IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

UNITED STATES OF AMERICA, et al.,
Plaintiffs,

vs.

GOOGLE, LLC,

Defendant.
_____/

Civil Action
No. 1:20-cv-3010

Washington, DC
October 16, 2023
9:33 a.m.

Day 22
Morning Session

TRANSCRIPT OF BENCH TRIAL
BEFORE THE HONORABLE AMIT P. MEHTA
UNITED STATES DISTRICT JUDGE

APPEARANCES:

For DOJ Plaintiffs:

KENNETH DINTZER
U.S. Department of Justice
1100 L Street, NW
Washington, DC 20005

ADAM SEVERT
MEAGAN BELLSHAW
U.S. Department of Justice
450 Fifth Street, NW
Washington, DC 20001

DAVID DAHLQUIST
U.S Department of Justice
209 South LaSalle Street, Suite 600
Chicago, IL 60604

For Plaintiffs State of Colorado & State of Nebraska:

WILLIAM CAVANAUGH, JR.
Patterson, Belknap, Webb & Tyler, LLP
1133 Avenue of the Americas #2200
Suite 2200
New York, NY 10036

APPEARANCES CONT:

For Plaintiff State of Colorado: **JONATHAN SALLET**
Colorado Department of Law
CPS/Antitrust Section
1300 Broadway, 7th Floor
Denver, CO 80203

For Defendant Google: **JOHN SCHMIDTLEIN**
KENNETH SMURZYNSKI
Williams & Connolly, LLP
680 Maine Avenue, SW
Washington, DC 20024

Court Reporter: **JEFF HOOK**
Official Court Reporter
U.S. District & Bankruptcy Courts
333 Constitution Avenue, NW
Washington, DC 20001

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No exhibits marked.

P R O C E E D I N G S

DEPUTY CLERK: Your Honor, this is civil action 20-3010, United States of America, et al. versus Google, LLC. Attorneys Kenneth Dintzer is representing the Department of Justice in this matter. Attorneys Jonathan Sallet and William Cavanaugh represent the Plaintiff States. And attorney John Schmidtlein is representing Google, LLC in this matter.

THE COURT: Good morning, everyone. I hope everybody had a nice weekend. Let me just make sure everybody's in the right courtroom. This is U.S. v. Google. Anyway.

Just a couple of things before we move forward this morning. We should have out -- we will have out this afternoon the transcripts of Mr. Kolotouros and Mr. Higgins. The hope is that we should have Mr. Roszak out very soon, and then Mr. Yoo and Mr. Lehman shortly after Mr. Roszak.

Sorry, I thought I had one more administrative matter.

All right. Then there's the issue of the Daubert motion concerning Professor Whinston and certain testimony that is expected of Professor Whinston. I've read the parties' papers, and look, here's where I am. This probably won't come as a surprise to anybody, which is that I'm essentially going to allow the testimony.

As everybody understands, the Daubert gatekeeping function is relaxed quite a bit when it is a bench trial. I'll just read, for example, from a recent decision from this district,

DL vs. District of Columbia, 109 F.Supp.3d at 12 at 28, where the Court wrote: "The gatekeeping requirement is substantially relaxed when the judge will serve as a fact finder in a trial. This is because where the gatekeeper and the fact finder are one in the same -- that is, the judge, the need to make such decisions regarding reliability prior to hearing the testimony is lessened. This is not to say that expert testimony in this situation need be any less reliable. It simply means the Court can hear the evidence and make its reliability determination during rather than in advance of trial."

I'll just note, although I'm not sure there's -- we didn't find a circuit decision to that effect, there are a number of decisions from various circuits to the same -- for the same principle. In re: Salem at 467 F.3d 767 from the Seventh Circuit. United States vs. Brown, 415 F.3d 1257, from the Eleventh Circuit. White House Hotel Limited Partnership vs. Commissioner, 615 F.3d 321. Gibbs v. Gibbs, also from the Fifth Circuit, 210 F.3d 491. I could go on. But the bottom line is, because this is a bench trial, the gatekeeping function is relaxed a little bit.

Now, that said, I will be curious to hear what Professor Whinston has to say specifically about the issues that Google has raised. In particular, what his opinions are going to be about scale and latency and how he couches them, whether it's more of that in line of somebody who's an economist, rather

than someone who is a computer scientist. I appreciate and know what the limitations are of his background and his expertise. So I look forward to hearing what he has to say and how he says and in what context it arises.

So while I'm denying the motion to prevent him from testifying, it certainly is not without prejudice to raise in the -- later on, either ignoring parts of his testimony, altogether excluding him or diminishing any weight that I would give to it. So okay. All right.

MR. SCHMIDTLEIN: Thank you, Your Honor.

THE COURT: So are we ready to go? Anything else anybody would like to discuss this morning before we bring in Professor Whinston?

MR. DINTZER: Not from the DOJ plaintiffs. We're ready to call Professor Whinston.

MR. CAVANAUGH: No, Your Honor.

THE COURT: Terrific. Why don't we bring Professor Whinston back in and we'll get started.

Professor Whinston, welcome back.

THE WITNESS: Thank you. It's good to be back.

THE COURT: He doesn't need to be sworn in again. He remains sworn.

Good to see you. Welcome back.

Mr. Severt, whenever you're ready to go.

MR. SEVERT: Great. Thank you, Your Honor. Adam Severt

for the United States.

CONTINUED DIRECT EXAMINATION OF MICHAEL WHINSTON

BY MR. SEVERT:

Q. Professor Whinston, did you prepare a slide presentation to facilitate your testimony today?

A. I did.

MR. SEVERT: May I approach, Your Honor?

THE COURT: You may.

THE WITNESS: Thank you.

BY MR. SEVERT:

Q. Professor Whinston, last week, you described your assignment as it related to definition of market power. What was the rest of your assignment?

A. If you bring up slide two, you'll see the rest of my assignment. So first I was asked to determine as a matter of economic principles whether Google's conduct was or is likely to result in the creation, extension or maintenance of monopoly power. And second, I was asked to determine whether any such conduct was or is anti-competitive or was or is likely to result in material harm to competition and consumers.

MR. SEVERT: And just for the record, the slide deck has -- bears first Bates number -- sorry, Exhibit No. UPXD104.

BY MR. SEVERT:

Q. Professor, regarding that assignment, did you form any opinions?

A. I did.

Q. What were those?

A. So if you bring up slide three, you'll see there are three opinions related to those two assignments. They're numbered -- I had two opinions last time. So these are numbered continuing that numbering. So opinion three was that Google search distribution contracts give it exclusive defaults, which are a large driver of search traffic.

Opinion four is that Google search distribution contracts foreclose rivals from a substantial share of each relevant market. And opinion five is that Google search distribution contracts have harmed competition to the likely detriment of consumers and advertisers.

Q. And how do these three opinions fit into your overall analysis in this case?

A. Sure. So, Your Honor, I guess I regard what we did last time as sort of the predicate, setting the stage for really -- now for looking at -- now looking at Google's conduct. And in particular, looking at the effects Google's conduct ultimately has on competition and consumers and advertisers.

Q. Professor, let's go to slide four. And we have opinion three that you just described. What conduct did you investigate in this case?

A. So the conduct that I investigated was Google's

exclusionary distribution contracts, and in particular, the ISA with Apple, the MADA and RSAs with Android OEMs and carriers. And also the RSAs with third-party browsers.

Q. And what conclusion did you reach?

A. My conclusion is that they are anti-competitive and harm competition, and to the likely detriment of both consumers and advertisers.

Q. And your opinion says that Google's contracts give it exclusive defaults. Let's start with Apple. How does Google's contract with Apple give it exclusive defaults?

A. So if you bring up slide five. There are really three ways. First, most prominently, Apple must set Google as the default on all instances of Safari. Second, Apple has to ensure that its Safari suggest feature remains, quote, substantially similar to the way it operated in 2016. And third, Google has a right of first refusal should Apple decide to run ads on Siri or Spotlight.

Q. And practically, what do these provisions prevent Apple from doing?

A. If you bring up slide six, you'll see a variety of things that it restricts Apple from doing. So Apple cannot offer a search choice screen that gives consumers a choice of their default in Safari upon, say, device activation. They can't offer a different default in Safari's private browsing mode. Apple can't offer different defaults by device. Apple

can't offer different defaults in the U.S. versus the rest of the world. Apple can't substantially increase its suggestions for users. And Apple also can't run ads on Siri or Spotlight without giving Google the option to run.

Q. Now, Professor, doesn't the ISA allow, for example, Bing and Yahoo! to have bookmarks in Safari and users can change the default; isn't that right?

A. It does, but the Safari default is responsible for the lion share of queries on Apple devices. Your Honor, I think you heard testimony about this. And so it's -- you know, I take account of the fact in my analysis that there are these other ways for users to access alternative search engines. But nonetheless, the Safari default really is where the vast majority of queries are being entered.

Q. And let's move to Android. How do the Android contracts give Google exclusive defaults?

A. So if you turn to slide seven, you'll see here, Your Honor, the -- just a list of the provisions of the MADAs and the RSAs. I know you've probably heard more than you want to hear at this point about them, so I'll just be very brief.

So the MADA is requiring that the Google search widget be on the home screen. It's requiring Chrome and GSA to be undeletable and be in a Google folder on the home screen. And it's also prohibiting distributors from implementing launchers or otherwise encouraging or helping users change the

out-of-the-box defaults.

The RSAs, they're going further. They -- and they're signed by both OEMs -- I should say, the MADA's signed by OEMs. The RSAs are signed by both OEMs and carriers. And to maximize the revenue share that one of these distributors earns, it has to set the -- Google as the default on all search access points and not pre-install any alternative search service -- where, by alternative search service, the meaning really is general search engines.

One thing -- I know you're familiar with this, but one thing I think to -- is worth highlighting is the redundancy in these agreements. So in particular, around the Google search widget, the requirement is -- on the Google search widget appears both in the MADA and in the RSAs. So in the case of carrier ID phones, no one party can get out of it. So if a carrier decided it wanted to just completely ditch Google, it can't because the OEM has agreed to the MADA.

Q. And Professor, what about third-party browsers?

A. So third-party browsers, the restrictions are similar. It has to be the default for the -- out-of-the-box default for the third-party browser, out-of-the-box in a figurative sense.

Q. And when you say similar, similar to what?

A. Well, say, to the Safari default.

Q. So we talked about exclusive defaults, but if the users can change the default, why do they matter?

A. So, again, I think -- Your Honor, you've heard testimony from Professor Rangel and many others about the power of defaults. I think one thing Google has liked to say over the years is competition is just a click away. It's definitely not a click away in terms of how users behave. And if you bring up slide eight, you'll just see a range of testimony that you've heard about this.

Q. And Professor, what evidence did you look at about the importance of defaults?

A. So in my analysis, I looked at two different kinds of evidence. If you bring up slide nine, you'll see that. One, the internal projections and business decisions of Google, Microsoft and Apple. And two, analyzing the behavior of search users.

Q. Let's talk about the first category, and go to slide 11, the ordinary course business documents. Why is that evidence informative?

A. Right. So these -- just to be clear, these internal projections and business decisions, I'm looking at two sorts of things. One is ordinary course documents, which you've highlighted here from Google, Microsoft and Apple, that estimate the impact of Google losing search defaults. And then second, Google's payments to these search distribution partners. So, I'm sorry, Mr. Severt, could you just repeat your question?

Q. Sure. What's informative about this first category?

A. Well, what's informative about looking at the ordinary course business documents from these parties is these are decisions, Your Honor, that involve billions and billions of dollars. And so when you see these parties, who are very sophisticated, coming up with these estimates, it's very meaningful.

Q. Let's talk about this first bullet, the ordinary course business documents and projections. What did you look at?

A. So the first thing I looked at were estimates around Apple and the Safari default. So if you go to slide 12, this is a document, Your Honor, that you've seen before. I think Professor Rangel testified to it. It was a document -- it's a Google document that was from the period where they were negotiating with Apple around the -- so in 2016 around the -- a potential for the -- what would happen in 2017 with Apple Safari default.

And so what you can see here, Your Honor, just to kind of walk you through it -- I was here when Professor Rangel testified, and there's been a lot of water under the bridge since then. So on the left, you'll see that what they're doing is they're estimating recovery, the Safari search recovery assumptions. By that, what they mean is if we lose the default, how much of that default traffic will come back to us;

how much -- you know, how many loyal Google users are there that are going to follow us even though we lost the default. So on the left -- I can't say the numbers, you'll see the percentage. Stated in terms of the recovery, of course, what the -- whoever gets the default would be a hundred percent minus that.

So you'll see, first of all, that they break it out by iOS versus macOS. So they're separately coming up with estimates for mobile and for desktop. And you can see right away the figure for iOS recovery is much lower than it is for desktop. I think you've heard testimony about this as well, that defaults are more powerful on mobile devices.

And so the next thing to take from this is that they're looking at historical episodes to come up with these estimates. So in the case of the iOS estimate, they're looking at Apple Maps. And so, again, I think you've heard about this, Your Honor, that at one point, Apple -- Google Maps had been on iPhones, and Apple came in with its own map product, and Google lost a lot of traffic. And Google looked to that evidence to see what effect there would be if they lost the search default on Apple iOS devices. And you can see the number that they're coming up with. And they make the point, actually, immediately in the second sub bullet that mobile defaults have more prominence. So they're observing this as well.

And then the second main bullet, you'll see the Mac

recovery. What's that based on? It's based on something that you -- that Professor Rangel also testified about, which is the episode where Firefox, in 2014, switched the default from Google to Yahoo!, and so Google had experience in how much it would lose on -- it lost from that episode. And Firefox, nearly all the traffic is PC traffic, desktop. So that's why they looked to that as evidence for what they would lose on macOS.

And then the bottom bullet is what the -- you know, taking a weighted average of those based on what the revenue mix would be, and that's how they came up with that number.

And you can see from the -- what I put at the bottom, you know, Mike Roszak testified -- and it's something that I had observed in any case, that Apple -- sorry, Google used these episodes as evidence -- Google Maps, Apple Maps episode as evidence about the effect on iOS for many years after, all the way to 2021. It was the last evidence I found about that. And you can see his testimony, that they really -- you know, that was their best estimate.

Q. And Professor, did you see any evidence that Google used these estimates when assessing the potential benefits of the ISA?

A. I did. So if you bring up slide 13. So there's -- pretty much everything is redacted on here, Your Honor. But this is from the same slide deck that that document -- the

slide that we just looked at is from. On the left, you see a document with basically kind of projections of spreadsheets. The thing here is they -- you know -- and so what's getting -- and then I've done some call-outs for you to just highlight some points from it.

So from the left, what I would like you to take from that is they're using those estimates in a very detailed way. They're very sophisticated. And it's not just that they're throwing this number out. They're using it. And what are they using it for on the left in those spreadsheets? It's to figure out how much net benefit they're going to get from this deal. So like a key thing for Google in its analysis of deals is what's the net benefit we get, how much traffic are we incrementally going to get and how much are we paying. And this is something that they started doing back in 2005 or 2006.

Just as an aside, like, one of the fun things about doing this is, like, you see e-mails and such. And so, actually, back in 2005, it seems Michael Dell told Sergey Brin: This is how you should think about defaults, this is how you should think about these deals. Ever since then, this is what they've done. They've basically tried to estimate -- get that net benefit. The way they do it with these recovery assumptions.

So what you can see on the right side is they're using -- you can see right away, all I've done is pull the headers, because, like, going into the numbers, we could be here all

day. They're using -- up on the right, you see they're basing their estimate using that recovery number that we just saw, that I just -- that averaged recovery number, which I can't say it, but that we just saw. And you can see on the right in the kind of orange, you can see in parentheses the two separate things that they based it on that we just saw.

A second thing that you can see in the second header that I pulled out is, actually, you'll see what Apple asked for. Actually, you can see their nickname for Apple at this time, you know, clearly because Apple was the Big Apple, and that's why they have that acronym for it. So you can see Apple asked -- what Apple asked for in terms of a revenue share level. One of the things, if you looked at the numbers -- and you can see in the last call-out, is that at that proposed revenue share number from Apple, they still were going to make money, okay. They still were going to make billions of dollars of profit on that increment of paying less than it's worth to them.

But that's not actually the revenue share that they paid. They actually paid much less than this in the end. And so you can see that -- you know, this gap in terms of what their net benefit actually ended up being. Again, you can -- one can go into the details in that slide -- in that spreadsheet -- in the pictures of that spreadsheet to see the numbers specifically, but I didn't think for our purposes here it would be worth it.

Q. And then, Professor, you talked about evidence from Google. What about evidence from Microsoft?

A. So Microsoft was trying to get this -- and hoping to get the Safari default. And they also estimated what -- how much traffic they would keep if the -- if they got the default and Google lost it. So if you bring up slide 14, Your Honor, you'll see Microsoft's estimate. And again, on the left you can see a pretty detailed -- and again, I won't go into the numbers, a pretty detailed analysis of what the share shift would be if that happened. And on the right, you can -- the call-out is telling you the bottom line of it: What would the change in Bing's share on iPhones go from today -- that is, when they don't have the default, to post-deal where they do have the default. And so that's an estimate from 2018.

Q. And what does that tell you about how much the mobile default traffic would shift to Microsoft if it won the deal?

A. Yeah, so the thing about this -- the numbers that I'm showing you right here is these are the overall market shares on the phone. If you translate that into what share of Google's default traffic would it lose and recover, it's actually a slight -- it's very close to, but slightly more powerful default estimate than what I just showed you Google was estimating.

Q. And what did Microsoft rely upon in reaching this estimate?

A. So if you bring up the next slide, slide 15. So this is another Microsoft document, Your Honor. It's not from 2018, like what I just showed you, but it's back from 2016 at the same time as those Google documents, where they're also doing -- in 2016, they had started doing estimates.

What you can see here is what they based their estimate on. And it was a different piece of information. I guess -- I don't even -- it seems like I can't even say what that is, not just the number. But it was a different episode than the Apple Maps episode. They were looking at evidence on what they knew about a certain device, mobile device, and what their share was on it.

And then I think to kind of reiterate how important these decisions are, Your Honor, Jon Tinter from Microsoft testified about this, and I think was basically -- it's all under seal and I won't say -- you know, read any of the specifics. But basically saying, to paraphrase, if I'm in a position where I'm affecting billions of dollars of business for my company, I'm going to do a pretty good careful estimate of what the effect would be.

Q. And in that document, the 2018 document, did Microsoft also estimate share shifts for PCs?

A. They did, Your Honor. So the 2018 document we looked at was for iPhones, and in my report I also have similar estimate -- similar part of that document that did PCs and,

actually, PCs and iPads as well. And you're seeing very similar effects to what we saw in the Google document.

Q. And then --

A. And similar effects, I should say also, that the mobile estimate is much bigger than the desktop estimate.

Q. And how about from Apple? Do you see any evidence from Apple?

A. I have. So if you'd bring up slide 16. You'll see Apple's estimate -- this is from 2016 also, of overall what they thought the -- you know, they were interested in, well, if we go with Microsoft, what -- how much -- how many loyal Google users are there that are going to follow Google. The answer overall was something very closes to what the other two firms were estimating.

Q. So we talked a little bit about iOS estimates. Did you see any similar analyses for Android?

A. I did. So if you go to slide 17. Again, this is -- the whole call-out is redacted, so I won't say anything about the numbers. But in 2017 -- this is a Google document, Your Honor. In 2017, Google was in the process of negotiating with Samsung, and they were -- there was a -- the issue was, well, if we lose the default on Samsung, what's going to happen.

And what did they do? They looked at the episode again -- I don't know if I can say. Your Honor, you can read what episode that they -- what information they looked at, one of

which is something we just talked about and one is actually something that we're about to talk about. They came up with a quote. Here it's called a clawback number, but clawback is another word they sometimes use for recovery. And so you can see what that was.

Q. Professor, you listed Google's payments on -- sort of taking us back to slide 18, your second bullet was Google's payments to search distribution partners as evidence of the power of defaults.

What does the size of payments tell you about defaults?

THE COURT: If I can interrupt you for a second, Counsel.

I think Professor Rangel touched on this, but what is the explanation for -- if the premise is the defaults are difficult to move away from, what's the explanation for, then, some percentage that's not insignificant of people actually moving away from the default if it's not Google?

THE WITNESS: So, Your Honor, the -- I think the thing is it's not uniform across the population. So some people are -- whether it's because they're -- Professor Rangel is a behavioral economist. I'm not. I'm a rational economist. So whether you call it costs or you call it some kind of behavioral response, there's variation in the population to that.

And some people, if they, quote -- you know, you might say they might have preferred the non-default search engine.

They -- they might have preferred the non-default search engine. Some people will go and make the change and others won't. And we're going to talk, I think, soon, when we talk about foreclosure measures, we're going to talk about this fact and what it implies for thinking about foreclosure measures. But that's how I think about it.

THE COURT: I guess the question then, though, is to what extent -- if there are some consumers that view the cost of switching as negligible and they do switch, isn't Google's response, well, the reason they're making the switch is because they're switching to a better product? And so options like a choice screen, for example, would not really alter the alternate mix of search engines if it were offered?

THE WITNESS: Yeah, great question. I think a really, really important thing to keep in mind is that that can be true at the current qualities, but not true if rivals were at, say, invested and became better. So just what's happening when you see right now that what consumers are doing doesn't tell you in some sense -- ultimately, we're going to talk about competitive effects and but-for worlds and the like -- doesn't tell you what these defaults are doing to say rivals incentives for investment.

Because when rivals are thinking about investment, they're thinking, well, what if I get much better. And we're going to talk about -- I mean, your question -- you kind of did this

last time. Your question's kind of leading into a lot of other things.

THE COURT: Fair enough.

BY MR. SEVERT:

Q. Okay. Professor, on slide 18, you have a bullet about Google's payments to search distribution partners. What do the size of the payments tell you about defaults?

A. So if you bring up slide 19. So the thing -- Your Honor, this is a figure just showing what the -- Google's payments are to different groups, Apple, Android M&Os and OEMs and third-party browsers, of what in total Google paid for -- in revenue share in the U.S.

And the thing is, just to -- I think I should have said -- probably said this first because it was really what your question was, Mr. Severt. Is when you see Google paying billions and billions and billions of dollars, there's got to be a reason. There has to be a reason it's worth doing it. As an economist, you know, that's what is kind of the first thing that slaps me in the face.

So here, you're seeing, yes, Your Honor, they are paying many billions of dollars. And I should say, I know you've probably -- Your Honor, you've probably seen numbers for what revenue share payments are. And these are smaller, because the numbers -- sometimes, perhaps because the numbers you've seen perhaps are worldwide while these are just for the U.S., okay.

There are two bullet points at the bottom, just to kind of -- the first one is to just put this in perspective, and it just tells you for fiscal year 2020 what share of Apple's total operating income was the payment from Google, and it's large. The second thing is to recognize this isn't everything in a sense that Google is paying, because it doesn't count the fact that they give away the must-have Play Store for free in order to get the MADA signed. So on top of these RSA payments, Google is handing over the Play Store, which Android -- again, you've heard Android OEMs have to have to have a marketable Android device.

Q. Professor, does the percentage revenue share that Google pays partners tell you anything about the defaults?

A. It does. So, Your Honor, we just were speaking about just the absolute dollars that Google is paying. You can also think about this in a different way, which is what's the revenue share percentage that they're paying. And the same logic kind of applies, which is if they're paying a given revenue share, it has to be that losing the default would shift that amount of -- that share of revenue. So whatever the revenue share percentage is, it's a lower bound estimate on what the actual share shift would be. So if you bring up the next slide, slide 20, you'll see what that implies for Apple.

Now, I want to emphasize this is just a lower bound, because we've just seen evidence -- lots of evidence that

actually the share shift is bigger than that, and that Google actually would make profits at substantially higher revenue shares. But it is just kind of another way of thinking about the money on the table and what it implies about what Google must see as the value.

Q. And Professor, just to go back to slide 19 just for a moment, I had one clarifying question. Is the -- sorry, slide 19. There's a box at the top with some redacted text. I want to just ask if the redacted text in the header -- I don't want you to say it, but is that another reason why the numbers here are smaller than what the Court might have heard?

A. Yes, thank you. So, Your Honor, here I'm counting only the payments that were made for the queries that went through exclusionary -- through search access points for which Google has exclusionary payments. And when we get to talking about coverage, for example, there are some places -- for example, with Apple, there are some things that Google is paying for that you might say, oh, that's not exclusionary, and so I'm not counting those here.

Q. Okay, Professor. I want to go to slide 21 and talk about the second category of evidence that you described earlier, which is the observed behavior of users. What did you look at there?

A. So I looked at three things that you see listed here.

Q. And let's start with your first bullet, the 2014

Mozilla Firefox default switch. I think you said earlier that Google relied on this for its estimate, but did you do any analysis of this event?

A. I did. So if you bring up slide 23, you'll see, Your Honor, that -- again, it's redacted, so I won't say any numbers or anything. But this is just literally a daily -- a graph of search shares by day. And the source of this is Google's DisplayNav data.

What you can see, if you recall in November 2014, Firefox switched the default from Google to Yahoo!. What you can see from this is right at that day and the next couple days, you know, a jump in default -- in the traffic shares here. You can -- I don't -- down at the bottom is the implication of what -- how many percentage points of share Google lost. And on the right, in that bullet point is telling you what the share of its default traffic -- what that implies for the share of its default traffic that it lost.

It's pretty much dead on what the slide that we looked at from Google -- you know, Google managed to do this analysis some amount of years before I did, and that's what was in that slide that we looked at a little while ago, and that Professor Rangel had also shown you.

So you can see that jump. You can see there's some evolution in shares over time, and then you can see back in 2017, Firefox default was switched back to Google. And you can

see the jump there. And it's a little smaller, but there's a jump as well. And, of course, if defaults didn't matter, all of this would have been a nice, smooth -- maybe not line, but curve. You wouldn't have seen these jumps.

Q. Professor --

THE COURT: I'm sorry, is the number here lower than the estimates we've seen for -- well, let me ask you: Is the hypothesis that the number here in terms of actual switching is lower than what's estimated because switching is more difficult on mobile?

THE WITNESS: Are you referring to the number on -- oh, I'm sorry, let me be clear about this. So this is for Mozilla Firefox.

THE COURT: Right.

THE WITNESS: Yeah, sorry, I now understand. Yes, so this is Firefox, almost all of its traffic -- actually, not only that. This is actually focusing just on its PC traffic, if you look at the title.

THE COURT: Right.

THE WITNESS: Almost all of its traffic actually is PC, but exactly, you have it exactly right.

BY MR. SEVERT:

Q. I think on Page 24, you have your next example: The EU and Russia choice screens. Why did you look at those events?

A. So I looked at the EU and Russia choice screens because they are one of the very -- other than the Mozilla Firefox change, they're one of the very -- really, the only other cases where we see an actual default switch from one search provider to a different way of the defaults. You know, different default situation.

It's important to recognize this is not -- the previous things we looked at, Your Honor, were switches of a default where a default switched from Google to a rival. And here, it's different, it's a switch from a Google default to a choice screen. As I think Professor Rangel touched -- showed you some things about this, the choice screens were a little different in the way they worked in Russia and the EU. But in both cases, it was to a choice screen.

Q. And what would you expect to see with the choice screen that would be different where there's an exclusive default?

A. So the thing about a choice screen is you're seeing users -- at least if it's a well defined -- I'm sorry, a well designed choice screen, you're going to see users preferences over search engines. They're going to choose.

Q. A few minutes ago in response to the Court's question, you talked about the quality or strength of rivals. How does the ability to overcome an exclusive default depend upon the strength of rivals and applies to choice screens also?

A. Right. So it does apply to choice screens, and in a very strong way. So if everyone -- if Google is much, much stronger than its rivals, okay, then you may not see very much shift from a Google default to the choice screen in terms of shares because Google is much stronger than rivals, and at that moment, what you're seeing in the choice screen is what user -- consumers preferences are at the time the choice screen was instituted. And so that may hide the power of defaults.

Q. Can you give the Court an example to illustrate the point?

A. Yes. So, Your Honor, this -- and I think this point touches on exactly the question you were asking me 10, 15 minutes ago. So like, imagine, for example, that we had -- just to take an extreme hypothetical. Imagine that we had a default that was perfectly powerful, nobody ever leaves the default when it exists. So the power of the default there, a hundred percent, infinite, just nobody can leave the default.

And imagine, as well, that we have a search engine, say Google, that has the default to start with, and then we move to a choice screen. And that that search engine, say Google, suppose it's preferred by 99 -- at that moment, preferred by 99 percent of the population, okay.

What will you see in the choice screen? You'll see a 1 percent shift, from a hundred percent of everybody picking Google to 99. But we have a completely powerful default by

hypothesis, right. Nobody would ever leave that default. And in particular, if rivals got better -- suppose someone invested and got to the point where 30 percent of the population preferred the rival -- you know, instead of 99 percent preferring Google, only 70 percent preferred Google.

Now if you ran -- if you did the choice screen, you'd go from a hundred percent to 70. And so you would -- in the case where the rival had improved, you would see the power of the default, but you just don't see it when Google is preferred by everyone.

And why is that going to matter? It's going to matter because of the way it impacts investment incentives. When a rival is thinking, gee, should I spend a ton of money to get better, and it's thinking, what can I get -- how much traffic will I attract if I do that, when we get to competitive effects, the fact that the power of the default is there, if it got better, like that would have a big impact on traffic if it got better, will be really important.

THE COURT: So these numbers are not -- I take it the numbers on the right column -- oh, I guess I'm a page ahead of you.

Can you flip to the next page, please.

So the number on the right column is a market share number; is that right?

THE WITNESS: Yeah, I haven't explained it.

THE COURT: Why don't you explain it, then I'll ask my question.

THE WITNESS: Sure. So slide 25, what I'm showing here, Your Honor, is information about the choice screen outcomes. And just to be clear, if you remember, there were different versions of the choice screen. This is looking at the third quarter of 2021, when we had the kind of good choice screen implemented, not the one that kept the popular rivals off that had existed before.

THE COURT: I'm sorry, say that again.

THE WITNESS: Sure. So I think -- I can't remember now. Sitting in the courtroom, I don't remember exactly whether Professor Rangel went through this. But the remedy in EU, there were three stages of it. The very first stage, what happened is it really wasn't so much a choice screen to switch -- it wasn't switching your default. It was just to download things onto your device.

Then they went to a choice screen that was an auction. People had to bid to get on the choice screen. And you bid -- what happened -- hopefully I'm going to describe this right. You paid only if someone selected you. So it was kind of like the ad auction. Google had proposed this. It was kind of like the way they run their ad auction, like only if someone clicks and chooses you as the default from the choice screen do you end up paying in this auction.

But the result of that was lots of popular search engines, like Ecosia or DuckDuckGo, that have lower monetization didn't have -- like, it wasn't economic for them to bid, and so they didn't get on. And in fact, there's -- one of the latest issues of the American Economic Review has a paper talking about this flaw in the choice screen. So it became widely known this was a flawed choice screen.

And then starting in the third quarter of 2021, they changed it so that popular choice -- sorry, popular general search engines would all be on it.

So this is data from that non-flawed choice screen. On the right is just showing in -- back before the choice screen, actually back before any of the remedy, how strong Google was in terms of its mobile market share in these various European countries. This is stat counter data, and it's just reporting their shares. What you can see is, for the most part, Google is incredibly strong in European countries. Actually, all the way down at the right in the blue, you can see what Google's share is, which we already talked about, in the U.S. in those years.

You can see in these European countries, for the most part, Google was actually even stronger than it is in the U.S. There are exceptions. One is the Czech Republic, where there was a moderately strong search engine, Seznam, that had an 87.7 percent share before all of this happened.

The left column, which is redacted, is showing you what was the share in each country of Google's selections on the choice screen. What you can see here is, pretty uniformly, it's lower than the market share numbers. And also, it's bigger in the Czech Republic, where there was a stronger rival. And that's going to be a theme that when you -- and it's not a surprising theme, that when you have a stronger rival, the choice screen makes a bigger difference. Because now it's not the 1 percent example, it's the 30 percent example that -- and it can really move share.

And so one thing that I did here was I ran a regression analysis to -- that verified that point, that the stronger was the mobile phone share for Google -- or maybe a different way to put it, the stronger were rivals in terms of their share, which is one minus the Google share, the better they did in the choice screen. And --

THE COURT: And the variable for strength was market share prior to the choice screen?

THE WITNESS: Correct.

BY MR. SEVERT:

Q. And what did this regression mean for the United States?

A. Right. So, Your Honor, one thing you can do with that regression, once you've identified how strength translates into choice screen shares, is you can -- I could ask, well, suppose

I -- the same choice screen had been run at the same time in the U.S., where we've just seen, you know, rivals are weak in the U.S., but they're not as weak as they are in Europe.

So you can use that regression analysis to predict what the choice screen share would have been if you had had a choice screen. I don't know whether I can say that number.

Q. You can say the number.

A. Okay. So the bottom line on that would be the -- at least my estimate would be rivals would get about 10 percent of the selections.

Q. And is that prediction surprising to you?

A. As I said, no, because the --

THE COURT: This is on mobile?

THE WITNESS: Yes. Actually, on Android, not just mobile.

THE COURT: Just Android?

THE WITNESS: Yes. So the choice screen here was just implemented for Android phones in Europe.

THE COURT: I see, okay.

THE WITNESS: And so, no, it's not surprising for the reason that we talked about. Like the rivals are weak. If you run a choice screen and they're weak, you're going to see people's preferences, which is going to be for Google.

BY MR. SEVERT:

Q. And have you seen any other examples to illustrate the idea that the strength of rivals impacts the outcome of a

choice screen?

A. I have. So if we turn to slide 26. So the other choice screen, Your Honor, that I know you've seen --

THE COURT: Sorry, before you answer this, can I just ask a different question, it's the one I was going to ask earlier. The market where there is not a strong rival, the market share -- the number of -- there's not a large delta between the market share and the choice made. I mean, it varies, but it's not 50 percent.

THE WITNESS: Right.

THE COURT: In that circumstance, is there any -- I mean, is a choice screen truly effective in the sense that you're not necessarily driving that much more traffic to the rival? And if the whole theory here is that the rival will improve by more traffic, it's not clear to me that a choice screen accomplishes very much.

THE WITNESS: Right. So there's two things -- and we'll -- we're going to talk about this a lot. So it's a great set up --

THE COURT: I'm jumping ahead again.

THE WITNESS: It's okay. It's perfect. I like having people lay the -- open the door.

So it's going to be two things. One, just the move of share is going to tend to have a feedback kind of effect, which is we're going to talk about how getting more scale improves

your quality. And you've seen testimony about that. And of course, once you get more scale and your quality goes up, now your choice screen selection share goes up, which then gives you more scale, and so forth. So that can go -- over time, you'd expected that that could increase things.

Second, it is going to change incentives -- and this is a really important point.

THE COURT: Sorry, so why would you assume that, though? In other words, say you're right that some additional traffic does lead to some additional improvement. It's not clear to me why that then means the next time the next -- the next time a phone is purchased, that more people will make a different decision based upon the improved quality of a rival that the person may not know about. In other words, it's not clear to me why the share would not essentially remain static even with some marginal improvement by the rival.

THE WITNESS: So if we think that choice screens are revealing preference, and we think preference is related to quality, the different qualities that the different rivals have, then at least -- let's put it this way: At least if you were to -- if Google's quality were to stay unchanged and the rivals were to get better because they got some scale, then we would expect more preference -- some preference shift away from Google towards the rivals, for some people. And then --

THE COURT: Is the idea that's because reputationally -- I

mean, an enhanced reputation would cause people who otherwise might not have switched the first time to switch the next time they buy a phone?

THE WITNESS: Right. So, you know, you would -- you know, rivals start getting reviewed in PC Magazine or the equivalent of it online, and friends have used it -- I mean, the assumption with a choice screen is, of course, that people are going to -- when I say it will reflect preferences, it has some element of that they know something about these -- the choice that they're making.

THE COURT: Right.

THE WITNESS: So if they do know something about -- of course, if they know nothing about the choice they're making, maybe it would be static. But if they know something about the choice they're making, then this relation that we saw already and we're about to see even more of in a moment when we look at Russia, between quality and strength and choice -- you know, the effect of the choice screen, you would expect to see an impact of that.

THE COURT: And just to change the circumstance slightly differently. To markets where there was what you would consider a more effective rival, did the presence of a choice screen increase the rival's -- was the percentage of choice for the rival greater than their preexisting market share? In other words, was there some sort of bump or multiplier by

virtue of having the choice screen?

THE WITNESS: Okay, thank you. You've led into the next slide.

THE COURT: Okay, sorry. Let's go to the next slide.

THE WITNESS: So slide 26. So this is Russia, Your Honor. In 2015 -- just to -- again, I don't remember exactly what Professor Rangel described of the circumstance. But in 2015, Russia -- there was a finding by competition authorities in Russia that ended up in August of 2017 leading to the initiation of choice screen.

The choice screen, just to say another word or two about it, was -- there actually were two different things that happened. For existing users, when they accessed the Play Store for the first time -- I think it's the Play Store, I may be -- it may be either Chrome or the Play Store, what they got was a choice screen asking them what they wanted to do for the Chrome default. It didn't change the widget default, but it changed the Chrome default.

And then as new users -- as we had new devices coming in, a new device would get a choice screen when it first was booted up that would affect both the Chrome default and the widget, the search widget. Again, this was all for just Android.

Now, coming to what you were asking me, the thing about Russia that's really striking is you had a strong rival in Yandex, and you can see that before the --

Nothing is redacted here, correct?

BY MR. SEVERT:

Q. That's right.

A. Okay. You can see that before the choice screen, Yandex had about a 35 percent market share. So it was stronger than Seznam in the Czech Republic. It was quite strong. And, in fact, Google has done side-by-side tests where they show that Yandex and Google quality in Russia are about equal. And, of course, Yandex might have some local national preference for it.

But nonetheless, before the choice screen, Google had these exclusives -- defaults in place and its share on Android mobile phones was in the 60 to 65 percent range. The choice screen comes on -- starts to come on where you see the vertical blue line; that's August 2017. And then what you see is a complete reversal of share, okay.

Rather than Google having 63 percent and Yandex having 36 -- or 37 percent before the choice screen, within two to three years, the share has completely reversed. And so we're seeing almost a 20-point change in Yandex share.

And so you asked a moment ago, are there circumstances where we see a stronger rival and we see a big change. You see it here. Now, it's not a bump immediately. And the reason it's not a bump is when the choice screen is instituted, it's only as these -- you know, people start getting the choice

screen and start getting new devices that the change starts happening. So it took time for it to actually filter through, but you can see the dramatic effect.

Q. And did Mr. Parakhin testify about this?

A. He did. So, Your Honor, you've heard Mr. Parakhin say something very similar in his testimony.

Q. And Professor, how do you know that it was the choice screen that caused this change and not something else?

A. Right. So, Your Honor, I think it's an immediate question one has is, oh, is it something about maybe Yandex got much better in this time period or Google got much worse or maybe there was a rise in anti-American sentiment because it's Russia, after all. You can think all these things.

If you bring up slide 27, you can see, no, that's not it. It's the choice screen. So in this figure, Your Honor, you see in red the same curve about Google's share on Android. In blue is its share on Apple phones, iPhones. In yellow is Google's share on PCs. So if it was anti-Americanism, you would expect to see it on all of these things. You don't. You only see it on Android.

Q. Professor, turning to slide 28, I think your final example is Google and Bing's relative share by browser. What did you look at there?

A. So if you bring up slide 29, Your Honor, this is showing you data from -- again, from Google, Google data,

showing you Google's share on different browsers. And what you can see here is on the left, four browsers -- sorry, Google's share is in red -- and this is just showing you Google and Bing's share. Google's share is in red; Bing is in blue.

The four browsers on the left, they're browsers with a Google default. The two browsers on the right, IE -- Internet Explorer and Edge, are Microsoft browsers that have a Bing default. I should say, you know, this is Edge -- IE is an old browser that is almost not used anymore. So I guess Edge is more of the thing to look at. But you can see the really big difference here.

And just to remind you, something I couldn't say earlier but was in the slides, you know, one of these browsers -- the share on one of these browsers is something Google looked at in estimating effects.

Q. And Professor, just so we have a clear record, did this analysis rely on data from both Google and Microsoft?

A. I'm sorry, yes, thank you very much. So it relied on -- I'm using both Google and Bing data in terms of what their queries received on different browsers was. Thank you.

Q. Professor, there's been argument and testimony during this trial about Google's share on Windows PCs. Did you look at any evidence relating to that?

A. I did.

Q. What did you find?

A. If you'd bring up slide 30. So, Your Honor, this slide is showing you information about two different kinds of PCs, what Google and Bing's and others shares are. On the top are Windows PCs, and on the bottom are macOS PCs. And you can see the change in share. You can see -- and, you know, the way to think about this comparison is these are both PCs, and on one of them Google ships with a pre-installed default in Safari, and on Windows PCs the pre-installed browser is Edge with a Bing default. So you can see the change in share that it has, which is redacted, but it's in the first bullet point.

Q. Professor, the difference here seems lower than your estimates of the importance of defaults. Why is that?

A. So, Your Honor, the difference here is -- I think there's been some attention on this. I can't remember whether it was mentioned in the opening, about this number, and it's only the percent that you see there. But the thing is, this percent -- so first -- you know, how to -- what do we think about this percent? Well, this percent is percentage points, and the estimates I showed you before were about how much Google would lose if it lost its default, what share of its default traffic, okay, which is a different number.

And if you translate this number into what share of Google's macOS default traffic would Google lose, it's the number in the second bullet point. And that number is bigger than the estimates I showed you earlier.

So rather than Windows PCs being evidence against the importance of defaults -- you know, that undermines the other evidence, it's actually stronger evidence about the impact of defaults. And the thing is, why is it low, why is it only -- even so, only the number on the bottom? Well, these are PCs. These are desktop. They're not mobile. We know that on mobile the number is much bigger. What I'm just trying to say to you is this number is bigger than the number I showed you earlier for PCs.

Q. And now that you've discussed all these different pieces of evidence about the power of defaults, did you calculate any kind of bottom-line statistic that summarizes what you've learned about the importance of Google's defaults?

A. I did.

Q. And how did you do that?

A. So, Your Honor, to try to give you --

THE COURT: I'm sorry, I want to make sure I'm understanding the slide here. So the second bullet point is what you have determined would be the amplification of Bing's share that's currently in the second column. The second bullet point reflects your estimate of what the change would be in terms of the default traffic?

THE WITNESS: Right. Let me think about --

THE COURT: Well, I'm just trying to understand why the numbers are different and what accounts for the difference.

THE WITNESS: Right. So the previous numbers -- when Google was doing these recovery estimates, it was saying, okay, right now on iPhones we -- you know, on Apple devices, we're getting -- you know, we're paying for these exclusive defaults, and we're getting a certain amount of traffic. And what would happen if we lost that to a rival, what share of that query traffic and revenue would we lose.

So the number here in the first bullet point is not that, it's the overall change in share on the device. But a bunch of traffic on the device that is not -- first of all, it's not traffic google's getting. Some of it's going to other search engines, and also, even the traffic that Google is getting, only some share of it is -- smaller share of it is stuff that's going through the exclusive default in Safari, okay.

So to make it apples to apples to that previous recovery estimate, what we want to do is look at, okay, what is going through the Safari default, the exclusive default, in macOS for Google on macOSs, and what share -- that number in the first bullet point, what share of that does that first number in the bullet point represent? And that's the second bullet point.

So it's taking that number that was the overall change in share on the device and saying, well, what does that tell me relative to what Google's default traffic on macOS was? How much did they -- you know, the exercise is to say pretend -- in some sense, pretend macOSs and Windows PCs are exactly the same

thing, just the only thing is -- you know, think of it on Windows PCs, Google has lost the default. What would the recovery -- what would that tell you about its recovery?

And so that's what the second number is. It's a comparable number to what we -- you know, exercise to what the estimates before were, and it's a bigger number than what the estimates before were.

THE COURT: So these numbers are estimating -- to make sure I understand. These numbers are estimating a world in which the Safari default on Mac PCs was -- and how much recovery Google would get and what their loss ultimately would be?

THE WITNESS: Yes.

THE COURT: Okay, thank you.

THE WITNESS: Yeah, sure.

BY MR. SEVERT:

Q. Okay. Professor, I think we were talking about your bottom-line statistic summarizing what you learned about Google's default. How did you calculate that number -- or how did you go about finding that number?

A. So, Your Honor, what I wanted to do was come up with some exercise that would kind of give you a sense of how significant that -- those shifts are that we've just talked about, you know, from Google having a default to losing it to a rival. And so what I did is I used the estimates from -- that

we just saw from Google and Microsoft, and as well the -- I also had looked at the Mozilla actual effect, but that was the same as what Google had looked at.

But I used those estimates with the following kind of thought exercise, which is suppose I took all of Google's exclusive defaults in the U.S., and I switched them to a rival. So we take all of them -- not one at a time, we take all of them -- and we switch it to rivals, and we use those estimates from Google and Microsoft and Mozilla, and the actual Mozilla effect, what share of U.S. traffic would switch to rivals? And so if you bring up slide 31, you'll see that number -- which is in the first bullet point, which is that 33 percent of all U.S. queries would switch to rivals.

Just as an aside, we've seen that mobile defaults are more powerful. As a sub bullet, it's the same -- I'm showing you the number -- this is redacted -- of the same thing if we were just looking at mobile queries, okay. And to put it in perspective, that 33 percent shift in queries that we've already talked last time about market shares would quadruple rivals' total U.S. market share. So a shift in exclusive defaults, these defaults -- the power of the defaults is very significant.

Q. And Professor, why did you rely upon the estimates from Google and Microsoft in reaching the 33 percent number?

A. So --

THE COURT: I'm sorry, when you say the Google-Microsoft data, you're not referring to the thought experiments that Google was performing. This is actual numbers; is that right? In other words, I don't know whether the --

MR. SCHMIDTLEIN: The NYC scenario?

THE COURT: Yes, yes.

MR. SCHMIDTLEIN: The thought experiment.

THE COURT: That's right, calling it the thought experiment. Is that an input in this --

THE WITNESS: Yes. So when I'm using -- remember, those -- I don't want to call them thought experiments, because I think it understates the importance of those estimates. Those are estimates that are affecting billions of dollars for these companies, okay. So I think those estimates are extremely valuable estimates.

Google has used those estimates for years, okay. It wasn't a one-shot thing in 2016. In my report I have a list -- you know, an entire page where I'm going down, they used it here, they used it here, they used it there, all the way to 2021. And I've heard Mike Roszak testify -- I think his first name is Mike, Mr. Roszak, sorry, testify that they don't have any better estimates. And you heard Mr. Tinter testify how important those estimates were to him.

So those are the estimates that I'm using here, and I'm asking, given the traffic that's going through all of these

exclusive defaults, if you use those estimates -- which are also in the case of Google confirmed by -- Google on PCs, confirmed by what I looked at in Mozilla, if you use those estimates, what do you get for the overall shift in U.S. queries?

BY MR. SEVERT:

Q. And Professor, when you did your estimate, did you -- and switching Google's exclusive defaults, did that include switching the Google default on Windows Chrome?

A. No, no.

Q. Let's go to slide 32. I think this is your fourth opinion. Can you restate what your fourth opinion was in this case?

A. Yeah, this is my fourth opinion. So what is my fourth opinion? It's that Google's search distribution contracts foreclose rivals from a substantial share of each relevant market.

Q. And how did you go about reaching this opinion?

A. So, Your Honor, I know that in your summary judgment opinion, the measurement of foreclosure was something that you regarded as very important. So what I did here -- if you'd turn to slide 33. What I did here was -- and showing you is how -- is the Areeda and Hovenkamp definition of measuring foreclosure, which is that foreclosure is measured by looking at the percentage of the market that's tied up by the

contracts. So that's what I have tried to do as a measurement.

Q. And does this Areeda definition of foreclosure make sense to you as an economist?

A. It does, because what it's doing is it's identifying kind of the fundamental force that these contracts are having. When I get to competitive effects, I'm going to use these estimates to inform my analysis of competitive effects. But what this measurement is doing is it's kind of at a first level asking, well, what do these contracts do if they're in place.

Q. And were you able to identify a specific percentage of the market that's foreclosed by Google's contracts?

A. Not exactly. Your Honor, this comes back, again, to this discussion in your questions. So there's a question of what "tied up" means. And in particular, we talked about how consumers have some variation in how affected they are by defaults. And so when you're thinking about how tied up the contracts make things, as we've already -- kind of the conversation we've been having, it depends on the strength of rivals.

And so what I've tried to do here -- and, you know, at some level, it's not an economic decision in terms of this. It's what you think is kind of the right measure. So what I've tried to do is -- and I'm going to show you is a range, and I'm going to explain how that range is related to strength of rivals, where you can then think about what you think is the

right definition.

In the end, when I get to competitive effects, I'm going to use all that information. But in terms of what -- for legal purposes you find the right thing, I'm just trying to provide you with the information for you to think about that.

THE COURT: To make sure I understand. So at the most general level, what the foreclosure rate is in your thinking, it's here's the full market for search, say it's a hundred searches a year -- obviously, that's not right, but a hundred searches. The tied-up portion, at least at the most general level, is the percentage of that hundred that is attributed to those contracts in which Google is the default, the paid default, correct?

THE WITNESS: So I'm going to show you a range. It depends what you mean by attributed to. If you mean coverage, that's going to be one end of this range. I'm going to show you something else, too. But we're going to -- the way you started describing that in terms of the whole market, that's exactly what I'm going to show you.

THE COURT: Okay. And your range is not the coverage range because -- maybe I'm jumping ahead. You're assuming that some number of people are going to stick with Google no matter what?

THE WITNESS: So let me go two or three slides and I think it will help.

THE COURT: Fine, go ahead.

THE WITNESS: Totally fine. I'm just trying to do it in the most helpful way.

BY MR. SEVERT:

Q. What's the range that you identified?

A. So the range, if you look at slide 34, at the high end, it would be 50 percent. That 50 percent is -- where do I get it? It's the share of U.S. queries that are, quote, covered by Google's exclusive defaults. They're the queries that are going through the defaults that are affected by exclusionary provisions.

At the low end, kind of a lower bound is 33 percent -- and this is percentages of all U.S. queries, Your Honor. And what is that doing? It's the share of U.S. queries that Google's exclusive defaults make unavailable even to a much stronger rival. So the -- anyway, let me pause there, and you can --

Q. What do you mean by much stronger rival?

A. So by much stronger rival, Your Honor -- and let me first just say, a way to think about the first number -- and we're going to come back to that -- is the ones that are going through the exclusionary defaults are ones that are affected to some degree by the presence of a default. That is, it's not just all of those queries. It's not just Google's quality that matters. But also there is a default in place, and that can matter. So that's what the 50 percent is going to be.

The 33 percent is to think about an exercise where -- imagine rivals became like almost unimaginably better, where -- the thing I like to think about you're sitting at a restaurant with your friends, and a question comes up, like, nobody knows the answer. And everyone immediately says let's DuckDuckGo that. Nobody's talking about Googling things anymore. DuckDuckGo has become so good that everyone -- that that's what everyone uses as the verb, okay. Or it could be another rival, I'm just picking DuckDuckGo. But some rival has improved that much that it's gotten -- you know, which is almost unimaginable, but imagine that they did.

What do I mean by that? The exact thing I mean by it is they've gotten as much better than Google as Google now is better than them. That's what it's going to be when I think about that. I'll use a fanciful shorthand, because that's a mouthful. The rival has become Super Duck, okay. It's just a fantastic search engine that is that much stronger than Google.

So that's the -- where the 33 percent's going to come from, is asking what share of queries in the U.S. -- from these covered queries, what share of them would a rival be able to access when it got that good, and what share would nonetheless stick with Google -- which is now not nearly as good as the Super Duck, but would stick with Google just because it's the default. That's the way I'm thinking about this other extreme. So that's the range that I'm kind of trying to show you.

Q. And if we were looking just at mobile, what -- how would that impact the range?

A. So the range on both of these, if we looked at mobile, would be bigger numbers. I don't mean the range would be bigger, I mean the high end would be bigger on mobile, the share of covered queries is higher, and as well the lower bound would be higher. I'm not going to go further into talking about mobile. I'm going to stick with the overall estimate. but just to state that.

THE COURT: So the 50 percent number, let's just start there. So that's share of U.S. queries covered by Google's exclusive defaults. And by that, do you mean that half of all U.S. queries input into a search engine are subject to either an RSA or the Apple agreement?

THE WITNESS: Yes, with -- except that I've done it kind of conservatively. So I'm not counting, for example, queries coming through the bookmark in Safari -- on an iPhone, because arguably somebody might say, oh, the bookmarks, Yahoo! and Bing and Google are all there. So when I give a coverage number, I'll show you, it's not going to have those in it. It's not going to have queries where an individual went to the Google search app on an iPhone.

THE COURT: Right, or anything through Chrome.

THE WITNESS: Correct.

THE COURT: Which is probably the biggest number of the

remaining 50.

THE WITNESS: Exactly. So it's not going to be counting those things. I'm kind of trying to do it conservatively, where we're looking at things that really are affected by the exclusionary provisions.

THE COURT: And then the 33 percent, is that a third of 50 or is that a third of a hundred?

THE WITNESS: Good question. It's a third of a hundred. So the 50 is 50 percent of all U.S. queries. The 33 is 33 percent of all U.S. queries.

BY MR. SEVERT:

Q. Let's take a look at your slide 35 --

THE COURT: Counsel, why don't we actually take a break before Professor Whinston sort of provides more detail about his conclusions.

So it's a little bit before 11:00. We'll resume at 11:15. See you all shortly. Oh, one thing I did forget to add -- I can tell you after the break, it's not important. Thank you.

(Recess taken at 10:59 a.m.)

(Back on the record at 11:17 a.m.)

THE COURT: Before we get started, Counsel, I wanted to make sure -- I only saw it myself a couple minutes ago, that both sides -- or all sides had seen the memorandum the New York Times filed this morning. I assume you all received a heads up, since it reflects some meet and confer prior to that.

So I would be -- well, let me ask you, does anybody wish to submit something in writing in response?

MR. DINTZER: Not the DOJ plaintiffs, Your Honor.

MR. CAVANAUGH: Nor us.

MR. SCHMIDTLEIN: We may want to. Honestly, I haven't had a chance -- my client hasn't had a chance to review it yet. We got some vague description of it, kind of multiple descriptions of it starting late yesterday, and so we'd like a chance to review it. We may well want to file a response.

MR. DINTZER: Your Honor, I'm going to walk back what I said. We have not finished looking at it, so we would withhold whether we're going to respond to it as well.

THE COURT: Okay. Well, here's what I'd like to do then: Can I ask everybody -- it's short, it's not very long. Just make sure you review it at lunch, so that when we come back after lunch, we can talk about how to proceed. If there's not a desire to file something in writing, I would be inclined to see if counsel for the Times is available at 5:00 today just to address what the request is and try and work through it. If you'd like to do something in writing, I'd like to get it tonight so it can be addressed tomorrow, so we can move apace on this matter.

MR. DINTZER: Will do, Your Honor.

THE COURT: The one thing I forgot to mention this morning when I announced that a couple of the transcripts have now been

released -- or will be available this afternoon, is -- and maybe, again, I should probably be more explicit about these things.

I basically have done the same balancing I did the very first time. Maybe I should reiterate that each time on the record. But what I'll make clear now is that we are going line by line through each of the transcripts, both the proposed redactions that Google has -- redactions Google has proposed, redactions by third parties, and then the position of the DOJ and the states with respect to each of those requested redactions.

The general categories that we have unredacted have remained the same. Generally categories that we have kept redacted remain the same. So, again, sort of internal financial numbers, strategic internal strategy issues, trade secrets being the top three. And specific terms of contracts that I thought, if disclosed, could put -- it's really primarily Google or a business partner of Google's at some competitive disadvantage.

The only caveat to that will be apparent in one of the releases that will come out today, and that is I think I have -- we've not redacted a portion of these exhibits -- excuse me, an agreement that refers to -- that references the default and the way in which the default is structured. You'll see what I'm talking about.

But given the centrality of that provision, we took a harder look at it, and we made some decisions about whether at least that portion of any agreement should be disclosed. And I think at least in one case we did disclose that particular portion.

Go ahead, Counsel.

BY MR. SEVERT:

Q. Welcome back, Professor Whinston. I think we were on slide 35. And what does slide 35 depict?

A. So, Your Honor, slide 35 is looking at the queries covered by an exclusive distribution provision. It's showing from 2016 to 2021, which were the -- through half of 2021, the -- with this red line, what the queries that are covered by exclusive provisions amount to. So -- can I -- I'm a little -- the note at the bottom is redacted, and so it's --

Q. Well, let me ask this: I think you said that the coverage does not include Chrome on Apple or on PCs; is that right?

THE COURT: Can I ask, is there a reason that the box at the bottom is redacted?

MR. SCHMIDTLEIN: I think we, and I believe Apple, have treated as, you know, proprietary or confidential the portions that are attributable to particular access points on devices. And I believe that has been consistent with other third parties as well. And so this -- by this clarification, Your Honor, by

sort of negative inference, then gives more insight into what a larger number implies, if that makes sense.

THE COURT: Okay. It does.

MR. SCHMIDTLEIN: For consistency's sake, that's why that has been done.

MR. SEVERT: I'll point out, this is pretty aggregated. It's not by channel.

MR. SCHMIDTLEIN: Understood.

THE COURT: Okay. Look, from where I'm sitting, given this is an excluded amount -- these are exclusions from the percentage that Dr. Whinston has calculated, it's not clear to me that just identifying these is really a problem. What we've tried to do is maintain confidentiality with respect to particular search access points. And this is, while perhaps the negative of that, I'm not so sure it creates a real problem. So feel free to refer to what's otherwise redacted from the box there.

THE WITNESS: Okay, thank you. I mean, I'm afraid I may have already said it already.

THE COURT: I know you did. I'm giving you retroactive cover.

THE WITNESS: Okay, thanks. So as I said earlier, Your Honor, this is showing over time the 50 percent numbers corresponding to 2020. It did rise some over time from 2016 on. And as I described to you earlier, I excluded things that

one might arguably have said aren't -- even if paid, aren't -- even if paid under the contract, are not kind of exclusionary. And so I excluded iGSA and the bookmarks. And, of course, Chrome is not in here at all. User-downloaded Chrome is not in here at all.

BY MR. SEVERT:

Q. Just a clarification, what is iGSA?

A. Sorry, the Google Search app for iPhones.

Q. And when you said Chrome is not on here at all, does this include Chrome on Android?

A. This includes Chrome -- thank you, it includes Chrome on Android. What it doesn't include is user-downloaded Chrome on Windows, user-downloaded Chrome on Apple devices.

Q. And then, Professor, did you look at coverage by partner type?

A. I did. So if you'd go to slide 36. Your Honor, I think you asked about -- at some point in one of the hearings, you asked about how it breaks out by partner type. And this is just -- the total is that number to the right, 49.7. That's the approximately 50 percent that I rounded up to 50, the number that I rounded to 50, and this is just how it splits out.

Q. Okay. Why is the coverage of Google's agreements a reasonable estimate of foreclosure?

A. Well, as I said earlier, I think it's a reasonable

number for a foreclosure measure in the sense that it's the number of queries that are affected to whatever extent they are affected by the presence of a default. So those are queries for which it's not just the quality of Google and the rivals, but also there's a default effect present.

Q. And why doesn't the fact that defaults can be changed mean that foreclosure is less than coverage?

A. I'm sorry, could you just repeat the question?

Q. Sure. Why doesn't the fact that defaults can be changed, why doesn't it mean that foreclosure is less than coverage?

A. Right. So along the lines we've been talking about, there are ways to get to rivals that are not just involving the default. And so the -- it's really no different in some sense than any exclusive dealing case involving distribution. Consumers typically have some way of getting to rivals that isn't the distributors that are subject to the exclusive provisions.

And so that's no different here. It's the issue that we started talking about before the break. And so that's -- you know, that's something that when I'm thinking about this range, that's exactly what I'm trying to think about. That's what the kind of Super Duck, you know, exercise of thinking, well, what happens if we have such a strong rival. That's what it's aimed at trying to get at.

Q. And let's turn to that, the other end of the range. Where does the 33 percent come from?

A. So the 33 percent comes from exactly the share-shift estimate that we talked about earlier. So that's how we're going to get to a measure of foreclosure.

Q. And can you walk us through that?

A. So if you bring up slide 37. So, Your Honor, earlier you talked about the whole market. This is just a graphic of that whole market to start with. So we just talked -- you know, it adds up to a hundred percent. In red, we talked about are the -- the 50 percent that are the covered queries. In yellow is user-downloaded Chrome. And then in green are other queries that are not affected, you know, either by the contracts or are going through user-downloaded Chrome. So this is kind of a picture of the overall market.

Q. And would a much stronger rival be able to attract some of this 50 percent in red?

A. So a much stronger rival would be able to attract some of that 50 percent. So, Your Honor, earlier, as we were speaking, I talked about how in that 50 percent users vary in how much they're affected by defaults, whether it's behavioral or rational or for whatever reason.

And so if you bring up slide 38, I'm representing that. And I've pulled out that 50 percent, and you can imagine kind of that that red is shaded. Some of it's dark red. There's no

way you're going to get to some of those. Some of it is lighter red, and maybe they would go to a rival if the rival was better.

So what I'm going to try to -- what I'm going to walk you through is how those previous share-shift estimates give you the answer about Super Duck and what Super Duck could access, okay.

So let's think about those share-shift estimates. So when Google was thinking, what if we lose the default to a rival, it was thinking about what if it lost to a Bing or a DuckDuckGo, i.e. -- and those rivals were much weaker than Google. So what that share-shift estimate told us was if Google lost the default to a much weaker rival, how much would the default -- basically, the power of the default protect queries for the rival, for the weak rival.

And so what I've done here is represent that graphically. So you can see the 33 percent is that 33 -- to the left, is dark red. Those are queries done by consumers for whom defaults are extremely powerful. Even with a weaker rival in the default and Google out there with its better product, those consumers don't follow Google. They stick with the default.

The 17 percent in that previous share-shift estimate is the remaining part of the 50 percent of U.S. queries that are covered. Those are ones that Google recovers. Previously, when we were talking about it, they are the queries that Google

recovers if it loses the default to a much weaker rival. So that's a description of this picture in terms of the share-shift estimate, okay. So it's telling me that if I have a much weaker rival, the power of defaults is going to get that rival, even against Google, 33 percent of the U.S. market.

So now let's think about Super Duck. Imagine that a rival -- you know, DuckDuckGo or some other rival invested so much and was so successful at raising its quality that it was as much better as Google as Google now is to the rivals, okay. Well, this same number is telling me the answer, because this number is telling me what the much strong stronger rival would get and what the much weaker rival would get.

Only now, I'm just thinking about it from the other perspective, which is suppose Google is the weaker rival because we have Super Duck out there, and Google is going to get 33 percent of those 50, even though it's not nearly as good as Super Duck. Super Duck's only going to get 17.

So that's how those previous estimates give you this range, where if you, like, imagine, you know, how strong -- you know, what's a lower bound for how powerful these defaults are, for how much they protect Google? It's thinking about Super Duck. It's unimaginable improvement in rivals to get as much better than Google as Google now is to them, and how much Google would nonetheless hang on, too, compared to the rival, the much stronger rival. So that's how we get to the lower

number for the impact as a foreclosure measure.

Q. And then what about the 50 percent of queries that aren't covered under Google's contracts, the yellow and the green part on the top of the slide, of slide 38? Is that available to rivals?

A. So it's not -- those things are not in the foreclosure number. The foreclosure lower bound is this 33 percent. The foreclosure upper bound is this 50 percent. But it does color your view of what those numbers mean, because there's no allegation about what Google is doing with Chrome. But those Chrome queries are not fully available either to rivals, because Chrome is coming with a default in it to Google.

And so when you think about these numbers, this 33 percent number or the 50 percent number, in some sense, you shouldn't think of it, I think, relative to a hundred percent. You really should think of it in some sense relative to some smaller possible available market because of the presence of Chrome.

THE COURT: Can we just go back to 17 percent to make sure I understand what that number is. So the 33 percent is if all the defaults were switched. The 33 percent is -- when I say switched, I mean to another browser -- excuse me, to another search engine. This is your estimate of how much a weak rival would maintain?

THE WITNESS: Yes.

THE COURT: From day one?

THE WITNESS: Correct.

THE COURT: The 17 percent is the delta between the 50 and the 33?

THE WITNESS: Correct. It's what Google -- remember when we had those Google documents about recovery?

THE COURT: Yeah.

THE WITNESS: They were expressing it as what share of the 50 we hang on to, but that share of the 50 is 17 percent of U.S. queries. So the 17, when we're thinking about Google as the much stronger one and a rival as much weaker, which is the way those earlier documents were thinking about it, Google is the one that was imagining itself not with a default, a weaker rival with it. Google was saying, well, out of that 50 percent of queries in the U.S. I now have through the defaults, I'm only going to hang on to 17 percent of U.S. queries. That's what Google was saying in those -- you know, if we use those estimates.

But now, when you think about Super Duck, it's just the roles are reversed. Super Duck is now the strong one and Google is the one with the default. And so what that same estimate is telling you is that default will protect Google, to the extent that it's -- even against Super Duck it's going to hang on to 33 percent.

And just to be clear, if the rivals -- imagine Super Duck

wasn't as strong as Super Duck, it was Super Duck Minus or whatever funky name I'll give it. Google would hang on to more than that 33 percent. So it's -- you know, that's why it's a range that I'm kind of giving you.

THE COURT: So essentially, the 17 percent, in your estimation, is a sliding scale based upon the increasing strength of a rival?

THE WITNESS: Right. So it's saying that, like, if you're a rival, even if you thought of doing the unimaginable improvement in your quality and you were looking at these 50 percent of covered queries, and you asked yourself, well, what could I get out of that even if I managed to achieve that, the answer is, at most, 17 percent of U.S. queries.

BY MR. SEVERT:

Q. Professor, up to now, our discussion of foreclosure has focused on general search services. How about: How does the foreclosure analysis apply for the ads markets?

A. If you bring up slide 39. Your Honor, this is showing you coverage for general search text ad revenue. That is, again, falling under the exclusive provisions. What you see here -- again, we have the same redaction issue.

THE COURT: I'm sorry, can we go back to 38 real quick. I want to clarify one more thing. The 33 percent in your estimation, that is of the overall U.S. market? In other words, 33 of a hundred percent?

THE WITNESS: Correct.

THE COURT: The 17 percent, is that also 17 percent of a hundred percent or 17 percent of 50 percent?

THE WITNESS: No, 17 percent of a hundred. In other words, you add those two things up, and it comes to the 50 that are covered. So it's basically telling you, if we had Super Duck out there, and we looked at those covered queries before -- you know, that Google has, what share -- when that improvement in Super Duck happened, what share of that 50 would Google still have when suddenly Super Duck -- DuckDuckGo became Super Duck, and what share would Super Duck get of that.

So we're going to take that 50 percent of U.S. queries, 33 percent of U.S. queries Google will hang on to. Super Duck is going to get 17 percent of U.S. queries. So we're just saying out of that coverage, how does it split out when Google has those defaults and faces a really strong rival.

THE COURT: But the 17 percent, that would assume that Google essentially loses all of those 50 percent of those queries.

THE WITNESS: So it's -- say the sentence again, sorry.

THE COURT: In other words, the 17 percent, say it's achieved. That, in your estimation, is a complete loss of the 50 percent that is otherwise foreclosed right now?

THE WITNESS: I wouldn't say it exactly that way. So let me try again.

THE COURT: Okay, sorry.

THE WITNESS: No, it's totally fine. I mean, it's actually not the easiest thing to wrap your head around. So what we have is -- you know, imagine we have these contracts in place. We're in a situation, to start with, where it's just little old DuckDuckGo. And 50 percent of covered queries are going through these -- as they are now, going through these exclusive defaults. And now, bang, suddenly some miracle happens. Gabriel Weinberg suddenly figures out how to make DuckDuckGo amazing, Super Duck. What is he going to get and manage to attract out of those covered queries?

So covered queries amount to half of U.S. queries. He's only going to get 17 percent of U.S. -- in other words, 17 divided by 50 is the share of those that he's going to get. Google is going to hang on to what share of the 50? Thirty-three divided by 50, that's the share. So that's why I'm kind of showing that it splits the 50.

THE COURT: Okay, I think I understand.

BY MR. SEVERT:

Q. Professor, just going to the ads markets for coverage number, what was the coverage number you calculated on slide 39 for the general search text ad revenue?

A. So this, Your Honor, is the same kind of slide that I showed you before about coverage, only it's doing exactly the same thing but for search text ad revenue. And what it's

showing you is that in 2020, 45 percent of U.S. general search text ad revenue was covered by these exclusivity provisions.

Q. And what coverage did you calculate in the search advertising market?

A. You go to slide 40, you'll see the same thing for the overall search ad market, which is that 36 percent in 2020 was covered.

Q. And in these last two slides, 39 and 40, we looked at your upper bound estimates for foreclosure in the ads markets. Can you give us a rough sense of what the lower bound would look like?

A. Yeah. So a rough sense in the numbers we're looking at for search services and queries a moment ago, Your Honor, the lower bound was two-thirds of the coverage number. So a rough estimate here, and actually a conservative one, would be that that lower bound would be two-thirds of these coverage numbers.

Q. Why is it conservative?

A. It's conservative -- if you go -- there's evidence that the shift of the defaults can -- shifts revenue more than it shifts queries. So if you go back to that Google document that we first looked at that you saw as well from Professor Rangel, it states in the Mozilla change from Yahoo! -- from Google to Yahoo!, Google lost 30 percent of queries but 45 percent of revenue. So that's why I view it as

conservative.

Q. And Professor, let's turn now to slide 41. This is your opinion five. Can you, again, state your opinion five?

A. Yeah, so opinion five is that Google search distribution contracts have harmed competition to the likely detriment of consumers and advertisers.

Q. And just to start at a high level, why does competition matter?

A. Well, competition matters because it determines the outcomes in markets that consumers, in the case of search services and advertisers, get. Like what are the benefits they get when they go to these markets, and competition has a significant effect on that.

Q. And then do you recall writing in your rebuttal report: "The likely competitive effects of Google's behavior locking up search access points through the challenged agreements is ideally estimated relative to a but-for world"?

A. I do.

Q. And what did you mean by "a but-for world" in that sentence?

A. So, Your Honor, just a but-for world, what we mean is thinking about what would have happened in the general case, in the absence of an event or the absence of a behavior. And so that's what we mean. In this case, it would be in the absence of Google's contracting practices.

Q. And are there challenges associated with determining what a but-for world might be?

A. There are.

Q. And what kinds of challenges are there?

A. So this is why I used the -- you know, in that sentence you read before, I used the word "ideally." So, Your Honor, it's just very hard. In this case, for example, it requires thinking back to -- for me, thinking being to 2014 and asking what would the evolution of this entire market have been in the absence of Google's behavior. You know, like, basically, some backward time machine into a world that doesn't exist.

If you think about it, like even at the start -- like a first thing I ask myself when I think about that, Your Honor, is what would Google have done. Like if it wasn't doing the contracts that it did do, what contracts would it have used. So maybe it would have used an unconditional revenue share that paid revenue share but didn't require exclusivity. Maybe it would have used some kind of most-favored supplier contract, that said that it had to have at least as good search access points and access to consumers as any rival did. Maybe it would have used no contracts. Sometimes we hear Google say it would be chosen no matter what. Maybe it would have done that.

And even at the start of thinking about that is a legal question I don't even know the answer to, which is: Well,

which of those is permissible? I don't know that. And what would Google's general counsel have decided was a safe thing to do? I don't know the answer to that.

So even at the start, it's not exactly clear what -- exactly what the change in Google's behavior would be.

Q. Are there uncertainties relating to what rivals may have done?

A. There are. So on top of the starting point of what -- how Google's behavior would change, for current rivals, how would they have changed their investments; how would their investment efforts led -- you know, how much of a quality change would their investment efforts have led to; how would that quality translate into changes in market share. And that's for current rivals. And then what potential rivals might have come in; would Apple have come in. So all of these things are kind of up for grabs to think about. It's very, very challenging, and it means that that kind of analysis is not going to be something that comes up with some quantitative number, like, oh, if we had done this, the but-for world would have been 7 percent. We're not going to end up with that, it's just an impossibility.

Q. So given the difficulties you described, what did you do?

A. So what I did is I thought about two -- most about two particular but-for worlds. One is thinking about an

unconditional revenue share payment, that what if Google had done that. And the other being sort of most-favored supplier, where Google might have -- you know, for example, it might have offered a payment that was conditional on a choice screen, on at least being in a choice screen, or having at least as much access points as rivals or something like that.

So those are -- and those are -- the thing about them is they're less restrictive. So with that uncertainty, what I told myself is, okay, let's think about something that's less restrictive than what happened. I don't know for sure if it would have been permissible. I don't know for sure if Google would have done it. Granted, there are many other things, possible less restrictive alternatives I could have thought about, but those are the two primary ones I did think about.

Q. How would those two less restrictive alternatives that you mentioned, how would they impact competition?

A. So the way I view those two less restrictive alternatives, Your Honor, is that they would have made it more likely that there would have been an equal -- more equal playing field in terms of distribution. And so a lot of my analysis then is, well, what would that mean. What would that end up leading to in terms of changes in competition. And for the reasons that I just said, the way I think about that, you know, I'm not going to be able to trace -- you know, come up with the number, the 7 percent. But what I can do is think

about how that changes the fundamental forces in the market, and think about how those changes in fundamental forces would change market outcomes. So that's what I did.

Q. And then just to go back to foreclosure, you alluded to this earlier. Now talking about -- how do foreclosure and competitive effects fit together?

A. So, Your Honor, the foreclosure measure that you had asked about and that we talked about, I think of it as it's an input in some sense to thinking about competitive effects. It's a much more circumscribed question. It's asking, with the contracts in place, what would the effect be on how much of the market is tied up on -- you know, how much that quality improvement by DuckDuckGo could have given it.

And that -- you know, what's nice is, okay, I can have a quantitative measure of that that informs me. But when I get to competitive effects, I'm taking that and I'm taking other information about the market and coming up -- you know, trying to analyze what all of that ends up meaning. And so in that sense, it's an input. At least, that's how I think about it.

Q. And if -- but if you're using -- if competitive effects are best measured relative to the but-for world -- or a but-for world, why are you not using a but-for world to estimate foreclosure?

A. For the reason that I said, that it's useful to start by thinking about kind of this fundamental force of what the

contracts do. That's what the foreclosure measure is. It's, with the contracts in place, what's tied up? And it's not the end of the analysis. We're going to take that when we get -- we, I. I'm going to take that when I get to competitive effects and take that -- having learned that, then use that in thinking about what the impact would be.

Q. And Professor, are you aware that Google has argued that you defined foreclosure as the difference in market shares between this world and a but-for world?

A. I am.

THE COURT: I'm sorry, what was the question?

BY MR. SEVERT:

Q. Are you aware that Google has argued that you defined foreclosure as the difference in market shares between this world and a but-for world?

A. I am. I think Mr. Schmidtlein said something like that in the opening.

Q. And just to be really clear, do you define foreclosure as the difference in market shares between this world and a but-for world?

A. No, absolutely not. And I say that in my rebuttal report. As I said, what foreclosure measure -- what the foreclosure measure is measuring is how much of the market is tied up when the contracts are in place. That's different than when I get to competitive effects and I'm thinking about, gee,

how does this all -- how do these contracts all play out. When I get to competitive effects, I am thinking about but-for worlds. That's the difference.

Q. Can you explain what's causing the confusion?

A. I think they're conflating what I say about foreclosure and share shifts to what I'm saying about competitive effects. And so it's -- you know, I think it is -- I think sometimes you can -- keeping track of this difference, especially for an academic who does what I do, is a little tricky. Because in academic papers -- such as many I've written, I might write down a model that has -- I'm looking at the effect of a firm writing exclusive contracts. It's built into the model, and the model then let's me analyze what the ultimate effect is on outcomes.

The literature I -- and I'm one of them, part of that literature, is very loose about the way it uses the word "foreclosure." It will -- you know, the end of that -- having done all that analysis, proven a theorem, the end of that paper will say -- and in describing the result will say foreclosure -- you know, this outcome is because of foreclosure. There isn't -- in those papers, in the academic, there isn't this foreclosure measure kind of measuring that first fundamental starting point. It's in there and that's why people, including myself, describe the whole outcome as the result of foreclosure. But there isn't a separate foreclosure

measure.

So it's easy, at least for me, to start that distinction -- which really comes in in this case, and I think it's important, like I think it's really helpful to break that out when you're thinking about this case and have that foreclosure measure. But it's not something that we normally do in an academic paper.

Q. Okay. Professor, let's turn to the issue of effects on competition. Do Google's distribution contracts harm competition?

A. They do.

Q. And why do they lead to reduced competition?

A. So if you go to slide 42, you'll see two things here. So, Your Honor, the way I think about this, there are kind of two distinct ways in which competition is harmed, two mechanisms. The first mechanism is kind of a direct mechanism coming from reduced scale. I think you've heard testimony about scale mattering for quality. We will, I think, talk about that shortly. But because, you know, reduced scale can direct -- you know, if rivals have reduced scale, that can directly reduce the quality of their search services and their ad as well. So they -- basically, reduced scale directly weakens rivals as competitors. So that's one way in which harm occurs from these contracts.

The second way is distinct. It's about incentives. I've

kind of alluded to this a little bit already, which is: The contracts reduce the incentives for rivals to compete on quality and price -- price in the case of the ad markets. It does that for Google. It does that for current search engine rivals. It does that for potential entrants. And it also does it for potential distributors. So I think that's how I -- you know, when I'm thinking about the competitive impact here, I'm thinking about those two kinds of mechanisms.

Q. And I think you mentioned you list Google in your second mechanism. Why is Google listed there?

A. So let me -- maybe I'll -- it helps maybe to first -- if you don't mind, to say something about current search engine rivals and entrants. And we're going to come to this. But if you think about that Super Duck example, DuckDuckGo, if it's thinking about how much to invest in improving its quality, takes account of how much it can possibly get as a benefit. And to the extent that these contracts are in place and tie up the market, there's less that DuckDuckGo can foresee as a benefit of investing. So that's how DuckDuckGo's incentives or other rivals of Google see their incentives reduced. Same thing for potential entrants, same story.

Mr. Severt, your question was about Google: So why would Google's incentives be reduced. Google's incentives are reduced for two reasons. One is for the same reason that the contracts -- the same point that the contracts tie up the

market insulate Google. So Google doesn't have to worry if I lose -- my quality isn't so good -- or isn't as good as it might have been, I'm going to lose a lot of customers.

So it affects Google's incentives in that sense, and having weaker rivals also reduces Google's concerns over losing customers. So actually, I think nine days ago or whatever it was when we talked about ad markets, ad auctions, we were talking about competition in ad auctions and Usain Bolt; and this image of like it mattered where the rivals -- Usain's rivals were for how fast he would run. It's the same idea here. Google is going to run faster if it has more competition. And then finally, distributors, it's going to matter for them in terms of what they can do in terms of innovation.

Q. Okay. Let's talk about your first mechanism. What role does scale play in your competitive effects analysis?

A. So scale is going to matter in a very directive way in this first mechanism. So if rivals have less scale and scale is important for quality, then rivals are going to be weaker competitors.

Q. As an economist, why do you think you have something useful to tell the Court about scale?

A. So, Your Honor, scale is a central thing that -- in industrial organization. By that I mean scale impacts market outcomes in a significant way. The literature in industrial

organization is focused on that to a large degree, on how scale effects matter for market outcomes.

So if you look at my -- if you looked at my CV and you looked at my papers, like some of my most significant papers are precisely about this. So a paper that I wrote about tying, for example, which sort of resurrected -- or put -- you know, formalized kind of leveraged theories of tying, what was the key thing that it did. It posited a world where there were scale economies. And that had a really big impact on what -- how tying contracts could matter. In papers I've written on exclusive dealing, same thing. So it's just -- it's just a very central thing in industrial organization. It's why the markets we look at aren't all number two wheat.

And then the last thing I'd say is economists have developed a tool kit, an empirical tool kit, for looking at scale effects. It's just standard, kind of bread and butter things. So I think an economist has a lot to say, a lot to bring to the table about the effects of scale on market outcomes.

Q. And as an economist, what kind of evidence did you rely upon to determine whether there were scale effects in this case?

A. So if you go to slide 43, three kinds of things. One was ordinary course of business documents and testimony. A second was empirical work that I did using the data that Google

and Bing provided to me -- or I shouldn't say to me, but in this case. And then, finally, looking at the fact that there were significant business decisions that were predicated on scale.

Q. And what does this -- I guess at a high level, what does the scale of various market participants look like in the industry?

A. So, Your Honor, I mean, it's not going to be a surprise, given everything you've seen, that there's a massive scale difference between Google and its rivals.

Q. Is it just total number of queries that's relevant?

A. Right. So when we look at -- you know, the most immediate thing, of course, is you just think about market shares of queries, like I showed you last time. Of course there's a big scale difference. But you can also start looking -- and if you bring up slide 44, you can start looking at kind of a little bit more of like how does that rubber hit the road, like how does it impact things.

So here, the whole slide, I guess, except for pieces of the bullet points is redacted. But what I've done here, Your Honor, is look using Google and Bing data for -- at query phrases that they get. So I had a week -- I think it says this on here. Yeah.

So seven-day query data. There was a week where -- in February 2020 where I have data on all the queries that they're

getting. And so I can look at how many -- you know, out of the query phrases Google and Bing got -- by phrases, I mean the exact -- the things that were put in as keyword searches, okay. Not the number of queries here but the query phrases.

So here what I'm showing you is out of the query phrases Google and Bing got overall, that one of them got or maybe both of them got, how many were received only by Google, that's in red. How many were received only by Bing, that's in blue. And how many did they both receive.

So what you can see on the left -- and it's showing it on the left for all devices, on the right for PCs and -- I mean, in the middle for PCs and on the right for mobile. If you look on the left you can see a very -- an extremely high share of query phrases is only received by Google. It's even higher in mobile, all the way to right.

Now -- and then down at the bottom are two further -- you know, the first bullet point is just also saying this is just if you received things but if you look, say, at query phrases -- the first bullet point is saying if you look at query phrases that Google received in this week between one and four times, what share were seen by Bing and what share weren't. You can see it's a number close to a hundred percent that were not seen by Bing.

Q. Professor, aren't a lot of the queries that Google sees very infrequent? A lot of them are tail queries or maybe

they're not important?

A. Right. So this is talking about queries -- you know, query phrases overall. And, of course, the ones -- you know, these phrases that Bing isn't seeing that Google is, they are what you would call tail queries. They're not frequently seen, which is why Bing is not seeing them at all, given that it's small traffic.

You might ask -- a completely immediate question would be, well, okay, maybe tail queries aren't important. I'd say they are important, and there's two ways you can kind of capture -- look at that. One, if you look at what share of queries this represents, okay, so that -- what share of queries is Google seeing that isn't seen by Bing, that's the second bullet point.

And you can see, yeah, okay, even if when I count the number of queries, in aggregate these tail queries add up to a lot. So a lot of queries are not seen -- in aggregate are not being seen by Bing and are being seen by Google.

The second thing is tail queries are an important differentiator. I think you've heard testimony -- I think it was in testimony by Mr. Giannandrea, when he was advising Apple -- when Microsoft made an attempt in 2018 to do a joint certain deal with Apple or sell Apple Bing, he spent some time evaluating Bing. And what he said was, well, it's pretty good most of the time but, like, then you get some tail -- you put in some tail query and it's terrible. I mean, I don't know if

the word was terrible.

THE COURT: No, no, this was his Eurythmics, Annie Lennox example.

THE WITNESS: Okay. So you can see from that what it was doing in the tail was really important. Like anyone can do well -- you know, not anyone. I can't do well in the head. But Bing can do well in the head toward queries, but the differentiator is in the tail.

THE COURT: Sorry, can we just back up. Can you help me understand what these percentages are and what they represent one more time because I'm just trying to understand why these numbers are different and what they represent.

THE WITNESS: Okay. So on the left it's saying, if I look at all the query phrases put in on -- into Google and Bing -- Google and/or Bing in that week, Annie Lennox, Talking Heads, Baltimore Orioles, whatever it is, I look at all of them. The red percent, the percent in the red, is saying that out of all those phrases, that percent are phrases that only Google is seeing in that week. Bing doesn't see them at all.

THE COURT: So these are unique --

THE WITNESS: Phrases.

THE COURT: Unique phrases?

THE WITNESS: Yes.

THE COURT: In other words, anything that is seen on both search engines --

THE WITNESS: That's in the green.

THE COURT: That's in the green?

THE WITNESS: Yes.

THE COURT: Okay.

THE WITNESS: And then anything that's seen only by Bing is in the blue.

THE COURT: Okay.

THE WITNESS: And then if you look to the right, it's doing the same exercise but restricting to queries that were put in in that week on PCs, and doing the same calculation. And then on the right -- sorry, in the middle. And on the right, restricting to queries that were put in on mobile phones, and doing the same calculation.

THE COURT: Okay. And so the first bullet, then, is the number of phrases seen between a particular number of times. That number is higher.

THE WITNESS: Right. So what this is saying is of that very big number of queries that Google is seeing, some of them had seen a lot, some had seen little. I was just saying, let's even focus on the tail of the tail, like queries that Google has just seen between one and four times in that week. And in the tail of the tail, yeah, just like you said, you get an even bigger number.

And I don't know if you want to -- want me to also say something about the second bullet point?

THE COURT: If you would, yes.

THE WITNESS: So the second bullet point is saying, well, okay, you know, fine, a skeptic might say fine, you just showed me that Google -- of these query phrases, you know, these weird -- you know, there are all these weird query phrases, and sure, Google's seeing those and Bing isn't. But they're weird and they're almost never put in, and, like, they don't add up to much.

Actually -- so what the second pull bullet point is saying is yeah, they do. When you take a count of how many times each query is put in and you add up the -- you take that red and you take a count of how many times each of the things in the red is -- each of these things is put in and you just count what share of queries, not query phrases but queries, the red would be -- red would be the share that is in the second bullet.

THE COURT: I see. Okay. So that second bullet point is a percentage based on total queries, not --

THE WITNESS: Correct.

THE COURT: -- unique phrases?

THE WITNESS: Yes. So it's just trying to say does it add up to something.

THE COURT: Okay.

THE WITNESS: And the answer is yes.

THE COURT: Okay. Terrific, thank you.

BY MR. SEVERT:

Q. And Professor, let's start by talking about the effect of Google scale advantages on the user side. Have you seen documents that scale impacts a search engine's quality for consumers?

A. I have.

Q. What have you seen?

A. If you'd bring up slide 45. Your Honor, this is a 2017 Google document that I know you've seen before. It was authored by Dr. Lehman. I think he testified about it, that it was a presentation to people in charge of user interface or something to make sure that users really took account of -- would click on the things that they cared about. The first point of this is not -- actually, before that, which is just, okay, this is how -- this is not how search works on the left. On the right it's how search does work.

He was trying to motivate, he said, the Google employees in charge of user interface that, yeah, let's make really sure that, like, it's easy for people to click on the things they think are important. But that's the point. He wanted to have that information because it was useful for ranking. And yes, it was motivating them, but it was motivating them with the reason that clicks are important.

Q. Have you seen other evidence of Google employees discussing the importance of scale?

A. I have. So if you go to the next slide, slide 46.

Again, this is something that you've seen before when Hal Varian testified. You know, the whole back and forth around the -- whether scale mattered around the time of the Yahoo!-Microsoft deal in 2009, and how strongly Marissa Mayer and Udi Manber felt about the importance of scale.

Q. In addition to the documentary evidence, did you review any testimony during this trial about scale and its impact on quality?

A. I did. So if you bring up slide 47. Your Honor, you've seen all of these. This is just an excerpt of trial testimony from Mr. Parakhin, trial testimony from Dr. Lehman and e-mail in the record from John -- from Mr. Giannandrea, all of which are about how scale matters because seeing user clicks and user behavior.

Q. Professor, have you reviewed any evidence that Google's algorithm makes use of a significant amount of user data?

A. I have. So if you go to slide 48. So this, Your Honor, is talking about navboost. I think you've heard of navboost, which is not only one of the components of Google's ranking system, but to this day still considered the most powerful. And how much -- you know, how navboost is using user clicks.

What it does is it uses that information to help determine ranking, what should be at the top of -- what organic results

should be at the top of the SERP, of the results page. So at the top are two -- on the left, a document that Eric Lehman authored, just describing what navboost is in essence and that it's still the most potent. That's from 2016. On the right, trial testimony about what navboost does.

And importantly, on the right, let me just say something about how much data it uses, so how many months of data Google is using as an input into training navboost. And at the bottom, back when Amit Singhal, who was putting in for a Founder's Award nomination -- or was put in, in 2006 his team came up -- I think either him personally or his team came up with navboost. And the way he described it is: Navboost has locked out small players from the ranking game.

And the reason he described it that way is because he's using user data and a lot of user data. And one way to put the impact of this, Your Honor, is if you go back to the comment of Eric Lehman about how many months of data -- the question about how many months of data navboost is using, and you asked yourself how many -- how long would it take Microsoft -- how much data would Microsoft at its current share have to use to use -- get the same amount of data. It's basically like 16 or 17 years of data. And, obviously, the 16-year-old data is not going to be very useful when we start looking at that.

Q. Is it just algorithm training where scale matters for search services quality?

A. No. If you bring up the next slide, slide 49. So really important thing, Your Honor, is that it's not -- and again, I think you've heard some of this. It's not just training the current algorithms. It's also developing the current algorithms. And a key thing that they used to develop these algorithms and approve them are live-traffic experiments where they'll take some actual queries and they have some idea for an improvement in the algorithm, and they'll use the new algorithm and see how good the outcome is.

And so the thing is that when you don't have a lot of scale, you can't do a lot of these experiments. And moreover, the experiments that you do will tend to have smaller samples. So it's either going to be less precise, if you let the experiment go for the same amount of time, or it's going to have to go a lot longer. That's just a basic property of statistics: The bigger the sample, the more precise the results. And so -- and you can see here testimony to that effect from Jon Tinter -- Mr. Tinter, from Mr. Parakhin and Mr. Weinberg about what impact it has on experimentation.

Actually, one thing, I was here during Hal Varian's testimony, as I've mentioned before. You know, he had this thing that he would say that, like, it's not the ingredients, it's the recipe. I'm paraphrasing. By that, what he meant is -- he was trying to argue it's not the data, the ingredients, it's that we've learned how to use the data. It's

the recipes. But the thing he was leaving out is this: That, like, the way you figure out the recipes is by having a lot of data that you can use for experimenting.

Q. Professor, have you done any empirical analysis of scale effects on search services quality?

A. I have. So if you go to slide 50. This is redacted, Your Honor, so I won't say the numbers. But let me describe what is here. So we've talked -- and I think you've heard testimony about this and I think I also mentioned it nine days ago, about IS scores. It's the way Google measures quality of organic search results.

What I'm showing here is using Google and Bing data -- actually, sorry, this is all coming from Google, where they also -- they evaluated their own IS scores and they evaluated Bing's IS score. And this is split by whether it's a popular query -- and I think we've also used words like head query or a tail query. And this is -- sorry, hang on one second. Okay.

So the title -- let me just make a correction here. It shouldn't say "by month" at the top, because it's actually for this -- it's overall, over this period from July 2020 to September 2021. That's something that should have been deleted.

But what is this doing? It's showing you on the left what the IS score was for their popular queries, for Google in red and Bing in blue. And on the right it's showing you their IS

scores for Google and Bing for tail queries. And what you can see from this is two things.

Number one, the most striking thing is IS scores are way higher, way higher for popular queries than tail queries. And, remember, the last time I talked, to kind of give you context, I said how a 4-point IS score difference is very significant and how Google hopes to get -- I think Dr. Lehman testified to this -- hopes to get a one-point improvement in a year. I mean, these differences are much bigger than that between popular and tail.

The second thing that you can see is on popular, Bing is close. It's a little bit below Google in IS score. But on tail queries, it's more significantly below. And so you kind of can see this point that it's in the tail where scale matters most.

THE COURT: So the difference here, in your estimation, between Google and Bing and the tail queries is significant based upon what Dr. Lehman --

THE WITNESS: Correct.

THE COURT: -- said was the key scale?

THE WITNESS: Yes.

THE COURT: Okay.

THE WITNESS: And it's bigger than what you see in popular queries where Bing can be more successful because it's seeing the queries. Popular queries it tends to see; tail queries,

no.

BY MR. SEVERT:

Q. Did you do any other empirical analysis relating to the effect of scale on search quality results, Professor Whinston?

A. I did. So, Your Honor, another analysis that I did -- and I'm not sure whether -- I can't remember whether you've heard anything about this or not. But Google will use and has historically used the length of clicks that a user puts in as a measure of whether it was a good result. In particular, that if a user clicks a very short click -- so in other words, it clicks -- the user clicks, goes to the website and immediately comes back, that's bad. And if -- you know, it shows that they weren't satisfied with what they saw.

Of course, it's not perfect because maybe they got -- occasionally get a piece of information and they're happy and they come back. But Google has looked to that as a measure of poor quality and long clicks as a measure of high quality, and has this measure that they have tracked called click split, which is the ratio of long clicks to short clicks.

And so what I did is an analysis of looking at Google and looking at how click split is related to scale. And so what you find is that head queries have a better click split than torso queries, which are kind of the middle category that was left out in the previous -- you know, we looked at popular and

tail. There's also torso in the middle.

Click splits are better for head, significantly, than torso, and torso is better than tail. And that's controlling for things like what vertical -- you know, you might worry, like, oh, there are confounding effects. Head queries maybe are in shopping categories and tail queries are for -- I don't know what. I actually think Annie Lennox is probably frequently looked at. But whatever the categories are, controlling for that, controlling for the complexity of the query, things like that, and you still see it.

THE COURT: So the idea is that -- and it's intuitive, is that for the head queries, the click period is longer; in other words, there's -- sorry, there's less clicking back to the start page?

THE WITNESS: Correct.

BY MR. SEVERT:

Q. And then, Professor, I think you've at various times today talked about mobile separately from everything else. Why is that?

A. I think there's a really important issue here, is to what extent -- if you are talking about scale, you know, it's scale on what. So is it overall scale across all devices; is it scale within a device. And in particular, does scale in mobile matter distinctly for how good you are in mobile. So that's why I kind of have talked about mobile.

And, of course, just to be really clear, all the growth in -- you know, everything I talk about when I talk about mobile, it's important to remember mobile is where the market is growing. Like, PC queries are, like, flat and have been for a long time.

Q. Is there any testimony you relied upon to -- in considering whether mobile queries are different from desktop queries?

A. Yes. So if you bring up slide 51. This is something from the deposition of Pandu Nayak. Mr. Nayak was VP of search. So he was asked -- or his answer to a question about this topic was that there are some striking differences that come up between mobile queries and PC queries. What are they? Well, mobile queries tend to be much more local. They're local seeking, the intent is more local. And then he gives this -- I didn't bold it, but it's here, this great example of Bank of America. And so -- which shows you that the same query can have a different meaning when it's on desktop or on mobile. So what he says is, well, if someone puts in Bank of America on their desktop, they're probably interested in online banking. But if someone puts in Bank of America on their mobile phone, they want to know where the nearest ATM or branch is. So the exact same literal query phrase can have a different meaning, one versus the other.

Q. And have you seen, Professor, evidence in documents

that scale on mobile devices distinctly impacts a search engine's competitiveness for mobile queries?

A. Yes. Yes, I have. So if you go to slide 52. This is a document from -- that was authored by Mr. Giannandrea. Again, where he's -- you know, it's from 2018 during the same time when there was a discussion about a possible Microsoft-Apple deal.

And what he's saying is not having mobile queries at scale is a huge liability for Bing, since the most important search signal is engagement. He says it's not impossible to do okay, but it's a huge liability. And so that's just capturing this thing that, like, if you want to do well on mobile, in quality, you need to see the mobile stream. You need to see what's happening on mobile.

Q. Is there any empirical evidence of the difference between search on mobile phones and search on PCs?

A. There is. So if you bring up slide 53. Your Honor, this is -- it's all redacted. So, again, I won't say the numbers. But it's kind of a similar kind of exercise to what we talked about when we were looking at what Bing saw versus what Google saw, except here what I'm doing is I'm asking, on the left for Google, of the phrases that are put in on mobile phones, what share of them are only put in on mobile phones. So that's the blue on the left for Google.

The green are the mobile -- the query phrases that are put

in -- hopefully, I said query phrases before, not queries. The query phrases that are put in on mobile phones that are also put in on PCs. And what you can see on the left is the vast majority of mobile query phrases that are put in on mobile phones are only put in on mobile phones.

You see the same thing on the right for Bing. The percentages are a little different because, of course, Bing has a different ratio of the queries it's seeing on mobile versus desktop. It doesn't see very much on mobile.

And at the bottom you see kind of, you know, one kind of obvious kind of statistic where you could start, which is if you asked, like, what share of query phrases that include the words "near me," what share of them are on mobile phones, the answer, 86 percent. I'm sorry, I didn't mean to say that. I apologize. In the bullet point at the bottom.

Q. And what does this evidence tell you about rivals' ability to compete with Google?

A. It means, as I was saying, that if you don't have scale on mobile, it's going to be really hard for you to do well in quality on mobile.

Q. Professor, have you seen evidence of significant business decisions predicated on scale?

THE COURT: Counsel, why don't we take a pause since it sounds like you're moving to a slightly different subject.

MR. SEVERT: Sure.

THE COURT: So we are approaching the 12:30 hour. We will take our lunch, and we'll resume at 1:30.

Professor, I'll just ask you not to discuss your testimony with anyone during the break. Thank you, everyone. See you shortly.

(Lunch recess taken at 12:29 p.m.)

C E R T I F I C A T E

I, **Jeff M. Hook, Official Court Reporter,** certify that the foregoing is a true and correct transcript of the record of proceedings in the above-entitled matter.

October 16, 2023

DATE

Jeff M. Hook

BY MR. SEVERT: [20] 5711/2 5711/9 5711/22 5727/3 5731/21 5737/19 5738/22 5743/1 5749/15 5752/5 5755/3 5758/10 5761/6 5763/5 5770/13 5772/18 5779/11 5790/24 5797/1 5798/15
DEPUTY CLERK: [1] 5708/1
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MR. SCHMIDTLEIN: [7] 5710/9 5751/4 5751/6 5759/4 5761/20 5762/3 5762/7
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