United States v. Google LLC

United States District Court, District of Columbia
____ F.Supp.3d ____, 2024 WL 3647498

MEHTA, J. 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.

FINDINGS OF FACT

II. GENERAL SEARCH ENGINES

E. The Expense of Developing and Maintaining a GSE

50. Constructing a GSE is an extremely capital- and human-resource intensive endeavor. Developing just the technical infrastructure alone requires billions of dollars.

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]." 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. 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.

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[.]" 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.

53. Adding features to the SERP also dramatically increases costs. 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.

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. In 2020, Bing earned only $7.7 billion total in search ads revenue.

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.

57. New investment has not poured in despite the promise of high profit margins in general search.

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). 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. 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. And, on Windows desktop computers, the default access point is the integrated search bar in the Edge browser. Google is the default GSE on all of these access points except on Edge, where the default GSE is Bing.

60. Other browsers, which are not preloaded on devices but can be downloaded, also use an integrated search bar. Google is the current default search engine on Firefox. From 2014 through 2017 it was Yahoo. 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. This is called the "this time, search with" feature. Those options include SVPs, like Amazon

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. No browser allows a user to change the default GSE to a specialized vertical provider, such as Amazon, or to a social media platform

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. 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.

63. Another 20% of all general search queries in the United States flow through user-downloaded Chrome, which defaults to Google.

64. Thus, only 30% of queries in the United States run through a search access point that does not default to Google. (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. The consensus in the field is that "defaults have a powerful impact on consumer decisions."

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. 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."

67. Individuals often are not aware that they are acting out of habit. 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."

68. Many users do not know that there is a default search engine, what it is, or that it can be changed.

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." "Choice friction" refers to the concept that subtle challenges or barriers make it increasingly more difficult to implement a change

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[.]" By contrast, default effects are stronger when the user is satisfied with the product.

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.

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.

73. Google appreciates that increased choice friction discourages users from changing the default.

74. A GSE's placement as the default thus drives search volume through that access point. In 2017, over 60% of all queries entered on Google flowed through defaults. 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. 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). In 2019, about 50% of all search revenue on Android devices flowed through the Google Search Widget. 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, which would translate into net revenue losses between $28.2 and $32.7 billion (and over double that in gross revenue losses). 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."

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. 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. 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." The reason "why Neeva failed ... was simply because [it] could not get enough users to be in that state where they regularly used Neeva."

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.

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.

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. 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.

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.

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. User data also helps GSEs determine the frequency with which to crawl websites. "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." Popular sites, like the New York Times, are worth crawling more often than less visited sites.

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. User data also helps determine where a webpage resides within the larger indexGoogle divides its index into tiers. Each page is assigned to a tier based on how fresh it needs to be, and the fresher tiers are rebuilt more frequently.

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.

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. 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." It is trained on about 13 months of user data.

96. Navboost is another signal that pairs queries and documents through memorizing user click data. 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. Prior to 2017, Google trained Navboost on 18 months of user data. Since then, it has trained Navboost on 13 months of user data. Thirteen months of user data acquired by Google is equivalent to over 17 years of data on Bing.

97. More recent ranking signals developed by Google rely less on user data. Those include RankBrain, DeepRank, RankEmbed, RankBERT, and MUM. 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.

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.

99. MUM is a large language model (LLM), or "a computational system that tries to, in some way, capture patterns in language." Whereas RankBERT "exhibited fairly weak performance" on newer scoring metrics, MUM "achieved essentially human-level performance." 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."

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. These systems were not built with user data.

101. Google has also developed a Search Generative Experience, which leverages artificial intelligence (AI) in search. This experimental product "add[s] generative AI into the search results to enhance them[.]"

102. The more recent LLM signals did not replace Navboost and QBST in ranking. Nor did they render the generalization systems obsolete. LLMs are used as "additional signals that get balanced both against each other as well as against other signals[.]"

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

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.

105. Google continues to maintain significant volumes of data—despite the expense of storing it—because its value outweighs that cost.

106. For GSEs with little scale, even a small amount of data can result in meaningful improvements.

III. GOOGLE SEARCH

A. Product Development

126. Google is widely recognized as the best GSE available in the United States.

127. Although Google significantly outperforms all rivals on mobile devices, Bing's search quality on desktop measures up to Google's.

128. Google's superior product quality rests in part on its numerous innovations over the years… [A chart listing dozens of features and functions added to Google's search engine between 1998 and 2003 appears in the original opinion.]

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."

B. Branding

130. The fact that "Google is used extremely highly across the world ... contribute[s] to brand formation. Google also built brand loyalty and recognition by offering a high quality product.

131. Google has long recognized that "the affinity of the Google brand was something that was valued by users[.]"

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." Moreover, a search for "google.com" is one of the most frequently entered search queries on Bing

133. Google's strong brand also benefits its partners.

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). 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. This quality-reduction experiment correlated with only a 0.66–0.99% decline in global search revenue. In short, this study demonstrates that a significant quality depreciation by Google would not result in a significant loss of revenues.

135. Google has at times tracked its competitors' market shares or standing by identifying other GSEs and comparing Google to those rivals.

136. When Google evaluates its own quality, it does so by conducting side-by-side experiments with other search engines. These studies involve IS4 rating systems that use human raters to compare results. In the past, Google has compared its latency and search results quality (using IS differences) to Bing's. Google engages in an ongoing evaluation of Bing as part of its work.

137. Latency measures the speed with which a GSE returns search results and is an important quality metric. 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 Bing was "dramatically faster[.]"Its first result arrived

sooner 98% of the time. This translated to about 300 milliseconds faster than Google. In response, Google launched Project Folly, "an attempt at instituting a set of projects and policies and processes to decrease latency." The project was a success.

138. Google has also evaluated its privacy protections and IS metrics compared to those of DDG.

139. Google does not compare latency or IS scores with social media platforms like TikTok "because they're very different experiences." The same is true with respect to specialized vertical providers like Amazon.

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. 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. And a 2015 Google User Experience Research study concluded that Google users frequently used specialized vertical providers' mobile applications.

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, 86 S.Ct. 1698, 16 L.Ed.2d 778 (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.*

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, 76 S.Ct. 994, 100 L.Ed. 1264 (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. 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. "[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, 138 S.Ct. 2274, 201 L.Ed.2d 678 (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, 86 S.Ct. 1698.

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, 76 S.Ct. 994 ("Determination of the competitive market for commodities 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, 76 S.Ct. 994 ("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, 82 S.Ct. 1502, 8 L.Ed.2d 510 (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, 82 S.Ct. 1502. 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 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. 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 Sho*e 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*, 792 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."

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, 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. 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.

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, 76 S.Ct. 994) (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, 94 S.Ct. 2788, 41 L.Ed.2d 1016 (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 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.

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, 86 S.Ct. 1698 (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.

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, 76 S.Ct. 994. "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, 66 S.Ct. 1125, 90 L.Ed. 1575 (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.

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." 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, 66 S.Ct. 1125, 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, 86 S.Ct. 1698 (citing Am. Tobacco, 328 U.S. at 797, 66 S.Ct. 1125). 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),

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….