the price of Windows without considering rivals' prices" is "something a firm without a monopoly would have been unable to do").

Other direct evidence presented was less persuasive. Plaintiffs submitted evidence that Google's Senior Vice President of Knowledge and Information Products, Dr. Prabhakar Raghavan, cautioned his team against responding hastily to DDG's privacy initiatives absent a business case for doing so. FOF ¶¶ 138, 118–119. According to Plaintiffs, Google's ability to offer fewer privacy protections—without concern as to a rival's superior privacy offerings—is evidence of monopoly power. *See* U.S. Plaintiffs' Post-Trial Br., ECF No. 838 [hereinafter UPTB], at 53–55.

But using privacy to demonstrate monopoly power is questionable for a host of reasons. For one, Plaintiffs have not established any framework for evaluating whether Google's privacy offerings are suboptimal. Sure, there was evidence that users generally care about privacy. FOF ¶ 116. But Plaintiffs submitted little proof that identified the privacy features users value and, importantly, whether Google declined to adopt such features without any concern that its users would go elsewhere.

Nor is it proof of monopoly power that Google considers the business case for making privacy adjustments. There is some tradeoff between privacy and search quality. FOF ¶¶ 121–125. For example, less information about a user's search history might produce inferior results when the user returns to find more information about a previously searched topic. *See id.*; Tr. at 9905:1-10 (Murphy) ("Privacy is good, but it comes at a tradeoff from quality."). Also, Google's employees convincingly testified that Google refrained from particular privacy measures adopted by rivals to prioritize an improved user experience. FOF ¶ 120. That Google offers fewer privacy protections than DDG without losing users is thus not necessarily indicative of monopoly power. It may just be that users are willing to sacrifice enhanced privacy offerings for improved search functionality.

2. Indirect Evidence – Market Share

Assessing monopoly power through indirect evidence begins with determining market share. Although there is no minimum percentage, the Supreme Court has recognized that two-thirds of a domestic market can constitute a "predominant share." *Grinnell*, 384 U.S. at 571 (citing *Am. Tobacco*, 328 U.S. at 797). Duration also matters. "Monopoly power must be shown to be persistent in order to warrant judicial intervention[.]" AREEDA & HOVENKAMP, ANTITRUST LAW ¶ 801d (5th ed. 2022) [hereinafter AREEDA].

Plaintiffs easily have demonstrated that Google possesses a dominant market share. Measured by query volume, Google enjoys an 89.2% share of the market for general search services, which increases to 94.9% on mobile devices. FOF ¶¶ 23–24. This overwhelms Bing's share of 5.5% on all queries and 1.3% on mobile, as well as Yahoo's and DDG's shares, which are under 3% regardless of device type. FOF ¶ 25. Google does not contest these figures. Closing Arg. Tr. at 68:17–69:6.

Nor is this market dominance of recent vintage. Google has enjoyed an over-80% share since at least 2009. FOF ¶¶ 23–24. That is a durable dominant share by any measure.

3. Indirect Evidence – Barriers to Entry

Barriers to entry are essential to establishing monopoly power because the current market share may not reflect the "possibility of competition from new entrants[.]" *Microsoft*, 253 F.3d at 54. "[I]f barriers to entry are high, then market power can be sustainable over a long period of time." Tr. at 4763:21-22 (Whinston). Plaintiffs identify several such barriers to the general search services market: (1) high capital costs, (2) Google's control of key distribution channels, (3) brand recognition, and (4) scale. The court finds that these barriers exist and that, both individually and collectively, they are significant barriers that protect Google's market dominance in general search.

a. <u>High Capital Costs</u>

"[T]he need for large capital outlays and lengthy construction programs in order to enter the market" is a barrier to entry. *AT&T*, 740 F.2d at 1002; *see Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 307 (3d Cir. 2007) (barriers to entry include "high capital costs, or technological obstacles, that prevent new competition from entering a market in response to a monopolist's supracompetitive prices"); *Syufy Enters.*, 903 F.2d at 667 (structural barriers include "onerous front-end investments that might deter competition from all but the hardiest and most financially secure investors").

Building and maintaining a competitive GSE require an extraordinary upfront capital investment, to the tune of billions of dollars. FOF ¶¶ 50–55. Apple's Chief of Machine Learning and AI Strategy, John Giannandrea, testified that "a startup could not raise enough money . . . to build a very good, large-scale search engine" because "to build a competitive project is very

expensive," amounting to a "multi-billion dollar investment." Tr. at 2261:11-19, 2268:6-7 (Giannandrea); DX374 at 301; *see also* UPX266 at 986 ("[A] world class search engine is at least a $2–4B/year R&D investment[.]"). Neeva founder, Dr. Sridhar Ramaswamy, testified to the same effect. Tr. at 3672:7 (Ramaswamy) (stating that Neeva required "two substantial [venture capital] funding rounds"). Google's internal estimates also are consistent with this testimony. FOF ¶ 51 (assessing that it would cost Apple billions to compete in the search market). And those capital expenditures are required *before* the additional, multi-billion-dollar investment needed to build and maintain an ad platform or other means of monetization. FOF ¶ 55.

High capital costs thus constitute a substantial barrier to entry. *See Marathon Oil Co. v. Mobil Corp.*, 669 F.2d 378, 381 (6th Cir. 1981) (concluding that the relevant market was "characterized by high barriers to entry because of capital requirements" of about $1 billion, rendering it "unlikely that a new vertically integrated [] company would enter the market to take [the defendant's] place as a competitor and supplier for independent dealers").

b. Google's Control of Key Distribution Channels

The D.C. Circuit has described a dominant firm's "control of interconnection with its local distribution facilities" as perhaps the "most critical[]" barrier to entry, which should be considered by looking at the "realities of control[.]" *AT&T*, 740 F.2d at 1002. Plaintiffs point to two sources of Google's control: the challenged contracts and its ownership of Chrome.

Without descending into the contested issues of exclusivity and anticompetitive effects at this juncture, *see infra* Section IV.C & Part V, it suffices to say that Google controls the most efficient and effective channels of distribution for GSEs. It is the exclusive preloaded GSE on all Apple and Android mobile devices, all Apple desktop devices, and most third-party browsers (Edge and DDG are the exceptions). FOF ¶ 59. Rivals cannot presently access these channels of

distribution without convincing Google's partners to break existing agreements, all of which are binding for a term of years. FOF ¶¶ 291, 349, 364; *see infra* Section V.A.1.b; *Syufy Enters.*, 903 F.2d at 667 (a "network of exclusive contracts or distribution arrangements designed to lock out potential competitors" is a barrier to entry). Even if a new entrant were positioned from a quality standpoint to bid for the default when an agreement expires, such a firm could compete only if it were prepared to pay partners upwards of billions of dollars in revenue share and make them whole for any revenue shortfalls resulting from the change. *Infra* Section IV.A. No *current* search engine in the market can compete on those terms. It is even harder to envision a new entrant doing so.

It is also a "realit[y] of control" that Google is the sole default on Chrome. *AT&T*, 740 F.2d at 1002. Queries on user-downloaded Chrome make up 20% of searches conducted in the United States. FOF ¶ 63. Though the Chrome default is not alleged to be exclusionary conduct, it is a market reality that significantly narrows the available channels of distribution and thus disincentivizes the emergence of new competition. Google's near-complete control of the most efficient search distribution channels is a major barrier to entry.

c. Brand Recognition

"[T]he need to overcome brand preference established by the defendant's having been first in the market or having made extensive 'image' advertising expenditures[] also constitute[s] barriers to entry." *AT&T*, 740 F.2d at 1002; *U.S. Anchor Mfg.*, 7 F.3d at 998 ("[I]t is settled that customer brand loyalty may constitute an impediment to competition and thus an aid in the exercise of market power."); *cf. Am. Council of Certified Podiatric Physicians & Surgeons v. Am. Bd. of Podiatric Surgery, Inc.*, 185 F.3d 606, 623 (6th Cir. 1999) ("[E]stablishing credibility naturally seems to be a significant barrier to entry, particularly for an enterprise that depends heavily upon reputation, such as certification of medical specialists."). As U.S. Plaintiffs' expert in behavioral

economics, Dr. Antonio Rangel, opined: "If you have a brand that is so dominant and consumers are not familiar with the others, it's already at ceiling." Tr. at 649:19-21 (Rangel).

Record evidence firmly establishes that Google's brand is widely recognized and valued. FOF ¶¶ 130–131. After all, "Google" is used as a verb. Even on Bing, "google.com" is the number one search. FOF ¶ 132. The "entrenched buyer preferences" enjoyed by Google are a major deterrent to market entry. *Lenox MacLaren Surgical Corp. v. Medtronic, Inc.*, 762 F.3d 1114, 1126 (10th Cir. 2014).

Google's brand recognition also provides its distribution partners with a powerful incentive to retain Google as the default GSE. FOF ¶ 133. Google considers its brand as a benefit to its contracting partners, incentivizing them to choose Google. *See* Tr. at 7780:21-23 (Pichai) ("Apple benefits and sells more iPhones by having their brand associated with the quality . . . [of] Google Search."). The Google brand also benefits from the "seal of approval" it receives from its partners. *See id.* at 7780:23-24 (Pichai) ("Our brand gets validated by being present as a default in iPhones."); *id.* at 2619:24–2620:4 (Cue) ("It's a great product for our customers, and we wanted our customers to know that they're getting the Google search engine. I think one of the benefits, for example, that Google gets from Apple is that we are telling the world that Google is the best search engine, because that's what they would expect Apple to pick."). This mutuality of branding interests makes market entry that much harder.

To be sure, Google's brand recognition is due in no small part to its product quality. FOF ¶ 130. But as previously stated, "[t]he defendant's innocence or blameworthiness . . . has absolutely nothing to do with whether a condition constitutes a barrier to entry" evincing monopoly power. *AT&T*, 740 F.2d at 1001.

d. Scale

Finally, Plaintiffs identify scale as a barrier to entry. A lengthy discussion on the relationship between scale and search engine quality is unnecessary at this stage. *See infra* Section V.A.2. It is enough to say for now that scale is an important factor in search quality. As Google admits, "the volume and availability of user interaction data is one factor that can affect search quality[.]" Google's Proposed Findings of Fact, ECF No. 835, ¶ 256 [hereinafter GFOF]. Google has a lot of scale, and new entrants struggle to obtain it. FOF ¶¶ 87, 89. As Dr. Ramaswamy testified, acquiring users and getting them into the "habit" of using a new product is "tricky." Tr. at 3699:22 (Ramaswamy). Securing users to generate scale, in order to then exploit the benefits of scale, is a significant barrier to entry. *See Microsoft*, 253 F.3d at 55–56 (identifying as an entry barrier that "most developers prefer to write for operating systems that already have a substantial consumer base," such that developers would not similarly support rival operating systems without scale); *see also FTC v. Surescripts, LLC*, 665 F. Supp. 3d 14, 45 (D.D.C. 2023) (same).

4. Google's Counterarguments

Google counters that the barriers to entry are not as high as Plaintiffs suggest. It points to (1) evidence of new entrants;[6] (2) the emergence of nascent technology like artificial intelligence; and (3) its own emergence in a market that, prior to its entry, was dominated by other firms, most notably Yahoo. Google also cites the growth of search output (measured by number of queries) as inconsistent with its monopoly power. None of these contentions demonstrate low barriers to entry.

[6] Google also presented expert testimony that SVPs are market entrants that demonstrate low barriers to entry. *See, e.g.*, Tr. at 8438:12-14 (Israel). But that argument has no force because the relevant market does not include SVPs or social media platforms.

First, Google identifies Neeva and DDG as two market entrants during the alleged monopoly maintenance period. Neeva, it argues, "was able to build and develop a search engine in a relatively short period of time that [Dr. Ramaswamy] believed rivaled Bing and Google with a much smaller venture capital funding." Closing Arg. Tr. at 59:25–60:3. Also, "DuckDuckGo exists and . . . they believe they compete in the market." *Id.* at 60:4-5; *see* GRFOF ¶ 25 (DDG CEO "Gabriel Weinberg testified that he built, and continues to operate, DuckDuckGo at a fraction of Plaintiffs' estimated cost.").

These market entries are not inconsistent with high barriers to entry and Google's possession of monopoly power. "The fact that entry has occurred does not necessarily preclude the existence of 'significant' entry barriers. If the output or capacity of the new entrant is insufficient to take significant business away from the [monopolist], they are unlikely to represent a challenge to the [monopolist's] market power. Barriers may still be 'significant' if the market is unable to correct itself despite the entry of small rivals." *Rebel Oil Co., Inc. v. Atl. Richfield Co.*, 51 F.3d 1421, 1440 (9th Cir. 1995) (citations omitted); *McWane*, 783 F.3d at 832 ("Although the limited entry and expansion of a competitor sometimes may cut against such a finding, the evidence of McWane's overwhelming market share (90%), the large capital outlays required to enter the domestic fittings market, and McWane's undeniable continued power over domestic fittings prices amount to sufficient evidence" to support the conclusion that McWane had monopoly power.).

The tales of DDG and Neeva illustrate *Rebel Oil*'s point. Both entered the market notwithstanding Google's dominance, but neither has "taken significant business" from Google and they therefore have not posed any meaningful threat to its "market power." DDG, though in operation since 2008, has barely reached a 2% market share. FOF ¶ 25; *Surescripts*, 665 F. Supp.

3d at 46–47 ("[T]he ability of one competitor to capture [a relatively minor percentage] of the market does not undermine [the dominant firm's] durable monopoly power protected and perpetuated by barriers to entry."). As for Neeva, it entered and exited within four years. FOF ¶ 14. Google argues that Neeva's failure was caused by its subscription-based model, *see* GRFOF ¶ 25, but that is not the full story. The lack of access to efficient channels of distribution diminished Neeva's ability to grow its user base and significantly contributed to its demise. FOF ¶ 76; *see Multistate Legal Stud., Inc. v. Harcourt Brace Jovanovich Legal & Pro. Publ'ns*, 63 F.3d 1540, 1555–56 (10th Cir. 1995) (significant entry barriers existed notwithstanding three attempted entries, given that two of them were "largely unsuccessful"). These firms' experiences confirm that high barriers prevent entry of new competitors.

Second, the advent of artificial intelligence (AI) has not sufficiently eroded barriers to entry—at least not yet. New technologies may lower, or even demolish, barriers to entry, but such innovation is meaningful only if it can change the market dynamic in the "foreseeable future." *Microsoft*, 253 F.3d at 55 ("[W]ere middleware to succeed, it would erode the applications barrier to entry. . . . [But] middleware will not expose a sufficient number of APIs to erode the applications barrier to entry in the foreseeable future."). Currently, AI cannot replace the fundamental building blocks of search, including web crawling, indexing, and ranking. FOF ¶¶ 114–115. Neeva's experience is again illustrative. Despite building a search engine enhanced by AI technology, FOF ¶¶ 110–111, Neeva could not ride it to market success. AI may someday fundamentally alter search, but not anytime soon. FOF ¶¶ 114–115.

Third, Google's early success in dethroning Yahoo as the dominant market player says nothing about the barriers to entry *as they exist today*. For that same reason, Microsoft's impression in *2009* that barriers to entry were low in search carries little weight here. *See* GTB at

33 (citing DX430 at 2). The internet of today is a far different animal. Hundreds of millions of dollars is just the opening ante to enter the search market in part because of the internet's dramatic growth; billions are needed to acquire meaningful market share. *See infra* Section IV.A. The next great search engine (if there is to be one) will not be built in a rented garage like Google. *See Microsoft*, 253 F.3d at 56 (stating that this case is not about Microsoft's "initial acquisition of monopoly power," but about its "efforts to maintain this position through means other than competition on the merits").

Finally, Google argues that regardless of its market share and any barriers to entry, its lack of monopoly power is confirmed by the dramatic growth in search output and its numerous innovations that have increased search quality. *Cf. Qualcomm*, 501 F.3d at 307 ("The existence of monopoly power may be proven through direct evidence of supracompetitive prices and restricted output."). Dr. Israel opined: "A firm has monopoly power if it can act like a monopol[ist], which means reduce market-wide output. So to establish market power directly, you would need to show that the firm has reduced output relative to some but-for world[.]" Tr. at 8439:8-11 (Israel). But restricted output is simply a form of direct proof. Its absence is not fatal, as indirect evidence suffices to establish monopoly power. *See Mylan Pharms. Inc. v. Warner Chilcott Pub. Ltd. Co*., 838 F.3d 421, 435–36 (3d Cir. 2016) (treating as direct evidence the absence of "markedly restricted output" but then evaluating indirect evidence of monopoly power).

Also, reduced output is an ill-fitting indicia of monopoly power in a market like search. Google's marginal cost of responding to one additional query is near zero. In such a market, a dominant firm has no incentive to restrict output to earn monopoly profits. *See* H. ØVERBY & JAN ARLID AUDESTAD, INTRODUCTION TO DIGITAL ECONOMICS § 6.2 (2d ed. 2021) (For a digital good like search, "because the marginal cost is zero and [] there is no limit to the number of units that

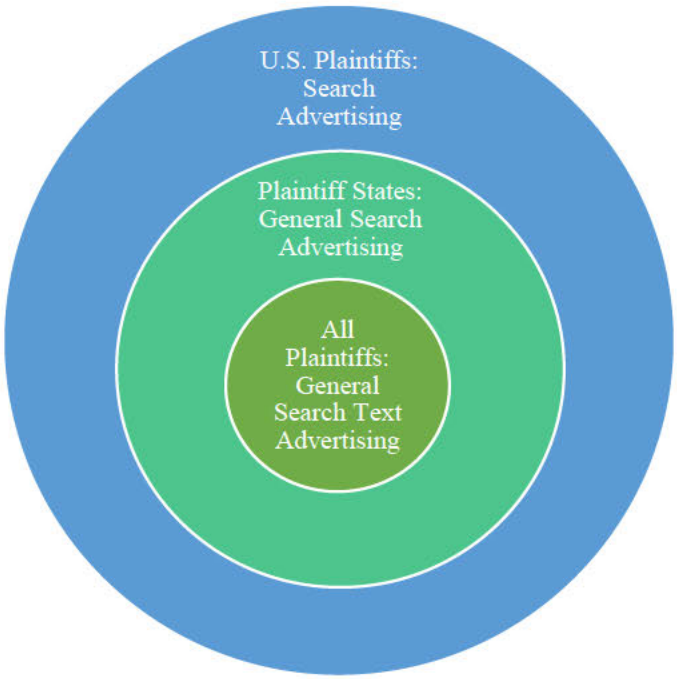
can be produced without increasing the fixed costs[,] . . . the cost per unit produced will be zero independently of the production volume."); *cf. Pac. Eng'g & Prod. Co. of Nev. v. Kerr-McGee Corp.*, 551 F.2d 790, 796 (10th Cir. 1977) (recognizing that in the face of "decreasing marginal costs," a firm "would be tempted to lower price and expand output to reach a lower point on its marginal cost curve"). So, the fact that search output has grown is not inconsistent with monopoly power in search.

* * *

For these reasons, the court concludes that Google has monopoly power in the general search services market.

III. MONOPOLY POWER: ADVERTISING MARKETS

The court now moves from search to advertising. Plaintiffs collectively assert that Google has monopoly power in three overlapping advertising markets. These markets and their relationships are illustrated below. U.S. Plaintiffs allege the broadest proposed market, search advertising, which includes all advertisements served in response to a query, regardless of the digital platform. Within the search ads market, Plaintiff States define a general search advertising market that includes only ads served on GSEs. Finally, both sets of Plaintiffs propose a general search text advertising market, limited to text ads appearing on a GSE's SERP. Google counters that Plaintiffs' proposed markets do not comport with business realities. There is, according to Google, one omnibus market for digital advertising, and the markets as alleged exclude various digital ad types that are effective substitutes for Google's text and shopping ads.



The court considers each of Plaintiffs' proposed markets under the *Brown Shoe* factors, and, to the extent that it recognizes a market, determines whether Google has monopoly power within it. The court addresses the broadest market first (search advertising), followed by the narrowest (general search text advertising), and then concludes with the one in between (general search advertising). It finds as follows. First, although there is a relevant product market for search advertising, Google does not monopolize it. Second, general search text advertising is a relevant product market in which Google has monopoly power. Finally, a relevant product market for general search advertising does not exist.

A. Search Advertising Is a Relevant Market, But Google Does Not Have Monopoly Power in It.

1. Search Advertising Is a Relevant Product Market.

The search advertising market is the broadest proposed advertiser-side market. It includes all advertisements served in response to a query—whether entered on a GSE, an SVP, or a social media platform. Excluded from this market are display ads, retargeted display ads, and non-search

social media ads (i.e., those that are integrated into a social media feed). What sets search ads apart, U.S. Plaintiffs assert, is the unique level of real-time, expressed intent discernable from a user's query. If a user types in "portable bluetooth speaker," the ad platform will recognize the query as one reflecting the user's interest in buying a portable Bluetooth-enabled speaker and will deliver advertisements from retailers that sell such products. Non-search ads, by contrast, are not delivered in response to a query and therefore are far less effective and precise at determining a user's intent at the time the ad is delivered. For this reason, U.S. Plaintiffs contend, online advertisers will not significantly substitute away from search to non-search advertisements in response to a small but significant price increase.

Google, on the other hand, argues that it competes within a broader market for digital advertising. It claims that all forms of digital advertising "provide advertisers the ability to connect with potential customers," and that other ad types identify and respond to user intent as effectively as search ads. GTB at 15–16. It points to advertisers' regular movement of spend among various ad types as evidence that, within the broader market of digital advertising, ad dollars are fungible and will be spent on the channel with the strongest return on investment, or ROI. *Id.* Technical differences among search ads and other ad types, Google says, do not overcome this market reality.

As before, the court addresses the parties' arguments within the framework of the relevant *Brown Shoe* practical indicia, this time including pricing considerations. Those factors again are: "[1] industry or public recognition of the submarket as a separate economic entity, [2] the product's peculiar characteristics and uses, [3] unique production facilities, [4] distinct customers, [5] distinct prices, [6] sensitivity to price changes, and [7] specialized vendors." *Brown Shoe*, 370 U.S. at 325. Nearly all of these criteria warrant recognizing a search ads product market.

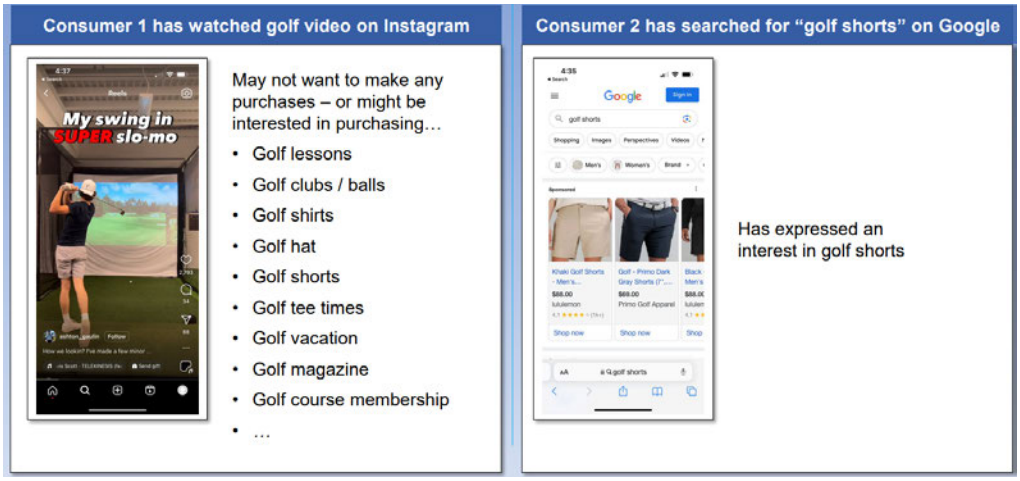
Peculiar Characteristics and Uses. Search ads are generated in response to a user query. U.S. Plaintiffs assert that such queries are a well-defined and contemporaneous expression of a user's intent that is unmatched at driving conversions. That is the defining feature of the proffered market. Google disputes the notion that search ads uniquely capture and convert user intent. That construct is outdated, it says. Social media and display ads can be extremely effective in discerning a user's unexpressed, or latent, intent and driving conversions. Thus, according to Google, what U.S. Plaintiffs say is unique about search ads is readily achievable through other ad channels. The court thinks U.S. Plaintiffs have the better of this argument.

Search ads are a direct expression of a user's specific motivation or interest at the time it is entered. FOF ¶¶ 167, 169–170. For example, a search ads platform understands the query "Taylor Swift Eras Tour tickets" to mean "I'd like to purchase tickets to see Taylor Swift in concert right now" (or at least "I'm thinking about doing so right now"). That provides ticketing vendors a unique opportunity to connect with a Swiftie who is seeking tickets for a show.

On the other hand, social media, display, and retargeted ads rely on indirect signals to decipher a user's latent intent and thus are less valuable to advertisers. Such signals include present and past interactions with a webpage, accounts the user follows, videos or photographs the user views, and how the user engages with a post. FOF ¶¶ 201–202, 208–209; *e.g.*, Tr. at 1418:4-8 (Dischler) ("The users'[] interest can be signaled in any number of ways, whether it's visiting a website, whether it's subscribing to a TikTok channel of a golf influencer[.]"). Consider a TikTok user who regularly watches videos of the Eras Tour. That user is not necessarily conveying an immediate desire to purchase concert tickets, and a ticket vendor who targets that user with a social media ad is less likely to achieve a conversion than if the user had searched for tour tickets on a GSE. Search ads are thus unique in their capacity to connect the consumer and vendor at the very

moment the consumer is looking to make a purchase. FOF ¶¶ 170–171; *cf. United States v. Bazaarvoice, Inc.*, No. 13-cv-00133 (WHO), 2014 WL 203966, at *24 (N.D. Cal. Jan. 8, 2014) (distinguishing social commerce products from "rating and reviews" online platforms, because social commerce products do not "provide[] potential consumers with product-specific feedback from other consumers at the point of purchase" and "are often focused on brand advertising rather than driving the sale of individual products").

The much-discussed golf-shorts example from trial, illustrated below, makes the same point.



PSXD10 at 25. The Instagram viewer of a golf-swing video (on the left) might not be in a buying frame of mind—they could just be interested in improving their golf swing. But even if the user were looking to make a purchase, or the video piqued their desire to do so, such interest could be directed to all manner of golf items—shoes, clubs, shirts, tee times, lessons, etc. Tr. at 6890:17–6891:23 (Amaldoss) (discussing PSXD10 at 25). By contrast, the user who enters "golf shorts" into Google is highly likely expressing an interest in buying golf shorts. *Id.* at 6891:24–6892:12 (Amaldoss) (discussing PSXD10 at 25). Delivering a search ad in response to directly expressed

intent on Google or Amazon is more likely to result in the sale of golf shorts than a social media ad on Instagram.

Retargeted ads differ from search ads for a similar reason. A retargeted display ad can be served only *after* the user has visited the advertiser's platform. FOF ¶¶ 202–203. For instance, a consumer interested in buying a portable Bluetooth speaker will see a retargeted display ad for, say, a Sonos-brand portable speaker, only if they have previously visited the Sonos website. But a search ad for such a product is presented immediately, regardless of whether the user has previously visited the advertiser's website. The time lag between the user's originally expressed intent and delivery of the retargeted ad makes such ads less effective. FOF ¶ 203 (describing how retargeting signals rapidly grow stale, even after just one hour).

Another unique characteristic of search ads is that they are not limited by privacy features. A user enters a query and gets a result without intermediation from privacy filters. On the other hand, display and retargeted display ads require individualized user information from cookie tracking and audience profiling, which can be disabled or impeded by platforms or the user. FOF ¶ 204.

At bottom, search ads and non-search ads are *not* "roughly equivalent": Search ads better approximate user intent than other ad types, and they do so with immediacy. *Queen City Pizza, Inc. v. Domino's Pizza, Inc.*, 124 F.3d 430, 437 (3d Cir. 1997) ("Interchangeability implies that one product is roughly equivalent to another for the use to which it is put; while there may be some degree of preference for the one over the other, either would work effectively.") (internal quotation marks and citation omitted).

Industry or Public Recognition. Advertisers recognize search ads as a distinct product market. *See Times-Picayune Pub. Co. v. United States*, 345 U.S. 594, 612 n.31 (1953) (considering

as relevant that "[t]he advertising industry and its customers . . . markedly differentiate between advertising in newspapers and in other mass media"). Advertisers have separate teams for search ads and other types of advertising, like display and social media. FOF ¶ 224. They also have separate budgets for those ad channels. *Id.*

Advertisers uniformly testified that they view search ads as unique because they respond to expressed user intent in real time. FOF ¶¶ 169–171, 218. Or, to put it in marketing terms, paid search is a "bottom funnel" ad channel or a "push" ad. FOF ¶¶ 213, 215, 218. Recall, the "marketing funnel" is a construct used in the advertising industry to generally depict a consumer's journey from ignorance about a product (at the top of the funnel) to its purchase (at the bottom of the funnel). FOF ¶¶ 213–224. Advertisers attempt to correlate ad types with each stage of that journey based on the advertiser's goal: promoting product awareness (upper funnel), addressing a consumer's consideration of a purchase (mid-funnel), or driving sales (lower funnel). *Id.* Advertisers use the funnel as a framework when determining how to allocate their spending. FOF ¶¶ 221–222. They typically consider search as an ad channel better suited for "lower funnel" objectives than social media or display advertising. FOF ¶¶ 218–220.

Google asserts that the "industry and public recognition" factor weighs against a market for search advertising for two reasons. *First*, it vigorously contests the relevance of the marketing funnel. Google protests that the funnel is a dated tool with limited application in today's digital ad market, especially given the explosion of social media advertising. GTB at 18–20; GRCL ¶ 7. It points to industry records that show greater fluidity among different stages of the funnel, and marketers conceiving of non-search ads as bottom-funnel media. GTB at 19–20. Google's point is that advertisers shift spend to the ad type that they believe will return the greatest ROI, which

makes search and non-search digital advertisements reasonably interchangeable and renders the marketing funnel obsolete. *Id.* at 20–23.

It is true that digital advertising has disrupted the traditional marketing funnel construct of a linear consumer journey from product awareness to purchase. But advertisers and even Google still use it, and they continue to view search advertising as unique because of its efficacy in reaching lower-funnel consumers. *See Rothery Storage*, 792 F.2d at 218 n.4 ("The 'industry or public recognition of the submarket as a separate economic' unit matters because we assume that economic actors usually have accurate perceptions of economic realities."); *FTC v. Cardinal Health, Inc.*, 12 F. Supp. 2d 34, 46 (D.D.C. 1998) ("[T]he determination of the relevant market in the end is a matter of business reality—of how the market is perceived by those who strive for profit in it.") (cleaned up). Every industry witness testified that the marketing funnel remains a framework through which they make ad spending decisions. FOF ¶ 222. A recent Google online marketing essay does the same. It contains a depiction of the funnel and touts a "full-funnel" marketing strategy. FOF ¶¶ 221, 223 (citing UPX8051 at .005) (extolling two brands that "meet[] customers where they are. And that means addressing them at every stage of the sales funnel to raise brand awareness, answer questions prepurchase, and nurture people through final decision-making").

Although Google presented marketing strategy documents from various industries that showed some advertisers placing display and social alongside search as bottom-funnel channels, no advertiser viewed search ads as upper funnel. FOF ¶ 218 (based on documents and testimony, 64% of advertisers view display to be higher than search in the funnel, and 0% consider it to be below search). To be sure, there are some products for which social media ads are particularly effective at driving conversions (e.g., cosmetics and apparel), but there are large categories of

products and services for which social media advertising is far less compelling (e.g., financial services). FOF ¶¶ 219–220.

To further underscore the distinction between search and social media ads, consider a new ad product recently introduced by Google: Demand Gen (or Discovery Ads). It is a feed-based ad platform for YouTube and Gmail, developed to better compete for advertising dollars going to Meta properties and TikTok, among others. Before its launch, Google recognized that it did not have an advertising channel that competed effectively for that highly lucrative ad spend. FOF ¶ 211; UPX29 at 541 ("Google has no *direct* competitor to Facebook's ad offering[.]"). And, when describing the audience targeted for Discovery Ads, Google did so with terminology by now familiar to the reader. UPX33 at 145 (describing the social ads buyer as seeking to "create intent" and "find new customers," as compared to the search ads buyer, who aims to "capture a person's declared intent") (2020). Thus, while Google as a *firm* may fiercely compete with Meta's feed-based ads offerings, Google *search* ads do not.

Second, Google claims that U.S. Plaintiffs' proposed market fails to account for the public's consideration of different ad channels. Google argues that the market should be defined based on the degree of audience overlap. *See* GTB at 17–18 (citing Tr. at 4634:24–4635:11 (Whinston) ("The overlap between the audiences is really important for the amount of substitution there will be between ad products.")). In other words, ads that target the same audiences should be treated as part of the same ad market. Google contends that "Plaintiffs' ads markets exclude forms of digital advertising that feature a high degree of audience overlap while including those with less overlap." *Id.* at 18. For instance, Google users typically do not also use Bing, FOF ¶ 21, but they *do* frequently use Amazon, FOF ¶ 157; *see, e.g.*, GTB at 17–18, GFOF ¶¶ 1018–1024. So, Google argues, U.S. Plaintiffs are mistaken when they consider search ads on Bing in the same

market as Google search ads but not ads shown on Amazon or other platforms where there is user overlap.

This argument misses the point. SVP search ads offerings *are* included in the search ads market. They target their users who express real-time intent with a query. Nor is there anything inconsistent about treating search ads and ads on other platforms, like social media, as distinct products even though they have overlapping audiences. Marketers use them as complements to fulfill their ultimate objective: to drive sales. FOF ¶¶ 221, 225.

Sensitivity to Price Changes. U.S. Plaintiffs argue that advertisers do not substitute away from search ads, even in the face of price hikes. Google says otherwise. It contends that advertisers care more about ROI or return on ad spend (ROAS) than any particular advertising channel, and that they move ad spend across different channels to maximize their ROI. For example, Google points out that advertisers increasingly are using tools like its own Performance Max, which helps advertisers optimize their ad spend to yield the best ROI. GFOF ¶¶ 1009–1013; FOF ¶ 229.

But Google's focus on ROI misses the forest for the trees. Products are reasonably interchangeable only if "significant" substitution occurs in response to a price increase. *See Ohio v. Am. Express Co.*, 585 U.S. 529, 543–44 (2018). To be sure, advertisers did testify to shifting spend to maximize ROI. But none said that they have "significantly" shifted ad spend away from search ads. In fact, the opposite is true. Advertisers uniformly said that they would not substitute search ads for another ad type absent some campaign-level reason to do so. FOF ¶¶ 230–231; *see Staples*, 970 F. Supp. at 1074 (courts look to "whether and to what extent purchasers are willing to substitute one for the other"). To the extent that ad dollars are increasingly being spent on other channels, that change reflects the ballooning of the digital advertising market as a whole.

FOF ¶ 166. There is no evidence that the massive growth of social media ads, for example, has come at the expense of search ads.

The record also shows that to the extent advertisers shift spending, they do so as part of a "full-funnel strategy." Campaign goals may require a different blend of complementary advertising types to further a firm's objectives. FOF ¶ 221. For instance, companies may shift ad spend to more upper-funnel strategies when introducing new products to create awareness but move ad spend to lower-funnel strategies if trying to increase seasonal sales of well-known products. FOF ¶¶ 226–227. The fact that advertisers may move money between search and social ads to achieve varying goals does not make them substitutes. *See Klein v. Facebook, Inc.*, 580 F. Supp. 3d 743, 782–83 (N.D. Cal. 2022) (concluding that social ads are a distinct market from other online ads due to industry recognition, in part because, in contrast to search ads, "social advertisements help a company find customers who are not already looking for the company's products"); *FTC v. IQVIA Holdings Inc.*, No. 23-cv-06188 (ER), 2024 WL 81232, at *17 (S.D.N.Y. Jan. 8, 2024) ("An agency running an advertising campaign will not have an unlimited budget, so it must make decisions about how to allocate the advertising funds it has. But the fact that [search] competes with these channels for advertising dollars in a broader market does not necessarily mean those channels are reasonably interchangeable substitutes that must be included in the relevant product market.").

The Nike-Meta episode does not help Google, either. In 2020, Nike boycotted advertising on Facebook, cutting all of its social spending on the platform for several months. According to Dr. Israel, Nike reallocated that spend to search and display ads and, when the boycott ended, Nike reverted the money to its social budget. Tr. at 8517:1–8518:13 (Israel) (discussing DXD29 at 83, 86–87). Per Google, this demonstrates reasonable interchangeability. But Dr. Whinston's

analysis—which aligns better with Nike's internal studies—shows otherwise. He convincingly demonstrated that most of the money previously invested into Meta ads was simply reallocated to other social media and display ads. *Id.* at 10489:10–10495:9 (Whinston) (discussing UPXD106 at 13–14, 16). In fact, Nike's search ads spend barely increased during the boycott. *Id.*; *see also* UPX2076 at 152 (as a percentage of Nike's overall ad spend, search grew from 48% to 51% and then returned to 50% post-pause, a minor change).

Google further contends that U.S. Plaintiffs' search ads market fails because U.S. Plaintiffs have presented no econometric modeling on pricing (e.g., a SSNIP test). GTB at 21–23; GCL ¶ 22; *see Sysco*, 113 F. Supp. 3d at 33–34 (describing a SSNIP test).[7] But as previously discussed, *supra* Section II.A, such modeling is not required to define a market.

Unique Production Facilities. U.S. Plaintiffs contend that "the uniqueness of production facilities present in the general search services market appl[ies] in the Search Ads market." UPFOF ¶ 440. That is not quite right. U.S. Plaintiffs' search advertising market includes search ads on SVPs, so the two proposed markets do not fully overlap. Still, search ads production, regardless of the platform, is characterized by certain common components. A platform must "(1) match Search Ads to consumers' real-time queries, (2) pull those ads into the relevant auction, (3) determine which ads in the auction will be shown, (4) determine where on the [results page] the shown ads will be positioned, and (5) calculate the price for each ad shown, should it be clicked on." *Id.* ¶ 441. Display and social ads are produced differently. FOF ¶¶ 198–199, 204, 206.

[7] U.S. Plaintiffs contend that that the pricing evidence relevant to the general search text ads market should be considered as persuasive in the search advertising market as well, because text ads make up 65% of the search ads market. *See* UPFOF ¶ 589 (citing Tr. at 4797:2-14 (Whinston)). As the court can define a search advertising market without reliance on such evidence, it discusses the relevance of text ads-specific evidence to the search ads market during the monopoly power inquiry. *See infra* Section III.A.2.

Distinct Customers. This factor does not support a search ads market, as advertisers who purchase search ads also purchase other ad types, including social media and display ads.

Distinct Prices. Search ads and display ads use different pricing models. Search ads are sold using a cost-per-click metric, such that advertisers pay only if a user clicks on a search ad. FOF ¶ 186. Display ads, on the other hand, generally use a cost-per-mille metric (i.e., cost per 1,000 impressions, or views). FOF ¶ 199. This means that advertisers are charged each time a display ad is posted, irrespective of whether a user clicks on the ad.

These different pricing approaches are consistent with the channels' different purposes. Search ads can be priced per click, as an ad click is in some sense indicative of the ad's effectiveness in satisfying a user's expressed intent. The effectiveness of display ads is more difficult to measure, as users click on them with less frequency. FOF ¶¶ 228, 230. The record contains almost no evidence as to pricing of social media ads.

Google argues that distinct pricing alone is "insufficient to confine a market to search ads, particularly in light of the evidence that different types of ads are priced similarly when adjusted for the outcomes advertisers seek to achieve." GCL ¶ 30. True. But neither U.S. Plaintiffs nor the court have rested solely on distinct pricing in defining a market for search advertising.

Google's Authorities. Google cites *Berlyn v. The Gazette Newspapers*, an unpublished Fourth Circuit case, to argue that all digital ads belong in the same relevant market. GTB at 17. There, the plaintiffs attempted to establish a market consisting of "legal and commercial advertising services provided by weekly community newspapers" and a single weekly section in the *Washington Post* dedicated to local news. 73 F. App'x 576, 582 (4th Cir. 2003). The court rejected that market based on the minimal evidence presented: (1) a single advertising flier touting the efficacy of print ads in local publications relative to radio and TV ads and (2) a *Washington*

Post marketing strategy paper discussing radio ads. *See id.* at 583. The court explained that this evidence, "if anything, . . . tends to show that all of these media outlets are within the same product market, to the extent that they are competing for the same limited pool of advertisers' dollars." *Id.* *Beryln* is of limited utility here. There can be no genuine comparison between the paucity of record evidence in *Beryln* versus the mountain of evidence presented in this case. Moreover, this court considered the evidence here in light of the *Brown Shoe* factors, which is something the *Berlyn* court did not need to do on a limited evidentiary record.

Google's other authorities are likewise inapposite. Google cites *Hicks v. PGA Tour, Inc.* for the proposition that "many courts have rejected antitrust claims reliant on proposed advertising markets limited to a single form of advertising." GTB at 15–16 (quoting 897 F.3d 1109, 1123 (9th Cir. 2018)). But "*Hicks* does not apply where," as here, "a plaintiff has alleged that two types of advertising have fundamentally different purposes." *Klein*, 580 F. Supp. 3d at 784. Google also cites to decades-old cases decided at the motion-to-dismiss stage, which rejected Sherman Act claims for failure to adequately allege digital ads markets. *See Kinderstart.com LLC v. Google, Inc.*, No. 06-cv-2057 (JFRS), 2007 WL 831806, at *6 (N.D. Cal. Mar. 16, 2007); *Am. Online, Inc. v. GreatDeals.Net*, 49 F. Supp. 2d 851, 858 (E.D. Va. 1999); GCL ¶¶ 19, 26. These cases are inapposite for numerous reasons, including that they predate the digital advertising boom and were decided on the pleadings. *See* GFOF ¶¶ 990–991 ("Digital Advertising is dynamic and growing. . . . Indeed, digital advertising has undergone dramatic change even in just the last few years."). More recent decisions, however, with the benefit of a factual record, have refused to lump together various forms of digital advertising merely because advertisers spend in different channels. *See, e.g.*, *IQVIA*, 2024 WL 81232, at *17.

* * *

In sum, the *Brown Shoe* factors counsel in favor of finding a relevant market for search advertising. Neither Google's counterarguments nor its legal authorities persuade the court otherwise.

All that said, U.S. Plaintiffs' search ads market is underinclusive in an important way: It excludes certain search advertisements that appear on Amazon known as "product page" ads. Such ads share the defining characteristic of search ads, which is that they are delivered in response to a user query. To illustrate, when an Amazon user queries "coffee," its results page contains ads like PLAs presented on Google. Such ads are included in U.S. Plaintiffs' market. When a user then selects a product—through a PLA or an unpaid result—they are taken to a "product page" that also contains advertisements (see below). These "product page" ads look a lot like PLAs, and they respond to the user's twice-expressed intent (the query and the product selection). *See* Tr. at 8459:8-24 (Israel) (discussing DXD29 at 108). Yet, they are not included in U.S. Plaintiffs' search ads market. *Id.*

DXD29 at 108 (blue boxes depict ads).

These "product page" ads likely generate substantial revenue for Amazon, whose ad business is growing rapidly. *See* DX231 at .003 (Google record from January 2021 estimating that Amazon's "US ads business is nearly the size of Google's US retail ads business today, and is growing at over twice Google's rate."). Dr. Israel testified that these product-page ads make up one third of Amazon's ads overall. Tr. at 8459:16-17 (Israel). Dr. Whinston put Amazon's search ads revenue at $7.6 billion in 2020, excluding product-page ads revenue. *See* Fig. 78, Whinston Expert Report, ECF No. 418-1, at 185. Although the record does not reveal precisely how much revenue Amazon generates from product-page ads, U.S. Plaintiffs' search ads market likely excludes a substantial dollar amount from its market share denominator. This under-inclusivity is not fatal to defining a relevant market for search ads, but it will impact Google's market share, as described *infra* Section III.A.2.b.

2. Google Does Not Have Monopoly Power in the Search Ads Market.

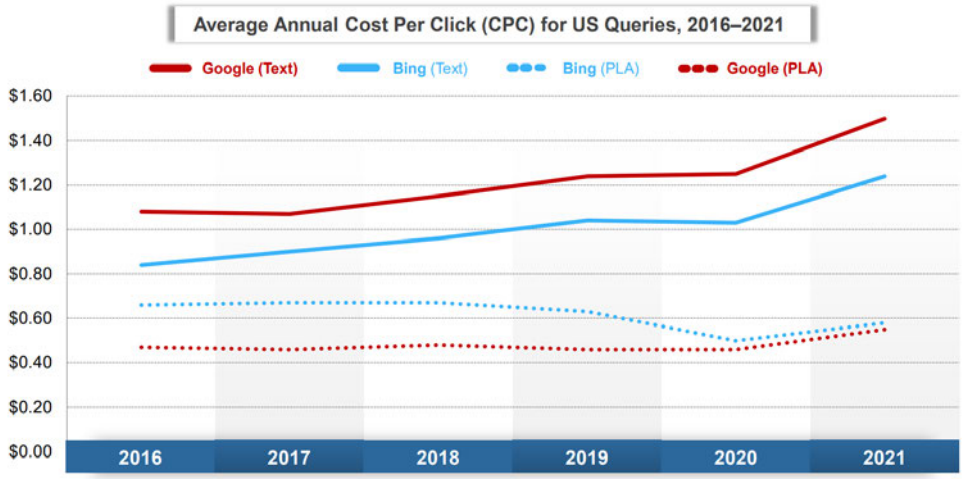
Although the court concludes that there is a relevant market for search ads, the court finds that U.S. Plaintiffs have not proven that Google possesses sufficient power in that market to make out a Section 2 violation. Recall, there are two types of evidence of monopoly power: (1) direct evidence indicating that a firm can substantially raise prices above the competitive level, and (2) indirect (or structural) evidence permitting the court to infer monopoly power "from a firm's possession of a dominant share of a relevant market that is protected by entry barriers." *Microsoft*, 253 F.3d at 51 (citation omitted). U.S. Plaintiffs have not met their burden with either.

a. Direct Evidence

As direct evidence, U.S. Plaintiffs have offered proof that Google has profitably raised prices on its general search text ads, a subset of its search ads offerings that is distinct from PLAs.

See infra Section III.B.2. U.S. Plaintiffs urge the court to extrapolate this text ads-specific evidence to infer that Google has monopoly pricing power in the broader search ads market. *See* UPFOF ¶ 589 ("Text Ads constitute approximately 64% of the Search Ads market; Google's pricing power in the Text Ads market therefore confers on Google the ability to control price in a significant portion of the Search Ads market, even without regard to any of Google's other Search Ads products."). *But cf.* FOF ¶ 185 (changes to the text ads auction do not directly impact the PLA auction).

The court declines to make such a simplistic extrapolation to sustain a finding of monopoly power. *Cf. ThermoLife Int'l LLC v. Neogenis Labs Inc.*, No. 18-cv-02980 (DWL), 2021 WL 1400818, at *8–10 (D. Ariz. Apr. 14, 2021) (finding that the court could not "infer" power in a broader market based on power in a narrower one because the plaintiff had not alleged the relative size of the submarket in relation to broader market). Text ads comprise 64% of the search ads market defined by U.S. Plaintiffs. Tr. at 4797:7-10 (Whinston). That is a large number, even if overstated by some degree due to U.S. Plaintiffs' exclusion of Amazon's product-page ads from the calculation. But Dr. Whinston's analysis of PLA pricing from 2016 to 2021 demonstrates that while Google has raised text ads prices, PLA prices, which comprise approximately 40% of the search ads market, have been stagnant, only showing nominal growth beginning in 2020. *See id.* at 4650:2-20 (Whinston) (discussing UPXD102 at 39) ("[W]hat you can see here is PLA prices have been flat or, if anything, a little decreasing, and text ad prices have been going up."). That prices have remained flat in nearly 40% of the market is inconsistent with the notion that Google has monopoly pricing power in the search ads market as a whole.



UPXD102 at 39.

These different pricing trends can be explained by competition (or the lack thereof). Google's ability to profitably raise text ads prices is surely due in part to the lack of any meaningful competition in that submarket—Microsoft is its only true competitor. *See infra* Section III.B.2. The competitive conditions for PLAs are very different. Amazon, as discussed, is a major competitor. Dr. Whinston put Amazon's search ads market share at 19%, a likely underestimate given the exclusion of product-page ads. Fig. 78, Whinston Expert Report, ECF No. 418-1, at 185; Tr. at 8459:16-20 (Israel). Also, many other retailers compete in the PLA space (e.g., Home Depot, Walmart, Target), and though their share is small now, it is likely to grow. *See* Tr. at 8438:12-20, 8550:2-10 (Israel). These competitive market conditions likely explain why Google's PLA prices remained largely unchanged from 2016 to 2021.

Google's lack of pricing power as to PLAs cautions against inferring that Google's pricing power in search text advertising extends to the broader search ads market.

b. Indirect Evidence

Nor is the court convinced that indirect evidence establishes monopoly power in the market for search ads.

"[A] market share below 50% is rarely evidence of monopoly power, a share between 50% and 70% can occasionally show monopoly power, and a share above 70% is usually strong evidence of monopoly power." *Broadway Delivery Corp. v. United Parcel Serv. of Am., Inc.*, 651 F.2d 122, 129 (2d Cir. 1981). Dr. Whinston calculated Google's share of the proposed market as 74%, although that is an overestimate given the omission of Amazon's product-page ads. *See* Tr. at 4779:7-15 (Whinston) (discussing UPXD102 at 63). Although Google's market share is some evidence of monopoly power, it is not necessarily "strong evidence." That said, Google's share of the search advertising market has been durable, *id.* (65% market share or more since 2012), despite the market's enormous growth, *id.* at 8874:25–8875:13 (Israel). These markers, taken together, tilt somewhat in favor of a finding of monopoly power.

But "because of the possibility of competition from new entrants, looking to current market share alone can be misleading." *Microsoft*, 253 F.3d at 54 (internal quotation marks and citations omitted); *see also Tops Markets, Inc. v. Quality Markets, Inc.*, 142 F.3d 90, 99 (2d Cir. 1998) ("We cannot be blinded by market share figures and ignore marketplace realities, such as the relative ease of competitive entry."); *Oahu Gas Serv., Inc. v. Pac. Res., Inc.*, 838 F.2d 360, 366 (9th Cir. 1988) ("A high market share, though it may ordinarily raise an inference of monopoly power, will not do so in a market with low entry barriers or other evidence of a defendant's inability to control prices or exclude competitors.") (citation omitted).

U.S. Plaintiffs have not shown that barriers to entry protect Google's leading share in the search ads market. *Microsoft*, 253 F.3d at 51. Concededly, the capital cost of developing an ad platform is high. *See* UPFOF ¶¶ 581–583. But well-resourced market entrants, and demonstrated growth by those entrants, belie a reality of unconstrained dominance. There is, of course, Amazon's entry and explosive growth in the market. FOF ¶ 196 (Google estimates that Amazon

has surpassed its revenue in retail advertising and is growing at a faster rate). Other SVPs are more recent market entrants and are looking to grow their search ads business. *See* Tr. at 8438:12-20 (Israel) ("[W]hat the lesson of commercial verticals has told us is that where there's money to be made, SVPs pop up and they compete for advertising."). These are not small firms likely to compete only at the margins. They include mega-retailers looking to aggressively expand their search ads business. Walmart and Target are two examples. *Id.* at 8549:9–8550:17 (Israel) (describing Walmart's emergence as a search advertiser); Alberts Dep. Tr. at 40:5-10 (same as to Target). Online travel sites are another. Tr. at 5244:12-17 (Dijk) (describing Booking.com's emerging search ads offerings). It is not surprising then that Google's share of the search ads market has steadily eroded since 2017. *Id.* at 4779:7-15 (Whinston) (discussing UPXD102 at 63) (declining from near 80% in 2017 to 74% in 2020). U.S. Plaintiffs thus have not shown that the barriers to entering the search advertising market are comparable to those that protect Google's monopoly in general search.

Meta's experience in search ads does not counsel a different outcome. U.S. Plaintiffs argue that if a massive digital media company like Meta could not enter search ads successfully, no new entrant can be expected to survive. UPFOF ¶ 584 (describing Facebook's "multiple unsuccessful attempts to enter the Search Ads market"). But U.S. Plaintiffs acknowledge that the reason for this failure had nothing to do with barriers to entry and instead was due to the difficulty of serving search ads on social media platforms. *See id.* ¶ 585 ("Google recognizes that, due to the nature of Facebook's product, the social network is ill-suited to offer Search Ads.") (citing Tr. at 1491:21–1492:2 (Dischler) ("The search feature is just not very important on Facebook for searching for products or services or other commercial things.")). That social media is a poor fit for search ads

does not mean that the market is protected by high entry barriers. It just means that the strength of social media advertising lies elsewhere.

In the end, courts "cannot be blinded by market share figures and ignore marketplace realities, such as the relative ease of competitive entry." *Tops Markets*, 142 F.3d at 98–99. Here, the court finds that, notwithstanding Google's leading market share, the recent history of new entrants, the strength of those entrants, and their growth show that barriers to entry are not so high as to compel the conclusion that Google has monopoly power in the market for search advertising. *Cf. id.* (finding no monopoly power by a retail supermarket in a local area where barriers to entry were low, despite 72% market share). U.S. Plaintiffs therefore have not proven a Section 2 violation in the search ads market.

B. Google Has Monopoly Power in the General Search Text Ads Market.

1. General Search Text Ads Is a Relevant Product Market.

The court moves next to general search text advertising. As before, the court applies the *Brown Shoe* factors to determine the relevant product market and then addresses Google's counterarguments. Each of the relevant *Brown Shoe* criteria warrants recognizing general search text advertising as a relevant product market.

Peculiar Characteristics and Uses. General search text advertisements, or "text ads," are displayed on a SERP in response to a user's query. FOF ¶¶ 175–176. Like search ads, they are distinguishable from social media and display ads for the reasons already stated, *supra* Section III.A.1. Text ads have various unique features that also differentiate them from other types of search ads, most notably shopping ads, or PLAs.

First, text ads have the appearance of organic search results and provide web links to the advertiser's site. FOF ¶ 176. They can include an image but are largely text-based. *Id.* PLAs, on

the other hand, are visually driven and appear at the top of the SERP in what is referred to as a "carousel." They are not integrated into the SERP results. FOF ¶¶ 177–178.

Second, advertisers write the "copy" for text ads but do not do so for PLAs. FOF ¶ 182. Advertisers value this control because it allows them to highlight discounts, seasonal offerings, new products, or other promotions. *Id.* PLAs offer little content other than a product image, its pricing, and its source. FOF ¶¶ 178, 183. For instance, Home Depot may purchase a PLA to sell a trash can that is currently on sale in response to the query "trash can." But a PLA cannot promote its storewide Labor Day sale, during which all trash cans are 50% off. That information can be conveyed only with a text ad. FOF ¶¶ 179, 182.

Third, and perhaps most importantly, text ads are available to a far broader range of advertisers than PLAs. PLAs can feature only tangible goods because they can be depicted visually, whereas text ads may be used to sell all manner of goods and services. FOF ¶ 179. This distinction is crucial. Over 92% of Google's advertisers *only* purchase text ads, while a mere 5.5% of Google's advertisers purchase both. FOF ¶ 181 (only 2% of Google's advertisers purchase PLAs but not text ads); *see also id.* ("In terms of revenue, 52.8% of ad dollars spent on Google came from advertisers who purchase *only* text ads."). Notably, some of Google's largest advertisers are travel sites, FOF ¶ 180, who have no use for PLAs. The breadth of advertiser access and usage is a key distinction between text ads and PLAs.

Industry or Public Recognition. Both Google and its advertisers recognize text ads as a distinct product submarket. Google has repeatedly acknowledged that text ads and shopping ads are different products. FOF ¶ 187. It even has different teams for text ads and PLAs. *Id.*

Advertisers also recognize each ad type as a distinct product. Non-retail advertisers emphasized that they simply cannot use PLAs, and thus they view text advertising as its own channel. FOF ¶¶ 179–180.

Retail advertisers who purchase PLAs view them as a complementary product. Text ads can be used in conjunction with PLAs to "own the SERP," that is, take up as much real estate on the search results page as possible. FOF ¶¶ 189–190. For instance, Amazon's Director of Software Development, Mike James, testified that, from the *advertiser's* perspective, "there are . . . distinct advantages in one ad format over another," and "there are edges where those ad units have their own specific incremental benefits." James Dep. Tr. at 234:23-24, 235:3-4. Amazon uses a particular bidding strategy for branded keywords on text ads, which cannot be achieved through PLAs alone. *See id.* at 95:3-8. To be sure, text ads and PLAs arguably serve a similar function from a user's perspective, *id.* at 142:4-5, 234:9-19 (stating that "there is an intersection of the purposes that they serve," which is that they "can fulfill the same customer's need"), but marketers view them as distinct products.

Google counters that "what matters for market definition is that many advertisers can and do buy other search ads as substitutes." GRFOF ¶ 19f. At trial, Google employees highlighted that certain advertisers shift spend between text ads and PLAs. FOF ¶ 234. This, Google contends, is evidence that these ad types are substitutes. But, as discussed, only retail advertisers can shift spend between text ads and PLAs—only a small minority of all Google advertisers (7.5%) purchase both ad types. And for reasons already discussed, the reallocation of some spending between text ads and PLAs does not on its own reflect significant substitution: Advertisers may reallocate dollars among ad channels for a variety of campaign- or product-specific reasons.

See supra Section III.A.1. Thus, the mere fact that advertisers move some spending between text ads and PLAs does not, without more, make them substitutes.

Unique Production Facilities. Text ads are generated and sold through different means than PLAs. The appearance and content of text ads is controlled by the advertiser, who has substantial design input. FOF ¶¶ 182, 184. In contrast, Google designs PLAs; the advertiser merely supplies the inventory. FOF ¶ 183. While both text ads and PLAs are sold through auctions, the auctions are separate. FOF ¶ 185. And Google has rejected proposals to integrate the auctions because "user intent and advertiser value is different across the units, and as a result advertisers are not bidding on the same thing on Shopping and Text ads." UPX1013 at .003; FOF ¶ 185. Finally, while PLAs appear on SVPs and other platforms, text ads are unique to GSE SERPs. *Cf.* FOF ¶ 193 (SVP search ads are almost exclusively PLAs).

Distinct Customers. As already discussed, text ads are open to nearly all advertisers, whereas PLAs can feature only tangible goods.

Google counters that "[t]he observation that some advertisers purchase only text ads (and not product listing ads), or do not advertise with certain major SVPs, does not show that general search text advertising is a relevant market because not all potential substitutes need to be equally compelling to all customers." GCL ¶ 34; *see also* GRCL ¶ 9. But that argument largely misses the point. Over 92.0% of Google's advertisers purchase only text ads. For that large cohort PLAs apparently will not do. A product that serves less than 10% of advertisers cannot be a substitute for one that serves all of them.

Distinct Prices. Text ads and PLAs are both priced on a cost-per-click, or CPC, basis. The prices of text ads, however, are higher than those of PLAs. FOF ¶ 186. Dr. Whinston's analysis

revealed that while PLA prices remained stagnant or decreased from 2016 to 2020, text ads prices steadily climbed over that same period. *Id.*

Sensitivity to Price Changes. Over the years, Google has tested whether it can profitably raise its text ads prices by 5% or more without losing substantial advertisers, and the results have been largely consistent—it can. FOF ¶¶ 238–267; *FTC v. Penn State Hershey Med. Ctr.*, 838 F.3d 327, 338 n.1 (3d Cir. 2016) ("The SSNIP is typically about 5%."); *Sysco*, 113 F. Supp. 3d at 33–34 (same). The court will delve further into the details of Google's numerous ad experiments and feature launches, *infra* Section VI.B, but at present it is sufficient to say that the evidence firmly establishes modest advertiser sensitivity to small but significant text ads price increases. This reality is particularly acute for sellers of services or non-tangible goods, who cannot buy PLAs.

* * *

Accordingly, applying the *Brown Shoe* factors, Plaintiffs have proven that general search text ads is a relevant product market.

2. Google Has Monopoly Power in the General Search Text Ads Market.

Plaintiffs offer both direct and indirect evidence of Google's monopoly power in the market for general search text advertising. The court starts with the indirect evidence.

Indirect Evidence. Google possesses a large and durable share in the text ads market, which is protected by significant entry barriers. In 2020, its market share in the text ads market was 88%, having grown steadily from 80% in 2016. FOF ¶ 192. Advertisers confirmed Google's market dominance. They testified that their text ads spending allocation mirrors Google's and Bing's relative query volumes (i.e., 90% of spend on Google vs. 10% on Bing). FOF ¶ 232. They also emphasized that under no circumstances would they spend more than 10% of their text ads dollars on Bing, and that no other platforms were viable substitutes. FOF ¶ 233. As one advertising

executive put it, once that 10% of ad spend on Bing is exhausted, "there's [nowhere] else to go." Tr. at 4875:19–4876:4 (Lim).

Barriers to entry are high. Because only GSEs can display text ads, new entrants face the same major obstacles as would the developer of a new GSE. *Supra* Section II.C.3. Those barriers are compounded by the additional costs and resources required to build an ad platform to deliver text ads. FOF ¶ 55 (Google spends $11.1 billion annually on search ads and $8.4 billion on search). Significant entry barriers thus insulate from erosion Google's longstanding, dominant market share in the text ads market. Google has monopoly power in this market.

Direct Evidence. It is not necessary here to discuss the specific evidence Plaintiffs have offered to prove that Google priced text ads at supracompetitive levels (or Google's responses to that evidence). It is sufficient at this point to observe what is undisputed, which is that Google does not consider competitors' pricing when it sets text ads prices. FOF ¶ 267. That is "something a firm without a monopoly would have been unable to do." *Microsoft*, 253 F.3d at 57–58 (making that observation as to Microsoft's pricing of Windows); *see also Am. Tobacco Co.*, 328 U.S. at 811 ("[T]he material consideration in determining whether a monopoly exists is not that prices are raised and that competition is actually excluded but that *power exists* to raise prices or exclude competition when it is desired to do so.") (emphasis added).

Google responds that *Microsoft*'s observation does not apply here, because Google does not set ad prices, the auctions do. GTB at 31 n.1; GFOF ¶ 1144. But that contention overlooks that Google controls key inputs to the auctions that influence the ultimate price that advertisers pay. FOF ¶¶ 243–246. That Google makes changes to its text ads auctions without considering its rivals' prices is something that only a firm with monopoly power is able to do. And, as will be

discussed, Google in fact has profitably raised prices substantially above the competitive level. That makes "the existence of monopoly power [] clear." *Microsoft*, 253 F.3d at 51.

* * *

The court thus concludes that Google has monopolized the market for general search text advertising.

C. The Evidence Does Not Support a Market for General Search Advertising.

Finally, the court addresses Plaintiff States' market for general search advertising. General search advertising is alleged to be a submarket of search advertising that "includes all ads that appear on a GSE results page in response to a user query, which overwhelmingly consists of text ads and product listing ads" but also encompasses local ads and travel ads. Pl. States' Post-Trial Brief, ECF No. 900 [hereinafter PSTB], at 8. While the court has found that the record establishes both a broader market (search advertising) and a narrower submarket (general search text ads), the *Brown Shoe* factors do not warrant recognition of a general search ads market.

Peculiar Characteristics and Uses. Plaintiff States' core argument is that all the differences between GSEs and SVPs already described, *supra* Section II.B, support a market solely comprised of search ads that appear on GSE SERPs. Specifically, they claim that "[g]eneral search advertising is a relevant market because all ads on a GSE's results page reach users who are considering the broad range of choices and destinations provided by a GSE." PSTB at 8. Because of a GSE's breadth compared to an SVP, Plaintiff States contend that "GSE users are more likely to be in a research or consideration mindset, whereas SVP users are more likely to be in a purchase mindset." *Id.* at 9. Users can purchase a product directly on an SVP's platform, whereas they cannot do so with Google. FOF ¶¶ 144–145, 194. This makes GSEs "attractive to advertisers

seeking to reach users in the mindset of actively researching a topic without having determined a specific purchase destination." PSTB at 10.

That all makes intuitive sense, and there is some record evidence to support it. *See, e.g.*, Tr. at 5138:11-14 (Booth) (Home Depot believes that once a user is on their website, it has "a higher likelihood to actually get them to convert"); *id.* at 3860:20-24 (Lowcock) ("So if a user goes to a retailer's website, they've got a high probability and intent to buy. And if they type something into search, typically they type in the brand and product that they're specifically looking for. So they know what they're going to do."); *id.* at 6873:7-10 (Amaldoss) (discussing PSX970) (SVPs "are the places [] people can actually buy the product from . . . because these consumers have a very high purchase probability, and they want to close the sale.").

But the fact that users of GSEs may sometimes be higher up in the marketing funnel does not mean that general search ads have a particular use that is distinct from search ads on SVPs. It just means that advertisers can purchase general search ads to satisfy broader objectives and on a wider range of topics. *Id.* at 5391:10-23 (Jerath) (stating "search ads are most suited and effective for bottom funnel goals and to some extent for mid-funnel goals"). That is a difference of degree, not kind.

Industry or Public Recognition. There is little industry recognition of a separate general search ads market. Advertisers testified that text ads are distinct because of their breadth and effectiveness, *supra* Section III.B.1, but that says nothing about whether they recognize a wider general search advertising market that also includes PLAs and other SERP advertising. Plaintiff States contend that "large, well-known companies like Amazon, Booking.com, and Expedia rely heavily on general search ads to acquire new customers." PSTB at 15. But Booking.com and Expedia only buy text ads, not PLAs. And Amazon's actual testimony suggests

that Amazon views text ads and PLAs not as a single product, but as different ones because it uses bid strategies unique to each ad type. *Supra* Section III.B.1.

Plaintiff States further argue that SVPs must purchase ads on GSEs using branded keywords (e.g., "Yelp" or "Expedia") to preempt rivals from doing so and siphoning off users who are potentially interested in their brand, a practice known as "conquesting." *See* PSTB 11–12; Pl. States' Proposed Findings of Fact, ECF No. 902, ¶¶ 36–38 [hereinafter PSFOF]. Because only GSEs accept queries that allow users to navigate directly to external websites, Plaintiff States say, advertisers cannot substitute away from general search ads to SVP ads if they seek to prevent conquesting. PSTB at 12. This all may be true, but it does not support a separate general search ads market. Only text ads, not PLAs, are purchased by keywords and appear similar to organic links on the SERP. FOF ¶ 184. The conquesting concern thus is a feature of the text ads market, not a broader market for general search advertising. FOF ¶ 191.

Finally, Plaintiff States contend that when purchased together, text ads and PLAs allow advertisers to "own the SERP" by taking up treasured real estate on a SERP. PSFOF ¶¶ 10–11. In this way, advertisers consider general search ads as a separate product.

Although Plaintiff States do not put it precisely this way, their argument resembles one for recognition of a "cluster market" that is defined by "a central group of customers for whom 'only [a particular package of goods and services] will do.'" *Whole Foods*, 548 F.3d at 1038 (Brown, J.) (quoting *Grinnell*, 384 U.S. at 574). There is some evidence to support this theory. Some advertisers do in fact purchase both text ads and PLAs to "own the SERP." FOF ¶ 189. And Plaintiff States point to evidence that Google has touted "owning the SERP" as a marketing strategy. FOF ¶ 190.

But the court was told little else about such customers. For instance, the record does not disclose how many advertisers have adopted that strategy and how much they spend and contribute to Google's revenues. Nor has the court been told whether such advertisers view "owning the SERP" as essential to their marketing strategy, including on Bing, such that no other combination of ad products will do. *See Whole Foods*, 548 F.3d at 1039 (Brown, J.) (recognizing that a core group of customers can define a market because they "need a complete 'cluster of products,'" the "particular circumstances dictate that the product 'is the only realistic choice,' or "they find the product 'uniquely attractive'") (citation omitted). Indeed, it is also equally plausible that such advertisers simply view text ads and PLAs as complementary products, rather than as a "clustered" general search ads product. In sum, there is very little evidence of industry recognition of general search ads as a distinct product market.

With respect to public recognition, Plaintiff States point to evidence that GSEs and SVPs—as platforms—are complements (not substitutes) as proof that general search ads and SVP search ads are also not substitutes. PSFOF ¶¶ 15–21. But this argument misses the mark. Users of GSEs and SVPs may view them as complements to gather information, but that does not mean they feel the same way about the *advertisements* that appear on those platforms. The record does not reflect any public recognition of general search ads as a separate market.

Unique Production Facilities. Although GSEs and SVPs have different means of production for answering a query, there is substantial overlap as to how the platforms serve advertisements. PLAs on both platforms are generated from the ad inventory either available on the platform (SVPs) or through a structured data feed (GSEs). This process does not involve affirmative keywords. FOF ¶¶ 183–184. Admittedly, there is an important difference between the breadth of general search ads on GSEs versus search ads on SVPs. The latter are limited to

advertising products available for purchase on the website, whereas the former are not so restricted. Still, that distinction alone is not enough to conclude that general search ads are uniquely produced in a way that sets them apart from similar ads on SVPs.

Distinct Customers. Not all firms who advertise on GSEs purchase search ads on SVPs. For example, the decision to sell a product on Amazon means agreeing to share a portion of any purchase completed on Amazon. FOF ¶ 194. Home Depot, for example, does not sell products on Amazon for that reason. FOF ¶ 195. Other firms do not buy ads on SVPs because no SVP corresponds to its product or service. Financial services companies are a good example. This means that a subset of Google's customers are not SVP search ads buyers, creating a class of customers who purchase only general search ads. But that class is so broad that this factor only marginally supports the proposed market.

Distinct Prices. Plaintiff States argue that SVP search ads and general search ads are priced differently, because when a purchase is made following an SVP search ad, it is done on the SVP, which takes a "cut" of the purchase price. In contrast, general search ads lead consumers directly to the advertiser's platform, where the advertiser keeps 100% of the purchase price. PSFOF ¶¶ 56–57. This factual distinction is accurate, but the record does not reveal how this difference impacts the pricing of ads on each platform. It is not established, for instance, how retailers think about pricing for search ads on Google versus search ads on Amazon because of this difference.

Instead of advertiser testimony, Plaintiff States point to three pieces of evidence in support of distinct prices, but none are persuasive. First, a slide deck by the ad platform Kenshoo (now Skai) notes that advertisers report the cost-per-click on Amazon to be about five times that on Google. *See* PSFOF ¶ 60 (citing PSX6 at 037). But that proof is of limited probative value because it compares only PLA ads pricing across platforms, not general search ads pricing (including text

ads). PSX6 at 037. Second, Plaintiff States note that Dr. Israel testified that when he adjusted various ad prices to fit within a cost-per-mille metric, general search text ads were significantly more expensive than Amazon ads. *See* PSFOF ¶ 60 (citing Tr. at 8461:23–8462:13 (Israel) (discussing DXD29 at 62)). But this time, the comparison excludes PLAs, which are in the proposed general search ads market along with text ads. Finally, Plaintiff States identify analysis from the clothing retailer North Face (unsupported by designated or trial testimony) showing that North Face calculated its ROI on Google to be a fraction of its ROI on Amazon but nevertheless continued to spend on Google. This, according to Plaintiff States, is evidence that search ads on GSEs and SVPs are not substitutable. PSFOF ¶¶ 64–65. But the weight of this evidence is limited by the particular features of North Face's product, primarily cold-weather apparel. As stated in the same record, its business is "highly dependent on weather," and GSEs can supply "triggers" that better identify when a user may be in a cold-weather location. PSX976 at 423–24. The court will not generalize a peculiar use case into a product market.

Sensitivity to Price Changes. Plaintiff States presented no evidence that advertisers lack reasonable substitutes for general search ads (as a market) in the face of rising prices. They point to testimony from Joshua Lowcock, Global Chief Media Officer at IPG, for the proposition that major advertising agencies would not recommend that their clients switch away from general search ads should prices increase. *See* PSTB at 17; PSFOF ¶ 9 (citing Tr. at 3825:12-24 (Lowcock)). But that testimony was limited to general search *text* ads and did not encompass PLAs. The same is true of other advertiser testimony the States cite: None of those advertisers purchase PLAs. *See* PSFOF ¶ 99 (citing testimonies from Booking.com, Expedia, TripAdvisor, Angi, and Yelp). Ultimately, this factor does not support a separate market for general search ads.

* * *

The *Brown Shoe* factors counsel against recognizing a market for general search advertising. Plaintiff States' Section 2 claim as to this alleged market fails.

IV. EXCLUSIVE DEALING

Before moving forward, it is worthwhile to pause and summarize where we are. The court has found that Plaintiffs have proven that Google has monopoly power in two relevant product markets: general search services and general search text advertising. On the other hand, although the court recognized a separate market for search ads, it found that Google did not have monopoly power in that market. It also rejected a separate general search ads market. As to the latter two markets, the court's Section 2 inquiry proceeds no further.

Because "having a monopoly does not by itself violate § 2," *Microsoft*, 253 F.3d at 58, the next step in the analysis is to determine whether Google has engaged in exclusionary conduct with respect to general search services and general search text advertising. Plaintiffs must prove a second element, which is "the willful acquisition or maintenance of [monopoly] power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." *Id.* at 50 (internal quotation marks omitted). The bulk of Plaintiffs' case focuses on the search distribution contracts—the browser agreements (primarily with Apple and Mozilla) and the Android agreements (the MADAs and RSAs)—which Google allegedly uses to maintain its monopoly in the relevant markets.

According to Plaintiffs, the challenged contracts are unlawful exclusive agreements. They effectively block Google's rivals from the most effective channels of search distribution, namely, the out-of-the-box default search settings. Google is the exclusive default search engine on the Safari and Firefox browsers. Likewise, on all Android devices, the Google Search Widget appears on the home screen and, on all except Samsung devices, Chrome is preloaded as the exclusive

browser. Plaintiffs say that these distribution contracts effectively "lock up" half of the market for search and, by extension, nearly half of the market for general search text ads. These exclusive deals protect Google's dominant position and shield it from meaningful competition. Plaintiffs also specify certain contractual provisions that they claim thwart competition. The ISA, for example, contains provisions arguably restricting Apple's ability to divert queries away from Google and serve search ads, and the RSAs prohibit partners from preloading "alternative search services" on Android devices.

Before turning to the merits of Plaintiffs' arguments, the court considers two threshold matters. First, Google contends that it is not subject to Section 2 liability because its positions as the default GSE are the product of "competition for the contract" and thus are not exclusionary. Second, Plaintiffs maintain that the court should eschew *Microsoft*'s exclusive dealing framework in favor of a broader "general Section 2 standard." UPCL at 14. The court rejects both arguments.

A. "Competition for the Contract" Is No Defense.

Google disputes that the distribution agreements are exclusionary. Recall, the Supreme Court has drawn a line between exclusionary conduct versus "growth or development as a consequence of a superior product, business acumen, or historical accident." *Grinnell*, 384 U.S. at 571. The former violates the Sherman Act; the latter does not. Google says that it has secured default distribution, not through exclusionary conduct, but by developing a "superior product" through constant innovation. Google claims that it "has repeatedly outcompeted its rivals . . . on the basis of its superior quality and monetization," and that any "scale benefits achieved from winning customers' business based on competition on the merits [do not] turn[] an otherwise lawful agreement into an unlawful one." GTB at 50, 56. Google points out that its partners chose to design their products to have a default GSE, and Google simply has bested its rivals to secure

those default positions. Google also emphasizes its superior "business acumen." *See id.* at 50–60. For instance, unlike Microsoft, Google anticipated that there would be increasing demand for search on mobile, and it invested accordingly. *Id.* at 68. Thus, Google says, it has won (and continues to win) the defaults through competition as opposed to exclusionary conduct. *See Paddock Publ'ns, Inc. v. Chi. Trib. Co.*, 103 F.3d 42, 47 (7th Cir. 1996) ("[C]ompetition for the contract makes it possible to have the benefits of exclusivity and rivalry simultaneously."); *see also Walker v. U-Haul Co. of Miss.*, 734 F.2d 1068, 1074 (5th Cir. 1984) ("The record contains no evidence to undermine the thesis that U-Haul's power was acquired by virtue of its superior product and marketing ability, and the Sherman Act does not punish monopolists whose position has been 'thrust upon' them.") (citation omitted); *United States v. Aluminum Co. of Am.*, 148 F.2d 416, 430 (2d Cir. 1945) ("The successful competitor, having been urged to compete, must not be turned upon when he wins.").[8]

In a sense, Google is not wrong. It has long been the best search engine, particularly on mobile devices. FOF ¶¶ 126–127. Nor has Google sat still; it has continued to innovate in search. FOF ¶ 128. Google's partners value its quality, and they continue to select Google as the default because its search engine provides the best bet for monetizing queries. FOF ¶¶ 126, 133. Apple and Mozilla occasionally assess Google's search quality relative to its rivals and find Google's to be superior. FOF ¶¶ 324, 332–333, 340–344. And Google's rivals have tried to oust it as the

[8] This court determined at summary judgment that the so-called "'competition for the contract' defense [could not] be resolved on summary judgment at the *prima facie* stage and [wa]s better left for the procompetitive prong of the *Microsoft* analysis." *United States v. Google*, 687 F. Supp. 3d 48, 73 (D.D.C. 2023). Upon further reflection at Google's urging, *see* Closing Arg. Tr. at 243:4-10, the court thinks the defense is better considered here, when determining whether the distribution agreements qualify as exclusionary conduct, *see Stearns Airport Equip. Co. v. FMC Corp.*, 170 F.3d 518, 526 (5th Cir. 1999) (analyzing impact of "qualitative merits of [defendant's] product," including the argument that it "enhanced rather than subverted competition on the merits" at the exclusionary conduct stage); *Barry Wright Corp. v. ITT Grinnell Corp.*, 724 F.2d 227, 230 (1st Cir. 1983) (citing AREEDA and defining exclusionary conduct as "conduct, other than competition on the merits or restraints reasonably 'necessary' to competition on the merits, that reasonably appears capable of making a significant contribution to creating or maintaining monopoly power").

default GSE. Microsoft, most notably, has pitched Apple on making Bing the default multiple times, and DDG made a bid to be the default for private browsing mode searches on Safari. FOF ¶¶ 321, 330. These firms have not succeeded in part due to their inferior quality. FOF ¶¶ 324, 327, 332. It is also true that Google foresaw that the future of search was on mobile. Microsoft acknowledges that it was slow to recognize the importance of developing a search product for mobile, and it has been trying to catch up—unsuccessfully—ever since. *See infra* Section V.A.3.a.

But these largely undisputed facts are not inconsistent with possessing and exercising monopoly power. Nor do they tell the full story. There is no genuine "competition for the contract." Google has no true competitor. Consider that Google's monopoly in general search has been remarkably durable. Its market share in 2009 was nearly 80%, and it has *increased* since then to nearly 90% by 2020. FOF ¶ 23. Bing, during that same period, has never held a market share above 11%, and today it stands at less than 6%—meaning that Google's biggest rival trails in market share by a whopping 84%. FOF ¶ 25. Yahoo, long ago considered Google's closest competitor, today holds less than 2.5% of the market. *Id.* Thus, over the last decade, Google's grip on the market has only grown *stronger*.

That is not the only evidence of market stasis. Only once in the last 22 years has a rival dislodged Google as the default GSE, and in that case, Mozilla switched back from Yahoo to Google three years later. FOF ¶¶ 337–339. Moreover, there have been only two new market entrants of note in the last 15 years—DDG and Neeva. One of them is no longer in business (Neeva), and the other has achieved a market share of 2.1% (as of 2020) after more than a decade in business. If there is genuine competition in the market for general search, it has not manifested in familiar ways, such as fluid market shares, lost business, or new entrants.

The market reality is that Google is the only real choice as the default GSE. Apple's Senior Vice President of Services, Eddy Cue, put it succinctly when, in a moment of (perhaps inadvertent) candor, he said: "[T]here's *no price* that Microsoft could ever offer [Apple] to" preload Bing. Tr. at 2519:10-11 (Cue) (emphasis added). "No price." Mozilla stated something similar in a letter to the Department of Justice prior to the filing of this lawsuit. It wrote that switching the Firefox default to a rival search engine "would be a losing proposition" because no competitor could monetize search as effectively as Google. DX547.002. A "losing proposition." If "no price" could entice a partner to switch, or if doing so is viewed as a "losing proposition," Google does not face true market competition in search.

Google understands there is no genuine competition for the defaults because it knows that its partners cannot afford to go elsewhere. Time and again, Google's partners have concluded that it is financially infeasible to switch default GSEs or seek greater flexibility in search offerings because it would mean sacrificing the hundreds of millions, if not billions, of dollars that Google pays them as revenue share. FOF ¶¶ 319, 320, 370–375, 378 (identifying instances in which Apple, Verizon, AT&T, and T-Mobile have all sought and failed to obtain greater flexibility under the relevant contracts). These are Fortune 500 companies, and they have nowhere else to turn other than Google.

That was the key takeaway from the testimony of Neeva's founder and former Google Senior Vice President of Ads and Commerce, Dr. Ramaswamy. The court found him to be a particularly compelling witness. He put it best. When the court asked why Google pays billions in revenue share when it already has the best search engine, he answered that the payments "provide an incredibly strong incentive for the ecosystem to not do anything"; they "effectively make the ecosystem exceptionally resist[ant] to change"; and their "net effect . . . [is to] basically

freeze the ecosystem in place[.]" Tr. at 3796:8–3798:22 (Ramaswamy). No one would ever describe a competitive marketplace in those terms. When the distribution agreements have created an ecosystem that has a "strong incentive" to do "nothing," is "resist[ant] to change," and is "basically [frozen] in place," there is no genuine "competition for the contract" in search. It is illusory.

As was true of Microsoft and Windows, Google "may have gained its initial dominance in the [general search services] market competitively—though superior foresight or quality. But this case is not about [Google's] initial acquisition of monopoly power. It is about [Google's] efforts to maintain this position through means other than competition on the merits." *Microsoft*, 253 F.3d at 56; *see Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 274 (2d Cir. 1979) ("Even if the origin of the monopoly power was innocent, . . . the *Grinnell* rule recognizes that maintaining or extending market control by the exercise of that power is sufficient to complete a violation of § 2."). Google has succeeded in doing just that. Like Microsoft before it, Google has thwarted true competition by foreclosing its rivals from the most effective channels of search distribution. *See infra* Section V.A.2. The result is that consumer use of rival GSEs has been kept below the critical levels necessary to pose a threat to Google's monopoly. *See Microsoft*, 253 F.3d at 71. The exclusive distribution agreements thus have significantly contributed to Google's ability to maintain its highly durable monopoly. *Id.* at 78–79.

Google asserts that this case is unlike *Microsoft* because there, Microsoft radically changed its conduct in response to Netscape's threat and, in so doing, flipped the companies' market shares. Here, by contrast, Google says its conduct has been relatively constant, both before and after its acquisition of dominant market status. *See* Closing Arg. Tr. at 244:13–245:22. But "many anticompetitive actions are possible or effective only if taken by a firm that dominates its smaller

rivals. A classic illustration is an insistence that those who wish to secure a firm's services cease dealing with its competitors. Such conduct is illegal when taken by a monopolist because it tends to destroy competition, although in the hands of a smaller market participant it might be considered harmless, or even honestly industrial." *Berkey Photo*, 603 F.2d at 274–75 (internal quotation marks and citations omitted). It is Google's status as a monopolist that makes its distribution contracts exclusionary, even if the same conduct did not have that effect when Google first began employing it.

B. The *Microsoft* Exclusive Dealing Framework Is Applicable.

Before turning to a more detailed discussion of the market effects, the court addresses the proper analytical framework within which to view the challenged distribution agreements. From the outset, Plaintiffs have framed this case as one about exclusive dealing. *See, e.g.*, Am. Compl. ¶¶ 78–79 (Android agreements), 118–119 (Apple), 156 (browser agreements). Unexpectedly, for the first time post-trial, Plaintiffs contend that the court should eschew considering the agreements through the lens of exclusivity, which they now deem "too narrow," but instead should "opt[] for the general Section 2 standard, even when harm resulted from agreements blocking access to distribution." UPCL at 13–16.

The court declines to ratify what Google rightly calls a "dramatic post-trial shift[.]" GRCL at 1. *Microsoft* compels application of the exclusive dealing framework. *See* 253 F.3d at 69–70. That framework requires the court to consider, at the threshold, the degree to which the agreements foreclose the relevant markets. *Id.* But because foreclosure is only a "useful screening function," the court also must identify real-world anticompetitive effects that arise from such agreements. *Id.* at 69; *McWane*, 783 F.3d at 835 (describing foreclosure as a "proxy for

anticompetitive harm"). Perhaps that is what Plaintiffs mean by the "general Section 2 standard." UPCL at 14. In any event, the court's analysis follows *Microsoft*.

C. The Challenged Agreements Are Exclusive.

"Generally, a prerequisite to any exclusive dealing claim is an agreement to deal exclusively." *ZF Meritor, LLC v. Eaton Corp.*, 696 F.3d 254, 270 (3d Cir. 2012) (internal quotation marks and citations omitted). Exclusivity need be neither express nor complete to render an agreement "exclusive" for Section 2 purposes: *De facto* and partial exclusivity may suffice depending on the circumstances. *Id.* at 270, 283.

To illustrate, in *Microsoft*, the D.C. Circuit upheld the trial court's determination that "although not literally exclusive, the deals were exclusive *in practice* because they required developers to make Microsoft's [Java Virtual Machine] the default in the software they developed." 253 F.3d at 75–76 (emphasis added); *see also LePage's Inc. v. 3M*, 324 F.3d 141, 157 (3d Cir. 2003) (Section 2 liability encompasses "arrangements which, albeit not expressly exclusive, effectively foreclosed the business of competitors.") (citing *Tampa Elec. Co. v. Nashville Coal Co.*, 365. U.S. 320, 327 (1961)). The court also found that Microsoft's distribution agreements with Internet Access Providers (IAPs) were exclusive, even though browser distribution could be achieved by other "more costly and less effective" means. 253 F.3d at 70. *Microsoft* thus provides the template for evaluating Google's distribution agreements.

1. Browser Agreements

Google's browser agreements are exclusive insofar as they establish Google as the out-of-the-box default search engine. The Apple ISA requires that Google be preloaded as the exclusive default search engine on all Safari search access points in exchange for [redacted]% revenue share. FOF ¶ 298. The resulting query volume is substantial. About 65% of queries on all Apple devices

(mobile and desktop), and 61.8% on iOS devices (mobile), flow through the Safari default, demonstrating that default placement is a "primary channel[] for distribution of" search. FOF ¶¶ 296–297 (queries entered on Safari (both mobile and desktop) account for 28% of all queries in the United States); *Microsoft*, 253 F.3d at 61.

The Mozilla RSA has a similar effect. Google is the default GSE on all Firefox search access points, including the navigation bar and the homepage, among others. FOF ¶ 334. Google's default placements on Firefox generate 80% of Mozilla's overall operating revenue, demonstrating that the vast majority of query volume on Firefox goes through defaults. FOF ¶ 335. Google also has comparable agreements with smaller browsers, like Samsung's S Browser. FOF ¶ 346; *see also* UPFOF ¶¶ 310–318.

Google mounts several arguments as to why these agreements are not exclusive as a matter of law.

First, it asserts that the browser agreements permit the browser to "promote search rivals on the same browser, and Apple and Mozilla have for many years entered into such promotional deals." GTB at 37. For instance, Apple's agreement with Microsoft provides that Apple will provide a readily discoverable means of switching the default and will install Bing as a default bookmark. FOF ¶ 320. Relatedly, Google's agreement with Mozilla permits the "this time, search with" feature on Firefox, which allows users to select a different search product from its "Awesome Bar" for a given query. FOF ¶ 60.

The fact that Google's browser partners can contract with its rivals for distribution through less efficient channels does not, however, immunize the challenged agreements from being deemed exclusive. That is the clear lesson of *Microsoft*. There, for example, Microsoft's contracts with the leading IAP, America Online ("AOL"), provided that AOL would not "provide software

using any non-Microsoft browser except at the customer's request, and even then AOL [would] not supply more than 15% of its subscribers with a browser other than I[nternet] E[xplorer]." 253 F.3d at 68. The trial court had described this agreement "for all practical purposes" as guaranteeing that Internet Explorer would be AOL's "browser of choice," even though "Microsoft [] permitted AOL to offer Navigator through a few subsidiary channels." *United States v. Microsoft Corp.*, 87 F. Supp. 2d 30, 53 (D.D.C. 2000). The trial court held that the agreement was exclusive, and the D.C. Circuit agreed. The Circuit explained that IAPs were one of the two major channels of distribution, and by reaching agreements with 14 of the top 15 IAPs, Microsoft had "kept usage of Navigator below the critical level necessary for Navigator or any other rival to pose a real threat to Microsoft's monopoly." *Microsoft*, 253 F.3d at 67. Similarly here, the mere fact that the browser agreements do not prevent Apple and Mozilla from entering into limited distribution deals with rivals does not render the agreements non-exclusive.

Google's additional counterargument that the ISA is not exclusive because Apple may not want more flexibility under the ISA is without merit. GRFOF ¶ 68. A firm that agrees to distribute only a monopolist's product may itself benefit from such an agreement, but that does not render it non-exclusive. *See id.* at 69 (observing that "exclusivity provisions in contracts may serve many useful purposes"). Google also overlooks that Apple has previously tried to negotiate around exclusivity in the ISA to no avail. FOF ¶¶ 319–320. The question of exclusivity turns on "the opportunities for other traders to enter into or remain in [the] market." *Microsoft*, 253 F.3d at 69 (quoting *Tampa Elec.*, 365 U.S. at 327). So, even if Apple does not want more flexibility, that is a market reality that heightens the anticompetitive effects of the ISA for "other traders" who might seek to enter the market.

Second, Google points out that the ISA does not prevent Apple from preloading a third-party's search application or a third-party browser on its devices. GTB at 38. But market realities matter more than what is theoretically possible. *See Tampa Elec.*, 365 U.S. at 327–28. Apple has made clear it will not design its products to include third-party applications. FOF ¶ 311. Google knows this well. *See* Tr. at 7667:20–7668:18 (Pichai) (testifying that it is common knowledge in the industry that Apple does not preload third-party applications onto its devices). So, even though the ISA contains no express exclusivity provision, its terms in combination with Apple's established business practices means that Google will be the only GSE preloaded on an Apple device. That makes it exclusive. *See LePage's*, 324 F.3d at 157–58 (concluding that agreement was exclusive despite no "express exclusivity requirement," because the arrangement "effectively foreclosed the business of competitors").

The same is true as to Google's contention that the ISA permits Apple to preload its own search widget on mobile devices. *See* GRFOF ¶ 67. There is no record evidence that Apple has developed such a product or intends to do so.

Third, Google argues that "users' search behavior [is] not consistent with Plaintiffs' assertion that the agreements were exclusive or *de facto* exclusive," and that ultimately, user choice is determined by quality, not defaults. GTB at 38. It points out that nearly 40% of queries on Apple's mobile devices flow through non-default search access points, such as default bookmarks or organic search. *Id.*; FOF ¶ 296. "This fact, alone," Google says, "confirms that the Safari agreement is not exclusive." GTB at 38. It also highlights the example of Firefox's default change from Google to Yahoo. In 2014, when that change happened, users switched back to Google despite the Yahoo default because users preferred Google. *Id.* And Google cites its own success on Windows PCs, where Google is not the preloaded search default. *Id.* at 38–39. This actual user

behavior, Google says, "flatly contradicts Plaintiffs' assertion that browser default agreements are the equivalent of an exclusive distribution agreement." *Id.* at 39.

But the fact that some consumers access search on non-default access points is not dispositive on exclusivity. On Apple devices, 65% of queries still go through the default. FOF ¶ 296. That is a "substantial amount of distribution[.]" *Microsoft*, 87 F. Supp. 2d at 42. Moreover, Google's brand recognition and Yahoo's poor quality were major factors that dampened the default effect on Firefox (and yet there was still a noticeable default effect when Firefox switched from Google to Yahoo). FOF ¶¶ 370–375; *infra* Section V.A.2.a. And Google's success on Windows again illustrates that defaults are less effective when the alternative has strong brand recognition and product quality. FOF ¶ 70. Even then, the default effect on users who stick with the Edge browser on Windows devices is real, as Bing receives 80% of such queries. FOF ¶¶ 82–84 (Google's share on Windows devices overall is 80%, but its share on Edge where it is not the default is only 20%).

To be deemed exclusive, a contract need not foreclose all other avenues of distribution to which consumers might have access. It is enough that the contract "clos[es] to rivals a substantial percentage of the available opportunities for [] distribution." *Microsoft*, 253 F.3d at 70. As will be seen when the court discusses market foreclosure, *infra* Section V.A.1.b, the distribution agreements do just that.

Fourth, Google notes that the ISA does not operate to prohibit *users* from accessing rival GSEs. To be sure, there are other ways for users to access a GSE other than Google on Apple devices and on Firefox. As noted, Bing and Yahoo are preloaded as default bookmarks on Safari's homepage. Also, users can download another search engine, download a browser other than Safari from the App Store, or navigate directly to a rival GSE's website for an "organic" search. *See* GTB

at 39–40. Similarly, on the desktop version of Firefox, the user can use the Awesome Bar to conduct individual queries on search engines other than Google. And on both Safari and Firefox, the user can change the default GSE. But mere user access to these less efficient channels of distribution does not render the browser agreements non-exclusive.

Microsoft again illustrates the point. There, the D.C. Circuit affirmed that Microsoft's agreements with OEMs were exclusive even though they "did not ultimately deprive Netscape of the ability to have access to every PC user worldwide to offer an opportunity to install Navigator," as "Navigator c[ould] be downloaded from the Internet," was "available through myriad retail channels," and could be "mailed directly to an unlimited number of households." 87 F. Supp. 2d at 53; *see* 253 F.3d at 64 (rejecting the argument that Microsoft's licensing agreements with OEMs were not exclusive "because Netscape is not completely blocked from distributing its product," as "although Microsoft did not bar its rivals from all means of distribution, it did bar them from the cost-efficient ones"). The court also found Microsoft's agreement with AOL to be exclusive, even though it allowed users to request a browser other than Internet Explorer. *See* 253 F.3d at 68–71.

The record here resembles that in *Microsoft*. Users are free to navigate to Google's rivals through non-default search access points, but they rarely do. In 2020 only 5.1% of all search queries on iOS devices went to a rival GSE through a non-default access point. FOF ¶ 296. That figure aggregates queries run through *all* non-default search access points, including organic searches, bookmarks, and downloaded search applications. Most non-default queries still go through Google. "The mere existence of other avenues of distribution is insufficient without an assessment of their overall significance to the market." *United States v. Dentsply*, 399 F.3d 181, 196 (3d Cir. 2005). Thus, the fact that a small fraction of Apple and Firefox users search on non-default access points with a rival GSE does not render the browser agreements non-exclusive.

2. Android Agreements

Plaintiffs likewise contend that the RSAs and MADAs are exclusive. Google disputes that characterization.

a. MADAs

At summary judgment, the court concluded that "although, by its terms, the MADA is not an exclusive contract, there is a dispute of fact as to whether market realities make it one." *Google*, 687 F. Supp. 3d at 76. With the benefit of a full trial, the court can now conclude that the MADA is exclusive in practice.

Its exclusivity arises from two contractual requirements and two market realities. The two contractual requirements are that all MADA signatories must: (1) feature the Google Search Widget in the center of the home screen and (2) place Chrome on the home screen with Google as the default GSE. FOF ¶¶ 351, 356. The two market realities are that: (1) the Google Play Store is a must-have on all Android devices, FOF ¶¶ 352–354, and (2) the industry-wide practice is to avoid excessive preloading of applications, or "bloatware," FOF ¶¶ 359–361. This combination of factors has resulted in all Android OEMs and carriers entering into MADAs, with all Android devices featuring the Google Search Widget and Chrome on the home screen to the exclusion of rivals as a practical matter. No Android device carries a second search widget and, other than Samsung, no device comes with a second preinstalled browser (and even the S Browser defaults to Google because of the RSA). *Id.* These prized placements are extremely effective at driving searches to Google. To illustrate, Samsung, the largest Android OEM, derives 80% of its on-device search revenue through searches performed via the Google Search Widget and Chrome default. FOF ¶ 74.

Google offers two primary arguments for why the MADAs are not exclusive.

First, Google contends that the MADA's device-by-device optionality allows an OEM to choose either to preload Google's products on some or all of their devices. GTB at 73. That is true, but the argument overlooks the market reality that the Google Play Store is viewed by OEMs as essential to the Android customer experience. FOF ¶¶ 352–354. As Microsoft CEO Satya Nadella put it, without the Play Store, the "phone is a brick." FOF ¶ 352. Even Samsung, which has developed and preloads the Galaxy Store, deems the Play Store essential. FOF ¶ 354. Not surprisingly then, every Android device sold in the United States is subject to the MADA. FOF ¶ 350. That rival app stores might be developed in the future, *see* GRFOF ¶¶ 239–240, is not relevant to the court's assessment of the market realities today. The MADA secures for Google the two most effective search access points—the search widget and the Chrome browser—on all Android devices, device-by-device optionality notwithstanding.[9]

Second, Google points out that the MADA does not expressly prohibit OEMs from preloading other search access points on the home screen, like a second search widget or a different browser that defaults to a rival GSE. Google illustrates the point by hypothesizing numerous MADA-compliant configurations that incorporate search access points defaulting to Bing. GTB at 74–76. But market realities make such configurations unrealistic. The industry is concerned with app "bloat," that is, excessive preinstallation of out-of-the-box applications. Too many preloaded apps degrade the user experience. FOF ¶ 359. So, while the MADA formally allows preloading of rivals' widgets or browsers, the industry practice of avoiding app "bloat" means that Android devices rarely come preloaded with non-Google applications.

[9] Google notes that the unbundling of GMS in the European Union has not been effective because OEMs still continue to license the Google Search Widget and Chrome. *See* GTB at 81–82. That may be true, but this court's task is not to peer into the future when determining the present effects of the MADA. *See* Section V.A.

Google recognizes this. It understands that OEMs are unlikely to place two search widgets on a device because to do so would create a negative customer experience. FOF ¶ 361. Even Microsoft did not add a second Bing search widget to its mobile devices due to concerns over poor user experience. FOF ¶ 359. The same is true of browsers other than Chrome. OEMs tend not to preload a second browser. Samsung is an exception. It preloads its S Browser (in addition to Chrome), but as noted even the S-browser defaults to Google per the Samsung-Google RSA. FOF ¶ 360. Because Samsung is unlikely to include a *third* out-of-the-box browser, no GSE can hope to secure that channel of distribution on Samsung devices other than Google.

Google's additional contention that "users who wish to use a rival search service can download its app, widget, or browser, or change the default in the preloaded" browser(s) fares no better. GTB at 76. Under *Microsoft*, the mere availability of less efficient and less prominent channels of distribution does not make the MADA non-exclusive. *See* 253 F.3d at 61.

b. RSAs

The RSAs between Google and Android device distributors formalize the practical exclusivity of the MADAs. That has been their purpose from the outset. FOF ¶ 365 (2011 Google email stating that "Our philosophy is that we are paying revenue share *in return for* exclusivity," "we are not 'getting' anything" without exclusivity, and recognizing that "Microsoft and Yahoo will enter into contracts on Android through carrier deals if we do not"). All of the RSAs contain an "alternative search services" clause. That clause prohibits Google's Android partners from preloading rival search engines. It also greatly restricts a partner's ability to promote other GSEs. In return, the Android partner receives revenue share. The structure of revenue share payments varies among the RSAs, but the basic barter is revenue share in exchange for default exclusivity.

It is, of course, true that no distributor of Android devices is *required* to enter into an RSA with Google. They can opt to distribute MADA-compliant devices without earning revenue share. Also, Google's agreements with Verizon and Samsung permit those partners to retain the option to preinstall another GSE, albeit at a lower revenue share percentage. FOF ¶¶ 366, 381. As Google argues, RSA "[p]artners are not prevented from preloading rivals on any devices (and any amount of devices) of their choosing—the only result of doing so is that the partner will not receive the highest revenue share on those devices." GTB at 77.

This optionality does not make the RSAs any less exclusive. "[A]ntitrust policy should not differentiate between the manufacturer of widgets that explicitly imposes exclusive dealing on its dealers and the manufacturer that gives such dealers a discount or rebate for dealing exclusively in the manufacturer's widgets," because both "have the 'practical effect' of inducing exclusive dealing." AREEDA ¶ 1807b (quoting *Tampa Elec.*, 365 U.S. at 326). While financial incentives to deal exclusively may not thwart competition in the short-term, "[s]uch a scheme is problematic [] when the defendant is a dominant firm in a position to force manufacturers to make an all-or-nothing choice." *Id.*

That is effectively how the RSAs operate. No rational market actor would sell a MADA-compliant device without ensuring that it earned search revenue through the RSA. FOF ¶ 363. The forgone revenue is simply too great. For instance, Verizon considered switching away from the Google default but would have had to risk a $1.4 billion loss to do so. FOF ¶¶ 372–374. The decision to stick with Google was the only rational choice. FOF ¶ 379. Not surprisingly then, Google has identified no Android device presently sold in the United States that is subject to a MADA but not an RSA. *Id.*

True, some of the RSAs do not present a literal "all-or-nothing choice," as a partner can on a device-by-device basis earn *some* revenue share on a non-exclusive deal, but that distinction is not dispositive. *But see* FOF ¶ 378 (describing the T-Mobile RSA, which requires exclusive default placements as a precondition to *any* payment at all). In *United Shoe Machinery*, an early Clayton Act case, the Supreme Court confronted a similar factual scenario. There, the challenged contractual provision was a "discriminatory royalty clause providing lower royalty for lessees who agree not to use certain machinery . . . other than those leased from the lessor." *United Shoe Mach. Corp. v. United States*, 258 U.S. 451, 457 (1922). The Court held that this clause was exclusionary because "[w]hile the clauses enjoined do not contain specific agreements not to use the machinery of a competitor of the lessor, the practical effect of these drastic provisions is to prevent such use." *Id.* Here too, the Verizon and Samsung RSAs technically provide a non- or less-exclusive option that still allows carriers to earn some revenue share, but "the practical effect" of the tiered system is to induce carriers to select the highest-value tier. And that is precisely how the market has played out. Nearly all RSA-covered devices are presently enrolled at the highest-revenue tier, thus locking in Google as only preloaded GSE. FOF ¶ 379.

The RSAs therefore are properly treated as exclusive agreements.

V. EFFECTS IN THE MARKET FOR GENERAL SEARCH SERVICES

A. The Exclusive Agreements Cause Anticompetitive Effects in the General Search Services Market.

Merely categorizing Google's distribution agreements as "exclusive" does not answer the question of whether those deals violate Section 2. That is because exclusive agreements are not condemned per se by the antitrust laws, even if they involve a dominant firm. *Microsoft*, 253 F.3d at 69 ("[E]xclusivity provisions in contracts may serve many useful purposes."); *In re EpiPen Mktg., Sales Pracs. & Antitrust Litig.*, 44 F.4th 959, 983 (10th Cir. 2022) ("Courts repeatedly

explain that exclusive dealing agreements are often entered into for entirely procompetitive reasons and pose very little threat to competition even when utilized by a monopolist."). They can, however, "run afoul of the antitrust laws when used by a dominant firm to maintain its monopoly." *McWane*, 783 F.3d at 832; *see also ZF Meritor*, 696 F.3d at 270 ("The primary antitrust concern with exclusive dealing arrangements is that they may be used by a monopolist to strengthen its position, which may ultimately harm competition.").

"[T]o be condemned as exclusionary, a monopolist's act must have an 'anticompetitive effect.' That is, the monopolist must harm the competitive *process* and thereby harm consumers. In contrast, harm to one or more *competitors* will not suffice." *Microsoft*, 253 F.3d at 58. A plaintiff bears the burden to show "that the monopolist's conduct *indeed* has the requisite anticompetitive effect." *Id.* at 58–59 (emphasis added). "Even though monopolistic conduct requires proof of actual or threatened consumer harm, the proof need not invariably be elaborate." AREEDA ¶ 651e2.

Anticompetitive effects analysis involves establishing a "causal link." *Microsoft*, 253 F.3d at 78. The exclusionary conduct must cause the anticompetitive harm. As here, when a regulator is seeking only injunctive relief, the standard is somewhat relaxed. *See id.* at 79. Courts may "infer 'causation' from the fact that a defendant has engaged in anticompetitive conduct that 'reasonably appear[s] capable of making a significant contribution to . . . maintaining monopoly power.'" *Id.* (quoting 3 AREEDA & HOVENKAMP, ANTITRUST LAW ¶ 651c, at 78 (1996) [hereinafter AREEDA (1996)]); *id.* (holding that the plaintiff in an "equitable enforcement action" need not "present direct proof that a defendant's continued monopoly power is precisely attributable to anticompetitive conduct"); *accord Viamedia, Inc. v. Comcast Corp.*, 951 F.3d 429, 485 (7th Cir. 2020) (same, citing *Microsoft*); *City of Oakland v. Oakland Raiders*, 20 F.4th 441, 460 (9th Cir.

2021) (same). Such an inference is appropriate "when exclusionary conduct is aimed at producers . . . of established substitutes." *Microsoft*, 253 F.3d at 79.

Importantly, causation does not require but-for proof. The plaintiff is not required to show that but for the defendant's exclusionary conduct the anticompetitive effects would not have followed. Such a standard would create substantial proof problems, as "neither plaintiffs nor the court can confidently reconstruct . . . a world absent the defendant's exclusionary conduct." *Id.* "To some degree, 'the defendant is made to suffer the uncertain consequences of its own undesirable conduct.'" *Id.* (quoting AREEDA (1996) ¶ 651c, at 78).

The key question then is this: Do Google's exclusive distribution contracts reasonably appear capable of significantly contributing to maintaining Google's monopoly power in the general search services market? The answer is "yes." Google's distribution agreements are exclusionary contracts that violate Section 2 because they ensure that half of all GSE users in the United States will receive Google as the preloaded default on all Apple and Android devices, as well as cause additional anticompetitive harm. The agreements "clearly have a significant effect in preserving [Google's] monopoly." *Id.* at 71.

The agreements have three primary anticompetitive effects: (1) market foreclosure, (2) preventing rivals from achieving scale, and (3) diminishing the incentives of rivals to invest and innovate in general search. Plaintiffs also contend that Google's incentives to invest are diminished, but the evidence of that effect is weaker than the others.

1. The Exclusive Agreements Foreclose a Substantial Share of the Market.

An exclusive agreement violates the Sherman Act only when its "probable effect is to 'foreclose competition in a substantial share of the line of commerce affected.'" *Id.* at 69 (quoting *Tampa Elec.*, 365 U.S. at 328). "The share of the market foreclosed is important because, for the

contract to have an adverse effect upon competition, 'the opportunities for other traders to enter into or remain in that market must be significantly limited.'" *Id.* (quoting *Tampa Elec.*, 365 U.S. at 328). "Substantial foreclosure allows the dominant firm to prevent potential rivals from ever reaching 'the critical level necessary' to pose a real threat to the defendant's business." *ZF Meritor*, 696 F.3d at 286 (quoting *Dentsply*, 399 F.3d at 191). Plaintiffs thus must "prove the degree of foreclosure" in the relevant markets because of the exclusive deals. *Microsoft*, 253 F.3d at 69.

a. Foreclosure Calculation

U.S. Plaintiffs' expert, Dr. Whinston found that 50% of all queries in the United States are run through the default search access points covered by the challenged distribution agreements. FOF ¶ 62 (28% through the ISA, 19.4% through the MADAs and RSAs, and the remaining 2.3% through third-party browser agreements). This figure does not include the 20% of all queries in the United States that flow through Google on user-downloaded Chrome. FOF ¶ 63.

Google does not dispute Dr. Whinston's 50% computation. Instead, it challenges his very understanding of market foreclosure. First, Google contends that the proper measure of foreclosure is not market coverage but the percentage of queries available to rivals in a "but-for world" in which the challenged contracts do not exist. In such a world, the foreclosure number would be far lower because users in large numbers still would use Google. Second, Google argues that, even if foreclosure is properly analyzed based on default coverage, Dr. Whinston fails to account for rivals' ability to "compete even for those users who access search through" defaults. GTB at 41. The foreclosure number is thus zero, according to Google. Finally, assuming that query coverage is the correct measure, Google argues that the court should disaggregate the

browser agreements, MADAs, and the RSAs when considering foreclosure figures, which when considered separately are not substantial and therefore not anticompetitive.

i. But-For World

Although Dr. Whinston testified that market foreclosure is "ideally" examined against a but-for world, Tr. at 6085:9-19 (Whinston), the law does not require it.

> [T]o demand that bare inference be supported by evidence as to what would have happened but for the adoption of the practice that was in fact adopted or to require firm prediction of an increase of competition as a probable result of ordering the abandonment of the practice, would be a standard of proof if not virtually impossible to meet, at least most ill-suited for ascertainment by courts.

Standard Oil Co. of Cal. v. United States, 337 U.S. 293, 309–10 (1949). A plaintiff thus "is entitled to view the situation as it exists." *Mytinger & Casselberry, Inc. v. FTC*, 301 F.2d 534, 538 (D.C. Cir. 1962). "To require that § 2 liability turn on a plaintiff's ability or inability to reconstruct the hypothetical marketplace absent a defendant's anticompetitive conduct would only encourage monopolists to take more and earlier anticompetitive action." *Microsoft*, 253 F.3d at 79; *see also ZF Meritor*, 696 F.3d at 286 (basing foreclosure on the percentage "of the market remaining open," that is, not presently covered by mandatory purchase requirement agreements); *LePage's*, 324 F.3d at 159 (describing market foreclosure based only on real-world effects of discount practices).

Google relies on the D.C. Circuit's decision in *Rambus Inc. v. FTC* to support the need for a but-for world showing. *See* 522 F.3d 456 (D.C. Cir. 2008). In that case, the FTC concluded that Rambus had secured its monopoly by making misrepresentations to a standards-setting body about its patent interests, in violation of Section 2. *Id.* at 461. The body developed standards that incorporated Rambus's intellectual property. *Id.* at 460. The D.C. Circuit reversed the agency's determination. The court explained that if the standards-setting body, "in the world that would have existed but for Rambus's deception, would have standardized the very same technologies,

Rambus's alleged deception cannot be said to have had an effect on competition in violation of the antitrust laws." *Id.* at 466–67. Put differently, the FTC's claim failed because it had not shown that the standards-setting body would have adopted the standard in question but for Rambus's deception. *Id.*

Rambus does not establish a categorical rule that the anticompetitive effects of an exclusive agreement must be measured against a but-for world. That case involved deception to a standards-setting organization, a form of exclusionary conduct particularly susceptible to a finding of materiality. *See id.* at 466 ("[A]n antitrust plaintiff must establish that the standard-setting organization would not have adopted the standard in question but for the misrepresentation or omission.") (quoting 2 HOVENKAMP ET AL., IP & ANTITRUST § 35.5 (Supp. 2008)). Indeed, the FTC itself had left open the possibility that the standards-setting organization "would have standardized Rambus's technologies *even if Rambus had disclosed* its intellectual property." *Id.* at 466. In such circumstances, the D.C. Circuit deemed it appropriate to demand proof that Rambus's deception in fact resulted in competitive harm. *See id.* at 466–67. Nowhere, however, did the court suggest that such a strict standard of proof was required to demonstrate anticompetitive effects for other forms of exclusionary conduct, particularly exclusive dealing arrangements. Such a holding would be contrary to *Microsoft*, and the court in *Rambus* nowhere questioned that precedent. *Rambus* therefore does not require Plaintiffs to prove substantial foreclosure against a but-for world.

Consequently, the court does not rely on Dr. Whinston's but-for world "Super Duck" analysis or determine foreclosure against a hypothetical world in which users are offered a GSE "choice screen" out of the box. *See* GTB at 44 (arguing that "Plaintiffs did not attempt to calculate the degree of alleged foreclosure if all browser developers offered a choice screen instead of setting

Google as the default"). Proving substantial foreclosure does not require such thought experiments.

ii. Zero Foreclosure

Next, Google says that there is no foreclosure at all because the distribution agreements still permit rivals to compete for queries. According to Google, "because rivals can compete even for those users who access search through the browser default, there is no foreclosure" arising from the browser agreements. GTB at 41. Similarly, as to the Android agreements, Google contends that "[r]ival search engines can compete for incremental promotion on MADA devices, and the device-by-device nature of the RSAs allows rivals to compete for preinstallation on any of the OEM's or carrier's devices." GTB at 80.[10]

As support, Google relies on *Eisai, Inc. v. Sanofi Aventis U.S., LLC*, in which the Third Circuit observed that, when analyzing foreclosure, the court's concern should "not [be] about which products a consumer chooses to purchase, but about which products are reasonably available to that consumer. For example, if customers are free to switch to a different product in the marketplace but choose not to do so, competition has not been thwarted—even if a competitor remains unable to increase its market share." 821 F.3d 394, 403 (3d Cir. 2016) (citation omitted); *see also Allied Orthopedic Appliances Inc. v. Tyco Health Care Grp. LP*, 592 F.3d 991, 997 (9th Cir. 2010) ("If competitors can reach the ultimate consumers of the product by employing existing or potential alternative channels of distribution, it is unclear whether such restrictions foreclose

[10] To the extent that Google argues that there is no foreclosure because rivals can compete to win the default, *see* GTB at 42 ("[R]ivals can compete for 100% of all queries . . . first by competing to be the default[.]"), that contention misconstrues the foreclosure analysis. "The central question is whether *after* the Exclusive Agreements were signed [Google's] competitors were able to meaningfully compete or whether they were foreclosed from the market." *In re Lorazepam Antitrust Litig.*, 467 F. Supp. 2d 74, 82 (D.D.C. 2006) (emphasis added).

from competition *any* part of the relevant market.") (citation omitted). Because users are "free to switch to a different product," Google contends, the foreclosure number is zero. GTB at 41.

But neither *Eisai* nor *Allied Orthopedic* stand for the broad proposition that there is no market foreclosure when a dominant firm leaves *some* alternative ways for customers to access rivals. *Microsoft* rejected that very proposition. For instance, it treated as exclusive Microsoft's agreement with AOL, even though it permitted AOL to distribute Netscape if customers requested it. 253 F.3d at 68. It did the same as to the OEM agreements, which left open internet downloads and mailings as a means for users to reach Netscape. *Id.* at 64, 70; *see Microsoft*, 87 F. Supp. 2d at 53. The court in *Microsoft* did not say that these contracts caused zero market foreclosure merely because Internet Explorer had other, less-efficient means of reaching users.

The same holds true here. The court already has found that preloaded default placements are the most efficient channel for reaching search consumers, and Google has secured all the major ones (except the default on the Edge browser preloaded on Windows devices). FOF ¶ 61. Sure, users can access Google's rivals by switching the default search access point or by downloading a rival search app or browser. But the market reality is that users rarely do so. The fact that exclusive agreements allow users to reach rivals through other means does not make the foreclosure number zero.

iii. Aggregation

Finally, Google argues that the court should consider the impact of each type of agreement (e.g., ISA, MADA, RSA) separately when assessing the magnitude of foreclosure. GTB at 80–82. That is not how foreclosure is measured under *Microsoft*.

The court largely addressed this argument at summary judgment when it explained that the *Microsoft* court "aggregate[d] foreclosure in the exclusive dealing context," considering smaller

channels of distribution alongside larger ones in arriving at its conclusion that the market had been substantially foreclosed. *Google*, 687 F. Supp. 3d at 68 (citing 253 F.3d at 72) ("Although the ISVs [(Independent Software Vendors)] are a relatively small channel for browser distribution, they take on greater significance because, as discussed above, Microsoft had largely foreclosed the two primary channels to its rivals. In that light, one can tell from the record that by affecting the applications used by 'millions' of consumers, Microsoft's exclusive deals with the ISVs had a substantial effect in further foreclosing rival browsers from the market."); *see also FTC v. Motion Picture Advert. Serv. Co.*, 334 U.S. 392, 395 (1953) (aggregating foreclosure caused by three contested agreements and concluding that "respondent and the three other major companies have foreclosed to competitors 75 percent of all available outlets for this business throughout the United States").

Aggregating the foreclosure effects of the browser and Android agreements is an appropriate way to understand the overall effect of Google's exclusive dealing in the relevant markets. Google's authority, which largely deals with aggregating challenged and lawful conduct, GTB at 82, is inapposite.[11]

* * *

The court thus finds that as to the general search services market Plaintiffs have proven that Google's exclusive distribution agreements foreclose 50% of the general search services market by query volume.

[11] The parties also disagree as to whether the court can permissibly aggregate the challenged conduct (i.e., the distribution agreements) together with unchallenged conduct (e.g., the placement of Google as the default GSE on user-downloaded Chrome). *See* GTB at 82; U.S. Pls.' Resp. Proposed Conclusions of Law, ECF No. 899 [hereinafter UPRCL], at 14. Because the court finds that the foreclosure figures—which do not include unchallenged conduct—are sufficient to establish significant foreclosure, *infra* Section V.A.1.b, the court need not resolve this dispute.

b. Significant Foreclosure

To be considered anticompetitive, the market foreclosure must be "significant." *Microsoft*, 253 F.3d at 70–71. The 50% figure meets that threshold. *See id.* (stating that "a monopolist's use of exclusive contracts, in certain circumstances, may give rise to a § 2 violation even though the contracts foreclose *less than* roughly 40% or 50% share usually required to establish a § 1 violation") (emphasis added); AREEDA ¶ 1821c ("Percentages higher than 50 percent are routinely condemned when the practice is complete exclusion by a contract of fairly long duration[.]").

Courts also look to certain qualitative conditions when assessing a foreclosure percentage's significance. *See Stop & Shop Supermarket Co. v. Blue Cross & Blue Shield of R.I.*, 373 F.3d 57, 68 (1st Cir. 2004) ("But while low [foreclosure] numbers make dismissal easy, high numbers do not automatically condemn, but only encourage closer scrutiny[.]"); AREEDA ¶ 1821c (stating that "even relatively high percentages are not necessarily illegal, for there is no 'per se' rule condemning any specific [foreclosure] percentage") (collecting cases). Such qualitative conditions include the duration of the exclusive agreements, their ease of terminability, the height of barriers to entry, the availability of alternative methods of distribution, and the willingness of consumers to comparison shop. *See, e.g.*, *Concord Boat Corp. v. Brunswick Corp.*, 207 F.3d 1039, 1059 (8th Cir. 2000); *Omega Env't, Inc. v. Gilbarco, Inc.*, 127 F.3d 1157, 1163–64 (9th Cir. 1997); *Ryko Mfg. Co. v. Eden Servs.*, 823 F.2d 1215, 1234 (8th Cir. 1987). These factors can be thought of as a test of the durability of market foreclosure at a given time. *See* AREEDA ¶ 1821 (noting that courts analyze "the existence of other factors that give significance to a given foreclosure percentage"). Each favors a finding of significant market foreclosure in this case.

Duration of Contracts. "[S]hort-term" exclusive agreements "present little threat to competition." *ZF Meritor*, 696 F.3d at 286; *see also In re EpiPen*, 44 F.4th at 988 ("It is axiomatic

that short, easily terminable exclusive agreements are of little antitrust concern; a competitor can simply wait for the contracts to expire or make alluring offers to initiate termination."). Here, the challenged contracts vary in term, but all are above the one year that courts have presumed reasonable under related antitrust provisions. *See, e.g.*, *Roland Mach. Co. v. Dresser Indus., Inc.*, 749 F.2d 380, 395 (7th Cir. 1984) ("Exclusive-dealing contracts terminable in less than a year are presumptively lawful under section 3.").

The 2016 ISA, renegotiated in 2021, consists of a base five-year term with extension options for an additional five years. Apple can unilaterally exercise a two-year extension, and then the parties can mutually agree to an additional three-year extension. FOF ¶ 291. That duration amplifies the significance of the ISA's market foreclosure. *See Twin City Sportservice, Inc. v. Charles O. Finley & Co.*, 676 F.2d 1291, 1301–02 (9th Cir. 1982) (finding a violation of Section 1 based on exclusive dealing where 10-year contracts foreclosed 24% of the market); *ZF Meritor*, 696 F.3d at 286–87 (condemning exclusive contracts, five and seven years in duration, which locked up 85% of the market).

The Mozilla RSA and the Android agreements are shorter, varying in terms of either two or three years, with opportunities for renewal. *See* JX31 at 628–29 (Mozilla RSA); UPFOF ¶¶ 250, 255 (summarizing terms of MADAs and RSAs). Such durations, depending on the circumstances, can raise antitrust concerns. *See Motion Picture Adver. Serv. Co.*, 344 U.S. at 393–96 (in a Section 5 case under the FTC Act, upholding contracts of one year or less, but condemning contract terms ranging from two to five years). In this case, the Android agreements do raise such concerns because they foreclose 19.4% of the market and, as discussed below, they are not easily terminable. FOF ¶ 62; *see ZF Meritor*, 696 F.3d at 287 (stating that "[t]he significance of any particular contract duration is a function of both the number of such contracts and market share covered by

the exclusive-dealing contracts") (citation omitted); *cf. In re Epipen*, 44 F.4th at 988–91, 1006 (holding that two- and three-year exclusive agreements were not anticompetitive where they could be terminated at will and without cause on 90-day written notice or less). As for the Mozilla RSA, although it forecloses a far smaller percentage of the search market, its effect is amplified by the significant foreclosure of larger channels. *See Microsoft*, 253 F.3d at 72.

The absence of meaningful rebidding further aggravates the foreclosure effects. "Even an exclusive-dealing contract covering a dominant share of a relevant market need have no adverse consequences if the contract is let out for frequent rebidding." *In re EpiPen*, 44 F.4th at 988 (quoting AREEDA ¶ 1802g2). Google's partners track rival GSEs' quality and occasionally have engaged with them, FOF ¶¶ 333, 340–344, but the record reflects no meaningful competitive rebidding of the agreements. The more common story is Google's partners renewing the agreements without genuine consideration of an alternative. *See supra* Section IV.A.

Ease of Terminability. An exclusive contract that is easily terminable can "negate substantially [its] potential to foreclose competition." *Omega Env't*, 127 F.3d at 1163; *Balaklaw v. Lovell*, 14 F.3d 793, 799 (2d Cir. 1994) (stating that "opportunities for competition remain" where the contract's term was three years but it "[could] be cancelled without cause upon six-months' notice"). Google's partners cannot easily exit the agreements. Neither Apple nor Mozilla have a unilateral right to terminate without cause, FOF ¶¶ 291, 336, and the RSAs and MADAs can be terminated only upon breach, FOF ¶¶ 349, 364. There is an added disincentive with the MADA, where termination would result in loss of the GMS license, including the essential Play Store. *See, e.g.*, JX49 at 878 ("[O]n expiration or termination of this Agreement . . . all rights and licenses granted hereunder will immediately cease" and the signatory must "immediately cease

reproducing, offering, or distributing" the GMS apps). The lack of flexibility for partners to exit the distribution agreements reinforces their foreclosure effect.

Barriers to Entry. As already discussed, *supra* Section II.C.3, there are significant barriers to entry to the market for general search services. This means that new entrants are unlikely to emerge to meaningfully reduce the share of the market foreclosed by the distribution agreements.

Willingness to Comparison Shop. There is no evidence on this record that consumers are apt to comparison shop among GSEs, likely in part due to the friction associated with switching the default or accessing a different search access point. FOF ¶¶ 69–74; Tr. at 8728:23-24 (Israel) (There is "relatively limited [user] overlap between the general search engines.").

* * *

These factors all demonstrate that Google's distribution agreements foreclose a substantial portion of the general search services market and impair rivals' opportunities to compete. This is not a market where "a competitor can simply wait for contracts to expire or make alluring offers to initiate termination." *In re EpiPen*, 44 F.4th at 988.

2. The Exclusive Agreements Have Deprived Rivals of Scale.

Google's exclusive agreements have a second important anticompetitive effect: They deny rivals access to user queries, or scale, needed to effectively compete. Scale is the essential raw material for building, improving, and sustaining a GSE. FOF ¶¶ 86–106. For more than a decade, the challenged distribution agreements have given Google access to scale that its rivals cannot match. FOF ¶¶ 87–89. Google has used that scale to improve its search product and ad monetization. FOF ¶¶ 90–94, 103–105. Meanwhile, without access to scale, other GSEs have remained at a persistent competitive disadvantage, and new entrants cannot hope to achieve a scale that would allow them to compete with Google. FOF ¶¶ 76, 87–89, 106. Naturally then, GSE

distributors prefer Google because of its search quality and because it would be economically irrational to sacrifice the high revenue share. They thus routinely renew the distribution deals with their exclusive terms. In this feedback loop, the revenue share payments "effectively make the ecosystem exceptionally resistan[t] to change" and "basically freeze the ecosystem in place[.]" Tr. at 3797:24–3798:21 (Ramaswamy); *see id.* at 3513:1-3 (Nadella) ("[T]his vicious cycle that [Microsoft is] trapped in can [] become even more vicious because the defaults get reinforced."). That is the antithesis of a competitive market. *See Berkey Photo*, 603 F.2d at 274–75 (While "[a] firm that has lawfully acquired a monopoly position is not barred from taking advantage of scale economies," a "classic illustration" of anticompetitive conduct "is an insistence that those who wish to secure a firm's services cease dealing with its competitors.").

Google acknowledges that a "search engine in the default position receives additional search volume beyond what it would otherwise receive." GRFOF ¶ 85. It also concedes that "user interaction data has some utility for search quality[.]" *Id.* ¶ 139. But it otherwise disputes that the default access points have afforded it a volume of query data that prevents others from competing for search users. It contends that Plaintiffs have failed to establish a link between the agreements, the denial of sufficient scale to rivals, and anticompetitive effects in the market in two ways. First, it maintains that the agreements' default effects are not so strong as to deny rivals' meaningful scale to compete. Second, Google asserts that the role of scale in GSE product quality and monetization is overstated, such that others can compete with less scale if only they were as innovative as Google. The record does not support either position.

a. The Power of Defaults

Numbers help explain the power of the search default settings. Half of all GSE queries in the United States are initiated through the default search access points covered by the distribution

agreements. *See supra* Section V.A.1. An additional 20% of all searches nationwide are derived from user-downloaded Chrome, a market reality that compounds the effect of the default search agreements. FOF ¶ 63. That means only 30% of all GSE queries in the United States come through a search access point that is not preloaded with Google. Additionally, default placements drive significant traffic to Google. Over 65% of searches on all Apple devices go through the Safari default. FOF ¶ 296. On Android, 80% of all queries flow through a search access point that defaults to Google. FOF ¶ 74.

All of this makes the defaults extremely valuable. In 2021, Google spent $26.3 billion in traffic acquisition costs—the revenue share paid to its partners—which is four times more than the company's other search-related costs combined, including research and development. FOF ¶ 289. The true value of the defaults is undoubtedly far greater. Tr. at 9786:6-8 (Murphy) (stating "there's a lot of headroom" between Google's revenues and the price of the distribution agreements).

Google, of course, recognizes that losing defaults would dramatically impact its bottom line. For instance, Google has projected that losing the Safari default would result in a significant drop in queries and billions of dollars in lost revenues. FOF ¶¶ 72, 75. The same would occur if Google were to lose the Android defaults. Over 50% of all search revenue on Android devices flows through the Google Search Widget alone. FOF ¶ 74; *see also* FOF ¶ 75 (the Widget and Chrome make up 80% of search revenue on Samsung devices). The defaults are more than just "incremental promotion." GRFOF ¶ 96. They supply Google with unequalled query volume that is effectively unavailable to rivals.

Against this backdrop, Google disputes the power of the default to drive query volume. It once again points out that users do not seem to have trouble switching to Google when a rival occupies the default. For instance, when Mozilla changed the Firefox default from Google to

Yahoo in 2014, most users "switched back" to Google by changing the default, navigating directly to google.com or searching through Chrome. GTB at 38. Google also points to its status on Windows devices. *Id.* at 39. There, Google is the dominant GSE, even though Windows devices come preinstalled with Microsoft's Edge browser, which defaults to Bing. FOF ¶¶ 82–84. But these examples confirm that the default effect is weaker when the alternative is a dominant firm with high brand recognition backed by a quality product. FOF ¶ 70; *supra* Section II.C.3.c. Otherwise, as Dr. Rangel convincingly explained, the combination of user habit, Google's brand, and choice friction creates a powerful default effect that drives most consumers to use the default search access points occupied by Google. FOF ¶¶ 65–74.

Google's discounting of the default also cannot be squared with Bing's success on the Edge browser on Windows desktops, where Bing is the default GSE. Of the users that remain on Edge, 80% of their searches are conducted using Bing. FOF ¶¶ 83–84. Even if some of that rate is attributable to users who prefer Microsoft products, and therefore consciously do not switch, the default effect no doubt materially contributes to the uniquely high percentage of Bing users on Edge. That added search volume has allowed Microsoft to improve its search quality on desktop devices, to the extent that it is now nearly on par with Google. FOF ¶ 127.

Finally, Google's position on defaults is at odds with many internal records that recognize, from a behavioral standpoint, the power of the default. FOF ¶¶ 66–68, 72–73, 75. It also is contrary to Google's well-documented early recognition of defaults as critical to driving query volume. FOF ¶¶ 67, 73.

b. The Impact of Scale

Having established that Google gets substantially more queries than its rivals as a result of the defaults, the question becomes how, if at all, that advantage impacts competition. The answer to that question turns on the relationship between scale and a GSE's quality.

The sheer magnitude of Google's query volume, or scale, compared to rivals is startling: Users enter nine times more queries on Google than on all rivals combined. On mobile devices, that multiplier balloons to 19 times. FOF ¶ 87. NavBoost, one of Google's core ranking models, runs on 13 months of Google click-and-query data. FOF ¶¶ 96, 102–103. That is the equivalent of over 17.5 *years* of Bing data. FOF ¶ 96; *see also* FOF ¶¶ 90–94. This wealth of data gives Google greater insight into search behavior in part because it simply sees more queries than other GSEs. *See, e.g.*, FOF ¶ 89 (98.4% of unique phrases seen only by Google, 1% by Bing & 99.8% of tail queries on Google not seen at all by Bing).

Armed with its scale advantage, Google continues to use that data to improve search quality. Google deploys user data to, among other things, crawl additional websites, expand the index, re-rank the SERP, and improve the "freshness" of results (i.e., bring them up to date). FOF ¶¶ 90–94, 103. Click-and-query data also is used to build and train models that algorithmically improve results' relevance and ranking, as well as to run large-format experiments to develop new features. FOF ¶¶ 90–94, 98, 103, 106. Scale also improves search ads monetization. This is intuitive: Understanding which advertisements users click on (or scroll past) enables Google to evaluate ad quality and serve more relevant ads in the future. FOF ¶¶ 105–106. The more precisely targeted an ad, the greater likelihood that it will be clicked, which translates into higher revenues that Google uses to make larger revenue share payments.

The market for GSEs is thus characterized by a type of network effect. *Cf. Microsoft*, 253 F.3d at 49 (discussing network effects in phone services). (1) More user data allows a GSE to improve search quality, (2) better search quality attracts more users and improves monetization, (3) more users and better monetization attract more advertisers, (4) more advertisers mean higher ad revenue, and (5) more ad revenue enables a GSE to expend more resources on traffic acquisition costs (i.e., revenue-share payments) and investments, which enable the continued acquisition of scale. *See* Tr. at 3492:8-25 (Nadella) (describing "network effects" in the market for search); ØVERBY & AUDESTAD, *supra*, § 9.3 (Data network effects are those "in which data collected about users or user behavior is used to improve digital services. Google Search is an example of data network effects since each search query contributes to refining the Google Search algorithm."). The network effects are captured in the illustration below, taken from a Microsoft document.

UPX270 at .001; *see* Tr. at 2646:15-19 (Parakhin) ("Relative traffic, if I have more traffic than my competitors, that participates in multiple feedback loops driving quality and driving index completeness, which in effect is driving quality. . . [I]t is very impactful for revenue.").

Google contends that these effects are dramatically overstated. It argues that newer ranking models rely on less data, with some driven entirely by AI, such that today's GSEs depend less on user data to improve quality and compete. GFOF ¶¶ 305–332. But the evidence shows otherwise. True, developments in search technology, including greater reliance on large-language models, or LLMs, for ranking, has reduced the need for user data. FOF ¶¶ 97, 99–101. Google, however, continues to rely on large volumes of user data at every step of the search journey, and no witness, even from Google, testified that LLMs had sufficiently advanced to supplant user data. FOF ¶¶ 101, 105, 114–115. There is a reason that Google still retains 18-months of a user's data: It is still highly valuable to Google.

Google also maintains that the quantity of user data is less important than how it is used, and if its rivals had Google's business foresight and drive to innovate, they too could win default distribution. GTB at 50. But that position blinks reality. Apple's flirtation with Microsoft best illustrates this point. Microsoft has invested $100 billion in search in the last two decades and its quality now matches Google's on desktop search. FOF ¶¶ 10, 127. Yet, Microsoft's failure to anticipate the emergence of mobile search caused it to fall behind, and with Google guaranteed default placement on all mobile devices, Microsoft has never achieved the mobile distribution that it needs to improve on that platform. FOF ¶¶ 24–25. This perpetual scale and quality deficit means that Microsoft has no genuine hope of displacing Google as the default GSE on Safari. FOF ¶¶ 321–329. As Apple's Eddy Cue testified, there was "no price that Microsoft could ever offer [Apple]" to prompt a switch to Bing, because it lacks Google's quality. FOF ¶¶ 323, 326.

Google's massive scale advantage thus is a key reason why Google is effectively the only genuine choice as a default GSE.[12]

That barrier is reinforced by the size of Google's revenue share payments. Consider the following thought experiment. What would it take for a new market entrant to convince Mozilla—a small distribution channel—to walk away from Google as the default? The following would have to happen. First, the new entrant would have to surmount the entry barriers to create a GSE of comparable quality to Google. Second, it would have to build an ads platform that could monetize search on par with Google. Third, it would have to promise to offset any revenue shortfall that might arise either from reduced query volume (because some users would elect to stay with Google) or from inferior ad monetization (because fewer users could mean fewer advertisers and less profitable ad auctions, notwithstanding the quality of its delivery of ads). A new entrant would need billions of dollars to meet these three conditions. And notably, it would have to accomplish this trifecta either by acquiring enough user data through non-default distribution channels (which is improbable) or by developing a technology that would make the need for user data far less important (which is unlikely to happen anytime soon, FOF ¶¶ 102–104, 114–115). The truth is, no new entrant could hope to compete with Google for the default on Firefox or any other browser. Google's query and quality advantage and high revenue share payments are strong incentives simply to stay put.

The end result here is not dissimilar from the *Microsoft* court's conclusion as to the browser market. Just as the agreements in that case "help[ed] keep usage of Navigator below the critical level necessary for Navigator or any other rival to pose a real threat to Microsoft's monopoly,"

[12] To be clear, the court is by no means suggesting that query volume *alone* would make a rival GSE more competitive. It still must develop a quality product that satisfies users' needs.

Google's distribution agreements have constrained the query volumes of its rivals, thereby inoculating Google against any genuine competitive threat. *Microsoft*, 253 F.3d at 71; *Dentsply*, 399 F.3d at 191 (condemning the defendant's exclusionary conduct, which "helps keep sales of competing teeth below the critical level necessary for any rival to pose a real threat to Dentsply's market share").

When "a monopolist's actions are designed to prevent one or more new or potential competitors from gaining a foothold in the market by exclusionary . . . conduct, its success in that goal is not only injurious to the potential competitor but also to competition in general." *LePage's*, 324 F.3d at 159. No current rival or nascent competitor can hope to compete against Google in the wider marketplace without access to meaningful scale, especially on mobile. The exclusive distribution agreements have substantially contributed to these anticompetitive market conditions.

c. Diminishing Returns of Scale

Finally, Google uses a data experiment to challenge the proposition that Microsoft lacks sufficient scale to compete. It contends that Microsoft has reached the point of diminishing returns on scale, and that factors other than scale explain the quality differences between the two GSEs. *See* GRFOF ¶ 139; GFOF ¶¶ 256 (collecting testimony); GTB at 67–69.

For these propositions, Google relies upon a data reduction experiment (DRE) performed by its computer science expert, Dr. Edward Fox. *See* GFOF ¶¶ 344–406.[13] The DRE retrained various Google ranking signals (including NavBoost, QBST, Term Weighting, RankBrain, DeepRank, and RankEmbedBert) on an estimate of Bing's quantity of user data. *Id.* ¶¶ 352–353, 357–370. It then applied those adjusted models to a sample of Google mobile queries to yield

[13] Dr. Fox's experiment and testimony are subject to a *Daubert* motion, ECF No. 443. Because the court has considered that evidence, but ultimately gives it little weight, the court denies the *Daubert* motion.

search results. *Id.* ¶¶ 354–356, 371–376. Those results were scored by human raters. *Id.* ¶¶ 377–379. Dr. Fox concluded that only 2.9% of the quality gap between Google and Bing was attributable to their respective volumes of user interaction data. Tr. at 7848:18-24 (Fox) (discussing DXD26 at 10); *see* GFOF ¶¶ 382–386, 349.

The court found Dr. Fox's experiment to be an interesting exercise but ultimately is unpersuaded by it. If Dr. Fox is right that Google could operate a search engine of equal quality using the amount of data possessed by Bing, one would expect Google to have used the experiment beyond just litigation. If the DRE's conclusions are correct, Google would not need to collect and store the incredible volumes of user data it retains to maintain its quality advantage over Bing. Less need for user data would translate into reduced costs and, possibly, greater privacy protections. FOF ¶¶ 105, 120–125. Yet, Google made no effort to run further experiments to verify Dr. Fox's study, and further, key Google employees were completely unaware of it. *See* Tr. at 1827:5-19 (Lehman); *id.* at 7534:21–7535:18 (Raghavan). If Dr. Fox's results are as powerful as Google suggests, it is odd that Google has done nothing more than present them in this lawsuit.

In any event, Dr. Fox's study in one sense only reinforces the importance of user interaction data. Microsoft has had a search engine since 2005. FOF ¶ 10. In 2009, it struck a deal with Yahoo to, among other things, aggregate the amount of user data available to Bing. FOF ¶ 13. If Dr. Fox is right that Bing's scale has passed the point of diminishing returns, it has taken decades and a substantial acquisition of Yahoo's data to get there. Still, Bing remains well behind Google in absolute scale. That leaves little hope that a smaller firm like DDG or a nascent one can compete with Google. In fact, for Neeva, the inability to attract and retain users, and thus build scale, was a key reason for its demise. FOF ¶ 76.

Finally, Dr. Fox's study does not account for the years of product development made possible by Google's scale. Even if Google's modern data-based signals yield identical results when trained on a fraction of their scale, Google's ability to design and engineer those signals relied on volumes of user data that Bing (nor anyone else) has never had. FOF ¶¶ 98, 105; Tr. at 10318:9-24 (Oard) ("[T]hat's the way Google does it is based in part on Google seeing what works and trying out new ideas, and user-side data is just all over that process. And so that if you have access to more and better user-side data, then you have opportunities to do things here you might not otherwise have. And that's simply not measured in the experiment, right. That experiment of this general design couldn't possibly measure that effect. I mean, you'd have to replay 20 years of search engine development.").

In the end, Google's dismissal of the importance of scale is inconsistent with market realities. Google often warns that competition is "only a click away." However, "[t]he paltry penetration in the market by competitors over the years has been a refutation of [that] theory by tangible and measurable results in the real world." *Dentsply*, 399 F.3d at 194; Tr. at 3796:19-23 (Ramaswamy) (defaults are "enormously powerful," notwithstanding "pious prose around 'competition being a click away'").

3. The Exclusive Agreements Have Reduced Incentives to Invest and Innovate.

The distribution agreements have caused a third key anticompetitive effect: They have reduced the incentive to invest and innovate in search. *See 1-800 Contacts, Inc. v. FTC*, 1 F.4th 102, 118 (2d Cir. 2021) (stating that anticompetitive effects can "include evidence of [slowed down] innovation") (internal quotation marks omitted); *McWane*, 783 F.3d at 827 (observing that "slow innovation" can be a consequence of exclusive dealing arrangements) (internal quotation marks and citation omitted).

For more than a decade, the market for general search services has presented the opportunity to earn outsized profits. Google certainly has reaped the rewards. FOF ¶ 8 (Google Search's 2022 booked revenue was over $162 billion). Yet the general search services market has remained static for at least the last 15 years, with investments largely coming from established players. Only Google and Microsoft have made the sizeable capital investments needed to build a self-sustaining GSE. FOF ¶¶ 10, 55. Smaller competitors do even not compete as fully integrated search engines. Yahoo, once the market leader, no longer crawls the web and instead relies on Microsoft for web results. FOF ¶ 13. DDG operates in the same way. FOF ¶ 12.

Nor has venture capital money rushed in. As Apple's John Giannandrea wrote in 2018: "[T]he reason a better search engine has not appeared is that it's not a VC fundable proposition even though it's a lucrative business." UPX240 at 507; *see also* Tr. at 3510:24–3512:7 (Nadella) (describing Silicon Valley venture funding in search as a "no fly zone"). As a result, DDG and Neeva are the only two notable market entrants in the last 15 years. Each attempted to innovate—DDG on privacy and Neeva through a subscription-based model—but found only limited success (DDG) or left the market altogether (Neeva). FOF ¶¶ 14, 25, 76.

The foreclosure of efficient channels of distribution has contributed significantly to the lack of new investment. Neeva is a case in point. It could not gain a foothold in the market in part because it was relegated to less efficient means of distribution, such as app downloads. Tr. at 3689:15–3694:21 (Ramaswamy). Neeva was unable to gain a position as an alternative default GSE on any mobile device. FOF ¶ 76. Ultimately, Neeva's inability to retain and attract users—and thus acquire scale—was a primary reason for its withdrawal from the market. *Id.* The loss of nascent competitors is a clear anticompetitive effect. *See* AREEDA ¶ 1802d5 (observing that exclusive dealing arrangements that deny smaller firms access to retailers may "impair their ability

to expand, thus becoming more effective competitors with the dominant firm. Indeed, the smaller [firms] may decline and even be forced to exit from the market").

Plaintiffs offer other examples of how the distribution agreements disincentivize investment and innovation in general search: (1) Google's main rival, Microsoft, has limited its investment due to its limited distribution on mobile; (2) Apple, a fierce potential competitor, remains on the sidelines due to the large revenue share payments it receives from Google; (3) nascent competitors, like Branch, are unable to obtain distribution; and (4) knowing that stagnation will engender no consequences, Google lacks incentives to innovate. The court addresses each in turn.

a. Microsoft

Everyone agrees that Google's distribution agreements did not cause Microsoft's *past* underinvestment in search. Microsoft "missed" the mobile revolution and was unable to improve its browser, Internet Explorer, until it used Google's rendering engine, Chromium. *See generally* Tr. at 3585–3590 (Nadella). Some of Microsoft's quality issues also were attributable to its poor index. *See* DX429 at .021 (Bing is 25 times worse than Google regarding not-in-index issues). By 2007, Microsoft understood that it was three to five years behind in search and increased investment was needed. DX424 at .005. Ultimately, Microsoft committed significant capital to search. FOF ¶ 10; *see* Tr. at 3510:3-7 (Nadella) ("As per capita to our revenue . . . we've invested a lot, more so than Google has invested, in search. . . . [W]e're the only player other than Google that has continued to invest in search."). That investment (combined with secured distribution on Windows devices) has allowed Bing to achieve quality parity with Google on Windows desktop devices. FOF ¶ 127.

Today, Microsoft could invest more money in search but chooses not to without assurances of additional distribution on mobile. *See* Tr. at 3510:13-15 (Nadella) ("Can we invest more? Of course, any day, you know, everybody wants to invest more. And in order to invest more, please give me some mobile share and I'll invest more."). That withholding of additional investment is in part attributable to Google's exclusive search distribution agreements. As Microsoft's former CEO of Advertising and Web Services, Mikhail Parakhin, testified, "fundamentally it boils down to what kind of a long-term revenue we can achieve. . . . If you don't have [the] ability to effectively distribute [through defaults], it's almost meaningless to invest in the area." *Id.* at 2643:1-23 (Parakhin).

Google responds that Microsoft's current investment strategy is not evidence of an anticompetitive effect because market actors must take financial risks to compete and Microsoft's unwillingness to take such risks is not an antitrust problem. *See* GTB at 4, 68 ("Microsoft should not be heard to complain that Google has been too successful or that Microsoft simply cannot invest to improve its search quality *until* Apple replaces Google with Bing as the Safari default.").

What Google says has intuitive appeal, but it does not reflect market realities. Microsoft stood no realistic chance of beating Google for the Apple default, and there is no evidence of any serious negotiations for Android placements. No profit-driven firm in Microsoft's position would invest the substantial sums required to enhance its search product when there is little to no genuine opportunity for a default distribution deal. *See* AREEDA ¶ 725a ("To say that a business firm acts 'rationally' means that it seeks to maximize its profits or its value. Such a firm does not invest its resources unless it anticipates that the investment will be more profitable than available alternative investments."). Google's distribution agreements thus appear reasonably capable of having significantly contributed to disincentivizing Microsoft from enlarging its investment in search.

Plaintiff States advance a different theory of anticompetitive harm involving Microsoft. They contend that Bing's limited distribution restricts Microsoft's ability to enter into data-for-traffic agreements with SVPs to secure structured data for use in Bing's vertical offerings. *See* PSTB at 32–33. Plaintiff States argue that Bing's reduced scale means that it must either forego this data or pay for the data itself. *Id.* Google, on the other hand, can simply offer those partners traffic, due to its extraordinary scale. *Id.*

But the record does not support this theory. As of 2020, Microsoft had entered into *hundreds* of partnerships to obtain structured data. FOF ¶ 47. Bing has had some partnership challenges but none that could be fairly characterized as an anticompetitive effect. In one instance, Bing understood that a travel SVP refused to partner with it explicitly due to Bing's lack of query volume. FOF ¶ 48. But Bing partners with much larger SVPs in the same vertical, like Expedia and Booking.com. *Id.* On another occasion, Bing's partnership with [redacted] broke down when [redacted] sought a financial commitment (rather than traffic). *Id.* But it was not that [redacted] was unwilling to work with Bing; it was Bing who made a business judgment to forgo the partnership given self-imposed budget limitations and its strong relationship with another [redacted] *Id.* These isolated instances do not demonstrate that Google's contracts have substantially hampered Microsoft's ability to obtain structured data to improve Bing.

b. Apple

Plaintiffs contend that the billions of dollars that Apple receives in revenue share are, in effect, a payoff to keep Apple on the sidelines of search. Plaintiffs also maintain that the ISA limits Apple's ability to expand search through its Suggestions feature and prevents Apple from running ads on its Spotlight product. *See* UPTB at 33–34, 55. The evidence relating to Apple cannot be cast in such absolute terms and calls for more nuance.

Entering Search. Apple has the financial, technological, and human resources to develop or acquire a competing GSE. In 2018, Apple hired the former head of Google Search, John Giannandrea. Tr. at 2164:18–2165:12 (Giannandrea). Since then, Apple has been "investing quite a lot in" search by "building all of the technology [it] would need to build a general-purpose search engine." *Id.* at 2245:2-6 (Giannandrea); *id.* at 2247:14-16 (Giannandrea); FOF ¶ 301 (describing dollars and manpower dedicated to search at Apple). Both Apple and Google understand that Apple could develop its own GSE to replace Google as the default in Safari. FOF ¶¶ 300–301. Apple has decided not to do so thus far. FOF ¶ 302.

The ISA revenue share is an important factor in Apple's calculus. In return for exclusive and non-exclusive default placements (i.e., user-downloaded Chrome and Safari default bookmarks), Google pays Apple [redacted]% of its net ad revenue, which amounted to $20 billion in 2022. FOF ¶¶ 298–299. This is almost double the payment Google made in 2020, which was at that time 17.5% of Apple's operating profit. *Id.* Google pays Apple more in revenue share than it pays all other partners combined. FOF ¶ 299. If Apple were at all inclined to enter the market for general search, it would have to be prepared to lose these large revenue share payments. FOF ¶¶ 302–326.

But the loss of revenue share is not the only reason Apple has not entered the market. There are other costs and risks. Although Apple has built an infrastructure to deliver some search results to its users, it would have to commit billions more to build and maintain a fully functioning GSE. FOF ¶ 302. It also would need to develop an ad platform to monetize searches. Critically, Apple would have to be willing to put its brand reputation—and possibly device sales—at stake if it were to produce an inferior or unpopular product. *See id.* The required investment also would divert capital from other possibly profitable ventures. *Id.* Even if all went well, Apple's own projections

estimate that it would lose over $12 billion in revenue during the first five years following a potential separation from Google. *Id.*

Still, the ultimate question is whether the ISA reasonably appears capable of significantly contributing to keeping Apple on the sidelines of search, thus allowing Google to maintain its monopoly. *See Microsoft*, 253 F.3d at 79. The revenue share payments unquestionably have that effect. The prospect of losing tens of billions in guaranteed revenue from Google—which presently come at little to no cost to Apple—disincentivizes Apple from launching its own search engine when it otherwise has built the capacity to do so. The payments need not be Apple's sole reason for staying out of search to constitute an anticompetitive effect. Plaintiffs are not required to prove that Google's "continued monopoly power is precisely attributable to" the ISA. *Id.*[14]

"Substantially Similar" Clause. Plaintiffs' other theories of anticompetitive harm do not fare as well. According to Plaintiffs, Google insisted on modifying the terms of the ISA to constrain Apple from intercepting increasing volumes of commercial queries through its Suggestions feature. UPTB at 33–34. When a user types a query in the Safari search bar, sometimes Safari will "suggest" a relevant link to the user that, if clicked, allows the user to avoid Google entirely. FOF ¶ 303. By 2016, Google viewed Apple's increased use of Suggestions as a threat, because more diversions could translate to fewer revenue-generating search queries. FOF ¶ 304. So, when the parties renegotiated the ISA in 2016, Google insisted on inserting a term in which Apple promised that its use of Google Search as the default in Safari "will remain

[14] In its discussion of Apple, Google references the principle that a firm's "make or buy" decision typically does not offend antitrust law. GRCL ¶ 40 (citing *Jack Walters & Sons Corp. v. Morton Bldg., Inc.*, 737 F.2d 698, 709–10 (7th Cir. 1984) (holding that a firm's decision to vertically integrate—the decision to "make or buy" a good or service—typically does not offend antitrust law)); *see also* Tr. at 8698:25–8699:9 (Israel). But that principle has no application here because the question is not whether *Apple's* decision to remain out of search is exclusionary, but whether the exclusivity of ISA has an anticompetitive effect by influencing that decision.

substantially similar to its use" in 2016. FOF ¶ 305. This has been termed the "substantially similar" clause.

Google denies that the clause's purpose is to limit Apple's ability to innovate its products. *See* GRFOF ¶¶ 171–172. Rather, it was meant to ensure that Apple would not divert queries to an SVP, like Amazon, thus leaving Google with a greater proportion of less profitable, noncommercial queries. *See* GFOF ¶ 1270.

Regardless of its purpose, Plaintiffs have not shown that the "substantially similar" clause has led to any actual competitive harm or threat of such harm. Both Apple witnesses, Cue and Giannandrea, testified that Apple does not view the "substantially similar" clause as limiting Apple at all on Suggestions, and that Apple has not been restrained by it. FOF ¶¶ 305, 307. Nor have Plaintiffs produced any evidence that would suggest that, since 2016, Apple has purposely reduced or limited the number of "suggestions" it offers users. Plaintiffs thus have not shown that the "substantially similar" clause "indeed" had an anticompetitive effect in the relevant market. *Microsoft*, 253 F.3d at 58–59.

Advertising on Spotlight. Plaintiffs' related theory that the ISA restricts Apple's ability to monetize its on-device search, Spotlight, is also not supported by the record. Spotlight is primarily an on-device search feature on Apple devices, though it has the capacity to run searches through Safari. FOF ¶ 308. Under the ISA, Apple must grant Google the opportunity to deliver search advertisements for on-device searches on Spotlight before it does so itself. FOF ¶ 309. This "right of first refusal" in theory prevents Apple from siphoning off advertising dollars from Google. According to Plaintiffs, this provision depresses competition by restricting Apple from expanding its search ads offerings. UPTB at 34.

But the evidence that the "right of first refusal" has an anticompetitive effect—in any market—is thin. Apple presently does not place ads on Spotlight. Nor has it expressed any intention to do so. Tr. at 2497:11-25 (Cue) (stating that Apple had "no intentions or plans to put ads on Siri or Spotlight," and "today, we have no intentions to put ads on Siri or Spotlight"). If Apple seeks to monetize Spotlight in the future, and Google insists on enforcing the clause, then that would be an anticompetitive effect. But there is no evidence in the record that the "right of first refusal" clause is one today. Plaintiffs thus have not shown the "requisite anticompetitive effect." *Microsoft*, 253 F.3d at 58–59.

c. Branch

Plaintiffs also contend that the distribution agreements prevent the emergence of innovative search-adjacent technologies. The example they cite is Branch. UPTB at 34–35. Branch is not a GSE. It develops a product that, as presently deployed, uses "deep linking" technology to search content within on-device applications, like Yelp. FOF ¶ 15. Plaintiffs do not contend that greater adoption of Branch's technology would either facilitate competition among GSEs or lower entry barriers to the general search market. Instead, Plaintiffs' theory is that Branch's tool, as originally designed, uses the web to provide limited results, UPTB at 35, and thus could one day serve as a competitor to Google as a provider of web information retrieval, U.S. Pls.' Resp. Proposed Findings of Fact, ECF No. 907, ¶¶ 2452–2453 [hereinafter UPRFOF].

According to Plaintiffs, the RSAs' restriction on preinstalling an "alternative search service" caused potential distribution partners to balk at integrating Branch with full functionality. UPTB at 34–35. For instance, in 2019, Samsung, which was a primary investor in Branch, worked to integrate Branch into its devices but grew concerned about whether doing so would affect its relationship with Google. FOF ¶¶ 391–393. Samsung ultimately did preinstall Branch but only at

a reduced functionality (fewer searchable apps and no direct linking to mobile websites). *Id.* In 2020, the amended Google-Samsung RSA contained a modified clause that more squarely limited Samsung's ability to preload on-device search. FOF ¶ 394. In addition, when another potential partner, AT&T, requested that Google clarify whether Branch could be preloaded on an RSA-compliant device, Google responded simply by citing the "alternative search services" term. FOF ¶¶ 395–396. AT&T decided not to partner with Branch given the uncertainty and the financial risk of losing revenue share if Google viewed integrating Branch as a breach of the RSA. *Id.*

Google has a different take on the evidence concerning Branch. It claims that the RSAs do not preclude the preloading of Branch, which is available on some RSA-compliant devices. GTB at 93. It also maintains that it never told any partner that integrating Branch would violate the RSA, and that partners declined to preload Branch for reasons other than the RSAs, including quality and data privacy issues. GRFOF ¶¶ 277–280.

Because Plaintiffs claim is that Google's conduct blocked a nascent competitor, the question is not whether the technology "would actually have developed into [a] viable platform substitute[]," but whether such technology has "showed potential" to do so. *Microsoft*, 253 F.3d at 79; *see also id.* (explaining that "nascent threats are merely *potential* substitutes"). In *Microsoft*, for instance, middleware technologies Java and Navigator were deemed nascent threats to Windows because such products, although not then substitutes, had the potential to "take over some or all of Window's valuable platform functions[.]" *Id.* at 53.

The record does not support the conclusion that Branch's technology has shown potential to become a viable platform substitute for Google. Branch's founder and former CEO, Alex Austin, testified that Branch's technology does not "conflict with or overlap with web search[.]" Tr. at 2961:3-4 (Austin). Branch also externally described its "search use case [a]s totally different

and distinct from Google search, and there is zero impact on Google search traffic after implementing Branch." PSX65 at 531; *see also id.* at 532 (outlining significant differences between general web search and Branch). Although Austin stated that Branch "had hopes that over time, as people found they could do more in apps, that eventually some of that web search traffic would actually start to migrate over to this new app search engine and just create more competition in web search overall," he admittedly "didn't have any data, like an experiment data that suggested the impact." Tr. at 2960:13-22 (Austin).

Thus, while there is some evidence that Branch aspired to compete with Google in general search, the nascent-threat evidence here is far weaker than in *Microsoft*. The trial court there "made ample findings that both Navigator and Java showed potential" as nascent threats. 253 F.3d at 879. This court cannot do the same about Branch.

That said, the record evidence does show that the RSAs' "alternative search services" term had some chilling effect on distribution partners' consideration of Branch. Samsung ultimately preloaded a scaled-back version of Branch, and AT&T declined the opportunity to partner with Branch because of the possibility of putting revenue share at risk. FOF ¶¶ 395–396. That chilling effect just did not occur in the general search services market.

d. Google

Finally, Plaintiffs argue that the absence of genuine competition for general search queries has reduced Google's incentives to innovate its search product, thereby harming consumers. They note that Google spends seven times more on securing defaults than on R&D, FOF ¶ 289, and point to some evidence that its search expenses have declined over the years, *see* UPX249 at 556; UPX260 at 681 (Apple noting that "in recent years, Google has . . . under invest[ed] on desktop"). Plaintiffs also identify instances where Google has reacted to rare competitive pressure by rapidly

investing in product improvements or launches. For example, Plaintiffs point to Google's "Go Big in Europe" campaign, launched in response to the advent of a search engine choice screen on Android devices required by European Union regulators. UPFOF ¶¶ 1088–1090. Plaintiffs also cite to some isolated examples of degraded search engine quality, such as a period of stagnation and decline in Google's index size, declining latency, and anecdotal evidence from complaining employees. *Id.* ¶¶ 1083–1086.

The court is not persuaded. Google has not sat still despite its dominant market share. Search has changed dramatically over the last 15 years, largely because of Google. FOF ¶ 128. Its SERP, for example, is different today than it was even five years ago. *Id.* Moreover, the evidence that Google has left innovative technologies on the shelf, or that its investments in R&D and human capital have fallen behind others in the industry, is sparse. "Go Big in Europe" is a one-time, discrete episode that is far from robust evidence that Google remains inert absent competition. In truth, Google's penchant for innovation is consistent with the behavior of a monopolist. *Microsoft*, 253 F.3d at 57 ("[M]onopolists have reason to invest in R&D," as "innovation can increase an already dominant market share and further delay the emergence of competition[.]").

There is one notable exception, however. That is Google's launch of its generative AI chatbot Bard (now Gemini) in direct response to Microsoft's announcement of BingChat (now Copilot), which integrates Bing and ChatGPT's AI technology. FOF ¶¶ 111–112. This is a clear example of Google responding to competition.

In any event, based on the record as a whole, the court cannot find that the distribution agreements have had an anticompetitive effect by deterring Google from innovating in search.

* * *

Plaintiffs have made the required showing of anticompetitive effects in the general search services market, satisfying their prima facie case. The burden now shifts to Google to proffer a "procompetitive justification" for the exclusive distribution agreements. *Microsoft*, 253 F.3d at 59.

B. The Exclusive Agreements Do Not Result in Procompetitive Benefits.

"[I]f a plaintiff successfully establishes a *prima facie* case under § 2 by demonstrating anticompetitive effect, then the monopolist may proffer a 'procompetitive justification' for its conduct." *Id.* The defendant must "present the District Court with evidence demonstrating that the exclusivity provisions have some such procompetitive justification." *Id.* at 72. "If the monopolist asserts a procompetitive justification—a nonpretextual claim that its conduct is indeed a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal—then the burden shifts back to the plaintiff to rebut that claim." *Id.* at 59.

Google advances three categories of procompetitive benefits. It submits that the challenged agreements (1) enhance the user experience, quality, and output in the market for general search services, (2) incentivize competition in related markets that redounds to the benefit of the search market, and (3) produce consumer benefits within the related markets. The court concludes that the record does not sufficiently support any of these procompetitive justifications.

1. Benefits in the Market for General Search Services

First, Google argues that its browser agreements "allow[] the browser's search functionality to work effectively out of the box," which "ensure[s] convenience for Safari and Firefox users[.]" GTB at 51, 53. As support for this proposition, Google notes the longstanding industry practice of preloading a browser with a default GSE. *Id.* at 51. Indeed, all browsers in

the United States are so designed. FOF ¶ 59. This practice, Google contends, is evidence that the browser agreements benefit consumers. *See In re EpiPen*, 44 F.4th at 989.

But the procompetitive benefit must justify "the specific means here in question, namely exclusive dealing contracts[.]" *Microsoft*, 253 F.3d at 71; *see id.* at 76 (defendant did not carry its burden when its purported benefit failed to justify the particular contractual clause that made the agreement exclusive). Assuming Google has established the value of a default placement to competition and consumers, it has not shown that *exclusive* defaults across nearly all key search access points have such utility.

What's more, a non-exclusive default would still provide all the convenience and efficiency benefits that Google touts. *See* UPRFOF ¶ 2143 ("Plaintiffs are not challenging the concept of a search default or that distributors may recommend a search engine, set a search default, or preinstall search access points. Plaintiffs are challenging Google's exclusionary contracts that require counterparties to set Google as the exclusive search default."). For example, Google asserts that "Apple's commitment to providing the best out-of-the-box experience to consumers includes designing the products to be simple to use and work right out of the box" and that "product designs with additional decisional steps for consumers to take can cause users to abandon use of the product." GFOF ¶¶ 1223, 776. But Google does not explain why Apple would lack those same incentives absent exclusivity. Indeed, the original Google-Apple ISA preloaded Google as the default but did not require exclusivity. FOF ¶ 312; *see* AREEDA ¶ 1822d (stating courts may "consider alternatives to the challenged practice that are less threatening to competition than the challenged practice itself"). The absence of exclusivity did not stunt Apple's product development during that time. Additionally, Apple in the past has sought greater flexibility with defaults, which

Google rejected. FOF ¶¶ 319–320. Presumably, Apple would not have made that request if it felt that it would harm the consumer experience.

Second, Google contends that "the contest to be the default presents search engines the opportunity to" win incremental promotion, thereby incentivizing firms "to make quality improvements to compete for the default position[.]" GTB at 53. That may be true in a competitive market. But as the court already has concluded, there is no genuine competition among GSEs for defaults, *supra* Section IV.A, and there is no record evidence that competition for the default has motivated GSEs to make quality improvements. If anything, Google's near dominance over the defaults for more than a decade has *reduced* the incentive to invest. *See supra* Section V.A.3.

Google notes that "Microsoft highlighted its improvements in search quality over the past years" during its negotiations with Apple. GFOF ¶ 1440. But that only illustrates the importance of real competition for defaults. Microsoft committed resources to search, and Bing's quality followed, because it has access to an efficient channel of distribution: the Edge browser on Windows. FOF ¶ 59. Without such access, it would be where Yahoo or DDG is today, with no real prospect of competing for any default placement. Microsoft's ability to leverage its advantage on Windows is what spurred Microsoft's investment in search, not the unrealistic prospect of replacing Google as a search default on Apple or any other device.

Relatedly, Google argues that the revenue sharing provisions of the agreements introduce price competition for the default that would not exist otherwise, because GSEs are free products. GTB at 53–54. The evidence does not support that assertion. True, Microsoft perceives that Apple has used it as a stalking horse in its negotiations with Google, FOF ¶ 329, but there is no evidence that Google made its revenue share offer to Apple based on a concern that Apple might accept a better price from Microsoft. To the contrary, Google knew there was no prospect that Microsoft

could outbid it. Google's "Alice in Wonderland" analysis projected that Microsoft would have to offer Apple over 100% revenue share to compete, FOF ¶ 328, and this study turned out to be wholly accurate. Microsoft *did* offer Apple 100% revenue share plus guarantees, but Apple's executives testified that Bing was never a realistic option to replace Google. FOF ¶¶ 323–327. Even Google CEO Sundar Pichai testified that Google took "into account" that Apple had no other viable option "which was why [it] didn't pay the share Apple wanted." Tr. at 7772:12–7773:10 (Pichai).

Google further claims that "[t]his price competition can also reduce barriers to entry or expansion and facilitate entry from new rivals by allowing them to 'buy' their way into the market." GTB at 54. That assertion does not square with market realities. There is no evidence that entrants have been able to "buy their way into" the market, let alone ante up for default placement. *Supra* Sections II.C.3 & IV.A. Google's reliance on *In re Epipen* is unconvincing. There, "buyers instigated exclusivity to obtain lower prices" in the challenged contracts, and the exclusive deals "were a normal competitive tool in the epinephrine auto-injector market to stimulate price competition." *In re Epipen*, 44 F.4th at 986, 989. Here, exclusive deals are a feature of the market only because *Google* has insisted on them, not its distribution partners. Moreover, it is a market reality that no firm other than Google has held a default on any Apple or Android device for a decade or more, so the distribution agreements have not served as a "normal competitive tool." And when partners have asked for flexibility on the defaults, perhaps with an eye towards generating competition, Google has resisted. *E.g.*, FOF ¶¶ 319–320 (Apple); FOF ¶¶ 370–375 (Verizon); FOF ¶ 378 (T-Mobile); FOF ¶¶ 395–396 (AT&T). Those market realities make this case different from *Epipen*.

Third, Google contends that the challenged contracts have led to increased search output due to the efficiency of the default placements and its superior search quality. Google is right that search output has increased significantly, FOF ¶ 40, but it has presented no evidence that default exclusivity—as opposed to a host of other market forces—is a substantial cause of that result. *United States v. Apple, Inc.*, 791 F.3d 290, 334 (2d Cir. 2015) (the challenged conduct must be "necessary" to the justification for it to be procompetitive); *McWane*, 783 F.3d at 841 (same).

Even if the record supported a connection between the exclusive agreements and increased search output, increased output alone is insufficient to outweigh their anticompetitive effects. Output measured by global desktop device shipments grew rapidly during the years of Microsoft's anticompetitive conduct. *See* Tr. at 10456:17–10458:18 (Whinston) (discussing UPXD104 at 39). The D.C. Circuit nevertheless found that Microsoft's conduct violated Section 2. Increased output similarly does not inoculate Google against liability.

2. Benefits in Other Markets that Redound to the Benefit of the Search Market

Google also asserts that its revenue share payments facilitate better browsers, improved and lowered cost for smartphones, and increased competition between Apple and Android, all of which redound to the benefit of the general search market by increasing search output. *See Sullivan v. NFL*, 34 F.3d 1091, 1113 (1st Cir. 1994) ("[B]enefits to competition in the relevant market can include evidence of benefits flowing indirectly . . . that ultimately have a beneficial impact on competition in the relevant market itself."); *Epic Games*, 67 F.4th at 990 (same).

First, Google contends that its browser agreements promote browser competition, because a better GSE improves the browser experience, and browser developers use the revenue share payments they receive to improve their products. Put simply, better browsers equal better search products. *See* GTB at 62; Tr. at 7646:21-23, 7653:21–7654:1 (Pichai) ("We realized just

improving the state of browsers would overall help users use the web more, will increase online activity and increase search usage, including Google's usage."). Google supports its position with the testimony of its expert, Dr. Murphy. *See* Tr. at 9855:11-23 (Murphy). He opined, "[I]f I generate more of a complementary good[], right, I give you a better browser, you're going to do more search, right, that's how I can compete for more search, and just like lower prices expand output, these lower price[s] expand output too, and they're going to expand output not just of search but also out of these complementary products." *Id.* at 9705:19-24 (Murphy). The court accepts that the user experience of a browser is enhanced when the default GSE is excellent, but the evidence shows no more.

The ISA does not require Apple to use revenue share payments to improve Safari, and Google has presented no evidence that Apple does so. Mozilla likely does use its payments from Google to upgrade Firefox (given that those payments make up 80% of its operating budget), but Firefox's contribution to the overall search market is so small that the additional output it produces, at most, marginal procompetitive benefits. FOF ¶ 11. Importantly, even if there is a link between more competitive browsers and search output, Google not shown how the *exclusivity* of its agreements has produced that benefit. Dr. Murphy did not, for example, opine that the exclusivity feature of the distribution agreements was a contributor to increased search output. Moreover, Dr. Murphy conceded that there are multiple reasons why output in search has continued to expand for reasons that have nothing to do with Google as the exclusive default GSE. Tr. at 9710:4-25, 9711:5–9712:22, 10186:6-13 (Murphy).

Second, Google claims that the Android agreements promote smartphone competition between Android and Apple devices (inter-brand competition) and among Android devices (intra-brand competition). "This smartphone competition leads to higher-quality, lower-priced devices,

thereby increasing usage of mobile devices and expanding search output." GTB at 89. Again, Dr. Murphy asserted that Google's revenue share payments fund the Android ecosystem, enabling competition with Apple, which results in more consumers searching on all devices.

DXD37 at 100; *see* Tr. at 9855:16-23 (Murphy) ("Since you're going to pass some of that cost through, one of the ways you do that is through lower prices, but, also, higher quality. Higher quality is another way to get more users and, therefore, get more search and, therefore, more search revenue. So, this enhances search output, partly by directly encouraging search, because that's where the payment is coming from, but, indirectly, also, by pushing the . . . platforms.").

But this contention once again falls short. For one, the evidence is thin that Android device makers and carriers use Google's revenue share in any of the ways Google suggest. *See* Giard Dep. Tr. at 277:25–278:3 (stating that while the revenue share payments could be said to have subsidized costs to consumers of all services provided by T-Mobile, it would have "helped in a very minor way"); Christensen Dep. Tr. at 30:9-14 ("Q. Does the fact that the Android operating system license is free help Motorola develop more competitive devices across different price points? A. I think there is not necessarily a direct relationship to that."). Also, once more, Google has not shown how the agreements' *exclusivity* is the reason for greater smartphone competition and thus increased search output. *See* Tr. at 9847:8–9848:1 (Murphy) (agreeing that expanded output "comes from many things . . . [l]ots of things are driving it[.] . . . I can't tell you how much of that is due to that competition [in mobile search], but it's clearly a part of the picture[.]").

If anything, greater output resulting from increased competition between Android devices and iPhones benefits mainly Google. Search on those devices occurs primarily through the

defaults, so more searching on those devices means more ad revenue for Google, which only entrenches Google as the default GSE of choice. An out-of-market benefit that "preserve[s] [Google's] power in the [search] market" is not a procompetitive justification for the exclusive distribution agreements. *Microsoft*, 253 F.3d at 71.

3. Cross-Market Benefits

Google also claims that its distribution agreements create procompetitive benefits within the related markets themselves, which independently justifies their exclusionary effect in the market for search. *See* GCL ¶ 116 ("Procompetitive benefits that accrue in highly complementary markets should be considered in addition to the aforementioned benefits in Plaintiffs' alleged markets."). Put differently, Google says that exclusionary conduct in one market can be excused if it sufficiently promotes competition in another. This is a concept known as cross-market balancing. The parties dispute whether the court can engage in such balancing in a Section 2 case.

The Ninth Circuit recently observed that "[t]he Supreme Court's precedent on cross-market balancing is not clear." *Epic Games*, 67 F.4th at 989; *see NCAA v. Alston*, 594 U.S. 69, 87 (2021) (declining to consider argument by *amici* that "review should instead be limited to the particular market in which antitrust plaintiffs have asserted their injury," when the parties had agreed in the trial court that cross-market balancing was appropriate). The Court has refused to engage in cross-market balancing in cases of *per se* violations. *United States v. Topco Assocs., Inc.*, 405 U.S. 596, 609–10 (1972) ("Our inability to weigh, in any meaningful sense, destruction of competition in one sector of the economy against promotion of competition in another sector is one important reason we have formulated per se rules."). But in two Sherman Act cases the Court did consider with little discussion whether procompetitive benefits in one market justified anticompetitive conduct in a related one. *See Image Tech. Servs.*, 504 U.S. at 482–84 (addressing argument in a

Section 2 case that exclusionary conduct in the parts and repairs market was justified by "interbrand competition" in the market for photocopiers); *NCAA v. Bd. of Regents of Univ. of Okla.*, 468 U.S. 85, 104–08, 115–17 (1984) (considering in a Section 1 case a procompetitive rationale regarding the college football tickets market when assessing anticompetitive conduct in the market for college football television).

The court need not, however, resolve this legal question because the record evidence does not support Google's contention that the exclusive agreements have resulted in procompetitive benefits in related markets.

Browser Market. The link between the exclusive agreements and competition in the browser market is weak. It rests on the presumption that browser developers invest Google's revenue share payments in improving their browsers. But, as discussed, no evidence shows how Apple uses its revenue share payments, and to the extent Mozilla uses them to improve Firefox, its share of the browser market is so low that it does not move the competitive needle.

Device Market. As to the Android agreements, Google argues that its payments fund the Android ecosystem, which promotes consistency across devices, lowers device prices, and ultimately stimulates competition among Android devices and with iPhones. But here, too, the evidence is unconvincing. Google has produced little industry evidence from any OEM or carrier that views the Android agreements and their revenue share payments as enhancing competition among devices. Google's best evidence is testimony from Brian Higgins, Chief Customer Experience Officer at Verizon. Higgins shared his view that the Android agreements align incentives between Google and Verizon to promote Android and foster competition with Apple's operating systems. *See* Tr. at 1097:1-22 (Higgins). But one partner's testimony is not enough to establish procompetitive benefits in the *market* as a whole. As Dr. Murphy conceded, the

decreasing cost of Android phones was "consistent" with the "MADA barter," but he could not establish causality. *Id.* at 10186:6-13 (Murphy). The rest of the evidence supporting this purported cross-market benefit comes from Google employees, but that testimony is largely speculative, as they have no first-hand knowledge of how Android partners use the revenue share payments. *See* GFOF ¶¶ 1711, 1713.

Security Upgrades. Before moving on to the general search text ads market, the court needs to address one more contention. That is Google's argument that the RSAs enhance security in the Android device market because the agreements condition payment on making security upgrades. GTB at 91–92. Google notes that Apple can do this directly, as it is vertically integrated. Tr. at 9856:5-13 (Murphy). By contrast, OEMs historically have failed to prioritize performing security upgrades. *See* GFOF ¶ 1717. Google also points to the testimony from an AT&T representative, who said that security upgrades can involve a significant amount of work, implying that absent the agreements, AT&T might not be as willing to cooperate on device security. *Id.* (citing Ezell Dep. Tr. at 150:2–151:1). That witness, however, heavily caveated his own testimony. *See* Ezell Dep. Tr. at 153:21-25, 154:6-18.

Even if the court were to accept that the RSAs provide some additional incentive to partners to perform security upgrades, Google has not established a connection between that benefit and the agreement's exclusivity. In fact, its CEO Sundar Pichai admitted that incentivizing partners to perform timely security upgrades could be done through a structure other than the RSA. Tr. at 7718:24–7719:1 (Pichai); FOF ¶¶ 397–398 (describing Mobile Service Incentive Agreements).

* * *

Google has not met its burden to establish that valid procompetitive benefits explain the need for exclusive default distribution. Accordingly, Plaintiffs have established that Google is

liable under Section 2 of the Sherman Act for unlawfully maintaining its monopoly in the market for general search services through its exclusive distribution agreements with browser developers and Android OEMs and carriers.[15]

VI. EFFECTS IN THE MARKET FOR GENERAL SEARCH TEXT ADVERTISING

To prove a Section 2 violation in the general search text ads market, Plaintiffs again must show that the exclusive agreements "indeed [have] the requisite anticompetitive effect." *Microsoft*, 253 F.3d at 58–59. Plaintiffs contend that Google's conduct has caused three anticompetitive effects particular to the text ads market: (1) market foreclosure, (2) supracompetitive text ads pricing, and (3) product degradation through diminished transparency regarding text ads auctions. As before, Plaintiffs argue that the exclusive deals deprive rivals of scale, which freezes competition in the text ads market in the same manner as in general search.

A. The Exclusive Agreements Foreclose a Substantial Share of the Market.

As previously discussed, evaluating an alleged exclusive dealing agreement first requires an estimation of market foreclosure. *See supra* Section V.A.1. Recall, the D.C. Circuit has said that "a monopolist's use of exclusive contracts . . . may give rise to a § 2 violation even though the contracts foreclose less than the roughly 40% or 50% share usually required in order to establish a § 1 violation." *Microsoft*, 253 F.3d at 70; *see also McWane*, 783 F.3d at 837 ("Traditionally a

[15] Google argues that Plaintiffs have failed to identify a substantially less restrictive alternative for achieving its proffered procompetitive benefits. GTB at 69–70. This requirement, according to Google, stems from the Section 1 case *NCAA v. Alston*, which stated that courts must determine whether the plaintiff has shown that "any procompetitive benefits associated with the [challenged] restraints could be achieved by substantially less restrictive alternative means." 594 U.S. at 101 (internal quotation marks omitted). Plaintiffs do not dispute that the burden lies with them but remind the court that the principle only applies to "proven competitive benefits." UPRCL at 22 (citing *Alston*, 594 U.S. at 101). Because Google has failed to prove that the challenged contracts have procompetitive benefits at all, the court need not reach the issue of least restrictive means.

foreclosure percentage of at least 40% has been a threshold for liability in exclusive dealing cases.").

Here, Dr. Whinston has calculated that Google's distribution agreements foreclose 45% of the text ads market, measured by ad spend. FOF ¶ 192. As before, Google does not dispute the underlying methodology used to calculate this figure, but rather mounts various objections as to its sufficiency, each of which the court has already considered and rejected. *Supra* Section V.A.1. Google does not make additional arguments specific to the text ads foreclosure percentage. *See* GTB at 41–47.

The court thus accepts Dr. Whinston's determination that the challenged agreements foreclose 45% of the general search text ads market. The court also concludes that the market foreclosure is significant in light of same factors that court considered in the general search market. *See supra* Section V.A.1.b.

B. The Exclusive Agreements Allow Google to Profitably Charge Supracompetitive Prices for Text Advertisements.

The trial evidence firmly established that Google's monopoly power, maintained by the exclusive distribution agreements, has enabled Google to increase text ads prices without any meaningful competitive constraint. There is no dispute that the cost-per-click for a text ad has grown over time. UPFOF ¶¶ 629–637, 652–676; FOF ¶ 186. Google has used various "pricing knobs" to drive these increases, often between 5% and 15% at a time, without a significant shift in advertiser spending to GSE competitors. FOF ¶¶ 243–267. Ad experiments consistently showed Google achieving a "stickage" rate of 50% for its pricing knob adjustments, meaning half of post-launch revenue increases translated into long-term gains. FOF ¶¶ 252, 254–255. Google also tweaked the pricing knobs when needed to achieve periodic revenue targets. FOF ¶¶ 257–260.

Google did so successfully, as its ad revenues have grown consistently at a rate of 20% or more year over year. FOF ¶ 259.

What's more, there is no evidence that any rival constrains Google's pricing decisions. In fact, Google admits it makes auction adjustments without considering Bing's prices or those of any other rival. *See Epic Games*, 67 F.4th at 984 (recounting among the district court's anticompetitive effects findings that "Apple has for years charged a supracompetitive commission" on App Store transactions that it set "without regard" to anything "other than legal action") (Section 1 case). The only apparent constraint on Google's pricing decisions are potential advertiser outcry and bad publicity. FOF ¶¶ 263–265. Google, however, has managed to avoid those pitfalls by ramping up its pricing incrementally, which has allowed advertisers "to internalize prices and adjust bids appropriately[.]" UPX519 at .003. Many advertisers do not even realize that Google is responsible for the changes in price. FOF ¶ 266. Thus, through barely perceptible and rarely announced tweaks to its ad auctions, Google has increased text ads prices without fear of losing advertisers.

Unconstrained price increases have fueled Google's dramatic revenue growth and allowed it to maintain high and remarkably stable operating profits. FOF ¶ 289 (citing UPX7002.A); *cf. Microsoft*, 253 F.3d at 50 ("High profit margins might appear to be the benign and necessary recovery of legitimate investment returns . . . , but they might represent exploitation of customer lock-in and monopoly power when viewed through the lens of network economics. . . . The issue is particularly complex because, in network industries characterized by rapid innovation, both forces may be operating and can be difficult to isolate."); *McWane*, 783 F.3d at 838 (considering monopolist's profit margins when analyzing anticompetitive effects, specifically supracompetitive

pricing). Google in turn has used these monopoly profits to secure the next iteration of exclusive deals through higher revenue share payments. *Supra* Sections IV.A & V.A.2.b.

Google's counter to this pricing evidence is to focus not on the nominal price increases of text ads, but on their quality-adjusted prices. *See In re Qualcomm Antitrust Litig.*, 328 F.R.D. 280, 309 (N.D. Cal. 2018) ("The economic term 'quality-adjusted prices' captures both the nominal price and total quality of a particular product."). Even a monopolist can increase prices to reflect improvements in quality without running afoul of the antitrust laws. *See Harrison Aire, Inc. v. Aerostar Int'l, Inc.*, 423 F.3d 374, 381 (3d Cir. 2005) ("Competitive markets are characterized by both price and quality competition, and a firm's comparatively high price may simply reflect a superior product."); *In re HIV Antitrust Litig.*, No. 19-cv-02573 (EMC), 2023 WL 3089820, at *7 (N.D. Cal. Mar. 7, 2023) ("[O]ne product may have the same price as another product. However, if the first product is of better quality than the second, then [the] first product is actually cheaper than the second."). Google insists that as text ads prices have grown, so too has their effectiveness.

Google says that its quality-adjusted price in fact has *decreased* over time. GFOF ¶¶ 1131–1143. As proof, it points to the increase in click-through rate (i.e., how often an ad is clicked) as a proxy for ad quality, assuming that "higher-quality ads are more likely to be clicked on by users[.]" *Id.* ¶ 1133; Tr. at 8554:22–8555:20 (Israel) (comparing click-through rate in 2011 of only 10% to click-through rate of over 30% in 2021) (discussing DXD29 at 121); *see also* AREEDA ¶ 403b n.2 ("Better products and other innovations do benefit consumers even though motivated by a firm's desire for monopoly."). Plaintiffs dismiss this evidence as irrelevant because it does not speak directly to whether the click resulted in a conversion. *See* UPRFOF ¶ 2269 ("Absent an increase in conversion rates per click, increased CPCs reduce advertiser value."). But Plaintiffs

are too dismissive. It is not an unreasonable inference that more ad clicks might correspond to better results for advertisers.

That said, the evidence that Google's quality-adjusted ads prices have remained steady, let alone decreased, is weak. Google has long recognized the inherent difficulty in determining the value of an ad to its buyer. FOF ¶ 228 (advertisers struggle to quantify ROI). Its ad launch and experiments reflect as much. FOF ¶¶ 251, 253. Instead, what they show is the company, largely through trial and error, attempting to capture the "headroom" between an ad's purchase price and its value to the buyer. FOF ¶¶ 254–255; UPX507 at .026 (Google admitting that that it had "no way to say what formats should cost"). This evidence does not reflect a principled practice of quality-adjusted pricing, but rather shows Google creating higher-priced auctions with the primary purpose of driving long-term revenues. FOF ¶¶ 257–265.

Dr. Israel's charting of the increased click-through rate onto the upward trend of CPCs is only so informative. *See* Tr. at 8569:5–8570:8 (Israel) (discussing DXD29 at 129). While there is arguably some correlation between click-through rate and ad quality, the strength of the connection is far from certain. There are other obvious contributors to the increased click-through rate that are wholly unrelated to ad quality. Such factors include the dramatic expansion of the online marketplace, the shift towards more online purchasing, and the emergence of mobile search. The most the court can conclude from Dr. Israel's mapping of the click-through rate onto the text ads price index is that both have directionally trended upwards.

But even if Google's ads have increased in quality, that by itself would not establish the absence of anticompetitive pricing effects. "[O]nce monopoly has been achieved and assuming significant entry barriers, the monopolist can set a profit-maximizing price without excessive concern about the behavior of other firms in the market." *Cf.* AREEDA ¶ 727d (discussing pricing

power following price predation to drive out competitors).[16] That is precisely how Google has approached its ad pricing. Consider the following hypothetical (in whole numbers). Say, an advertiser values an ad at $10. That advertiser would be willing to pay up to $9 for the ad. A second-price auction, however, could result in a final price that is lower, say $5, because the runner-up has capped its price at that amount. Google has endeavored through the years to capture the "headroom" between the ad's value ($10) and its price. FOF ¶¶ 254–255. It has done that by using its tuning knobs to adjust the auction formula so that, in this hypothetical case, it would push the final ad price to upwards of $9. Google simply could not take this approach in a competitive market. If it did so, a rival could adjust its auction to charge the advertiser less for the same ad, say, $7. In the competitive market then, Google still could earn a profit from the sale of an ad, but it could not achieve the *monopoly* profits that it does presently in the absence of rivals.

This is an anti-competitive price effect, irrespective of Google's ad quality.

C. The Exclusive Agreements Have Allowed Google to Degrade the Quality of its Text Advertisements.

Google's text ads product has degraded in two ways: (1) advertisers receive less information in search query reports (SQRs) and (2) they no longer can opt out of keyword matching. FOF ¶¶ 269–278. Specifically, Google removed information from SQRs that provided advertisers with insight into low-volume queries, which diminished advertisers' ability to tailor their ad strategy in light of such queries. FOF ¶¶ 272–274. Similarly, disallowing advertisers from opting out of keyword matching created thicker auctions at the expense of advertiser control. FOF ¶¶ 277–278. These are arguably small changes, but they reveal Google as a monopolist unconcerned about product changes that have decreased advertisers' autonomy over the auctions

[16] To be clear, the court cites this passage not to suggest that Google has engaged in predatory pricing, but for the legal principle only.

they enter and the ads they purchase. Google has suffered no consequences because it does not operate in a competitive text ads market.[17]

D. The Exclusive Agreements Have Capped Rivals' Advertising Revenue.

The exclusive distribution agreements allow Google to maintain its text ads monopoly in much the same way as in the general search services market. That is, Google's rivals must distribute their GSEs through less efficient, non-default access points, which results in fewer users and fewer ad dollars spent to target those users. *See supra* Section V.A.2. With less ad revenue, Google's rivals are limited in their ability to reinvest in quality improvements (both as to search and general search text ads) to attract more users and more ad dollars. *Supra* Sections V.A.2 & V.A.3. That cycle puts rivals in no position to compete with Google for the increased ad revenue that accompanies greater query volume. *See supra* Section IV.A.

Advertising witnesses consistently testified to this reality. They uniformly cap their text ads spending on Bing at no more than 10% to approximate its relative market share. FOF ¶ 233. So, even if Bing's ads were to offer better value than Google's, Bing could not effectively constrain Google's ad pricing. As one witness put it, once the spending maxes out on Bing, there is simply "[nowhere] else to go." Tr. at 4875:19–4876:4 (Lim). By locking in a huge comparative query volume advantage through its exclusive agreements, Google ensures that advertisers will continue

[17] Plaintiffs also assert that Google has depreciated SQR quality by removing information that allows advertisers to better approximate the final physical placement of their text ad. *See* UPFOF ¶¶ 1185–1192. Google's SQRs used to include an "average position" component, which gave advertisers insight into their ad placement compared to other ads. *See* UPX8037. Google changed that metric to be more relative, telling advertisers only the percentage of their ads that appear on a prime location, phasing out average position metrics. *Id.* at .001; DX2021 at .001. Now, while advertisers understand how many of their ads reach the top spot, they do not have a similar understanding of the lower positions. But there was very little advertiser testimony that this change was harmful, and no evidence that it led to increased prices. *See* Tr. at 5177:11-15 (Booth) (while Home Depot "wouldn't have the same specificity" without the average position metric, the change "certainly wasn't catastrophic"). Amazon's concern about the switch away from the average position insight adds some weight to the analysis, *see* UPFOF ¶¶ 1191–1192, but one advertiser's desire for a particular product feature is not an anticompetitive effect in the market as a whole.

to spend 90% of their text ad dollars with Google, regardless of increases in price or decreases in quality. That is an anticompetitive effect in the marketplace.

* * *

Google has not argued that the contracts generate procompetitive benefits beyond those already addressed and rejected, *supra* Section V.B. The court thus concludes that Plaintiffs have proven that Google's exclusive distribution agreements substantially contribute to maintaining its monopoly in the general search text advertising market, violating Section 2 of the Sherman Act.

VII. SA360

As noted at the start of this opinion, Plaintiff States alone claim that Google engaged in additional exclusionary conduct that centers on SA360, Google's proprietary search engine management tool, or SEM tool. *See* PSTB at 20–31. An SEM tool allows advertisers to run online marketing campaigns across multiple platforms in one centralized place. FOF ¶¶ 279–281. When it acquired the platform, Google vowed that SA360 would be a "neutral third party." FOF ¶ 281. But Google has not acted in that way. Instead, Plaintiff States say, Google has prioritized and advantaged its own ad platform, Google Ads, over Microsoft's ad platform on SA360. PSTB at 21–22. Specifically, they assert that for years Google has intentionally slow-rolled the development and launch of various features for Microsoft Ads that Google has fully integrated into SA360 for Google Ads. *Id.* at 22–24. Most critically, Google ignored Microsoft's repeated pleas to integrate auction time bidding (ATB), a feature that permits advertisers to change their bid strategies in real time during auctions. *Id.* at 24–26; FOF ¶ 286. ATB remained unavailable for Microsoft Ads on SA360 at the time of trial. FOF ¶ 286. According to Plaintiff States, this feature disparity has caused anticompetitive effects in the proposed markets. They maintain that Google's conduct harmed both "advertisers by diminishing the efficiency of their ad spend on

SA360" and "rival GSEs that use Microsoft Ads to attract customers . . . by driving down demand for advertising on these search engines." PSTB at 29–30.

A. The Sherman Act Imposes No Liability on Google for Its Refusal to Grant Feature Parity to Microsoft Ads on SA360.

Plaintiff States' SA360 theory falters at the threshold because it conflicts with the settled principle that firms have "no duty to deal" with a rival. "As a general rule, 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 Comm'n, Inc.*, 555 U.S. 438, 448 (2009). "Even a monopolist generally has no duty to share (or continue to share) its intellectual or physical property with a rival." *Novell, Inc. v. Microsoft Corp.*, 731 F.3d 1064, 1074 (10th Cir. 2013) (Gorsuch, J.). That is because "[c]ompelling" a dominant firm "to share the source of their advantage . . . may lessen the incentive for the monopolist, the rival, or both to invest," and "[e]nforced sharing" requires courts to "act as central planners," "a role for which they are ill suited." *Verizon Commc'ns Inc. v. Law Off. of Curtis V. Trinko LLP*, 540 U.S. 398, 407–08 (2004); *see also New York v. Meta Platforms*, 66 F.4th 288, 305 (D.C. Cir. 2023) (stating that a Section 2 claim that "suppose[s] that a dominant firm must lend its facilities to its potential competitors" "runs into problems" under *Trinko*). Therefore, "a firm with no antitrust duty to deal with its rivals at all is under no obligation to provide those rivals with a 'sufficient' level of service." *Linkline*, 555 U.S. at 444.

Although the Supreme Court has placed a "high value" on the right of firms to refuse to deal with others, it has said that "the right is [not] unqualified." *Trinko*, 540 U.S. at 408 (quoting *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 601 (1985)). "Under certain circumstances, a refusal to cooperate with rivals can constitute anticompetitive conduct and violate § 2." *Id.* Such circumstances are "limited," *Linkline*, 555 U.S. at 448, however, and the Court has

"been very cautious in recognizing such exceptions, because of the uncertain virtue of forced sharing and the difficulty of identifying and remedying anticompetitive conduct by a single firm," *Trinko*, 540 U.S. at 408.

The "leading case for § 2 liability based on a refusal to cooperate with a rival" is *Aspen Skiing*, a case "at or near the outer boundary of § 2 liability." *Id.* at 408–09. To fit within the *Aspen Skiing* exception, a plaintiff must make at least two, if not three, showings. First, "before the defendant refused its competitors access[,] the defendant 'voluntarily engaged in a course of dealing with its rivals.'" *Meta Platforms*, 66 F.4th at 305 (quoting *Trinko*, 540 U.S. at 409). Second, the defendant's "unilateral termination of a voluntary (and thus presumably profitable) course of dealing suggested a willingness to forsake short-term profits to achieve an anticompetitive end." *Trinko*, 540 U.S. at 409 (emphasis omitted); *see also Covad Commc'ns Co. v. Bell Atl. Corp.*, 398 F.3d 666, 675 (D.C. Cir. 2005) (stating that "in order to prevail upon [a refusal to deal] claim Covad will have to prove Bell Atlantic's refusal to deal caused Bell Atlantic short-term economic loss") (citation omitted); *Novell*, 731 F.3d at 1075 (same).

In *Novell*, then-Judge Gorsuch distilled a third requirement from the Court's prior precedents: "a showing that the monopolist's refusal to deal was part of a larger anticompetitive enterprise, such as . . . seeking to drive a rival from the market or discipline it for daring to compete on price." 731 F.3d at 1075 (citing *Aspen*, 472 U.S. at 597); *see also FTC v. Facebook, Inc.*, 560 F. Supp. 3d 1, 23 (D.D.C. 2021) ("The larger anticompetitive enterprise that characterizes an *Aspen Skiing* violation, crucially, cannot simply be an intent to harm—or, the flip side of the same coin, to avoid helping—a rival or rivals.") (internal quotation marks omitted). Because a monopolist may rationally withdraw from a prior course of dealing and suffer short-term losses "to pursue perfectly procompetitive ends—say, to pursue an innovative replacement product of its

own," *Novell* also required "a showing that the monopolist's refusal to deal was part of a larger anticompetitive enterprise." 731 F.3d at 1075.

Plaintiff States seek to bypass the "no duty to deal" doctrine entirely. They assert that "*Trinko* has no application where there is a voluntary, ongoing course of dealing," and that "[e]xclusionary conduct occurring within a voluntary, ongoing commercial relationship is entirely actionable under Section 2." PSTB at 34. According to Plaintiff States, the "no duty to deal" principle has been applied only to circumstances not applicable here: when "(i) the business relationship was government mandated, (ii) there was no prior dealing at all, or (iii) any prior dealing had ended." *Id.* at 33–34. Here, by contrast, Google has chosen to "engage with another marketplace participant" and even has an agreed-upon "escalation process" by which the two companies raised the SA360 dispute to the CEO level. *Id.* at 34; *see* PSFOF ¶ 233 (citing PSX671).

The court is unpersuaded that Google's SA360 conduct falls outside the "no duty to deal" framework. The fact that Google and Microsoft continue to have an ongoing course of dealing as to SA360 does not put this case in a different posture than a case such as *Novell*, where a dominant firm (Microsoft) at first shared its intellectual property with rivals, only to later withdraw it to advantage its own products. *See* 731 F.3d at 1067–68. The concerns that animate the no-duty-to-deal principle are equally applicable here. Primarily, adjudicating Plaintiff States' claim would require the court to act as a "central planner" that endeavors to identify the proper "terms of dealing." *Trinko*, 540 U.S. at 408. Their claim requires grappling with a host of questions that the court is ill-equipped to handle, such as: (1) by when, from a technical standpoint, could Google have integrated ATB into Microsoft Ads?, FOF ¶ 285 (noting that it took Google between two to three years to integrate its ATB on SA360); (2) how much advertiser interest in ATB does there need to be for Google to act on Microsoft's request?, *see* DX179 at .009–.010 (Google survey of

U.S. Microsoft Ads customers showed that ATB was not among the top 20 features requested for Microsoft Ads in SA360); PSX444 (ATB listed 15th among feature priorities for Microsoft Ads on SA360); and (3) was it improper for Google to commit resources to prioritizing other projects, namely, Projects Amalgam and Myx, FOF ¶ 286, over integrating ATB for Microsoft Ads? And those thorny questions foreshadow the challenges the court would face in administering a remedy. Any relief presumably would require Google to ensure feature parity on SA360 now and into the future. A favorable outcome for Plaintiff States thus would mire the court in Google's day-to-day operations. *See Trinko*, 540 U.S. at 415 ("An antitrust court is unlikely to be an effective day-to-day enforcer of [] detailed sharing obligations."). The court has learned a lot about Google, but it is "ill suited" for that role. *Id.* at 408.

To allow a continued course of dealing between rivals to circumvent *Trinko*'s strict limits also would invite uncertainty as to when antitrust liability attaches to otherwise rational business conduct. *See Linkline*, 555 U.S. at 453 (stating that "antitrust rules 'must be clear enough for lawyers to explain them to clients'") (quoting *Town of Concord v. Bos. Edison Co.*, 915 F.2d 17, 22 (1st Cir. 1990) (Breyer, C.J.)). This case well illustrates the point. What standard should Google have used to determine by when it must integrate ATB or other features for Microsoft Ads to avoid a Sherman Act violation? Caselaw does not provide an answer, and it is difficult to conceive of one that is not highly subjective. The "no duty to deal" framework is appropriately applied in such circumstances.

Applying *Trinko* then, Plaintiff States have failed to meet their burden of proof. They have not shown that Google deviated from a voluntarily "course of dealing with its rivals" akin to the one that established a duty to deal in *Aspen Skiing*. In that case, "the monopolist elected to make an important change in a pattern of distribution that had originated in a competitive market and

had persisted for several years." 472 U.S. at 603. That change amounted to a "decision by a monopolist to make an important change in the character of the market." *Id.* at 604. No similar market change was proven here. True, Google did vow that SA360 would be a "neutral third party." FOF ¶ 281. But a vague promise made in marketing materials provides a poor yardstick against which to measure antitrust liability.

In addition, the record does not establish that Google was "willing[] to forsake short-term profits to achieve an important anticompetitive end." *Trinko*, 540 U.S. at 409; *Covad*, 398 F.3d at 675–76. Plaintiff States did not offer any testimony or evidence as to how much Google left on the table by delaying the launch of ATB for Microsoft Ads on SA360. The record does not indicate, for example, how much additional revenue Google would have earned in the first years of an integrated ATB in Microsoft Ads. Plaintiff States made no effort to even ballpark that sum, let alone quantify it.

Finally, Plaintiff States did not show that Google's action was part of "a larger anticompetitive enterprise," such as "seeking to drive [Microsoft] from the market." *Novell*, 731 F.3d at 1075. Part of the explanation for Google's unresponsiveness was that it prioritized progressing work on Project Amalgam, which was in effect a new product launch. FOF ¶ 286. It was not improper for Google to prioritize "an innovative replacement" of SA360 over immediately delivering feature parity to a rival. *See Novell*, 731 F.3d at 1075 ("Neither is it unimaginable that a monopolist might wish to withdraw from a prior course of dealing and suffer a short-term profit loss in order to pursue perfectly procompetitive ends—say, to pursue an innovative replacement product of its own."). That business decision may have come at Microsoft's expense, but it does not give rise to Section 2 liability. *See id.* at 1067–68, 1077

(finding no Section 2 liability against Microsoft after it withdrew from sharing its intellectual property with rivals, after initially agreeing to do so, to advantage its own products).

B. Plaintiff States Have Not Proven that Google's SA360 Conduct Had Anticompetitive Effects.

Plaintiff States' SA360 claim falls short for a second independent reason: They have not shown anticompetitive harm. Plaintiff States contend that "Google's conduct harm[ed] advertisers by diminishing the efficiency of their ad spend on SA360." PSTB at 29. It also "harm[ed] rivals . . . by driving down demand for advertising on these search engines." *Id.* at 30. The evidence does not support either contention.

Plaintiff States produced no advertiser testimony that the lack of ATB on SA360 reduced ad spend efficacy on Bing. No question, the evidence showed that the use of ATB resulted in increased conversions. FOF ¶ 285. But there was no evidence presented of any advertiser who wished to use ATB on Microsoft Ads but was left stuck using the less-effective, intra-day bidding on SA360 as a result of Google's delayed integration. To the contrary, the evidence showed that some advertisers found other ways to place ads on Bing using ATB. For instance, some advertisers moved ad spend from SA360 to Microsoft's native tool, which caused Google to worry that they would move even more spend away from SA360. FOF ¶ 288. Also, at least one major advertiser (Home Depot) began using a rival SEM tool, Skai, to take advantage of ATB for its Bing ad spend *Id.* And even if there were advertisers who desired to use ATB but could not because it was too costly to switch away from SA360, Plaintiff States offered no examples and the overall impact on the market remains uncertain.

As to Google's competitors, the evidence of harm is similarly thin. Plaintiff States point to Dr. Israel's analysis of Bing's share of total spend on SA360 during the relevant time period, showing that the decline of ad spending on Bing accelerated after Google introduced ATB for

Google Ads on SA360. PSFOF ¶ 268. The implication is that the lack of feature parity caused advertisers on SA360 to increasingly shift spend away from Bing to Google. But correlation does not equal causation, and Plaintiff States offered no evidence that any advertiser in fact shifted its ad spend away from Bing because of the absence of feature parity. *Cf.* FOF ¶ 233 (advertiser testimony that their relative text advertising spend on Google and Bing is constant).

Plaintiff States' best evidence comes from Frederick van der Kooi, the former Corporate Vice President of Advertising at Microsoft, who testified: "The degree to which SA360 does or does not code to our latest features and functionality can impact us to the tune of hundreds of millions of dollars in revenue." van der Kooi Dep. Tr. at 241:2-5. But the only evidence substantiating this statement is a series of email threads referencing an internal estimate of Microsoft's lost revenue because of the unavailability of ATB and other key features on SA360. PSFOF ¶¶ 269–271 (citing PSX745 at 327–28, PSX746, and PSX754 at 336). Those emails acknowledge the "analyses have been very rough," PSX745 at 327, and describe the loss estimate as "broad assumptions," *id.* at 326; *see also* PSX754 at 255 (describing the figure as "a low precision estimate"). Importantly, no witness testified about the methodology used to produce the loss estimate. The court will not make an anticompetitive effects finding on such a shaky evidentiary foundation.

* * *

Because Google had no duty to deal with Microsoft and, even if it did, Plaintiff States have not established anticompetitive harm, the court finds in favor of Google on the SA360 claim.

VIII. INTENT AND SANCTIONS

The final piece of business the court must address is Plaintiffs' contentions concerning Google's intent and their demand that the court sanction Google pursuant to Federal Rule of Civil

Procedure 37(e). UPTB at 75–76. Under Rule 37(e), "[i]f electronically stored information that should have been preserved in the anticipation or conduct of litigation is lost because a party failed to take reasonable steps to preserve it, and it cannot be restored or replaced through additional discovery, the court" may order sanctions upon a showing of prejudice or an intent to deny another party use of the information. Fed. R. Civ. P. 37(e). Plaintiffs urge the Court to sanction Google for two practices: (1) "its systemic destruction of documents" and (2) its "flagrant misuse of the attorney-client privilege," both of which Plaintiffs also say are "strong indicators that Google knows its conduct is unlawful." UPTB at 75.

When Plaintiffs speak of "systemic destruction of documents" they mean Google's long-time practice (since 2008) of deleting chat messages among Google employees after 24 hours, unless the default setting is turned to "history on," which preserves the chat. *Id.* at 76–78. This failure to retain chats continued even after Google received the document hold notice at the start of the investigative phase of this case. It was not until Plaintiffs moved for sanctions in February 2023, more than two years after filing suit, that Google changed its policy to automatically save all chats of employees under a legal hold. Plaintiffs maintain that, as a result of Google's chat-deletion policy, "years' worth of chats—likely full of relevant information—were destroyed" and thus never subject to regulatory scrutiny, "show[ing] that Google knew its practices were likely in violation of the antitrust laws and wanted to make proving that impossible." *Id.* at 78. Plaintiffs demand sanctions under Rule 37(e) for Google's failure to preserve chats after it received the litigation hold notice.

As for "flagrant misuse of the attorney-client privilege," that refers to Google's "Communicate with Care" initiative. Google trained its employees to add its in-house lawyers on "any written communication regarding Rev Share [RSA] and MADA." *Id.* at 78 (quoting UPX320

at 605). It also instructed that, when "dealing with a sensitive issue" via email, to "ensure the email communication is privileged" employees could add a "lawyer in [the] 'to' field," "mark 'Attorney/Client Privileged," and "ask the lawyer a question." Pls.' Mot. to Sanction Google & Compel Disclosure of Docs. Unjustifiably Claimed by Google as Att'y-Client Privileged, ECF No. 317, Ex. 1, ECF No. 317-4, at 363.

Google employees assiduously followed that advice. UPTB at 78–79 (collecting examples). As a result, Google's outside counsel in this case initially withheld tens of thousands records on the grounds of privilege, which ultimately were re-reviewed, deemed not privileged, and produced to Plaintiffs. *See* Jt. Status Report, ECF No. 361, at 20–23. This creation of faux privileged materials, Plaintiffs contend, "demonstrates that Google intended to harm competition through its contracting practices and its supposed procompetitive justifications were simply pretext." UPTB at 79.

In addition to these two practices, Plaintiffs also point out that, for years, Google has directed its employees to avoid using certain antitrust buzzwords in their communications. UPFOF ¶¶ 1225–1226. For example, in March 2011, Google prepared a presentation titled, "Antitrust Basics for Search Team," which directed employees to "[a]void references to 'markets,' or 'market share' or 'dominance,'" "[a]void discussions of 'scale' and 'network effects,'" and "[a]void metaphors involving wars or sports, winning or losing." UPX1066 at 880. Eight years later, Google still was telling employees not to "define markets and estimate shares" and to "[a]ssume every document you generate . . . will be seen by regulators." UPX2091 at 584.

A. The Court Need Not Make a Finding of Anticompetitive Intent.

Plaintiffs seek a finding of "anticompetitive intent," but the court need not make one. UPTB at 75–76. A finding of anticompetitive intent is not an element of a Section 2 violation.

See Microsoft, 253 F.3d at 59 (stating that in determining whether conduct is deemed exclusionary "our focus is upon the effect of that conduct, not upon the intent behind it"). "Evidence of intent behind the conduct of a monopolist is relevant only to the extent it helps [a court] understand the likely effect of the monopolist's conduct." *Id.* (citation omitted). Given that the court already has concluded that Google's exclusive dealing agreements have anticompetitive effects in two relevant markets, *supra* Parts V & VI, it is unnecessary to consider intent evidence to further "understand" that conduct.

Still, the court is taken aback by the lengths to which Google goes to avoid creating a paper trail for regulators and litigants. It is no wonder then that this case has lacked the kind of nakedly anticompetitive communications seen in *Microsoft* and other Section 2 cases. *See, e.g.*, *Microsoft*, 253 F.3d at 73 (stating that Microsoft could "use Office as a club" to coerce Apple to adopt Internet Explorer); *McWane*, 783 F.3d at 840 (citing evidence that left "little doubt" that the defendant's program was meant to prevent its rival from "any critical mass market"); *Dentsply*, 399 F.3d at 190 (referencing "clear expressions of a plan to maintain monopolistic power"). Google clearly took to heart the lessons from these cases. It trained its employees, rather effectively, not to create "bad" evidence. Ultimately, it does not matter. Section 2 liability does not rise or fall on whether there is "smoking gun" proof of anticompetitive intent. AREEDA ¶ 1506 (discussing the role of intent evidence in Sherman Act cases).

B. The Court Declines to Impose Sanctions.

On the request for sanctions, the court declines to impose them. Not because Google's failure to preserve chat messages might not warrant them. But because the sanctions Plaintiffs request do not move the needle on the court's assessment of Google's liability. UPTB at 75–76 (requesting evidentiary sanctions such as "a presumption that deleted chats were unfavorable to

Google"; "a presumption that Google's proffered justifications are pretextual"; and "a presumption that Google intended to maintain its monopoly"). An adverse evidentiary inference would not change the court's finding that Google lacks monopoly power in the market for search ads or that there is no relevant market for general search ads. Nor would it change the court's legal conclusion that Google had no duty to deal with Microsoft on its preferred terms as to SA360, nor its finding on the absence of anticompetitive effects, as Google is not likely to have possessed such evidence. *See* AREEDA ¶ 1506 ("[I]n the absence of . . . provable anticompetitive effects, an evil mental state will not serve to condemn it."). The court therefore declines to sanction Google for its failure to preserve its employees' chat messages.[18]

The court's decision not to sanction Google should not be understood as condoning Google's failure to preserve chat evidence. Any company that puts the onus on its employees to identify and preserve relevant evidence does so at its own peril. Google avoided sanctions in this case. It may not be so lucky in the next one.

CONCLUSION

For the foregoing reasons, the court concludes that Google has violated Section 2 of the Sherman Act by maintaining its monopoly in two product markets in the United States—general search services and general text advertising—through its exclusive distribution agreements. The court thus holds that Google is liable as to Counts I and III of the U.S. Plaintiffs' Amended Complaint, Am. Compl. ¶¶ 173–179, 187–193. To the extent that Counts I and III of the Plaintiff States' Complaint are co-extensive with the U.S. Plaintiffs' Counts I and III, the court finds Google liable. *Colorado* Compl. ¶¶ 212–218, 226–232.

[18] For this same reason, the court denies as moot Plaintiffs' Motion to Take Judicial Notice of Certain Publicly Available Exhibits, ECF No. 843.

The court enters judgment for Google as to Count II of both the U.S. Plaintiffs' Amended Complaint and the Plaintiff States' Complaint, Am. Compl. ¶¶ 180–186; *Colorado* Compl. ¶¶ 219–225, as well as the remainder of Counts I and III of the Plaintiff States' Complaint.

Dated: August 5, 2024

Amit P. Mehta
United States District Court

APPENDIX

I. TRIAL WITNESSES

A. Fact Witnesses

Name	Title	Affiliation	Called By
Alex Austin	*former* Chief Executive Officer & Founder	Branch	Plaintiffs
Neil Barrett-Bowen	Director, Business Development	Microsoft	Plaintiff States, Google
Chris Barton	*former* Strategic Partner & Development Manager	Google	U.S. Plaintiffs
Ryan Booth	Senior Manager, Paid Search	Home Depot	Plaintiffs
Joan Braddi	Partner Advisor, Global Partnerships	Google	U.S. Plaintiffs, Google
Patrick Chang	*former* Director	Samsung NEXT	U.S. Plaintiffs
Eddy Cue	Senior Vice President, Services	Apple	U.S. Plaintiffs, Google
Arjan Dijk	Senior Vice President & Chief Marketing Officer	Booking.com	Plaintiff States
Jerry Dischler	Vice President & General Manager, Ads Team	Google	U.S. Plaintiffs, Google
Jennifer Fitzpatrick	Senior Vice President, Core System and Experiences	Google	Plaintiff States, Google
John Giannandrea	Chief of Machine Learning and AI Strategy	Apple	U.S. Plaintiffs, Google
Ben Gomes	*former* Senior Vice President, Search	Google	Plaintiffs, Google
Brian Higgins	*former* Senior Vice President, Device Marketing & Product	Verizon	U.S. Plaintiffs, Google
Richard Holden	Vice President, Product Management for Chrome	Google	Plaintiff States, Google
Jeffrey Hurst	*former* Chief Operating Officer	Expedia Group	Plaintiff States
Adam Juda	Vice President, Project Management	Google	U.S. Plaintiffs, Google

Anna Kartasheva	Senior Manager, Android Sales and Operations Strategy	Google	U.S. Plaintiffs
Jim Kolotouros	Vice President, Android Platform Partnerships	Google	U.S. Plaintiffs, Google
Ryan Krueger	Product Manager, Search Ads 360 Bidding & Planning Tools	Google	Plaintiff States
Eric Lehman	*former* Distinguished Software Engineer	Google	U.S. Plaintiffs
Tracy-Ann Lim	Managing Director, Chief Media Officer	JPMorgan Chase	U.S. Plaintiffs
Joshua Lowcock	Global Chief Media Officer	Universal McCann, Interpublic Group	Plaintiffs
Adrienne McCallister	Vice President, Global Partnerships	Google	U.S. Plaintiffs, Google
Satya Nadella	Chief Executive Officer	Microsoft	U.S. Plaintiffs, Google
Pandu Nayak	Vice President, Search	Google	Google
Mikhail Parakhin	*former* Chief Executive Officer of Advertising & Web Services	Microsoft	Plaintiffs
Sundar Pichai	Chief Executive Officer	Google & Alphabet	Google
Prabhakar Raghavan	Senior Vice President, Knowledge and Information Products	Google	U.S. Plaintiffs, Google
Sridhar Ramaswamy	Co-Founder & Chief Executive Officer	Neeva	Plaintiffs
Elizabeth Harmon Reid	Vice President, Search	Google	Google
Jamie Rosenberg	Part-Time Advisor	Google	Google
Mike Roszak	Vice President, Finance	Google	U.S. Plaintiffs
Jonathan Tinter	Corporate Vice President, Business Development	Microsoft	Plaintiffs, Google
Paul Vallez	Executive Vice President, Business Development & Partnerships	Skai	Plaintiff States, Google
Amit Varia	Director of Product Management	Google	Plaintiff States
Hal Varian	Chief Economist	Google	Plaintiffs

Gabriel Weinberg	Chief Executive Officer & Founder	DuckDuckGo	U.S. Plaintiffs
Jonathan Yoo	*former* Finance Manager, Android Partnerships	Google	U.S. Plaintiffs

B. Expert Witnesses

Name	Title	Affiliation	Called By
Wilfred Amaldoss	Thomas A Finch Jr. Endowment Professor of Business Administration & Professor of Marketing	Duke University Fuqua School of Business	Plaintiff States
Jonathan Baker	*former* Law Professor	American University Washington College of Law	Plaintiff States
Edward Fox	Professor of Computer Science	Virginia Polytechnic Institute & State University	Google
Mark Israel	President & Member of the Global Executive Committee	Compass Lexecon	Google
Kinshuk Jerath	Arthur F. Burns Professor of Free & Competitive Enterprise & Advisor in Digital Marketing	Columbia Business School, Media and Technology Program	U.S. Plaintiffs
Kevin Murphy	George J. Stigler Distinguished Service Professor Emeritus in Economics	University of Chicago Booth School of Business and the Law School	Google
Douglas Oard	Professor	University of Maryland College of Informational Studies & Institute for Advanced Computer Studies	U.S. Plaintiffs
Antonio Rangel	Bing Professor of Neuroscience, Behavioral Biology & Economics	California Institute of Technology	U.S. Plaintiffs
Michael Whinston	Sloan Fellows Professor of Management and Professor of Applied Economics	Massachusetts Institute of Technology	U.S. Plaintiffs

II. DESIGNATED DEPOSITION TESTIMONY

Name	Title	Affiliation	Called By
Brendan Alberts	Senior Vice President, Head of Search	Dentsu	Plaintiff States, Google
Timothy Baxter	*former* President, Chief Executive Officer	Samsung	U.S. Plaintiffs, Google
W. Mitchell Baker	Chief Executive Officer	Mozilla	Google
Eric Christensen	Executive Director, Software Product Management & Partner Manager	Motorola	Google
Matt Dacey	Vice President, Marketing and Global Markets	TripAdvisor	Plaintiff States
Alexander Daniels	Founder	Thumbtack	Plaintiff States
Jeffrey Ezell	Vice President, Business Development, Mobility Business Unit	AT&T	U.S. Plaintiffs, Google
Jeffrey Giard	Vice President, Strategic Partnerships & Business Development in Emerging Products Group	T-Mobile	Google
Shirley Health	*former* Senior Director of Microsoft Advertising API Ecosystem	Microsoft	Plaintiff States
Sundeep Jain	*former* Vice President, Product Management	Google	Plaintiffs
Mike James	Director, Software Development	Amazon	Plaintiffs, Google
Daniel Levy	*former* Vice President, Ads & Business Products	Meta	Google
Chris Lien	Chairman & Chief Executive Officer	Marin	Google
Emily Moxley	*former* Vice President, Search	Google	U.S. Plaintiffs
Ramesh Ramalingam	*former* Senior Director, Product Management	Yahoo	U.S. Plaintiffs
Debby Soo	Chief Executive Officer	OpenTable	Plaintiff States
Mark Stein	Executive Vice President & Chief Strategy Officer	IAN	Plaintiffs

Jeremy Stoppelman	Chief Executive Officer	Yelp	Plaintiff States
Brian Utter	General Manager, Advertising	Microsoft	Plaintiff States
Frederick van der Kooi	*former* Corporate Vice President, Advertising	Microsoft	Plaintiffs