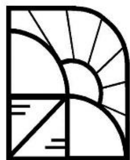

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T. Randolph Beard, PhD
George S. Ford, PhD

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MEASURED STEPS: OPTION VALUE THEORY AND GOOGLE ANTITRUST REMEDIES

Abstract: In August 2024, Judge Amit Mehta ruled that Google violated Section 2 of the Sherman Act by entering into exclusive distribution agreements with browser and device companies (*e.g.*, Apple, Mozilla, AT&T) to set Google as the default search engine on their devices' browsers (and browser-like applications) in return for a share of Google's advertising revenue. The case now turns to remedies. This BULLETIN examines the contrasting remedy proposals from the Department of Justice ("DOJ") and Google, with the DOJ advocating for structural remedies including the divestiture of Chrome and Android, while Google proposes behavioral remedies focused on modifying the set of distribution agreements found by the court to violate Section 2. Drawing on the economic theory of option value, we argue that a more measured initial approach targeting the specific anticompetitive conduct is preferable to immediate structural intervention. This recommendation stems from the weak causal evidence linking the agreements to Google's market position or quality of its products, the irreversibility of structural remedies, and the significant uncertainty surrounding both the effectiveness of proposed remedies and the future evolution of search markets, particularly given the emergence of Artificial Intelligence ("AI"). Maintaining flexibility through targeted behavioral remedies, while preserving the option for more aggressive intervention if needed, likely better serves the goals of antitrust enforcement in this and similar cases.

I. Background

In August 2024, Judge Amit Mehta of the U.S. District Court for the District of Columbia ruled in favor of the Department of Justice ("DOJ") in its antitrust case against Google, finding that Google "violated Section 2 of the Sherman Act by maintaining its monopoly [] through its

exclusive distribution agreements."[1] In these exclusive distribution agreements, browser and device companies (*e.g.*, Apple, Mozilla, AT&T) set Google as the default search engine on their devices' browsers (and browser-like applications) in return for a share of Google's advertising revenue (sometimes mixed with a fixed amount). Payments from these agreements accounted for 17.5% of Apple's profit in 2020 (and perhaps double that in 2022) and represented essentially all the profits of small browser companies like the Mozilla Foundation and Opera Limited, among others.[2] The judge found that these default agreements harmed competition by making it prohibitively expensive for rivals to gain similar default positions, effectively blocking them from key distribution channels.

While Google is appealing the decision, the case now moves to the remedy phase where Judge Mehta will determine appropriate measures to address the distribution agreements, though remedies will not apply until the case runs its course through the appellant courts. As might be expected, the DOJ and Google disagree on appropriate remedies. Google offered remedies closely in line with the judge's narrow ruling, targeting the distribution agreements.[3] In contrast, the DOJ wants Google to divest both its Chrome browser and Android operating system, to sell its search data to rivals, and to cease payments for the default position, and to limit investments in AI firms.[4] Both parties propose to monitor Google's compliance with remedies.

Judge Mehta must now choose between targeted and broad remedies and craft a solution, perhaps choosing a mixture of the two opposing proposals. Fortunately, economic theory—beyond the boilerplate antitrust sort—offers some guidance to help Judge Mehta choose the appropriate remedies in this case. This situation is a dilemma familiar to economists and others who study policy interventions when the future benefits of the intervention are unknown, some more severe interventions are largely irreversible, and industries are prone to rapid and dramatic technological change, as here where Artificial Intelligence ("AI") is expected to (and has already) upset many apple carts including search.[5] As we see it, the issue facing Judge Mehta is whether

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[1] *United States of America v. Google,* Case no. Case No. 20-cv-3010 (APM) (United States District Court for the District of Columbia) (August 5, 2024) (hereinafter "*Mehta Opinion*") at p. 276.

[2] *Mehta Opinion, id.* at p. 103.

[3] *United States of America v. Google,* Case No. 20-cv-3010 (APM) (United States District Court for the District of Columbia), Defendant Google LLC's Proposed Final Judgment (filed December 20, 2024) (hereinafter "Google PFJ").

[4] *United States of America v. Google,* Case No. 20-cv-3010 (APM) (United States District Court for the District of Columbia), Plaintiffs' Initial Proposed Final Judgment (filed November 20, 2024) (hereinafter "DOJ PFJ").

[5] R. Kurtz, *AI and the Future of Search Engine Marketing*, BASIS TECHNOLOGY BLOG (March 28, 2024) (available at: https://basis.com/blog/artificial-intelligence-and-the-future-of-search-engine-marketing) ("In fact, Gartner has predicted that by 2026, traditional search engine volume will drop by 25% as a result of chatbot-like applications."); F.

(Footnote Continued…)

to radically restructure Google today absent a clear grasp of what effects such a drastic intervention will have or, more modestly, to address the offensive conduct, see if the intervention works and, if it does not, address residual issues when the effects of more drastic interventions are easier to assess. We conclude, under the circumstances of the case and the industry, that the latter approach is more sensible.

II. Opinion and Remedies

In his lengthy decision (286 pages), Judge Mehta concluded that Google possessed monopoly power in the "general search" and "general search text advertising" markets in violation of Section 2 of the Sherman Act.[6] This conclusion is only a prerequisite, however, as monopoly is not a crime under antitrust law. As the Supreme Court held in the seminal case of *United States v. Grinnell,* 384 U.S. 563 (1966) (and has routinely reaffirmed thereafter), market power alone is not enough to establish liability under Section 2. Rather, there must be "the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident."[7] That is, monopoly may be obtained by competition on the merits. Monopoly is not a crime, but acting in ways to acquire or maintain the monopoly is.

While Judge Mehta attributed Google's monopoly position in search to its superior performance, foresight, sizable investments and innovative disposition, he concluded that Google illegally maintained its legitimately-obtained monopoly in the relevant markets in violation of Section 2 of the Sherman Act by entering exclusive dealing agreements, whereby Google shared its ad revenues with certain equipment manufacturers (*e.g.*, Apple, Samsung, AT&T, and several others) to make Google's search engine the exclusive search default on smart phones, web browsers, and other search applications. Judge Mehta, while noting that Google provides a superior product, determined that the agreements—while not exclusive contracts *per se* since users are not bound by the default search engine—were anticompetitive in that they foreclosed large shares of the markets from rival search services, thereby depriving rivals of the data needed

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Palermo, *Will AI-Powered Search Engines Ultimately End Traditional Search?* CMSWIRE (November 14, 2024) (available at: https://www.cmswire.com/digital-experience/will-ai-powered-search-engines-ultimately-end-traditional-search).

[6] 15 U.S.C. §2. Section 2 of the Sherman Act states: "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony."

[7] *Id.* at 570-71; *see also Verizon Communs., Inc. v. Law Offices of Curtis V. Trinko, LLP,* 540 U.S. 398, 406 (2004); *Christianson v. Colt Indus. Operating Corp.,* 486 U.S. 800, 811 (1988); *Pac. Bell Tel. Co. v. linkLine Communs., Inc.,* 555 U.S. 438, 447-48 (2009); *Eastman Kodak Co. v. Image Tech. Servs.,* 504 U.S. 451, 480-81 (1992).

to build a better search engine to compete with Google and reducing the incentives of rivals, real or potential, from investing and innovating in the relevant markets.[8]

With liability established, for now at least, the case turns to remedies. While there is no strict template for antitrust remedies, the courts (and antitrust authorities) generally follow some key principles, though individual decisions vary in their adherence to such principles. There are two general types of remedies: *structural* remedies and *behavioral* remedies. Structural remedies involve divestitures (breaking up a company) or the sale or spin-off of particularly problematic corporate assets or divisions. Behavioral remedies involve prohibited conduct or required conduct. Structural remedies aim to neuter incentives, while behavioral remedies aim to control them. In both cases, monitoring activity over time is required, though behavioral remedies perhaps more so. Of course, remedies may include both structural and behavioral components.

In *United States v. Microsoft*, 253 F.3rd 34 (D.C. Cir.), *cert. denied,* 534 U.S. 52 (2001), the D.C. Circuit recognized that the objectives of remedies were to: (1) unfetter a market from anticompetitive conduct; (2) terminate the illegal monopoly; (3) deny to the defendant the fruits of its statutory violation; and (4) ensure that there remain no practices likely to result in monopolization in the future.[9] Other caselaw, and also *Microsoft*, advances other principles, which include (but are not limited to): (1) the remedy should preserve competition, not competitors; (2) be enforceable and administrable; (3) address the specific competitive harm identified; (4) be proportional to the violation;[10] (5) depend on the strength of the causal evidence; (6) minimize unintended consequences; and (7) preserve legitimate efficiencies where possible.[11] Such principles may apply more-or-less to specific cases and apply more-or-less to specific

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[8] *Mehta Opinion*, *supra* n. 1. *Also see*, *e.g.*, R. Milne and E. Thrasher, *In Landmark Decision, D.C. Federal Court Holds Google Maintained an Illegal Monopoly in Internet Search and Advertising Markets and Sets the Stage For Future Enforcement Actions*, White & Case (August 16, 2024) (available at: https://www.whitecase.com/insight-our-thinking/landmark-decision-dc-federal-court-holds-google-maintained-illegal-monopoly#:~:text=In%20his%20nearly%20300%2Dpage,deemed%20exclusionary%20under%20the%20antitrust).

[9] *Id.* at 184 (citations omitted); *see also* C. Shapiro, *Microsoft: A Remedial Failure*, 75 ANTITRUST LAW JOURNAL 739-772 (2009).

[10] The *Microsoft* case, which Judge Mehta relies heavily upon, is an interesting because the divestiture required by the district court was later remanded by the appellate court, in part due to its lack of proportionality to the violation. *See New York v. Microsoft Corp.*, 224 F. Supp. 2d 76, 101 (D.D.C. 2002), *aff'd sub nom. Massachusetts v. Microsoft Corp.*, 373 F.3d 1199 (D.C. Cir. 2004) ("the appellate court appears to have identified a proportionality between the severity of the remedy and the strength of the evidence of the causal connection."); Shapiro, *supra* n. 9.

[11] *See* MERGER REMEDIES GUIDE—FIFTH EDITION: KEY PRINCIPLES OF MERGER REMEDIES AROUND THE WORLD, Global Competition Review (2024) (available at: https://www.wlrk.com/wp-content/uploads/2024/11/GCR-key-principles-of-merger-remedies-around-the-world.pdf); *Merger Remedies Manual*, Antitrust Division, U.S. Department of Justice (September 2020) (Withdrawn) (available at: https://www.justice.gov/atr/page/file/1312416/dl).

decisions. Put simply, the remedy should cure the competitive problem without overdoing it or causing a lot of collateral damage.

The DOJ's remedies, as stated in its Proposed Final Judgement ("DOJ PFJ"), involve both structural and behavioral remedies.[12] As for structural remedies, the DOJ's PFJ would require Google to divest Chrome and remain out of the browser market for five years and would prohibit Google from having any investment or interest in any search or search text ad rival, search distributor, or rival query-based AI product or ads technology. The DOJ's PFJ would also require Google to divest the Android operating system, which it provides at no cost to device manufacturers. As for behavioral remedies, the DOJ's PFJ would require Google for a period of ten years to make available to rivals and potential rivals its (U.S. originated) proprietary search index at cost-based prices, provide free access to user-side and ads data, and syndicate its search results, ranking signals, and query understanding information. Moreover, Google would have to provide advertisers with real-time performance information about ad performance and costs in its search query reports, submit to the government monthly reports on any changes to its search text ads auction, not install any search access point on any new Google device, and display a choice screen on every new and existing instance of a Google browser where users have yet to affirmatively select a default general search engine. Targeting Judge Mehta's narrow finding, the DOJ's PFJ would prohibit Google from "offering anything of value for any form of default, placement, or preinstallation distribution (including choice screens) related to general search or a search access point," regardless of whether the agreements were or were not found to be anticompetitive.[13] Additionally, Google would have to establish an officer and committee to monitor Google's compliance with the remedies.

As for Google, its proposed remedies focus on the exclusive distribution agreements and restrictions therein.[14] Google's proposed remedies would prohibit the company from requiring manufacturers to preload or use Google Search, Chrome Browser, Google Assistant, or Gemini Assistant as a condition for licensing Google Play or other Google software. Google also would be prohibited from paying or incentivizing manufacturers or carriers to avoid using competing third-party search engines, browsers, or AI assistants. For browser agreements (including with Apple), Google would be forced to allow annual changes to default search engines without penalty and permit promotion of competing search services. Googe's PFJ includes exceptions

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[12] *See supra* n. 4.

[13] *See United States of America v. Google,* Case No. 20-cv-3010 (APM) (United States District Court for the District of Columbia), Executive Summary of Plaintiffs' Proposed Final Judgment (filed November 20, 2024) at p. 11.

[14] *Supra* n. 3.

that would allow Google to bundle certain applications (with opt-out options) and continue offering compensation for voluntary promotion or placement of their services.[15]

The DOJ's proposed remedies represent a sweeping attempt to restructure the search advertising industry through both structural changes (divesting Chrome and Android) and extensive behavioral requirements (sharing search index, data, and algorithmic information). These far-reaching interventions contrast sharply with Google's more focused proposal that mainly addresses distribution agreements and default settings. The DOJ's approach raises serious concerns about irreversibility and uncertainty—once implemented, structural changes cannot easily be undone even if they prove harmful to competition or innovation. As discussed below, given the complex nature of search markets (and technology industries in general) and the uncertain effects of major structural interventions, maintaining flexibility through less drastic remedies might be preferable to irreversible changes that could have unintended consequences for market efficiency and consumer welfare.

III. Option Value

By a sliver, the Venn diagrams of the two remedy proposals overlap. Judge Mehta, therefore, must form remedies from deeply contrasting proposals, searching for a remedy that adequately solves the problem he identified in his *Opinion*, which is that Google "maintain[ed] its monopoly [] through its exclusive distribution agreements with browser developers and Android OEMs and carriers."[16] The DOJ wants to eradicate any possibility of an agreement by breaking Google apart, while Google wants to neuter the agreements of any facially anticompetitive effect. Judge Mehta faces a challenging task by any measure. The economic concept of *option value* may offer some useful guidance, especially when informed by the content of the *Opinion*.

Arrow and Fisher (1974) offer insights into how to analyze problems of this sort. Their insights are commonly used in environmental economics, investment theory, and policy analysis.[17] The dilemma facing the decisionmaker arises from the combination of the irreversibility of some interventions, and uncertainty regarding the future benefits of intervention. In many cases, policies can be crafted which are intermediate between extreme sorts of interventions (which are irreversible), and more nuanced initiatives that allow for both further interventions later, and the gathering of information over time.

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[15] *Id.*

[16] *Mehta Opinion, supra* n. 1 at p. 258.

[17] K.J. Arrow and A.C. Fisher, *Environmental Preservation, Uncertainty, and Irreversibility*, 88 QUARTERLY JOURNAL OF ECONOMICS 312-319 (1974).

Courts tasked with implementing antitrust remedies face the same type of decision problem. A court ordinarily has more than one possible course of action and need not generally make a "one and done" ruling. Rather, the court is ordinarily able to make a preliminary order and, after the passage of time, revisit the consequences, noting relevant developments in market conditions and firm behavior. This is not a novel concept in antitrust.

In the seminal 1968 case of *United States v. United Shoe Machining Corp.,* the Supreme Court provided useful guidance to trial courts about how to fashion the most efficient remedy when firms have violated Section 2 of the Sherman Act.[18] The Court began its analysis by acknowledging the obvious: in a Section 2 case, "upon appropriate findings of violation, 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."[19] That said, noted the Court, while a "trial court is charged with inescapable responsibility to achieve this objective," a trial court "may, if circumstances warrant, accept a formula for achieving the result by means less drastic than immediate dissolution or divestiture."[20] If the trial court opts for a "less dramatic" remedy than full divestiture, however, the Supreme Court instructed that the trial court should continue to monitor the situation to ensure that that the relief "has met the standards which this Court has prescribed."[21] In *United Shoe*, the Court found that a ten-year oversight period was reasonable, concluding "[a] decade is enough."[22] At that point, a trial court should make a determination whether the relief ordered was successful. If not, noted the Court, then the trial court "should modify the decree so as to achieve the required result with all appropriate expedition."[23]

Both the DOJ and Google propose ongoing monitoring, with the DOJ's proposals spanning a decade. This continued monitoring is important because the complexities of many antitrust actions, particularly in the technologically dynamic industries relevant to this case, give rise to a decision environment characterized by: (1) large uncertainty regarding the future economic conditions; (2) the admitted weakness of causal links between firm behavior and market outcomes; (3) the ability of the court to observe the market consequences of initial orders, thus gaining information; (4) the irreversible nature of remedies, such as structural interventions, which impose highly consequential effects on the evolution of competition and technical

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18 *United States v. United Shoe Machining Corp.,* 391 U.S. 244 (1968).

19 *Id.* at 250 (citations omitted).

20 *Id.* at 250-51.

21 *Id.* at 252.

22 *Id.*

23 *Id.*

innovation; and (5) the high probability of collateral damage. Put simply, the court needs to decide how aggressive to be and when aggression is warranted.

The basic logic of the problem can be explained quite simply. Imagine a decisionmaker (*e.g.*, a court considering remedies) faced with the following simple timeline. At the initial period, denoted 1, the Court may select between two actions, $r_1 \in \{0,1\}$. Next, information potentially useful to be best choices, denoted Φ, becomes available. After this revelation, the judge faces a choice of action r_2, where again for simplicity $r_2 \in \{0,1\}$. The relevant social benefit (e.g., consumer surplus) is then given as $B(r_1, r_2, \Phi)$. The wrinkle in this narrative is that the decision $r_1 = 1$ implies that $r_2 = 0$ must be chosen. In other words, the choice $r_1 = 1$ is *irreversible*. This constraint, which courts face when implementing significant structural remedies, complicates the court's problem and gives rise to an "option value" which the rational decisionmaker needs to consider.

If no useful information can be expected in the future, then the problem devolves into an issue of examining and comparing $B(1, 0, \Phi)$ and $B(0, 1, \Phi)$, where the resulting comparison does not depend on the value of Φ. However, if Φ is useful (that is, information about best choices may be learned over time), then the problem becomes one of analyzing $E[B(1, 0, \Phi)]$ and $E[B(0, r_2^*, \Phi)]$, where r_2^* maximizes $B(0, r_2, \Phi)$ and expectations are taken over the prior distribution of Φ. This leads to the *option value* (or *quasi-option value*) given by $OV = E[B(0, r_2^*, \Phi)] - E[B(1, 0, \Phi)]$. That is, the return to watching and waiting the progress of remedies targeting the offending behavior may exceed the return to aggressive "one and done" remedies that upset the market entirely and in unknown ways. A less aggressive approach is preferred when future information is likely to be valuable, the costs of irreversible action are high or uncertain, and the benefits of immediate action are not overwhelmingly large.

Figure 1. Option Value in Remedies

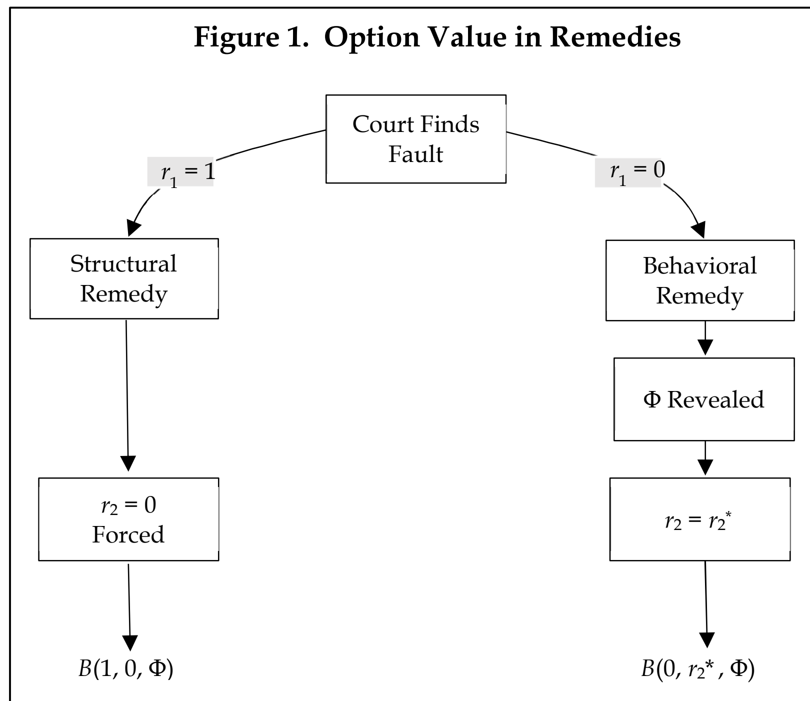

Figure 1 illustrates this simple option value model (albeit crudely), where r_1 is an irreversible structural remedy and r_2 is another possible remedy (a host of them actually). In the first stage, the court finds the defendant guilty of anticompetitive conduct. There are two paths for remedies. On the left, the judge chooses irreversible structural remedy ($r_1 = 1$) and surplus is $B(1, 0, \Phi)$. On the right side, the structural remedy is set aside for some sort of behavioral remedy ($r_1 = 0$). Over time, uncertainty (Φ) is reduced, providing clarity on the best path forward. Given the improved information, additional remedies (r_2) may be applied, providing a surplus of $B(0, r_2^*, \Phi)$.

In antitrust cases, structural remedies like breaking up a company or requiring divestitures represent irreversible decisions, while behavioral remedies maintain future flexibility under uncertainty. When enforcers choose behavioral remedies, they preserve two options: (1) they can strengthen the remedies later if the initial approach proves insufficient; or (2) they can maintain or reduce oversight if the current approach effectively restores competition. In contrast, once a structural remedy like divestiture is implemented, it typically cannot be reversed even if it later proves to have been excessive, harmful to competition, or involves collateral damage. This flexibility has value (*i.e.*, a quasi-option value) that exists separate and apart from the direct benefits of either remedy type; that is, structural remedies have benefits, behavioral benefits have benefits, and flexibility has benefits. Behavioral remedies maintain decision-making flexibility under uncertainty, while structural changes eliminate this flexibility through irreversibility, thus foregoing the value the flexibility.

IV. Application of the Option Value

An important factor in the quasi-option value framework is the prospect that the future holds information that permits better decisions later. The Google case offers a straightforward application of this idea. Specifically, Judge Mehta's *Opinion* lists several factors that raise questions about the causal effect of the distribution agreements on Google Search's success in the search ad marketplace.

Causal analysis is a method for determining whether one variable (the cause) influences another variable (the effect). Such analysis goes beyond identifying correlations to establish actual cause-and-effect relationships. Causal analysis also contemplates the presence of confounders. A confounder is a factor that influences both the cause-and-effect variables, potentially creating a spurious relationship between them. For instance, ice cream sales and drowning deaths are correlated, but ice cream consumption does not cause drowning. Rather, hot weather is causing both, making temperature a confounding variable that creates a spurious relationship.

While causal analysis is vital to empirical research, it is also relevant to antitrust liability and remedies. As stated by the D.C. Circuit in *Microsoft*,

> In devising an appropriate remedy, the district court also should consider whether plaintiffs have established a sufficient causal connection between Microsoft's anticompetitive conduct and its dominant position in the OS market. "Mere existence of an exclusionary act does not itself justify full feasible relief against the monopolist to create maximum competition." Rather, structural relief, which is "designed to eliminate the monopoly altogether … requires a clearer indication of a *significant causal connection* between the conduct and creation or maintenance of the market power."[24]

This sentiment is echoed in Judge Mehta's decision: "Anticompetitive effects analysis involves establishing a 'causal link.' The exclusionary conduct must cause the anticompetitive harm."[25]

Establishing a causal link between Google's success and the distribution agreements, where the remedy phase requires stronger evidence than the liability phase, is troubled by several issues. First, Judge Mehta recognized that Google Search is the best search engine, in part because Windows failed to recognize the importance of, or invest in, mobile search.[26] Judge Mehta also

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24 *Microsoft, supra* n. 9, 253 F.3rd at 194 (emphasis in original and citations omitted).

25 *Mehta Opinion*, *supra* n. 1 at p. 215 (citations omitted).

26 *Id.* at p. 238 (citations omitted).

conceded Google legitimately obtained its market leadership by virtue of its superiority. Thus, there is the question of whether, and by how much, the agreements protected that monopoly position. The large payments Google made to browsers and device manufacturers suggest that Google derived incremental value from such agreements or was otherwise concerned (to some extent) about losing market share absent those agreements. Still, Google's superiority and favor with users is a confounder in that it explains, in some part, Google's high market share.

Did these agreements contribute a lot or a little to Google's market share? The evidence presented offers some insight. When Mozilla switched to Yahoo as the default search engine between 2014 and 2017, in return for compensation, Googe's share of queries from Firefox fell by 20 percentage points and Yahoo's rose by the same.[27] Yahoo was nowhere near dominant in Firefox's search despite the default position. Although the default had some effect on shares, though small, there was more to the story. To generate more revenue, Yahoo resorted to increasing the number of ads, degrading user experience and, presumably, Firefox's perceived value among users. Mozilla switched back to Google Search. This scenario revealed that not only is Google search superior at producing useful search returns, but it is also *more efficient* in search advertisements than its rival.

Other evidence is confirming. In 2016, Mozilla switched the default search engine for a sample of new and existing users from Google to Bing.[28] Users defected quickly, with Bing keeping only 42% of the search volume in two weeks and eventually holding on to only 20–35%. Mozilla did the same for Yahoo Search and Yahoo only retained 16.5% of the total search volume. A few years later (2021, 2022), Mozilla again set Bing as the default for a sample of Firefox users. Search volume decreased (7%), ad clicks fell (13%), and 35.5% of users changed the default. Those that remained on Bing were more casual users, producing few ad clicks on average. Google is preferred by users and is more efficient at generating ad revenue. Such evidence does not nullify the possibility that default status may be capable of anticompetitive effects, but the evidence raises question about the power of the default to lock in market share and exposes the relative efficiency of search engines.

The evidence in the record is inadequate to support a causal linkage. Causal effects are quantified by comparing observed outcomes to a counterfactual (a "but for" world). Good counterfactuals can be difficult to construct. As such, Judge Mehta concludes "causation does not require but-for proof" since, citing *Microsoft*, "[s]uch a standard would create substantial proof problems, as 'neither plaintiffs nor the court can confidently reconstruct . . . a world absent

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27 *Id.* at p. 116 (citations omitted).

28 *Id.* at p. 117 (citations omitted).

the defendant's exclusionary conduct.'"[29] Instead, Judge Mehta concludes, "The key question then is this: Do Google's exclusive distribution contracts *reasonably appear capable* of significantly contributing to maintaining Google's monopoly power in the general search services market?"[30]

But while Judge Mehta concluded that such agreements appear to be "reasonably capable" of foreclosing markets, this conclusion is not the same as a definitive finding that the agreements did, in fact, foreclose markets, or whether they foreclosed markets to a "significant" degree.[31] The phrase "reasonably appear capable of" is not a causal claim. A causal effect requires a counterfactual at least in academic circles where causal effects are the gold standard. In the last two decades, the empirical tools used for causal analysis in economics (and other fields, especially when only observational data is available) have completely transformed (termed the "credibility revolution").[32] Modern empiricists are now entirely focused on developing sound counterfactuals (the "but for" outcome), with alternative and improved procedures published regularly.

Moreover, such soft causal linkages have more force for liability purposes than remedies. As the D.C. Circuit in *Microsoft* observed, "… concerns over causation have more purchase in connection with the appropriate remedy issue, *i.e.,* whether the court should impose a structural remedy or merely enjoin the offensive conduct at issue."[33] In this case, evidence supporting a causal nexus between the agreements and Google Search's market share is weak (they only *appear* to be "reasonably capable of"). In the remedy phase, this lack of causal evidence, and the presence of multiple confounders and Microsoft's lack of foresight in mobile search, there is little support for structural remedies, at least currently. Nonetheless, Judge Mehta is tasked with solving the problem. To this end, information obtained over time from restrictions on the distribution agreements reduces uncertainty regarding the causal relationship. With that uncertainty resolved, the judge may impose weaker or stronger remedies in the future as deemed necessary. Imposing structural remedies today forecloses the opportunity to resolve the uncertainty.

In sum, by targeting the more troublesome aspects of the agreements, which Judge Mehta holds as the length of the agreements, the termination terms, and their broad application, the

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[29] *Id.* at p. 216 (citations omitted).

[30] *Id.* (emphasis supplied).

[31] *Id.* at pp. 239, 223 (citations omitted).

[32] *See*, *e.g.*, G.W. Imbens and J. M. Wooldridge, *Recent Developments in the Econometrics of Program Evaluation*, 47 JOURNAL OF ECONOMIC LITERATURE 5-86 (2009); S. Cunningham, CAUSAL INFERENCE: THE MIXTAPE (2021); J. Angrist and J.S. Pischke, MOSTLY HARMLESS ECONOMETRICS (2008); P. Garg and T. Fetzer, *Causal Claims in Economics*, Working Paper (2023) (available at: https://www.causal.claims).

[33] *Microsoft*, *supra* n. 9, 253 F.3rd at 110.

force of the agreements to foreclose markets may be revealed. In effect, the first remedy phase is an experiment to test of the veracity of the "reasonably appear capable of" hypothesis. If weak agreements do not alter Google Search's market share, where users continue to choose Google due to its superiority, then the theory of the case is in question, or else the remedies were insufficiently robust. If the modified agreements lead to a large loss of market share, then such evidence supports the judge's theory. At that point, it may be that the issue is resolved, or else some other intervention may be required to more firmly establish the competitive outcome.

Narrowly targeting the distribution agreements and postponing more aggressive remedies not only allows the parties to evaluate the impact of these agreements but may provide clarity on a host of relevant factors. If additional remedies are required after the uncertainty is resolved, then suitable remedies may look nothing like the remedies being proposed today. Experience suggests that the rate of change in technology markets is rapid, and the evolution of services and applications is unpredictable. AI might trivialize online search markets in a few years, making further efforts moot. Or, Google might go the way of My Space, AOL, IBM, Blackberry, and a host of other successful brands in the technology industry now on the trash heap of history.

V. Unintended Consequences

There are a host of other imaginable complicating factors with structural remedies. Antitrust remedies can have significant unintended consequences beyond their intended competitive effects. Breaking up integrated companies might sacrifice economies of scale and scope, disrupt ongoing R&D projects, create product incompatibility, reduce competition in other markets, and trigger other consequences that harm consumers. Also, workers can face displacement, business partners may need to restructure long-standing relationships, and market uncertainty during remedy implementation can chill investment and innovation.

For instance, forcing the divestiture of Google's flagship products, the costs of which are supported in large part (if not exclusively) by its ad revenues (both products are made available for no charges or fees), is certainly a remedy with uncertain consequences. It is unclear whether Chrome or Android can exist outside of Google. Android supports intense competition in mobile devices. Perhaps a private party could license Android for a fee to generate revenues, though doing so presumably would raise the price of Android devices. It is impossible to say.

Also, Google is the primary developer of Chromium, an open-source browser underlying nearly all browsers aside from Apple's Safari. Even Microsoft's Edge browser is a Chromium

browser, a switch that has substantially improved its quality.[34] Will the development of Chromium continue, or maintain quality, after the divesture of Chrome? Microsoft may take up the mantle, but the company's ability to build quality browsers has little-to-no historical support. Whether a substitute investor/developer will step in is unknown. It may be that the only free-to-use browsers become Edge and Safari, since the revenue from search ads supports several firms in the browser market.[35] Such a reduction in choice is sure to harm consumers. Nor can we ignore how device manufacturers and browsers respond to remedies. They will not be passive recipients, and their responses may harm market performance more than the remedies improve it.

Judge Mehta also established there are large scale economies in search engines. Consequently, search services will presumably be available only in a concentrated market.[36] Structural remedies, therefore, may do little to increase competition, as the number of providers is constrained by market conditions. There is the potential, as recognized in the *Opinion*, that AI may reduce the cost of search engine development, and this potential will be realized in coming years. It may be worth the wait to see how AI's influence on search plays out.

Finally, there is the broader issue of innovation on the global scale. For decades, by virtue of its largely unregulated status, the U.S. has led the world in technological innovation. The threat of overdone remedies creates risk, reducing investment and shifting innovation to other nations. Today, the nation, indeed the world, is at the dawn of an AI revolution—a revolution largely led by U.S. firms. Threatening that leadership can have natural security concerns. Certainly, overt anticompetitive actions should be remedied, but efforts to do so should be targeted and not excessive.

VI. Conclusion

The remedy phase of the Google antitrust case presents Judge Mehta with a critical choice between aggressive structural intervention and more targeted behavioral remedies. While the

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[34] *Mehta Opinion*, *supra* n. 1, at p. 238 (citations omitted) ("Microsoft "missed" the mobile revolution and was unable to improve its browser, Internet Explorer, until it used Google's rendering engine, Chromium."); T. Warren, *Inside Microsoft's Surprise Decision to Work with Google on its Edge Browser*, THE VERGE (May 6, 2019) (available at: https://www.theverge.com/2019/5/6/18527550/microsoft-chromium-edge-google-history-collaboration).

[35] *Proposed Contractual Remedies in United States v. Google Threaten Vital Role of Independent Browsers*, MOZILLA BLOG (2024) (https://blog.mozilla.org/en/mozilla/internet-policy/google-remedies-browsers); *see also* J. Delray, *Forget Apple, the Biggest Loser in the Google Search Ruling could be Mozilla and Its Firefox Web Browser*, FORTUNE (August 6, 2024) (available at: https://fortune.com/2024/08/05/mozilla-firefox-biggest-potential-loser-google-antitrust-search-ruling). All the operating margins of the Mozilla Foundation and Opera Limited are from the Google agreements.

[36] *See*, *e.g.*, J. Sutton, SUNK COST AND MARKET STRUCTURE (1991).

DOJ's proposed structural remedies might appear to offer a definitive solution, several factors counsel in favor of a more measured approach. First, the causal connection between Google's distribution agreements and its market dominance remains empirically uncertain, with evidence suggesting that Google's superior product quality and relative efficiency play substantial roles in its market position. Second, the technological landscape is rapidly evolving, particularly with the emergence of AI, creating significant uncertainty about the future of search markets. Third, structural remedies like divesting Chrome and Android are effectively irreversible and could have far-reaching unintended consequences for browser development, mobile device competition, and U.S. technological leadership.

Drawing on the economic theory of option value, we conclude that the most prudent approach is to first implement targeted remedies addressing the specific anticompetitive elements of the distribution agreements. This strategy preserves flexibility while allowing the court to gather information about the actual competitive impact of these agreements. If these initial remedies prove insufficient, then the court maintains the option to implement more aggressive measures when their effects can be better assessed and when technological developments provide greater clarity about optimal market structure. This approach aligns with both established antitrust principles and the Supreme Court's guidance in cases like *United Shoe*, where the Court endorsed starting with less dramatic remedies while maintaining oversight to ensure their effectiveness, and the D.C. Circuit's ruling *Microsoft,* where the court found the causal evidence insufficient for aggressive structural remedies.

In an era of rapid technological change and uncertainty, particularly regarding AI's impact on search markets, maintaining this flexibility through measured intervention better serves the goals of antitrust enforcement than immediate structural changes that cannot be undone. This approach allows for the correction of anticompetitive conduct while minimizing the risk of unintended consequences that could ultimately harm competition, innovation, and consumer welfare.