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Judicial Remedies To Restore Competition in the Market for General Search

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Judicial Remedies To Restore Competition in the Market for General Search

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I. INTRODUCTION

In August of this year, after a nine-week trial, a United States District Judge found Google (today known as "Alphabet") liable for illegal monopolization of the general search market. The court now has set a schedule for proceedings to determine what remedies to impose, which will culminate in a further evidentiary hearing that likely will begin in April of next year and a decision and judgment to issue by August. This essay presents the considered views of a collection of American and European economists, technologists, and competition experts, all of whom have studied digital markets and the platform economy for years. We present a proposed suite of interrelated remedial proposals that, together, are likely in our view to restore competition to the market for general search.[2]

II. THE ILLEGAL CONDUCT

The court's finding of liability still feels in some ways unexpected: courts in the United States, particularly appellate courts whose decisions can appear influenced more by policy and ideology than by evidence, have been trending in a conservative direction in competition cases.

On the other hand, it's relatively easy to conclude that Google is a monopolist and engaged in monopolization. Google holds 94% of the general search market on mobile and has held a similar share for a decade. One of the ways it has maintained its hold on this market is an arrangement with Apple—its most threatening competitor—that compensates Apple for default positions; this encourages Apple to stay out of the search market. Each year, Google pays Apple more than $20 billion (US) to make Google search the exclusive default at all search access points on Apple's operating systems. Each company benefits from the arrangement: Google maintains its monopoly and Apple gets a share of the monopoly rents.

The arrangement, however, also plainly kneecaps current rivals and discourages the development of potential rivals in the search market.

One of the findings of the trial (long known in the economics discipline) is that consumers stick with a default choice even when taking just a few minutes to adjust the settings on their

[2] Different authors of this essay may have differing views on the importance or likely efficacy of certain elements of our proposal, yet all endorse the *collection* of interrelated remedies proposed herein as the most likely of those publicly proposed to date to restore competition to search.

handset would give them a different search engine. Default status is therefore economically valuable and, were it available, would be the best way for entering search engines to gain customers. But these exclusive contracts make it virtually impossible for a rival search entrant to outbid Google for a default position on iOS. Rivals therefore cannot get access to compete for the millions of Apple users. And it is not only third parties that the Apple-Google contract blocks. It also eliminates any incentive for Apple to develop its own search engine. Why would Apple bother trying to develop its own search engine to compete with Google's when, with no effort at all, it can earn billions of dollars just by making Google's search engine the default on all of Apple's devices?

Google uses a similar strategy to prevent potential search competitors from reaching Google Android users. Independent handset makers must license a mobile operating system for their handset to work, and Google's Android OS is the only option. Therefore, Google has tremendous market power over handset makers and can impose extractive licensing conditions. The licensable Google Android OS includes open-source Android as well as proprietary code embedded in Google Play services and in other functionalities as well.[3]

Google requires, through contracts called Mobile Application Distribution Agreements (MADAs), that any OEM licensing Google Android pre-install a suite of apps and functionalities called Google Mobile Services (GMS).[4] GMS includes, among other apps and functionalities, the Google Search Widget, Chrome, and Google Play.[5] Because Google Play services contain SDKs (software development kits) and APIs (application programing interfaces) that are critical to the proper functioning of the OS, and because Google Play services and the Google Play store are available only as a part of the GMS suite, OEMs must as a practical matter accept MADAs that requires the installation of the entire GMS suite, including the Google Search Widget and Chrome (which defaults to Google Search).[6]

The MADAs do not expressly preclude OEMs from preinstalling an additional search widget and/or browser. In practice, however, manufacturers recognize that "preloading more than one of the same search access points, especially in similar prominent positions" amounts to "bloatware" that would confuse users if adopted.[7] The result is that all OEMs that license Google Android, even Microsoft, which owns Bing, manufacture and sell devices on which the Google Search Widget is the only preinstalled search widget, and most OEMs manufacture and sell devices on which Chrome is the only preinstalled browser.[8]

Google additionally enters revenue sharing agreements (RSAs) with OEMs and with carriers whereby the percentage of search revenue shared with the partner is tiered and based on the degree of exclusivity as well as the prominence on the handset that is given to Google Search (through, for example, the exclusive placement of the Chrome browser on the home screen).[9] The RSAs thus reinforce the coercive effect of the MADAs' requirement that OEMs install

[3] We define "Google Android" by its function, namely the entirety of all code needed for third-party developers to run their apps. The Android Open Source Project, Google Play Services, and other necessary APIs together constitute "Google Android."
[4] *See United States, et al. v. Google LLC*, Cases No. 20-cv-3010; 20-cv-3015, Memorandum Opinion (D.D.C. Aug. 5, 2024), available at https://static01.nyt.com/newsgraphics/documenttools/f6ab5c368725101c/43d7c2a0-full.pdf, at 118.
[5] *See id*. at 119.
[6] *See id*. at. 119-20.
[7] *See id*. at 121-22.
[8] *See id*. at 122.
[9] *See id*. at 123.

the entirety of the GMS suite of Google products by overlaying a financial incentive not just to install Google features that default to Google Search, but also to give them prominence relative to rivals' products (including rival browsers) that might steer traffic away from Google Search.[10]

Thus, even if device makers might prefer to offer their users a different default search engine, or even multiple differentiated search engines on the front page, Google's contracts have the effect of preventing it or making it economically irrational.

Google's argument in the trial court—that it's the best search engine and that's why everyone uses it—failed for obvious reasons. In the case of an Android device maker, the contracts with Google *require* that Google Search be the exclusive default. In the case of Apple, common sense tells us that *if* the search engine is indeed the best available, and *if* consumers could choose freely and fairly among rival search engines, then the vast majority of consumers would choose Google, rendering it unnecessary for Google to deploy exclusive contracts to forbid Apple from placing a rival search engine in the default positions. And if for some reason it were necessary for Apple to make a single search engine the default, and Apple thought Google was the best choice, we would expect Apple to select Google, even were it not being paid $20B per year to do so. After all, the best component improves quality and therefore generates increased demand for the finished good, which benefits Apple. Here, if the only dynamic at play is that Google's search engine really is the best, why is Google paying Apple to use it? The true reason is obvious: to freeze the market with Google in place as a monopolist and prevent entry by rivals who might otherwise seek placement on Apple devices, thereby shutting down competition.

III. THE PURPOSE OF REMEDIES IN A MONOPOLIZATION CASE

The Department of Justice must supply a proposed plan for remedies by November 20 of this year. As framed by the Supreme Court, Section 2 remedies should "start from the premise that adequate relief in a monopolization case should put an end to the combination and deprive the defendants of any of the benefits of the illegal conduct and break up or render impotent the monopoly power found to be in violation of the Act."[11]

Thus, the principal goal of a court-ordered remedy should not be to punish, but rather to restore the lost competition. The fact that punishment is not the principal goal, however, does not mean that the monopolist will or should find the remedies painless. Dismantling or blunting the monopolist's power (whether through conduct remedies or structural remedies) necessarily will be costly to the monopolist. This is not to be avoided, but rather advances one appropriate purpose of Section 2 remedies as stated by the Supreme Court: to deprive the monopolist of the fruits of its illegal conduct.[12] If restoring the lost competition is costly for the monopolist, that is not a concern; it is equitable for the monopolist to bear those costs. The need to restore the lost competition generates a logical path that arrives at an effective remedy.

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[10] *See id*. at 123 ("Google has long viewed RSAs with carriers as essential to securing query traffic on Android devices to the exclusion of rivals.").

[11] *See United States v. Grinnell Corp.,* 384 U.S. 563, 577 (1966) (emphasis added); *see also United States v. United Shoe Mach. Corp*., 391 U.S. 244, 250 (1968) ("[I]n a [section] 2 case . . . it is the duty of the court to prescribe relief which will terminate the illegal monopoly, deny to the defendant the fruits of its statutory violation, and ensure that there remain no practices likely to result in monopolization in the future.").

[12] *See Grinell*, 348 U.S. at 577.

In this inquiry, there is no role for assumptions about general types of remedies—for example, whether behavioral or structural remedies are better. Instead, the focus should be on restoring the lost competition through whichever set of remedies are necessary to accomplish that goal, regardless of whether those remedies are properly described as behavioral, structural, or something else.

In the case of Google Search, what are the remedies that might restore the lost competition? Many policy experts worry that no remedy will be effective at generating vigorous competition among search engines because Google "is the best" and so, they fret, nothing can be done. This point of view misses two key issues. First, search engines may horizontally differentiate; not everyone needs to have the same favorite search engine. A competitive market might have given us rival engines that differentiate through specialized curation, vetted information, innovative privacy preservation technologies, cross-domain searching functions like Spotlight[13] or Branch, and so forth.

Second, the "remedies won't do anything" view is stuck in the market we have now and does not recognize its potential dynamic nature. When Google obtains all the search data while ensuring that competitors have almost none, it can (unsurprisingly) build the best search engine. As rivals gain access to more search query data, however, their results will improve and make them more attractive to users. If a rival can obtain default status, it will obtain data, and then quality. The current inability of competitors to begin moving along this virtuous circle of customer-data-quality-more customers means that there is no business future for them. No matter how significant the innovation by the potential rival, there will be no venture capital funding for an entrant in a world where it cannot obtain customers.

On the other hand, if we consider a dynamic environment in which an innovative competitor is permitted to compete for a contract to be a default search engine—perhaps it starts with default status on one handset model or one type of search access point—then the entrant can get funding because there is a path to success. Data will lead to rapid improvement in quality, in turn leading to more intense competition between the entrant and Google as quality converges. This environment is one in which entrepreneurs and funders can thrive and grow, and thus kick start innovation. Successful remedies will open up the market so that competition on the merits can take place.

* * * *

There are a number of regulatory and judicial interventions that could help competition to search, as has been described previously.[14] This essay proposes remedied we recommend the District Court order at the conclusion of its evidentiary hearing. In Parts IV-IX, we describe our proposed interrelated package of behavioral and structural remedies, and their economic and factual underpinnings. In Part X, we describe several standalone interventions the court impose even if it does not adopt our suite of interrelated remedies in its entirety. The essay concludes by reminding the reader that, because of the duration of Google's monopoly and its attendant consequences, remedies that restore competition to the search market necessarily must be transformational.

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[13] *See* https://support.apple.com/en-us/118232 (describing how Apple Spotlight allows the user to search across their device and the web).

[14] *See, e.g.*, Paul Heidhues et al., *More Competitive Search Through Regulation*, 40 YALE. J. ON REGUL. 915 (2023).

IV. RESTRICT GOOGLE'S CONTRACTS

Remedies are traditionally classified into two categories: conduct remedies and structural remedies. Some interpretations of the *Microsoft* decision interpret it as eliminating the possibility of a structural remedy in the Google search case. This seems to be an unnecessarily simplistic reading in light of both Supreme Court doctrine and the text itself.[15] Whatever tool could restore the lost competition in an efficient and effective way should be considered as a remedy, and those that are most effective and least disruptive should be chosen. We follow this approach in the argument that follows.

In considering contractual remedies, it is important to distinguish between three types of benefits that Google search can obtain by contracting with a device or browser vendor or wireless carrier:

- Exclusive: a benefit that is only available to Google;
- Default: Google search being pre-set as the search engine that will be used absent proactive user intervention to switch to a competitor, and
- Preinstallation: Google search being pre-packaged into any new version of the device or browser.

To illustrate, a hypothetical *exclusive* would be if Google obtained an agreement that no other search engine could occupy that same role (whether that is preinstallation or a default status or something else) on a device. A hypothetical *default* would be if Google obtained an agreement that, for a normal place on a handset where one would input a search query, Google will conduct the search unless the user takes steps to change to a different search engine. A hypothetical *preinstallation* would be if Google obtained an agreement that handsets are to be delivered to users with Chrome (Google's browser, which defaults to Google search) already installed on the home page. A simple preinstallation, by itself, has no condition limiting the ability of rivals to also be pre-installed and no agreement that any service (such as an app) would default to that search engine.

Further, defaults and pre-installations can be either exclusive or non-exclusive. Google's contract with Apple, for example, ensures that Google will be the default search engine at *every* search access point on Apple devices; no other search engine can be the default at any of these points. Google thus has secured "exclusive default" positions on Apple devices. Similarly, when we think of the preinstallation of a browser, it is easy to see how a pre-installation can be exclusive (e.g., handsets must be delivered with Chrome and only Chrome pre-installed) or non-exclusive (e.g., handsets must be delivered with Chrome, but the OEM may pre-install any other browser as well). These are not mere distinctions in nomenclature; each of these agreements has a distinct competitive effect.[16] It therefore is crucial in defining

[15] *See Massachusetts v. Microsoft Corp.*, 373 F.3d 1199, 1231 (D.C. Cir. 2004) (en banc) (describing the goal of Section 2 remedies as "restoring conditions in which the competitive process is revived and any number of competitors may flourish (or not) based upon the merits of their offerings").

[16] Today's search market would look very different if Google had, for example, been able to secure default status on only *half* the search access points on Apple devices (i.e., "defaults"), rather than on *all* of the search access points (i.e., "exclusive defaults").

remedies to think clearly and precisely about the ways Google has secured advantageous placement in the past, and which in the future should be off limits.

As was explained during the trial, Google also currently contracts for preferential device placements of different kinds (central location on the home screen, "hotseat" placement, home screen location of Google applications folder, etc.).

We begin with the most obvious remedy in light of the court's findings: Google should not be permitted to enter any contract that *requires* a distribution partner to make Google Search the default or the exclusive search engine at any search access point on any device or browser, or to preinstall any app or widget that has the effect of defaulting users to Google Search (e.g., the widget, the browser), in exchange for any type of consideration. This prohibition would apply to Google's relationships with independent handset makers and browsers such as Safari and Firefox.

Consider first the impact of this restriction on Google's relationship with Apple. Google could not contract to pay for an exclusive or default position on any iOS or macOS distribution channel. Apple could not sell off the default position to Google, but it could sell its default position to Bing. Apple could also enter with an Apple search engine. Both of these are more expensive options for Apple relative to sharing Google's monopoly rents because Bing monetizes at a lower rate and is less popular, while building a search engine is expensive. Nonetheless, both options would generate conditions that would permit Google's rivals, whether Apple, Bing, or a third-party search engine, to gain a foothold and begin to compete with Google.

Under the remedy, Samsung (a handset maker) could not be *required* by the terms of its Android contracts to exclusively preinstall or default to Google search. Like Apple, Samsung could sell its default search positions to Bing or develop its own search engine. Notice, however, that if Samsung tried to sell its default search positions instead of giving that revenue to Google, Google could simply raise Samsung's cost for the Android operating system. This would both re-capture the revenue and punish Samsung for sponsoring a competitor, thereby forcing Samsung to abandon its plans to use a different search engine as the default on its devices. We discuss the Android ecosystem in more detail below.

Critically, however, prohibiting defaults and exclusives will not alone restore competition in our view because of the market position Google has achieved with its illegal conduct during the many years in which it has held a monopoly position. Simple preinstallation by OEMs of a Google search widget on the home screen or Chrome would achieve very similar results to those of exclusive contracts. This is in part because of the high existing use of Google Search and Chrome and the power of those brands—if the Google Search Widget and Chrome remain sitting right there on the home screen, consumers will continue to use them out of habit and/or brand loyalty. The "stickiness of defaults" and consumers' limited interest in installing rival software will also factor in. Even without a default or exclusive contract with Google, a handset vendor could opt to pre-install only Google Search, which would effectively give the consumer the choice of just using what is already on the device (Google) or putting in the effort to identify and install a rival search engine. In short, consumers are used to Google and it is high quality; even absent contracts requiring exclusive defaults, for example, distribution partners are likely to simply make it the default at all access points it in exchange for a share of search revenue, either as a result of an auction (which Google will

always be able to win because of its high monetization rate) or as a result of a straightforward negotiation with Google.

We can look to the European enforcement experience for an illustration of this point. The European Commission in 2018 ruled that Google had used Android related contractual restrictions to cement the dominance of its search engine[17] The Commission order identified, and prohibited three specific restrictions: (1) the requirement that manufacturers to pre-install the Google Search app and Chrome as a condition for the Play Store; (2) payments to certain large manufacturers and mobile network operators conditioned on the exclusive preinstallation of the Google Search app; and (3) an anti-forking restriction.[18] The Commission recognized, however, that this would not alone restore competition; even absent the restrictions, OEMs might simply install Google search, thereby recreating the very market structure Google had achieved through the unlawful restrictions. Under European law, it then fell on Google to propose additional steps it would take—beyond simply terminating the illegal restrictions—to restore competition.[19] Google in 2019 introduced a "choice screen" that allowed users to select the search engine that would appear in their default search box and in Google Chrome.

These remedies, both the new contracts and the choice screen collectively, did little to return competition to the search market; Google's share on Android devices in the years following the order and the implementation of the choice screen remained virtually unchanged. Because users were accustomed to using Google (and because of various flaws in the design and implantation of the choice screens which were both carried out by Google), users continued to select Google search. Simply banning the restrictions and giving users a choice, it turns out, wasn't enough.[20] Indeed, one commentator observed that, "[a]s an antitrust remedy, the choice screen has not only failed to make the search market a more competitive space, it may even be reinforcing Google's dominant position."[21]

Consider also this thought experiment: suppose Apple and Samsung each said that they would offer to preinstall the best search engine they could find from among those that agree to give them 40% of search revenue. Suppose further that the preinstallation would be non-exclusive, meaning OEMs would be free to pre-install a different search engine or a browser with a different default search engine. Bing and Google both would agree to pay 40% of revenue to be preinstalled on Apple and Samsung. However, 40% of Google's search revenue will be more money than 40% of Bing's revenue because Google's data advantage makes its advertising more valuable. As a result, Apple and Samsung both would pre-install Google search because doing so will make them more money than they would make by preinstalling

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[17] *See* Greg Sterling, *Google hit with largest-ever $5 billion antitrust penalty in Android case*, MarTech (July 18, 2018), available at https://martech.org/google-hit-with-largest-ever-5-billion-antitrust-penalty-in-android-case/.
[18] *See* Natasha Lomas, *Google gets slapped with $5BN EU fine for Android antitrust abuse*, TechCruch (July 18, 2018), available at https://techcrunch.com/2018/07/18/google-gets-slapped-5bn-by-eu-for-android-antitrust-abuse/.
[19] *See id*. As described below, Google proposed and implemented a "choice screen" solution that suffered from various flaws that rendered it effective.
[20] *See generally* George Nguyen, *Google's search choice screen had virtually no effect on search market share, perhaps by design*, SEARCH ENGINE LAND (Feb. 17, 2021), available at https://searchengineland.com/googles-search-choice-screen-had-virtually-no-effect-on-search-market-share-perhaps-by-design-346167 ("As an antitrust remedy, the choice screen has not only failed to make the search market a more competitive space, it may even be reinforcing Google's dominant position.").
[21] *See generally* George Nguyen, *Google's search choice screen had virtually no effect on search market share, perhaps by design*, SEARCH ENGINE LAND (Feb. 17, 2021), available at https://searchengineland.com/googles-search-choice-screen-had-virtually-no-effect-on-search-market-share-perhaps-by-design-346167.

Bing.[22] As regards to Apple, the result would be identical to what we see in the market today, with Google and Apple splitting the monopoly search rents on iOS. In the Android ecosystem, Google would retain its monopoly position and its monopoly profits by adjusting the Android license fee to recapture any lost revenue. This reasoning illustrates how allowing Google to contract or pay for distribution, even without allowing it to contract or pay for defaults or exclusives, will likely perpetuate the status quo in search.

The key to maximizing the incentive for entry (if entry were the only goal) would be to prohibit Google from offering any payment *at all* to distribution channels like Apple. Apple would then fail to receive its annual $20B payment. But it could earn back a fraction of that by defaulting to Bing, its own search engine, or a new entrant. Samsung may appear to have the same incentive to preinstall Bing, but this is not the case; Google can claw back any revenue gained by Bing through the Android license fee.

There are important downsides to banning payments from Google, however. Economic theory would predict that the search revenue that Google shares today with distribution partners lowers the cost of phone service and handsets to end consumers and provides innovation and quality in browsers. These current benefits would be eliminated if payments are prohibited. If the court forbids Google from making these payments to OEMs and browsers, Google earns a windfall profit. Google simply keeps the $26B hat it would have paid Apple and others.

Banning payments from Google entirely also would have negative price and quality effects on the related phone service and handset markets, at least in the short term, because it would abruptly cut off the flow of billions of dollars in search revenue that otherwise would be shared with those channels. In the long term, as search rivals gain share and quality, we can expect that Google and its rival search engines will compete for distribution, renewing the flow of significant search revenue to carriers and handset makers. The carriers and handset makers, in turn, will compete for consumers by offering cheaper and better plans and handsets (due to the additional marginal revenue) and in this way, the profits from search will end up in the hands of consumers. But it may be several years before competition among search engines is sufficiently vigorous to re-open the spigot and allow search revenues to flow to these distribution channels at the volume they now see from Google.

Moreover, in the case of a sudden prohibition of all payments from Google, we can anticipate it will advertise to newly-lucrative users to convince them to adjust their defaults to Google; a successful campaign of this sort would deprive the market of the benefits that otherwise would result from user experimentation, such as social learning, and improved quality of Bing and other rivals. In this scenario Google would continue to enjoy the full financial benefit of the installation and use of Google search that is carried out by users themselves and would not share its monopoly profits with distribution channels. Competition in search will not have meaningfully changed.

[22] And the court found that even if Bing offered 100% of search revenue this would be insufficient to make it more profitable for an OEM.

V. THE FUNDAMENTAL CONFLICT IN REMEDY DESIGN FOR THE GENERAL SEARCH MARKET

The discussion above highlights that the difficulty in designing a remedy—a difficulty that is driven by a fundamental conflict: Google's revenue sharing payments to distribution partners **harm** the ability of rivals to enter, while Google's revenue sharing payments to distribution partners **help** consumers by lowering handset and browser costs.

This observation suggests that there are two simultaneous dynamics a remedy must harness to create a new, competitive search equilibrium: entry and price competition for handsets. Entry in the short run will eventually generate price competition later. But the mechanism that creates price competition in the short run (revenue share to browsers, carriers, and OEMs for placement on devices) prevents initial entry. The temptation for the regulator is to shut down price competition for this reason; however, over time it is needed to bring the benefits of the resulting competition to consumers. We therefore identify two, related remedial goals:

Goal 1: A remedy should provide Apple (and others) an incentive to enter to compete with Google Search; right now, Google pays Apple enough so that, for Apple, staying out is more lucrative than entering.

Goal 2: A remedy should make rival search engines bid high revenue shares to get advantageous placement on handsets, browsers, and carriers, including default placements. Vigorous competition in the hardware market will turn that additional revenue into lower prices for handsets so the profits from search end up in the hands of consumers. In the browser market, the additional revenue will fuel quality, differentiation, and innovation.

One option for the court is to choose to a remedy to fix entry at first (Goal 1) and, when there has been enough entry, turn to Goal 2 (price competition). However, this requires constant oversight by the court and quick responses to market conditions. If a remedy is hard-fought, one that changes mid-stream and perhaps unleashes follow-on litigation may not be in the public interest.

For this reason, we constrain ourselves to one set of rules that does not change over time or in response to entry. However, choosing a remedy that emphasizes only entry or only price competition, but not the other is unattractive. On one hand, choosing a remedy that maximally incentivizes entry requires banning payments *by* Google and causes financial gain for the company found to be an illegal monopolist. A remedy that raises Google's profits may undermine consumer and political support for antitrust enforcement. In addition, under this remedy, OEMs and browsers must choose a rival search engine if they wish to earn any revenue, and there is only one choice in the market today, Bing. All distributors will preinstall Bing and therefore almost all consumers will experience the sudden loss of Google search. This also may be hard for consumers to understand. Worse, the market power that Bing will gain due to this remedy means that, at least in the short term, it has no need to offer distributors a high revenue share to obtain a default position.

On the other hand, a remedy that delivers lower prices to users in the short term, (allowing for distribution partners to share in search revenue) leads to the preservation of the status quo in search. If Apple and Samsung are permitted to accept payment from Google, they will announce the terms they require and make Google search preinstalled and easy to for

consumers to choose. Entrants will once again be unable to outbid Google and will be excluded.

VI. A REMEDY PROPOSAL: ALLOW GOOGLE TO PAY FOR NO MORE THAN HALF THE SEARCH TRAFFIC

Perhaps the best way forward is literally the middle ground: Google can pay for half of the market only. We propose the following remedy design.

The bedrock condition of an effective remedy must be to prohibit Google from entering contracts that require any channel partner (device manufacturer, browser) to provide it with exclusive or default positions. Rival search engines are of course unaffected by the remedy and may enter such contracts and pay for favorable positions, including exclusive, preinstalled, and default positions.

If, however, a third party chooses for its own reasons to preinstall or otherwise favor Google search, Google should be permitted to pay that distribution channel (manufacturer, browser, or other partner) a share of the search revenue. However, the remedy would place three crucial limitations on any such arrangement.

First, *the third parties should retain total freedom to deploy, or not, the Google functionalities that default to Google Search* (including the search widget, Chrome, Maps, etc.) as they see fit. Thus, the arrangements would be terminable at will by the third parties, who could cease using Google at any time and for any reason (other than those proscribed by law). Google should have no claim or expectancy relating to its continued placement, nor any claim to revenues generated by such continued placement. And, as long as Google search is among the choices offered by the device or browser, consumers retain the right to easily change the default search engine on their device or browser.

Second, any such arrangement would be subject to a coverage cap: *Google would be enjoined from sharing any of its search revenue for all searches that exceed 50 percent of the total search revenue of a partner's distribution channel*. We have chosen 50 percent (of revenue, or of installs) because that allows a rival search engine to achieve the same scale of operations as Google. Any larger share for Google might preserve its dominance. If preinstallation is random, then 50% of users will deliver 50% of search revenue. If channel partners choose where to install each search engine, Google may be given to the highest revenue users, in which case a small percentage of users could generate 50% of revenue.[23]

Third, the revenue share that Google could offer would further be capped at 40 percent. The 40 percent share was revealed at trial to be the amount that Google pays Apple today.[24] By limiting payment to (a random) half of users, the coverage cap gives OEMs and browsers an incentive to go out and find another search engine that will give it revenue for the other half of users. The price cap stops Google from offering to pay 80 percent of revenue on its share of users and obtaining tacit support from the partner that enables it to serve the other half of the user base for zero revenue share.

[23] Discovery can be used to determine what share of users (ordered by revenue) constitute 50%.
[24] The revenue share is invariant to whether the partner preinstalls one app or a chain of Google apps such as Chrome and search.

The half of the business directed to search entrants will allow them to improve and then compete going forward for exclusives and defaults in any distribution channel. The simplest way to carry out the market share cap is for the court to order the assignment to be random and then the Google cap would be 50% of users in a channel.

To effectuate this in the case of an order of random assignment, for example, the court could (a) order that any contract Google enters with a channel partner must specify that the partner transmit periodic installation counts (at Google's expense); and (b) prohibit Google from paying a revenue share in respect of any end users in excess of the 50% cap.

If a user in a channel that is at the 50% cap changes her default widget to Google from Bing, Google cannot pay any more in revenue and therefore the OEM cannot earn any revenue from that incremental user. This gives the OEM an incentive to act as an agent for rival search engines, urging users to use the preinstalled rival so that the OEM earns a revenue share on each user instead of hitting the cap.[25]

A corporation that owns more than one channel (e.g., an OEM with its own browser) must make each individual user default to Google in both channels or none. In other words, Apple cannot preinstall the Google widget for half its customer and a Google default in Safari for the other half. An anticircumvention provision will likely be necessary to shut down any tricks played by channel partners and Google.

The more difficult method of assignment allows the channel partner to choose users, perhaps based on revenue generated, that get the Google default. The OEM or browser or carrier could determine which of their users get which search engine preinstalled, while keeping track and reporting to Google as before. If Google search is the luxury option, OEMs may preinstall it on the most expensive handsets while the cheaper ones get rivals like Bing. This option is more informationally intensive for the regulator and has the possibility of altering product design as well as competition in the advertising industry. We therefore focus the remaining of the paper on the random assignment approach.

Regulation of the level of the revenue share seems necessary to us in light of the ability to play games. An obvious tactic for Google is to offer an 80% revenue share on half of consumers and accept the mandated zero on the other half. A tacit understanding with the distribution partner not to preinstall a search rival will result in close to 100% of consumers on that partner using Google search and therefore an average payment of 40 percent. Such an arrangement would be a circumvention of the remedy that would replicate the status quo. The remedy must further require that, in order for Google to pay a partner a share of search revenue, Google and the partner cannot have any other relationship that would allow the two parties to circumvent the payment cap. The structure of Google Android licensing is obviously a problem in this scenario, which we will come back to below.

An additional condition that could open the market slightly more would be to require that consumers be offered a choice of search engine whenever a channel partner has preinstalled

[25] If an OEM has a user using Google search inside Chrome and another using Google search as a widget they each count as one user. Any preinstallation or favoring of Google search by the channel partner causes that user to count in the share of Google search users.

Google search. This choice design (which the device or browser vendor could decide to implement as a choice screen or in a variety of other ways[26]) would provide more agency for users who are in the 50% whose search revenue is accruing in part to Google and consequently are getting Google search preinstalled. The choice architecture will have to be overseen by the technical committee comprised of experts approved by the court (and that can include or retain experts in the evaluation of choice architecture). Because choice screens are easy to manipulate, the remedy would prohibit Google from paying the partner if the choice design is not approved by the technical committee. In the alternative, the court could simply order Google to use the same choice screen design it is currently deploying in Europe, unless it offers to the technical committee a design that it can demonstrate better facilitates user choice.

Again, the European experience confirms the need for oversight of the design of any choice screen. As noted above, after the European Commission found Google's Android restrictions illegal, Google proposed offering choice screens purportedly to facilitate user choice and thereby to restore competition. Google, however, designed the choice screens and associated auction in a way that frustrated their purpose. After the Commission mandated a new choice architecture it changed Google's share very little. The European evidence demonstrates two important facts: prohibiting exclusive contracts with a choice screen does very little to shift share to rivals. Allowing Google to design the remedy made it even less effective.

Mandating a change in the way defaults and preinstallations are deployed will require a transition. The court could abrogate all existing contracts for search engine distribution to ensure all parties have the freedom to recontract in the new environment. At the time it comes into force, OEMs, carriers, and browsers will adjust their defaults for already existing customers as well as new ones. The stock of handset users of search will experience a software update on the first day of the remedy, if not before, in order to reflect the new contracts and choices. If the OEM values a reputation for respecting user choice concerning their search engine, it could offer full search engine choice and accept the preferences of its users; it simply would not earn search revenue on Google users above the 50% cutoff level. To earn more search revenue, an OEM or carrier could combine a choice screen with in-kind benefits for users who choose non-Google search engines, e.g., free photo storage or a discount off the user's monthly service charge. Such benefits would raise the share of rivals, benefit consumers, and earn revenue for the carrier or OEM.

The bilateral relationship between Google and any type of channel partner would be regulated by the remedy described. Google could not pay a revenue share (or any consideration) for more than 50% of users of any channel partner. Google will require each of its partners to measure user-installs and share the figures regularly to facilitate audits of revenue share payments and compliance with the cap. Each of these partners will preinstall Google search for some consumers and not for others. Because the channel partners are not permitted to coordinate with one another, a consumer who is exposed to different search engines due to different preinstallation strategies among their browser, OEM, and carrier, will learn about options in the marketplace. Google will be forbidden from gathering additional personal data from distribution partners about their installations (other than the minimum data necessary to permit payment and cap compliance audits) and forbidden from trying to

[26] *See* Gemma Petrie, *Beyond Choice Screens: Exploring browser choice design interventions*, available at https://research.mozilla.org/browser-competition/remedyconcepts/.

coordinate those partners to preinstall Google's products for particular users. Payments must be on a per user basis with no lump sum or nonlinear structure that might somehow disincentivize the OEM from promoting the use of non-Google search engines.

The coverage cap will significantly reduce the amount that Apple receives from Google (likely by more than 50 percent, because the previous payment reflected the value of *total* exclusion of rivals). This disproportionate loss of revenue may force Apple to consider entry itself to re-capture the lost search revenue (Goal 1). Moreover, the rule will enable search engines *other* than Google can bid successfully to be the default search engines for the 50% of preinstallations on Apple and other devices where Google is forbidden from revenue sharing (Goal 2). Even better, if those rivals gain in quality, they can also be entrants (Goal 1). While rival search engines will pay Apple to be the default search engine for some or all of the 50 percent of users not covered by the Google revenue share, Apple may feel that its own product would produce both more revenue and a better user experience, and for this reason may enter.

VII. PREVENTING GOOGLE'S USE OF CHROME TO MAINTAIN ITS MONOPOLY

The role of the handset maker in moving users to rivals highlights the fact that the remedy just described will not work in the case of user-downloaded Chrome on desktop. And yet desktop users also suffer from blocked entry and lost competition by virtue of the vertical integration of the monopoly Google search into Chrome on desktop. A remedy that can be used to help desktop users is to mandate that Chrome offer a neutral search choice design to its desktop customers with the details and cadence of delivery reflecting all that has been learned from choice screen mandates around the world. This would need to be coupled with behavioral remedies prohibiting Google from otherwise giving preference to Google search in any way, including by prompting Chrome users to switch to Google search; degrading the performance, functionality, or user experience of search rivals in Chrome; adopting standards-incompatible functionality in Chrome that Google's search rivals do not support; and preferencing Google search in Chrome's browser settings.

However, we do not think such a choice design remedy is strong enough to restore effective competition in search. First, it comes with a very long list of behavioral restrictions that must be policed by the court. Second, recall that Google initially created Chrome for desktop platforms, such as Windows and macOS, to direct users to Google Search on platforms that it did not control.[27] Google has also used its monopoly position in search to drive adoption of Chrome by employing dark patterns nudging users to install Chrome and through prominent advertising for Chrome in Google search ads.[28] Google uses Chrome to repeatedly push users to adopt services such as Chrome Sync and Sign-in, which provide vast amounts of browsing history data to Google from across Google and non-Google websites. According to Google's own disclosures, by default these services share browsing history data with Google to help Google improve search.[29] These rich data are unavailable to Google's search rivals and contribute to the quality of Google search. Data also increase the monetization rate on Google search engine results in Chrome. These facts explain why Chrome for desktop is a critical

[27] *See* https://blog.google/products/chrome/chromes-turning-10-heres-whats-new/ ("You know the box at the top of Chrome that combines the search bar and address bar into one? We call it the Omnibox, and we built it so that you can get to your search results as fast as possible.").
[28] *See* Google Chrome's Antitrust Paradox, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4780718.
[29] *See* https://support.google.com/websearch/answer/54068.

channel for maintaining and expanding Google's search dominance. They also explain why we believe that restoring competition in search requires including Chrome in the Android spin off described below.

Failing to address Chrome in a potential package of remedies would leave a significant loophole for Google to maintain and expand its monopoly in search. In a scenario where remedies are applied to Google's contracts with third-party browser vendors and to Android but not to Chrome, Chrome would become the only search access point that Google directly controls that is not subject to remedies. At the same time, Google would likely face a loss of search market share, and Microsoft's Bing would likely see a gain, at least in the short run.

This foreseeable outcome would motivate Google to become ever more aggressive in maintaining and expanding Chrome's market position, both as a vector to maintain search market share, and as a defense against its most significant competitor in both the search and browser markets, Microsoft. In other words, the prospect of losing users to both Bing and Edge simultaneously may result in Google doubling down on pushing Chrome to consumers through means that are not provision of higher quality. For example, Google could use its presence via widgets, ad display, and analytics on large swaths of websites to display notices indicating to users that the sites would work better on Chrome, encouraging users to switch. If Chrome vertically integrates Google search by default with no user choice and no prohibitions on Chrome self-preferencing Google search, such tactics will undermine other remedies designed to induce entry in search.

VIII. SEVERING THE LINK BETWEEN THE ANDROID OPERATING SYSTEM AND SEARCH

The remedy above requires Google to remove any requirement that Google Android licensees preinstall or position its search engine or make it a default in any search distribution channel such as the home screen or browser. However, simply changing these contracts is unlikely to make a meaningful difference to the behavior of Android licensees because their relationships with Google are characterized by complete dependence. There is only one mobile OS available for them to license, and, without an OS, they have no product to sell. If such a manufacturer sponsors entry of a rival search engine for 50% of its users, Google can simply worsen the terms on which that licensee gets Google Android to punish the manufacturer and force it to drop the rival.

We saw exactly this response in France a few years ago. Google raised the price of Google Android by 40 Euro from its previous price of zero. The company took this strategy because Huawei wanted to preinstall the rival search engine Qwant.[30] Google paired the 40 Euro price increase on the OS with a similar sized discount for OEMs who chose to preinstall Google search rather than Qwant. Demand for Qwant disappeared because the additional 40 Euro cost would have rendered the handset uncompetitive. This evidence illustrates that if the court chooses the same remedies that were tried in Europe, they are very likely to be ineffective.

[30] *See* Qwant's open letter to lawmakers (October 2021), https://ddg-staticcdn.s3.amazonaws.com/press/2110_Search_coalition_letter_calling_on_a_default_ban_in_DMA.pdf; *see also* Heidhues et al., *More Competitive Search Through Regulation*, supra note ____ at 940. (describing Google's response to Qwant's efforts to obtain placement on Huawei handsets).

Moreover, Google is not limited to formal contractual punishments for licensees that provide distribution for rival search apps. Indeed, there are all manner of services that Google provides licensees such as technical support, software updates, complementary apps such as YouTube, cloud credits, etc., that the manufacturer puts at risk if it opposes Google in search. Therefore, to successfully apply a remedy of forbidding exclusive contracts and stimulating entry, the court must de-couple control over Google Android from Google Search. In combination with this de-coupling, the court must place a line of business restriction on Google so that it does not re-enter the operating system market for a number of years.

This de-coupling can be carried out either through a spin-off or through structural separation. We explain below why a spin-off is preferable to a court-ordered and -supervised structural separation.

Before going further, it is necessary to explain the origin and functioning of open-source Android. Android Inc. was launched in 2003.[31] Its founders aimed to develop an operating system that was more responsive to user location and preferences than other then-extant operating systems. Android struggled financially until Google purchased it in 2005, for $50M.[32] Early on, Google signaled an openness to engaging partners in the development a platform for mobile phones based on the Linux kernel. In 2007, a consortium of technology companies called the Open Handset Alliance (of which Google was a member) publicly assumed control of developing the Android operating system.[33] Leaders of this coalition (including Google executives and the founders of Android Inc.) unveiled the first version of a phone running on the Android operating system in 2008.[34]

Since acquiring it, Google has envisioned and managed Android principally as a system for delivering its various products into the hands of consumers—a system that cannot be captured by any one particular participant in the mobile ecosystem.[35] Thus, even though Android's development now is steered by Google's Android Open Source Project (AOSP), rather than the Open Handset Alliance, the project's goals, including the commitment that Android remain open source, have remained constant. Google currently describes AOSP's purpose as follows:

> [T]o make sure there would always be an open platform available for carriers, OEMs, and developers to use to make their innovative ideas a reality. We also wanted to avoid any central point of failure, so no single industry player could restrict or control the innovations of any other. Our single most important goal with the AOSP is to make sure that open-source Android software is implemented as widely and compatibly as possible, to everyone's benefit.[36]

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[31] *See* "Google's Android OS: Past, Present, and Future", PhoneArena (Aug. 18, 2018).
[32] *See* Lisa Eadicicco, *THE RISE OF ANDROID: how a flailing startup became the world's biggest computing platform*, Business Insider (May 27, 2015), available at https://www.businessinsider.com/how-android-was-created-2015-3.
[33] *See Industry Leaders Announce Open Platform for Mobile Devices*, Open Handset Alliance (Nov. 5, 2007), available at https://www.openhandsetalliance.com/press_110507.html.
[34] *See* Transcript, *T-Mobile launches G-1, first Google Android phone*, *CNET: Your Guide to a Better Future* (Sept. 23, 2008), available at https://www.cnet.com/videos/t-mobile-launches-g1-first-google-android-phone/.
[35] *See id*.
[36] *See* Google, AOSP Frequently Asked Questions (FAQ), *Why Did Google Open the Android Source Code?*, available at https://source.android.com/docs/setup/about/faqs.

A functioning handset, however, does not run on open source Android alone. Many of the APIs and other code necessary for the operating system to function and interoperate with apps is proprietary to Google, and resides, for example, within Google Play services. This is why we have defined "Google Android" to include the open source code overseen by AOSP along with whatever other code is necessary to make a functioning handset, wherever that code resides, including in Google Play services and the Google Play store. Indeed, because a fully functioning handset requires more than just the open source code managed by AOSP, OEMs take out a license for proprietary code controlled by Google.

An Android divestiture would proceed in two steps. In the first step, Google would incorporate a new, independent nonprofit—for now we will call it NewCo. Google, as the incorporator, would appoint an independent board of directors and create a mission statement similar to the one that exists today for AOSP. Google and the government plaintiffs both could submit a slate of board nominees; the Court would choose individual board members from those slates.[37] Terms could be limited—three years for example—and staggered. Open seats could be filled in a manner similar to that used to select the initial board. We envision that board members would represent various types of constituents within in the Android ecosystem—app developers and handset makers, for example—all of whom would represent companies with a financial interest in maintaining a vibrant Android ecosystem. In this way, the NewCo board could reflect an updated version of, and have the same incentives as, the old Open Handset Alliance (the exception being that Google would have no representation on the NewCo board). In addition, the court and the United States would require that the mission statement of NewCo promote competition in search, which would further bind both the board and management.

Second, Google would need to contribute to NewCo what we have been calling "Google Android," namely the sum total of code necessary for the proper functioning of handsets, including the open source code, and certain proprietary code that Google currently is developing independently for Android but has not yet contributed to the AOSP.[38] In addition, the Google Play store itself would be part of NewCo. This transfer is necessary because Google, at the time of the spinoff, will have code or features has not yet contributed to AOSP but instead has placed in the Play store and also, a store is needed to complete the license package. All the code needed for apps to run correctly, including Google Play services and the Google Play store, therefore, would become the property of the independent NewCo.

Some APIs and other necessary code may be located in yet other apps, while innovations that occur during the remedy phase, such as AI extensions to Android functionality, may manifest themselves in other places. Determining precisely what code ought to be contributed to form a fully functional OS requires technical expertise. As has been done in the past, the court should create and rely on a technical committee to advise on what must be contributed to ensure that OEMs can license a fully functioning OS from NewCo without the need to contract directly with Google for particular features or functionalities that developers expect.[39]

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[37] This process would encourage Google to nominate individuals who truly are independent, for fear the court will simply appoint the government proposed slate wholesale.

[38] *See AOSP Overview*, Source, available at https://source.android.com/docs/setup/about (last visited Sept. 1, 2024).

[39] The U.S. District Court for the Northern District of California recently ordered the creation of a technical committee to help oversee compliance with an injunction issued after a jury found that Google, among other bad

Because Google has maintained AOSP in the same manner for many years, there already is a functioning unit (albeit one currently controlled by Google) with people experienced with, and processes designed for, a mission that is practically purpose-built to take on the role of a new home for the divested operating system. Google's own description of how it manages the Android Open Source Project suggests that the people currently managing AOSP easily could continue their current mission, independent of Google. Google says, for example, that it has "committed the professional engineering resources necessary to ensure that Android is a fully competitive software platform."[40] These resources, already committed to Android, presumably could simply remain with the newly spun-off entity. Using these dedicated engineers, NewCo can continue to innovate so that the Android OS remain competitive with Apple's iOS.[41]

Google also asserts that it "treats the Android project as a full-scale product development operation and strikes the business deals necessary to make sure great devices running Android make it to market."[42] Thus, AOSP already has the core of a marketing and sales function built into it. In other words, even though Google controls Android, AOSP already is relatively self-sufficient[43] and achieves its goals on its own. Finally, the goals of AOSP as articulated today are fully compatible with the remedial goals of returning competition to search and handsets: AOSP's "single most important goal" is "to make sure that open-source Android software is implemented as widely and compatibly as possible, to everyone's benefit."[44]

Another option to accomplish the decoupling is for the court to mandate the creation of a subsidiary of Alphabet that would hold the Google Android OS that we have described above. This structural separation would allow the OS to stay within the Alphabet corporation, but it would be strictly walled off. The U.S. Federal Communications Commission used this solution when it sought to protect competition in the burgeoning data processing market. After a series of inquiries in the 1960s and 1970s, the FCC mandated that AT&T (and other

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acts, illegally monopolized the app store market. *See In re Google Play Store Antitrust Litigation*, MDL Case No. 21-md-02981-JD (N.D. Cal. Oct. 7, 2024) (Dkt. 1016) (Order on UCL Claim and Injunctive Relief). Only three people will comprise that technical committee. We think the breadth of issues the technical committee will be required to address in the search case demands a substantially larger technical committee—one that includes engineers, technologists, competition lawyers, experts in computer-human interface design, etc.

[40] *See* AOSP frequently asked questions (FAQ), *Why is Google in charge of Android?*, Source, available at https://source.android.com/docs/setup/about/faqs (last visited Aug. 30, 2024).

[41] As a next best option, the court could identify the assets that should be transferred to NewCo, and auction them to a for-profit buyer. Such a solution, however, generates administrative and incentive problems the creation of a new non-profit would skirt. As an example, a for-profit buyer would, at least in the short term while rivals remain in their infancy, have a financial incentive to structure its licensing arrangements to encourage OEMs to continue advantaging Google (on account of Google's high monetization rate, which would flow through the revenue share to the OEMs and potentially back to the for-profit Android). Because a for-profit Android would face this and various other incentives that might conflict with the simple purpose of the non-profit NewCo (i.e., maximizing the utility of the Android OS for all who use it) and undermine the goal of spurring new entry, court supervision of a for-profit Android necessary will be more intensive than supervision of the non-profit NewCo.

[42] *See AOSP frequently asked questions, supra* note ____.

[43] We claim no expertise in Google's organizational chart, especially in light of a recent reorganization. See https://www.theverge.com/2024/4/18/24133881/google-android-pixel-teams-reorg-rick-osterloh. Some of the people who ought to be offered employment in NewCo to ensure a seamless transition of the Android OS into its new corporate home may work in a variety of units and functions within Google. The court can use an implementation committee to help identify the personnel who should be encouraged to join NewCo.

[44] *See* AOSP frequently asked questions, *supra* note ___.

common carriers of a certain size) could *only* enter the unregulated data market through fully separate subsidiaries. The FCC reasoned that AT&T's anticompetitive practices prevented "free and fair competition between communication common carriers and data processing companies" and that "appropriate regulatory treatment of these concerns requires a maximum separation of activities which are subject to regulation from non-regulated activities involving data processing."[45] These requirements were termed "maximum separation" safeguards; their stated goal–and their ultimate effect—was to ensure competition in the data processing market.[46]

More recently, Congress in the Telecommunications Act of 1996 imposed strict structural separation between local and long-distance providers to bring more competition to the telephone market for both local and long-distance service.[47] These prior structural separations can provide models for what structural separation might look like here.

A. A New Nonprofit To Hold and Control "Google Android"

In our view, the simplest and cleanest remedy is for the court to order Google to spin off the entity that controls AOSP with the necessary other assets and then to deposit the component parts of the OS into the nonprofit NewCo, as outlined above. If such a spinoff were set up as a for-profit corporation, it would have the financial incentive to exploit its vast market power, either directly through Android licensing, or through search, or through a different, and as yet undiscovered method of monopolization. The shareholders of such a corporation would pressure management to exploit its market power as soon as line of business restrictions or technological changes in AI permit. This would very likely generate the need for a repeat of a similar antitrust case in the near future. In addition, the risk of future anticompetitive behavior by this extremely powerful corporation will stimulate other players in the ecosystem to invest in risk mitigation and perhaps hesitate to invest in projects that rely on Android. The imperfect ability of a court to control such an entity as time goes on creates a risk that any improvements in search competition due to the spinoff are transitory.

Because of the tremendous market power inherent in the Google Android OS, some court supervision of even a nonprofit NewCo's practices will be needed. But these restrictions are far fewer because there is no profit incentive to overcome and there are no shareholders agitating for the company to exploit its power. To prevent recreating the problematic

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[45] *See* Final Decision and Order, *In re Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities* (First Computer Inquiry), 28 F.C.C.2d 267 (1971) (Computer I Final Decision) (1971 FCC LEXIS 2066) paras. 9-10 ("[T]he furnishing of such data processing services by carriers should not inhibit free and fair competition between communication common carriers and data processing companies or otherwise involve practices contrary to the policies and prohibitions of the anti-trust laws…[A]ppropriate regulatory treatment of these concerns requires a maximum separation of activities which are subject to regulation from non-regulated activities involving data processing.") (internal quotations omitted).

[46] *See* Amendment of Section 64.702 of the Comm'n's Rules & Regs, (Second Computer Inquiry), 77 F.C.C.2d 385 Para. 12 (1980); 1980 FCC LEXIS 188 *389 ("We find that only AT&T and GTE present a sufficiently substantial threat such that they should be required to establish separate corporate entities for the provision of enhanced services and customer-premises equipment. We will not require any other underlying carrier to form separate entities for the provision of these services and CPE.").

[47] *See* 47 U.S.C. § 272(a)(1) (" A . . .local exchange carrier . . . may not provide any service described in paragraph (2) unless it provides that service through one or more affiliates that . . . are separate from any operating company entity that is subject to the requirements of . . . this title; and . . . meets the requirements of subsection (b) [including that the separate entity operates independently, maintains separate books and records, is managed by separate officers, directors, and employees, obtains separate credit, and documents any transactions with the long-distance provider in writing that is subject to public inspection]").

situation that caused the antitrust violation, NewCo would be restricted from expanding into the search business. Licensing fees would be non-discriminatory and linear in the number of devices to give small licensees the same cost profile as large one. The Google Play Store and Chrome would be part of the licensed Android OS without any requirement on how an OEM uses them.[48] The license fee would be required to be FRAND to ensure widespread use as well as support of ongoing R&D. The court would rely on the same technical committee it uses to oversee the divestiture process to later advise it on FRAND terms. Court oversight will remain as a backstop.

Forking of Google Android using AOSP would be permitted as long as any new OS is clearly labeled with a different name and distinguished. Forking has the possibility of confusing consumers if they are unaware of the need to use apps that run on a particular OS. A NewCo license ensures that official Android continues to work as a coherent ecosystem. As is done by Google today, NewCo would review the Android build of a particular OEM and approve it as authorized. NewCo would review the apps that developers write for the Android OS in exchange for a reasonable fee. The PlayStore would allow an authorized OEM to distribute certified apps and consumers would be confident that they will work correctly. Today, about one billion Android devices are sold each year. A modest per-handset license fee would support the budget of NewCo.

This environment would give manufacturers the security of licensing the operating system they are accustomed to (including all the APIs necessary for a well-functioning device) at a regulated price. The engineers and other employees who maintain and advance on the development of Google Android could move to NewCo, as described above.[49]
OEMs could then bargain over search engine placement and percentage of search revenue to be paid to Google without fear of losing access to a competitively priced operating system. An OEM could install a competing search engine like Bing as its default if it offered more search revenue and this competitive pressure would raise the payments that Google makes to OEMs.[50] Consumers would pay less for handsets because that higher level of search revenue earned by OEMs would be competed away in handset prices. Thus, a larger share of what now constitute monopoly profits for Google would find its way into consumer pocketbooks.

Even with NewCo controlling Android, Google would still control Android apps that are extremely popular and, arguably in the case of YouTube, lack true competitive substitutes in the market. When contracting with OEMs for search engine placement or revenue sharing, Google could continue to bundle its other apps with search when negotiating with OEMs. At the outset, this would amount to Google leveraging its search monopoly to secure preinstallation or prominent placement of other Google apps. This strategy must be prevented in the remedy by requiring Google to offer its other apps and services in an a la carte fashion without any tying or bundling.

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[48] The absence of tying or other licensing conditions would mean that handset makers could install rival stores and users could download such stores.

[49] There will be complexities in determining which Google employees from which divisions should be offered the chance of employment with, and encouraged to join, NewCo. Moreover, determining the terms on which such employees will be permitted to leave Google and join NewCo may add to these complexities, especially for those employees whose compensation includes incentive compensation, stock options, and the like. These problems are all solvable, however. The Court could order that all contingent options be deemed vested as of the date an employee departs Google for NewCo, for example. And the technical committee can help identify, by name and/or job title, those Google employees who should be offered positions at NewCo.

[50] Note that the 40% revenue share cap and 50% user cap proposed earlier would still apply to any Google contract with an OEM in this setting.

Another tactic that seems likely is that Google develops a cool new feature for a popular app like YouTube. The catch is that the feature requires a modification to the OS to run properly, and Google encourages OEMs to install the patch so that their users can enjoy the YouTube features. OEMs that install the OS modification are effectively using a forked version of Android. This strategy would undo the openness of the new Android and restore Google's leverage over OEMs. The technical committee could identify such forks and recommend that they be contributed to NewCo, and the court could so order. This process enforces the line of business restriction that is a key part of the remedy.

It is important to note that Google's control over the mobile operating system is existential; there is no other OS that handset makers can license to sell a handset today in the US. While there are substitutes for other functionalities used by OEMs, there is no substitute for Google Android. This is the reason why either spinning out Android or placing it in an independent and firewalled division of Alphabet is necessary.

B. A Messier Option: Court-Supervised Structural Separation

If the court dislikes the divestitures into NewCo option, it could instead opt for structural separation. Either way, a solution is needed to block Google's current ability to degrade a manufacturer's access to the operating system or raise its price, and in that way coerce the manufacturer into preinstalling Google search. Forbidding exclusive or default contracts will be ineffective if such coercion is possible. The link between the operating system and the search business must be severed.

In a structural separation solution, Google would transfer the operating system (Android, Google Play services, the Google Play store, and any other relevant APIs), Chrome, and all associated employees into a division or subsidiary of Google that is strictly separated within Alphabet, rather than to an independent entity. Because the division or subsidiary would still have an incentive to make as much money for its parent as possible, the separation would have to be accompanied by the imposition of additional court-ordered conditions beyond those required for an independent entity. There likely would need to be a commercial committee as well as a technical committee to aid the court's oversight.

Necessary conditions that likely would require significant oversight would include a prohibition on bundling or tying between the OS and any other Google service or benefit, including those that would be managed by other Google divisions. For example, Google would be prohibited from leveraging its control of Google Maps or YouTube with a handset maker in order to coerce use of Google search. License fees would need to be simple linear contracts without discrimination and where any additional services are offered a la carte to all licensees. Because informal communication could aid in coercion, a firewall would be needed to prevent communication between divisions. Employees would not be permitted to move from the OS division directly to other parts of Google and vice versa.

The price of the OS would have to be regulated in order to prevent it from being set very high to punish licensees who do not install Google search, or simply set very high to replace the revenue formerly earned from Google search. The court would have to assess what a fair, reasonable, and non-discriminatory price is for Google Android and ensure this was the price charged. Determining FRAND would likely require an accurate measurement of the costs of running Android. The OS division would maintain strictly separate accounting so that the

court could determine its costs of R&D and see the prices it was charging to each customer. No infrastructure or fixed costs could be shared, nor would joint procurement be permitted. The monitors would need the authority to obtain information of any kind to ensure compliance with all the restrictions imposed by the court.

If this solution worked, it would again allow a handset maker to license Google Android from the OS division for a fair, non-discriminatory, price without any conditions attached to it. Then that handset maker could then bargain, in theory, freely and separately with another division, Google Search, over the terms on which it would preinstall the service in a widget or browser.

As compared to a spin-off, structural separation seems to us likely to impose a significantly larger burden on the Court. As the technology of search, its costs, and demand evolve, Google will ask the court to adjust the remedy, necessitating further hearings and collection of evidence. The direction of Android investments, both in terms of technological choices as well as functionalities will critically benefit the remainder of Alphabet. The management of Android and decisions on issues like which functionalities to include in the operating system will devolve into arguments about what benefits Google's business over rivals' business. A Google division—even if walled off—retains an incentive to act in ways that advantage its parent, necessitating significant court oversight to ensure the separate division does not coordinate with other divisions of Google in ways that frustrate the very purposes of the separation. NewCo, by contrast, will be an independent nonprofit with a mission and governance that do not give it these problematic incentives.

Oversight activities, such as enforcing line of business restrictions, will be easier in the NewCo structure. Determination of FRAND rates will similarly be easier. Because it does not have shareholders to claim excess profits, an independent NewCo is more likely to have the incentive to set a FRAND price that is similar to the one the court would choose than would a for-profit company. The court could permit NewCo to determine and impose those rates on its own, subject to challenge only if its rate structure appears problematic. A Google division, by contrast, has a strong incentive to choose a rate that increases the profit of the for-profit corporation and is *not* FRAND. Therefore, the court will likely need to set up a rate-setting process that is more closely supervised, and the final rate specifically approved. The FRAND rate will change over time, necessitating regular repetition of the process, as is done in music licensing, for example.[51]

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Whether the court chooses a spinoff or structural separation, Google will need to be enjoined from re-entering the OS or browser market for a period of years. Given Google's existing portfolio of apps, services, and platform products, and the open source nature of Android and Chromium, these restrictions will need to be carefully crafted to ensure that Google does not remain in these markets under the guise of other Google software. And the court will have to explicitly forbid Google from attempting to re-create its original market power by some form of contract that undoes the remedy.

[51] *See generally* Ed Christman, *Copyright Royalty Board? Statutory? Mechanical? Performance? A Primer for the World of Music Licensing and its Pricing*, Billboard (Aug. 18, 2016), available at https://www.billboard.com/music/music-news/music-licensing-pricing-primer-copyright-royalty-board-statutory-mechanical-performance-7476929/.

IX. SEPARATING CHROME FROM SEARCH

Although the desktop browser market is not characterized by the same level of coercive power that Google can currently exert over OEMs due to their dependence on Android, foreclosing the ability of Google to use Chrome to maintain and extend its search monopoly through purely behavioral remedies may prove to be exceedingly difficult. If a court-appointed monitor empowered to police all the possible ways that Google might seek to give Google search advantages in Chrome or use Chrome to reinforce its existing advantages in search, disputes from Google's search rivals will frequently land back in the court. There are numerous and potentially subtle ways Google could try to advantage its own search engine in Chrome: using the vast network of websites with Google presence to encourage users to switch Chrome's search engine in ways unavailable to search rivals; degrading the performance of rival search engines; reducing support for web standards and compatibility in ways that specifically harm rival providers of both browsers and search (Microsoft and, perhaps in the future, Apple); making it harder to use other Google services in Chrome if Google search is not set as the default; and many more.[52] Gathering evidence and conducting the analysis needed to distinguish cases where Google is violating its commitments from cases of healthy competitive behavior across the adjacent browser, search, and web services markets will occupy the court for years or decades. Identifying potential self-preferencing behavior in Chrome would require a level of technical diligence exceeding the other scenarios where Google has a contract with a third-party browser vendor or OEM that could be scrutinized for violations.

A cleaner and simpler approach would be to include Chrome in either of the structural remedies described above, incorporating the Chrome software, employees, and other assets into the spun-off NewCo or subsidiary. A structural remedy for Chrome would erase the incentive for the browser to preference its own search engine, because Chrome would be structurally separate from Google search. As an independent browser, Chrome for Android would be part of the package licensed by OEMs. Those OEMs would be free to contract with non-Google search engines or with Google search for pre-installation, default positions, or revenue sharing according to the rest of the remedy obligations imposed on Google. Chrome would be designed to work in a neutral way with competing search engines. Contracts between Chrome for desktop and Google search would be subject to the same restrictions and obligations as those between Google and any other browser vendor, including choice design obligations. The need for a monitor to police each novel form of self-preferencing Chrome might attempt to provide to Google search would be eliminated.[53]

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[52] *See* Zak Doffman, *Google Chrome Secretly Shares Your Device Data—With Google*, Forbes (July 12, 2024), available at https://www.forbes.com/sites/zakdoffman/2024/07/12/new-google-chrome-warning-for-microsoft-windows-10-windows-11-users/; Catalin Cimpanu, *Google secretly logs users into Chrome whenever they log into a Google site*, ZDNet (September 23, 2018), available at https://www.zdnet.com/article/google-secretly-logs-users-into-chrome-whenever-they-log-into-a-google-site/; Mia Sato, *The biggest findings in the Google Search leak* (May 31, 2024), available at https://www.theverge.com/2024/5/31/24167119/google-search-algorithm-documents-leak-seo-chrome-clicks ('Google Search representatives have said that they don't use anything from Chrome for ranking, but the leaked documents suggest that may not be true. One section, for example, lists "chrome_trans_clicks" as informing which links from a domain appear below the main webpage in search results. Fishkin interprets it as meaning Google "uses the number of clicks on pages in Chrome browsers and uses that to determine the most popular/important URLs on a site, which go into the calculation of which to include in the sitelinks feature.").

[53] Separating Chrome from Google could benefit competition and choice in related advertising markets as well. Chrome currently supports a wide variety of industry-standard and proprietary protocol features and APIs that websites owners and ad tech companies (including Google's advertising businesses) use to facilitate ad

Observers may question whether NewCo would have both the resources and the incentive to continue to maintain the desktop browser. The facts gathered during the trial provide strong evidence that resourcing is unlikely to be a concern. Mozilla spends about $450M annually to operate the Firefox browser.[54] If we assume an independent Chrome for desktop would cost approximately that much to operate, this amounts to about 2% of Bing's current search revenue. Given how few resources are needed to operate a competitive browser relative to the total search advertising market, an independent Chrome interested in monetizing its browser through search revenue sharing seems like it would have options available to do so.

Cross-platform effects would likely further incentivize NewCo to stay in the desktop browser market. Chrome on Android would continue to be an essential component of NewCo's overall Android offering to OEMs. The versions of Chrome that run on Android and desktop are both based on the open-source Chromium project and share a significant code base.[55] Browser vendors in the market today are driven to have their users on mobile adopt the same browser on desktop and vice versa, as evidenced by their promotional activities. Browser syncing that allows users to sync their browsing history, bookmarks, and passwords across devices is a table-stakes feature offered by every major browser vendor.[56] There is no reason NewCo's incentives would significantly deviate from these realities of the market today.

X. ADDITIONAL À LA CARTE REMEDIES

The remedies described thus far are intended as a package because they are interrelated and depend on one another to succeed. Banning exclusives won't pry open the market unless paired with at least a partial ban on payments; that ban must be partial rather than total in order to spur entry; and with respect to searches conducted on devices reliant on the Android OS, none of this will dismantle Google's dominance so long as Google continues to control Android. In this section, by contrast, we offer remedies that we believe, even standing alone, will help generate competition in the search market.

The interrelated suite of remedies described above takes aim at Google's distribution channels, But it also is critical that the final remedies package directly addresses the court's finding that the fixed costs of running a search engine are high and that the cost of entry helped Google's anticompetitive conduct to be effective.

There are two straightforward ways for the court to lower the cost of entry into general search. Among the simplest and least controversial of these remedies is a requirement that

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targeting, delivery, and measurement. These include mechanisms based on standardized functionality such as cookies, image (pixel) tracking, and local or session storage. Chrome currently also employs a number of proprietary APIs and features, several of which have been developed as part of Google's Privacy Sandbox initiative, that are used by Google's ad businesses and other ad tech companies. If Chrome were to be divested, NewCo would have independent discretion to decide which features and mechanisms to provide to support online advertising, just as all other browser vendors currently do. NewCo's decisions about feature support would be shaped by concerns about the browser business, the web, and the mobile ecosystem, and would no longer be shaped by a parent company running the world's largest online advertising business.

[54] *See* https://assets.mozilla.net/annualreport/2022/mozilla-fdn-2022-fs-final-0908.pdf.

[55] *See* https://www.chromium.org/Home/.

[56] *See* Chrome sync, https://chrome.google.com/sync; iCloud for Safari, https://support.apple.com/guide/icloud/what-you-can-do-with-icloud-and-safari-mm9b8da4f328/1.0/icloud/1.0; Microsoft Edge sync, https://support.microsoft.com/en-us/microsoft-edge/sign-in-to-sync-microsoft-edge-across-devices-e6ffa79b-ed52-aa32-47e2-5d5597fe4674; Firefox sync, https://www.mozilla.org/en-US/firefox/features/sync/; Opera sync, https://www.opera.com/features/sync.

Google license its web index to other search engines on FRAND terms. Crawling the entire World Wide Web every day to maintain an index is costly and therefore acts as a significant barrier to entry. Moreover, there is little welfare benefit generated by spending the money needed to create more than one web index. Requiring that Google license its index on FRAND terms will promote entry by rivals. A FRAND licensing fee will compensate Google for the cost of sharing the index with competitors and for its continuing efforts to maintain the index, while greatly lowering entry costs for rivals. Of course, Google should be prohibited from conditioning such licensing in ways that make it difficult for licensees (who necessarily will be Google's search rivals) to use the index as easily and efficiently as Google does, or in ways that prohibit use of the index in innovative ways. We want rivals to differentiate by, for example, incorporating the index along with their own scraping data or machine learning technologies to generate new products and search experiences for users.

Given Google's monopoly position in search, its search index is a critical control point over what content is available to be delivered in search results and how that content is monetized.

As long as Google's index retains this control point status, behavioral remedies will be required to ensure that Google does not leverage its monopoly position in search to preference its other products, including Gemini and potential successor Google AI models. The court should prohibit Google from tying the web crawling that it does to build its search index to any other crawling or uses of the crawled data for other purposes. In other words, independent websites should be able to make their sites available to be crawled by Google for search indexing purposes without being required to consent to their data being used to train, contribute to, or otherwise improve Google's AI models. Google has already begun entering into contracts that condition the availability of site content in search results on its ability to train AI models with site data.[57] Given the court's findings, remedies are needed to address this point of leverage.

The second method of lowering the fixed costs of entry into search is to require Google to share click and query data with rivals. Google could charge a cost-based fee for such data. The European Commission has already mandated that Google share data in Europe. However, for the sharing to be effective, the queries cannot be too aggregated or too old, or they will not be useful to a small entrant trying to train its algorithm. The court can delegate to the technical committee decisions concerning privacy and speed so that sharing of click and query data helps entrants improve their quality. The technical committee will be able to study the European experience and improve upon it (of course with right to appeal to the court).

In light of the rapid changes that characterize technology markets, it may be difficult for the court to determine the length of time any given remedy should apply. A new technology combined with a clever entrant might create competition quickly. Equally, because of Google's enormous market power, scale advantages, and entrenched position, it is possible that it will be very difficult for entrants to gain share. We suggest the court pick a relatively long timeframe in which a remedy applies, combined with an ability for Google to bring evidence to the court that the search market has become competitive. The court could adjust the timing of remedies in accordance with the evolution of the market, with the burden borne by Google.

[57] *See* https://www.404media.co/google-is-the-only-search-engine-that-works-on-reddit-now-thanks-to-ai-deal/.

XI. FINAL THOUGHTS

Given the importance of the search market and duration of Google's monopoly, remedies that restore the lost competition will need to be powerful, targeted, and complete. The interlocking suite of remedies we put forward are likely to significantly transform the search market. The finding of liability logically generates the steps needed to restore competition. Only if competition is firmly re-established and protected will the remedy unleash innovation and benefit consumers.