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ACTIVE CHOICE INTERVENTIONS AT SCALE: BROWSER DEFAULTS UNDER THE DIGITAL MARKETS ACT

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ABSTRACT

Can active choice mitigate preset-default effects? Implementing a difference-indifferences design around the EU Digital Markets Act's choice-screen mandate, we find that choice screens increased Firefox usage by 91 percent on iOS and by 13 percent on Android, relative to a no-mandate counterfactual. The gap in effect size between iOS and Android is consistent with the fact that choice screens on Android primarily reached new devices, whereas it also reached existing users on iOS.

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1 Introduction

Default settings are pervasive in digital markets. A mobile operating system, such as Android or iOS, can preinstall an application and set it as the default. To the extent that people exhibit default bias, this gives companies that control defaults the ability to steer behavior. In this paper, we explore the effect of the European Union's policy requiring companies to present users with an opportunity to actively choose a browser.

Browsers can differ in dimensions such as speed and performance, compatibility and integration with other services, privacy protections, and business models. In practice, mobile operating systems often preset an affiliated browser, such as Safari on iOS devices or Chrome on Android devices, as the default, irrespective of whether it is the user's preferred option. Choice screens may mitigate the potential default effects by requiring users to make an active selection rather than passively using the preset default.

In March 2024, the European Union's Digital Markets Act (DMA) required browser choice screens on iOS and Android. Article 6(3) requires designated gatekeepers—large digital platforms that control important access points between businesses and users—to enable users to "easily change default settings" that "direct or steer end users to products or services provided by the gatekeeper." For web browsers, this includes prompting users to choose from "a list of the main available service providers" rather than relying on the browser selected by the operating-system provider (European Union, 2022).

We study whether this intervention shifted browser usage away from preset defaults. Using novel data from Mozilla, we construct a country-by-week panel of Firefox daily active users (DAU) across 70 countries from 2022 to 2025. Our analysis compares usage patterns in the 27 EU member states with usage patterns in 43 non-EU countries, before and after the rollout of choice screens. We estimate effects separately for iOS and Android, which implemented the mandate differently.

We find a persistent increase in Firefox usage after the mandate, with substantially larger effects on iOS than on Android. The effects also grow over the initial months: from 15 months after the mandate onward, Firefox usage is about 91 percent higher on iOS and about 13 percent higher on Android relative to a no-mandate counterfactual.

The contrast across platforms is consistent with differences in rollout decisions. The iOS choice screen was displayed to all existing users with iOS 17.4 and again to users with iOS 18.2 and Safari set to default. In contrast, Android browser choice screens were displayed primarily to new devices, and only to those for which Chrome was the default

browser. A back-of-the-envelope exposure adjustment suggests that the smaller Android estimate partly reflects limited exposure rather than a negligible response among users who saw the choice screen (Online Appendix A.4).

The Mozilla data allow us to observe usage for Firefox but not for other browsers. As a complementary analysis, we use third-party market-share data to examine whether the DAU results are reflected in browser market shares. Market shares shift away from the browser that was preset as the platform default: Safari on iOS and Chrome on Android. At the same time, Chrome gains share on iOS. Safari's market share declines by 6.93 percentage points, while Chrome's market share increases by 6.65 percentage points. Firefox also increases its market share by 0.22 percentage points, which is sizable relative to its pre-treatment average market share of 0.49 percent. On Android, the results similarly point to movement away from the preset default, but are noisier. Our estimates suggest that Chrome's market share declines by 1.93 percentage points, while Firefox's market share increases by 0.111 percentage points (Online Appendix A.6).[1]

Our work connects to an emerging literature on choice screens. Ostrovsky (2023) finds that the design of auctions used to allocate positions in search-engine choice screens can have significant effects on market outcomes. Decarolis and Li (2023) suggest that the effects of active-choice interventions depend on the presence of viable challengers. Allcott et al. (2025) experimentally find limited impact of the choice screens they design. Our work contributes to this literature by analyzing an EU-wide implementation of browser choice screens, using novel, first-party browser-usage data.

Our analysis speaks to a large literature documenting the importance of default bias in shaping decisions. We find that defaults are an important source of competitive advantage for companies, allowing them to steer customer decisions. Our results also suggest that mandating active choice can be an important policy tool in digital markets, but that its effectiveness may depend on implementation decisions often left to the discretion of regulated firms.

2 Choice Screens and the DMA

The EU Digital Markets Act (DMA) entered its implementation and enforcement phase on March 7, 2024. Starting then, operating system providers with a designated browser were

[1] This excludes Russia from the control group, since Russia exhibits an abrupt decline of around 18 percentage points in Chrome's market share between December 2023 and January 2024, due to shocks unrelated to the DMA.

required to present EU users with a browser choice screen, prompting users to actively select a browser.

In practice, there are important differences in the way that Android and iOS implemented choice screens. On Android, the choice screen appears on new or factory-reset devices during initial setup and on all Google Pixel handsets (Android, 2024). However, except for new Pixel devices after March 2026, Chrome typically remains pinned to the home-screen dock ("hotseat"), preserving salience even after an alternative is selected (Alphabet, 2026). On iOS, the choice screen is shown when a user first launches Safari on any device running a compliant OS version, not only on new devices. Apple introduced choice screens in iOS version 17.4, although users could initially defer the choice via a "Not Now" option. In iOS versions 18.2 and higher, choice screens removed the option to defer active choice, and required users to engage with the full list before setting a default. Also in iOS 18.2 and higher, Apple's implementation pins newly downloaded browsers via the DMA choice screen to the hotseat in place of Safari (Apple, 2026). Screenshots of these implementations are provided in Online Appendix Figures A1–A3.

3 Data

We measure mobile browser usage using client-based daily active users (DAU), defined as the number of Firefox clients that ran on a given calendar day. Our sample spans January 1, 2022 to December 31, 2025 and includes 27 EU member states, which were subject to the DMA browser choice-screen mandate, and 43 non-EU comparison countries. For each country, we observe DAU separately for iOS, Android, and their combination (Total). The weekly series are constructed as Monday–Sunday averages of daily active users. Online Appendix Table A1 reports descriptive statistics for the main DAU measures[2].

3.1 Empirical Strategy

Our identification strategy exploits the fact that the March 2024 DMA rollout required browser choice screens in EU member states, but not in other countries. Our baseline specification is

$$\log(DAU_{ct}) = \alpha + \beta ChoiceScreen_{ct} + \delta_c + \gamma_t + \varepsilon_{ct}, \tag{1}$$

[2]We exclude non-European countries that, on average, had fewer than 10,000 daily active users, due to the high level of noise in their data, with many of them even recording zero users on some days.

where c indexes countries and t indexes weeks. $ChoiceScreen_{ct}$ is an indicator equal to one for EU member states in the post-mandate period and zero otherwise, δ_c are country fixed effects, γ_t are week fixed effects, and ε_{ct} is an error term. We conduct the analysis with both iOS and Android combined, and also broken out for iOS and Android, all with standard errors clustered at the country level.

To study the dynamic effects, we interact the treatment indicator with indicators for the number of months since the mandate was implemented, grouping months 15 onward into a single bin. Our interpretation of the difference-in-differences estimates rests on the assumption that, absent the DMA browser choice-screen mandate, Firefox usage in countries required to implement browser choice screens would have followed trends similar to those in other countries, conditional on country and week fixed effects.

4 Results

4.1 Graphical Evidence

Figures 1a and 1b plot the evolution of weekly average DAU around the rollout for the treated region and comparison regions.

These figures suggest four key results. First, browser choice screens increased Firefox usage in the countries where they were required: in the pre-mandate period, the treated and comparison series evolve broadly similarly, with the main divergence emerging only after the March 2024 rollout. Second, the effects were much larger on iOS than on Android. Third, the iOS effects appear more quickly, compared to the Android effects, which appear gradually and remain substantially smaller. Fourth, Firefox usage on iOS rises further after the compliance-related update accompanying iOS 18.2 (Online Appendix A.5).

4.2 Dynamic Effects and Long-Run Impact

Table 1 allows the effect of the mandate to vary flexibly over time. On iOS, there is an effect that emerges quickly and grows over time. In contrast, on Android, the initial effect is close to zero; the effect then grows gradually over time, but to a much lower extent than for iOS. This heterogeneity is consistent with the fact that iOS exposed a broad set of users

quickly, whereas Android exposure grew more slowly[3].

Our preferred estimate of the longer-run effect comes from the 15+ month bucket. For iOS, the estimated longer-run effect is 0.6471 log points, obtained by summing the main effect and the Month 15+ interaction. This corresponds to an increase of about 91 percent relative to the no-mandate counterfactual. For Android, the corresponding estimate is 0.1198 log points, or about 13 percent.

5 Discussion

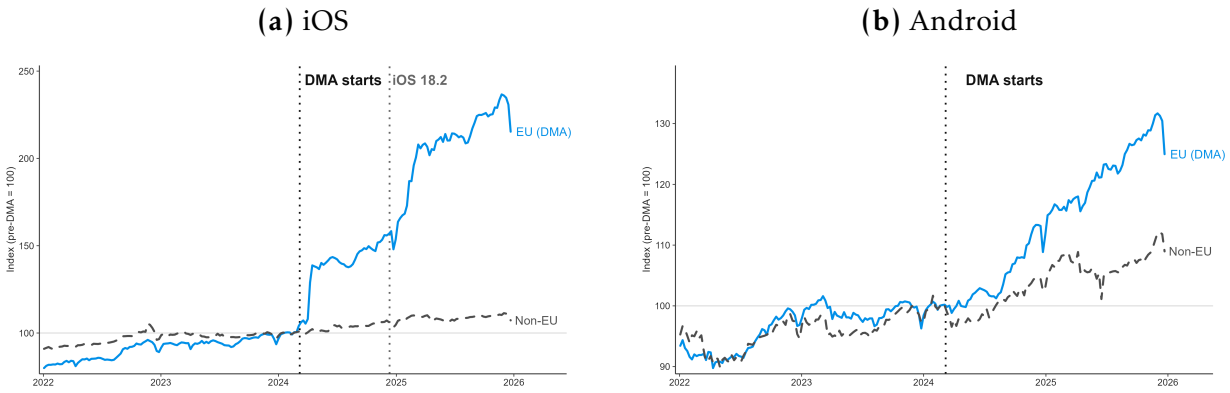
Our results suggest that observed browser shares under preset defaults should not be interpreted as revealed preference: they partly reflect inertia, inattention, and the choice architecture through which users encounter browsers. The market-share evidence shows substantial movement away from the relevant platform default, especially from Safari to Chrome on iOS. This suggests that choice screens are an important, if limited, intervention. More intensive policies, such as directly changing defaults or subsidizing experimentation with alternative browsers, might produce larger shifts in market shares, consistent with Allcott et al. (2025).

Because the data are aggregated, we do not observe individual-level behavior. The effects may also vary across user bases, as iOS and Android have different user bases, including higher baseline Firefox usage on Android.

Our results show that choice screens can materially affect market outcomes, and that implementation details are central to shaping both the size and timing of those effects.

[3]Each week is assigned to the calendar month as of the week's Monday.

Figure 1: Firefox usage in the EU versus non-EU before and after DMA browser choice screens



Notes. The vertical dashed line marks the introduction of DMA browser choice screens on 7 March 2024. In panel (a), the second vertical line marks the compliance-related iOS 18.2 update in December 2024. The series shows weekly averages of daily active users for the EU and the non-EU, with the pre-DMA average indexed to equal 100. The measure of daily active users is based on whether Firefox runs on the device on a given day, so should not be interpreted as the number of distinct people. The EU series aggregates AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, and SK.

Table 1: Effects of choice screens on log daily active users over time

	Dependent variable: log(DAU)		
	Total	iOS	Android
	(1)	(2)	(3)
Choice Screen	0.0144	0.1107***	-0.0029
	(0.0160)	(0.0145)	(0.0177)
Choice Screen × Month 2	0.0340***	0.1391***	0.0103
	(0.0073)	(0.0103)	(0.0079)
Choice Screen × Month 3	0.0577***	0.2080***	0.0244**
	(0.0102)	(0.0163)	(0.0110)
Choice Screen × Month 4	0.0661***	0.2267***	0.0300**
	(0.0117)	(0.0191)	(0.0123)
Choice Screen × Month 5	0.0494**	0.2173***	0.0124
	(0.0201)	(0.0267)	(0.0209)
Choice Screen × Month 6	0.0492***	0.2177***	0.0130
	(0.0184)	(0.0264)	(0.0195)
Choice Screen × Month 7	0.0696***	0.2458***	0.0318
	(0.0170)	(0.0202)	(0.0191)
Choice Screen × Month 8	0.0709***	0.2361***	0.0350*
	(0.0159)	(0.0154)	(0.0184)
Choice Screen × Month 9	0.0733***	0.2292***	0.0391*
	(0.0177)	(0.0153)	(0.0208)
Choice Screen × Month 10	0.0883***	0.2415***	0.0550**
	(0.0216)	(0.0178)	(0.0255)
Choice Screen × Month 11	0.0933***	0.2715***	0.0533**
	(0.0218)	(0.0218)	(0.0249)
Choice Screen × Month 12	0.0944***	0.3521***	0.0336
	(0.0211)	(0.0220)	(0.0242)
Choice Screen × Month 13	0.1230***	0.4623***	0.0401
	(0.0214)	(0.0227)	(0.0244)
Choice Screen × Month 14	0.1416***	0.4647***	0.0623**
	(0.0223)	(0.0236)	(0.0255)
Choice Screen × Month 15+	0.2054***	0.5364***	0.1227***
	(0.0289)	(0.0288)	(0.0338)
Country fixed effects	Yes	Yes	Yes
Week fixed effects	Yes	Yes	Yes
Clusters	Country	Country	Country
Observations	14,560	14,560	14,560
R^2	0.99597	0.99690	0.99493
Total effect, Month 15+	0.2198	0.6471	0.1198
	[24.58%]	[91.01%]	[12.73%]

Clustered standard errors at the country level in parentheses. *Choice Screen* captures the immediate effect of choice screens in the first month after introduction (Month 1). *Choice Screen* × *Month X* captures the additional deviation in month X relative to this first-month effect; the total effect in month X is the sum of both coefficients. EU member states enter as separate treated units. *Total effect*, *Month 15+* is the sum of *Choice Screen* and its Month 15+ deviation; the implied percentage change, $(e^{\beta} - 1) \times 100$, is reported in brackets. Significance levels: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

References

H. Allcott, J. C. Castillo, M. Gentzkow, L. Musolff, and T. Salz. Sources of market power in web search: Evidence from a field experiment. NBER Working Paper w33410, National Bureau of Economic Research, 2025.

Alphabet. EU Digital Markets Act (EU DMA) Compliance Report: Non-confidential Summary. Technical report, Alphabet Inc., March 2026. URL https://storage.googleapis.com/transparencyreport/report-downloads/pdf-report-bb_2025-3-7_2026-3-6_en_v1.pdf. Annual compliance report under Regulation (EU) 2022/1925 (Digital Markets Act).

Android. The choice screens: Your Android, your choice, March 2024. URL https://www.android.com/choicescreen/dma/. Accessed: 2026-04-14.

Apple. Apple's DMA Compliance Report: Non-confidential Summary. Technical report, Apple Inc., March 2026. URL https://www.apple.com/legal/dma/NCS-March-2026.pdf. Submitted pursuant to Article 11(1) of Regulation (EU) 2022/1925 (Digital Markets Act).

Cloudflare Radar. Browser market share reports (2022 q4–2025 q4). Cloudflare, Inc., Cloudflare Data Insights Team, 2026. Quarterly reports with downloadable CSV files. https://radar.cloudflare.com/reports. Accessed on 15 March 2026.

F. Decarolis and M. Li. Regulating online search in the EU: From the Android case to the Digital Markets Act and Digital Services Act. *International Journal of Industrial Organization*, 90:102983, 2023.

European Union. Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act). Official Journal of the European Union, OJ L 265, 12.10.2022, pp. 1–66, 2022. URL https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32022R1925. CELEX:32022R1925.

M. Ostrovsky. Choice screen auctions. *American Economic Review*, 113(9):2486–2505, September 2023. doi: 10.1257/aer.20220699.

Statcounter Global Stats. Mobile Operating System Market Share in Europe, 2026a. URL https://gs.statcounter.com/os-market-share/mobile/europe. Accessed April 2026.

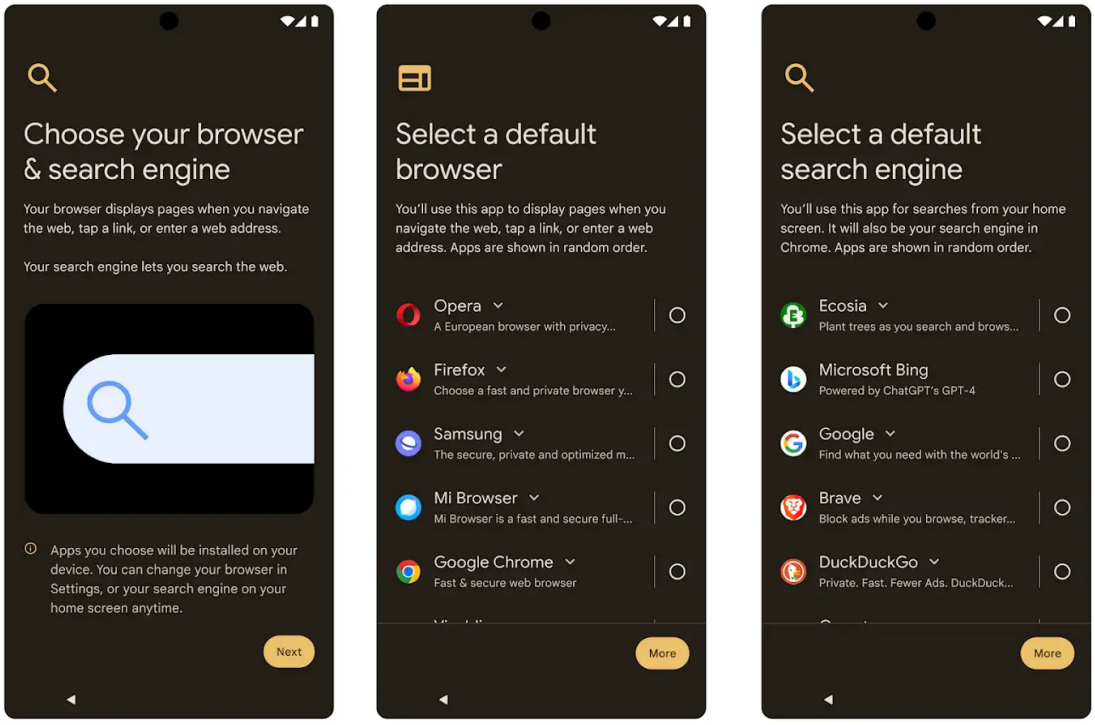
Statcounter Global Stats. Mobile Vendor Market Share in Europe, 2026b. URL https://gs.statcounter.com/vendor-market-share/mobile/europe. Accessed April 2026.

Vodafone Institute for Society and Communications. Refurbished over new: A second chance for smartphones—a comparative study regarding consumer behaviour in five european countries. Technical report, Vodafone Institute for Society and Communications, Berlin, Sept. 2025. URL https://www.vodafone.com/~/media/Files/V/vodafone/corp/news/protecting-the-planet/refurbished-over-new.pdf. Produced by Kantar, with scientific support from the Wuppertal Institute for Climate, Environment and Energy.

Online Appendix

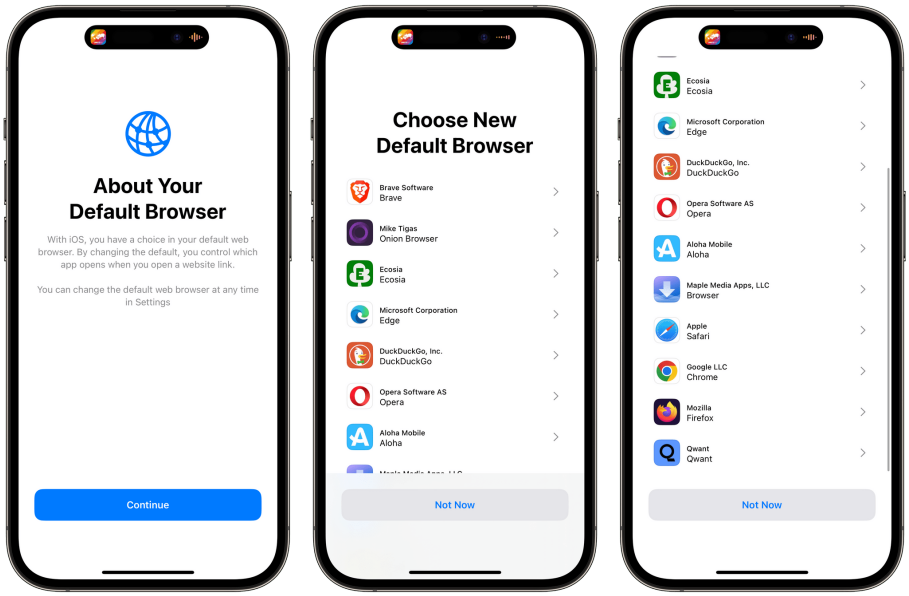
A.1 Choice Screen Implementations

Appendix Figure A1: Android browser and search engine choice screens



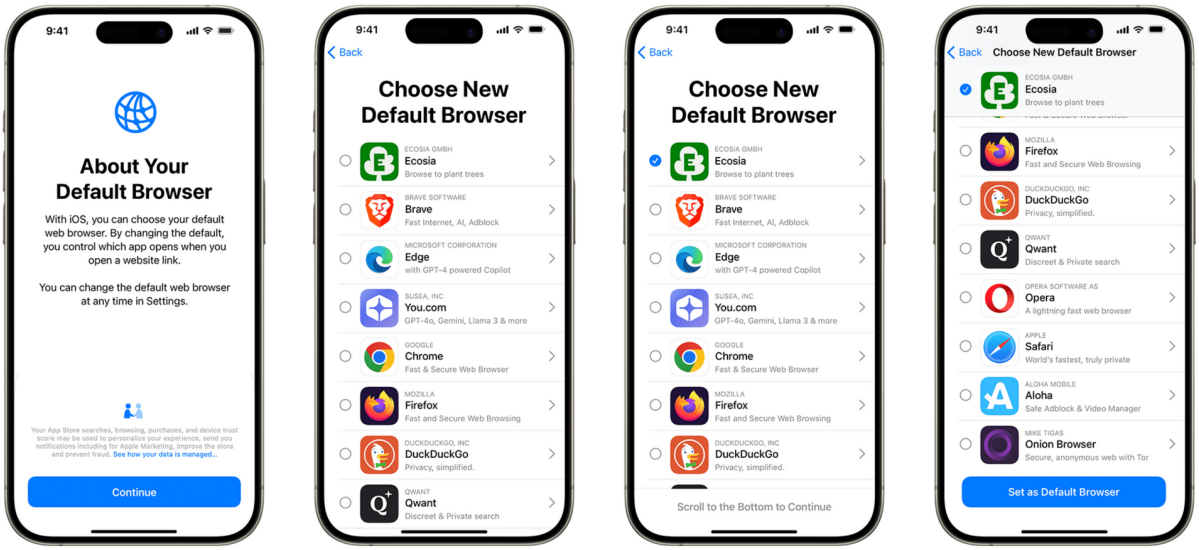
Notes. Choice screens presented during initial setup on new or factory-reset Android devices distributed in the EEA on or after March 6, 2024, on which Chrome is set as the default. First, an explainer page appears describing the concepts of browsers and search engines, and explaining that a default can be changed in Settings. When the user clicks "Next", they are presented with 12 browser options. On devices distributed in the EEA between March 6, 2024 and August 6, 2024 the five most popular eligible browsers in each country are at the top of the page (in random order), and the remaining seven are below, also ordered randomly. For devices distributed since August 7, 2024, all 12 browsers are ordered randomly. Users select a default search engine separately in the following step.

Appendix Figure A2: iOS browser choice screen (v17.4 - v18.1)



Notes. Choice screens displayed the first time a user opens Safari on a compliant device. First, a small explainer lets the user know about the ability to choose a different default browser at any time. After the user taps "Continue," a list of up to 12 browsers appears (in random order). These are up to 11 of the most popular browsers based on the given country's App Store, plus Safari. If the user taps a browser from the list, they are presented with its App Store listing, and are able to install it with a single tap. The browser selection can be skipped via the "Not Now" button, in which case the user continues to use Safari as the default browser. The selected browser can be changed later in Settings.

Appendix Figure A3: iOS browser choice screen (v18.2 and higher)



Notes. Choice screens displayed on first launch of Safari. The first page explainer now features larger black text. After the user taps "Continue," a list of up to 12 browsers appears (including Safari). Each browser's name is now listed together with its subtitle from the browser's App Store product page (in grey text). Also, users can review each browser's App Store product page by tapping on the chevron to the right. There are now radio buttons on the left of the screen to indicate selection and the chosen browser is pinned to the top of the screen. Users are required to scroll through the full list of browser options before setting a browser as default and the previous "Not Now" option is replaced by a forced selection and a "Set as Default Browser" button. Apps appear in random order and users can revise their browser choice in Settings.

A.2 Descriptive Statistics

Appendix Table A1: Descriptive Statistics: Daily Active Users

	Total		iOS		Android	
	Mean	SD	Mean	SD	Mean	SD
EU	4,799,204	753,051	871,742	336,004	3,927,463	422,786
US	2,211,595	126,880	760,485	46,440	1,451,110	83,263
IN	708,073	93,878	40,299	5,706	667,775	88,663
IR	471,663	70,930	24,606	4,398	447,057	67,278
GB	427,187	24,619	102,436	5,762	324,751	19,004
CN	370,336	53,695	132,460	13,932	237,876	43,169
BR	344,105	22,651	40,294	5,042	303,812	18,239
JP	315,744	12,560	81,336	1,874	234,409	11,943
CA	301,470	32,166	83,665	8,152	217,805	24,061
RU	216,580	6,232	20,702	1,187	195,878	6,443
AU	190,991	16,012	50,644	3,547	140,347	12,613
Overall	175,517	16,177	35,954	5,991	139,563	10,302

Notes: Statistics computed using weekly averages of daily active users over the estimation sample. The table reports the European Union aggregate and the ten largest non-EU countries by average total usage. Overall reports the unweighted average across all 70 countries in the analysis sample.

A.3 Average Effects

Table A2 reports our baseline difference-in-differences estimates. Converting the log-point estimates to percentage changes,[4] the estimates imply average increases of about 15 percent for usage on iOS and Android combined, 60 percent for iOS, and 6 percent for Android.

These results show that the increase was much larger on iOS than on Android. The dynamics of effects are also consistent with the fact that exposure to choice screens accumulated differently across platforms.

[4] Percentage effects are computed as $100 \times (\exp(\beta) - 1)$.

Appendix Table A2: EU choice screens and log average daily active users of Firefox

	Total	iOS	Android
Choice Screen	0.1356***	0.4681***	0.0618**
	(0.0232)	(0.0235)	(0.0258)
Observations	14,560	14,560	14,560
Countries	70	70	70
Clusters (country)	Yes	Yes	Yes
Fixed effects: Country and Week	Yes	Yes	Yes
R^2	0.9956	0.9955	0.9948

Notes: Dependent variable is the log of daily active users (DAU). Choice Screen indicator equals EU × Post. All specifications include country and week fixed effects. Standard errors are clustered at the country level. Stars denote: *** p<0.01, ** p<0.05, * p<0.1.

A.4 Back-of-the-Envelope Exposure Adjustment for Android

A recent industry survey of 5,186 smartphone users across France, Germany, Spain, Sweden, and the UK found that 36% planned to buy their next smartphone within a year (Vodafone Institute for Society and Communications, 2025). To make this comparable with our estimator, we linearly adjust this figure to a 15-month window, which implies roughly 45%. Moreover, data from Statcounter suggest that Samsung devices account for about 51% of EU Android usage (Statcounter Global Stats, 2026a,b). While Google states that some Samsung devices do not have Chrome as the default browser, we do not observe the share. Under bounding assumptions about the share of Samsung devices shown a choice screen, these inputs imply a rough exposure-adjusted effect in the range of 28% to 58%. This back-of-the-envelope calculation abstracts from additional Android exposure through factory resets, as well as from eligible existing Pixel devices, since we do not observe a comparable denominator for them.

A.5 The iOS 18.2 Redesign

The iOS 18.2 update was followed by a second sharp rise in Firefox DAU, with the increase over the next several months comparable in magnitude to the initial post-DMA jump (Figure 1a). The update bundled several changes to the choice-screen implementation. Early DMA screens allowed users to defer the choice by tapping "Not Now"; iOS 18.2 removed deferral, required users to engage with the full browser list before setting a default, provided more information within the choice flow, streamlined selection and installation, and allowed newly downloaded browsers to replace Safari in the hotseat

under the conditions described by Apple.[5] Table A4 shows that the DMA choice screen substantially increased Firefox usage on iOS, with the effect becoming larger after iOS 18.2. Column (1) estimates that, before iOS 18.2, Firefox DAU increased by about 36 percent in treated EU countries relative to the control group. After the rollout of iOS version 18.2, the effect rises to about 79 percent, suggesting the redesign increased the effectiveness of the policy. Column (3) further shows that iOS 18.2 is associated with both an additional level increase of about 4 percent and a steeper post-18.2 trajectory: the weekly treatment trend rises from about 0.4 percent per week before iOS 18.2 to about 0.6 percent per week afterward.

[5]Table A3 provides more detail about the design changes between iOS versions and the potential behavioral channels.

Appendix Table A3: Choice Screen Design and Relevant Mechanisms on iOS

Dimension	iOS 17.4–18.1	iOS 18.2 and later	Potential behavioral channel
Display rule	Shown when an EU user first opened Safari on an eligible compliant device.	Shown to EU users with Safari set as the default browser; users with another browser already set as default are not shown the choice screen.	Exposure; targeting of default users
Frequency	Shown once per user.	Shown once per device.	Repeated decision opportunities; learning/reminder effects at important moments
Deferral	Users could skip the choice screen by tapping "Not Now," leaving Safari as the default.	The "Not Now" option was removed; users must choose a browser before proceeding.	Active choice; default persistence
Engagement with options	Users could choose or defer without viewing the full browser list.	Users must scroll through the full list before setting a default browser.	Attention to alternatives
Information before choice	The list displayed browser names and icons; detailed app information was available only after tapping a browser and viewing its App Store page.	The list includes each browser's App Store subtitle, and users can open the browser's App Store page from the list.	Information and product differentiation
Choice flow	Tapping a browser routed the user to that browser's App Store page before completion.	Users select a browser directly on the choice screen using radio buttons and confirm with "Set as Default Browser."	Choice friction and transaction costs
Installation flow	If the selected browser was not already installed on the device, choice screen installation occurred through the App Store flow.	If the selected browser is not installed, download progress appears within the choice-screen flow and the browser opens automatically once installed.	Installation friction
Post-choice placement	Selecting a new default browser did not automatically move that browser into Safari's position in the Dock or on the first page of the Home Screen.	The selected browser can replace Safari in the Dock or on the first page of the Home Screen under the conditions described by Apple.	Salience; access friction and habit formation

Notes: Both versions displayed up to 12 browsers, including Safari, with browser order randomized. Unlike Android's rollout, the iOS choice screen was not limited to new or factory-reset devices; this table focuses on design differences within iOS. The final column is descriptive. Because several features changed at the same time, the empirical analysis cannot separately identify the effect of any individual channel.

Appendix Table A4: EU choice screens and iOS Firefox usage after iOS 18.2

	iOS		
	(1)	(2)	(3)
Choice Screen	0.3086***	0.2046***	0.2236***
	(0.0183)	(0.0161)	(0.0162)
Choice Screen × Post iOS 18.2	0.2727***	0.0283**	0.0382***
	(0.0152)	(0.0131)	(0.0119)
Choice Screen × Time		0.0052***	0.0042***
		(0.0003)	(0.0004)
Choice Screen × Post iOS 18.2 × Weeks since iOS 18.2			0.0013***
			(0.0004)
Observations	14,560	14,560	14,560
Countries	70	70	70
Country fixed effects	Yes	Yes	Yes
Week fixed effects	Yes	Yes	Yes
Clusters	Country	Country	Country
R^2	0.996475	0.996773	0.996776

Notes: Dependent variable is the log of iOS daily active users. Choice Screen equals EU × Post DMA. Post iOS 18.2 equals one beginning in the week containing December 11, 2024. Column (2) adds Choice Screen × Time, where Time is the number of weeks since the DMA date and equals zero before treatment. Column (3) additionally includes Choice Screen × Post iOS 18.2 × Weeks since iOS 18.2, which estimates whether the treated-country trend changes after iOS 18.2. All specifications include country and week fixed effects. Standard errors are clustered at the country level. Stars denote: *** p<0.01, ** p<0.05, * p<0.1.

A.6 Market Share Analysis

Using Cloudflare Radar, we obtain browser-market-share data that provide a broad, though noisy, measure of observed web traffic across websites. Our data span October 2022 to December 2025, beginning with the first month for which Cloudflare published its Browser Market Share Report (Cloudflare Radar, 2026). Unlike the Mozilla data, which measure Firefox usage directly but only for Firefox, the Cloudflare data allow us to examine whether the DMA choice screens shifted market shares across browsers more broadly and to distinguish between iOS and Android devices.[6] We focus on Chrome, Safari, and Firefox: Chrome and Safari because they are the dominant mobile browsers, and Firefox because it allows us to assess whether the increase in Firefox usage documented in the main text is also reflected in market-share data.[7] These data are an imperfect measure of browser usage. Baseline shares may be measured with error, and are affected by the extent to which different browsers limit third-party measurement. For instance, Firefox makes efforts to limit third-party measurement, which may lead to undercounting if its usage in Cloudflare data.

The market-share results in Table A5 and Figure A4 are consistent with the main analysis. On iOS, where Safari is the default browser, the estimates imply an increase of about 6.65 percentage points for Chrome and a decline of about 6.93 percentage points for Safari for months 15 and beyond. Firefox's gain of about 0.22 percentage points is modest in absolute terms, but meaningful relative to its baseline share of less than 0.50 percent in the Cloudflare data.

On Android, the market-share results are also suggestive of movement away from the default, although the estimates are less precise. During data validation, we also observed large movements in Android browser shares for Russia during the pre-treatment period, including an abrupt decline in Chrome's market share around the beginning of

[6] Cloudflare is our main data on market share, since it allows us to see market shares broken out by iOS and Android, which have different defaults and choice screens. Statcounter is another source of third-party data, but these data are not separated by iOS and Android so we are unable to use them for the main analysis. In appendix Tables A8 and A7, we look at shifts in market share across iOS and Android combined, using both Cloudflare and Statcounter data. Across both we find that Chrome share moves less, consistent with the fact that it has increased in iOS but decreased on Android. We also find that Firefox market share increases around 0.09-0.14 percentage points in Cloudflare and 0.25-0.30 percentage points in Statcounter depending on whether Russia is excluded.

[7] The EU group includes Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. The non-EU comparison group includes Australia, Canada, India, Russian Federation, New Zealand, South Africa, Switzerland, Turkey, United Kingdom, and United States.

2024. This adds considerable noise to the analysis, and may reflect Russia-specific market or measurement factors. Because Russia is part of the non-EU comparison group and this movement can affect the Android estimates, we report the Android results both including and excluding Russia. Excluding Russia, the estimates imply a decline of about 1.93 percentage points for Chrome and an increase of about 0.11 percentage points for Firefox.

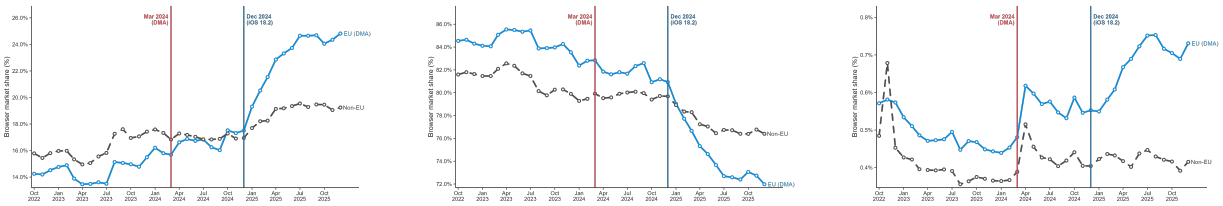
Appendix Table A5: Effects of EU choice screens on browser market share over time (monthly)

	iOS			Android		Android (excl. Russia)	
	Chrome (1)	Safari (2)	Firefox (3)	Chrome (4)	Firefox (5)	Chrome (6)	Firefox (7)
Dependent variable: market share (percentage points)							
Choice Screen	0.5448***	−0.3619	0.0115	1.7159	−0.0943*	−0.0201	−0.0941
	(0.1932)	(0.2397)	(0.0117)	(1.7754)	(0.0514)	(0.5614)	(0.0558)
Choice Screen × Month 2	0.4806**	−0.5971***	0.0106	0.1183	0.0294	0.0377	0.0337
	(0.1955)	(0.1973)	(0.0580)	(0.1617)	(0.0210)	(0.1534)	(0.0226)
Choice Screen × Month 3	0.8389***	−0.9014***	0.0492	0.0084	0.0738**	−0.1368	0.0789**
	(0.1571)	(0.2543)	(0.0331)	(0.2385)	(0.0335)	(0.2098)	(0.0361)
Choice Screen × Month 4	0.8455***	−1.0319***	0.0499**	−0.2669	0.1130**	−0.3672*	0.1160**
	(0.2410)	(0.2939)	(0.0223)	(0.2172)	(0.0460)	(0.2088)	(0.0495)
Choice Screen × Month 5	1.1316***	−1.2688***	0.0613***	−0.2967	0.1404**	−0.5903**	0.1353**
	(0.3038)	(0.3645)	(0.0221)	(0.3785)	(0.0618)	(0.2618)	(0.0653)
Choice Screen × Month 6	0.5583*	−0.6762*	0.0507***	−0.5646	0.1526**	−0.8946***	0.1523**
	(0.3189)	(0.4004)	(0.0166)	(0.4002)	(0.0572)	(0.2506)	(0.0602)
Choice Screen × Month 7	0.2926	−0.2917	0.0202	−0.5906	0.1167**	−0.9519***	0.1167**
	(0.3649)	(0.4305)	(0.0205)	(0.4283)	(0.0455)	(0.2573)	(0.0491)
Choice Screen × Month 8	1.3830***	−1.4020***	0.0531**	−1.2535**	0.1037*	−1.4569***	0.0971*
	(0.2751)	(0.3398)	(0.0214)	(0.4647)	(0.0518)	(0.4261)	(0.0554)
Choice Screen × Month 9	1.5589***	−1.4525***	0.0489***	−1.5937***	0.0985**	−1.3265***	0.0903**
	(0.3486)	(0.3951)	(0.0137)	(0.5072)	(0.0418)	(0.4464)	(0.0436)
Choice Screen × Month 10	1.7108***	−1.6717***	0.0560***	−1.3951***	0.1246**	−1.4402***	0.1208**
	(0.3471)	(0.3935)	(0.0165)	(0.4500)	(0.0505)	(0.4592)	(0.0536)
Choice Screen × Month 11	2.7662***	−2.8036***	0.0342	−1.7968***	0.1673***	−1.8724***	0.1737***
	(0.4685)	(0.4922)	(0.0216)	(0.5315)	(0.0589)	(0.5442)	(0.0613)
Choice Screen × Month 12	3.4649***	−3.5460***	0.0524*	−1.4316**	0.1512**	−1.6220***	0.1543**
	(0.5390)	(0.5424)	(0.0310)	(0.5602)	(0.0599)	(0.5456)	(0.0626)
Choice Screen × Month 13	4.4328***	−4.5516***	0.0834***	−1.2372*	0.1826***	−1.6401**	0.1737**
	(0.5494)	(0.5455)	(0.0295)	(0.7096)	(0.0667)	(0.6100)	(0.0685)
Choice Screen × Month 14	4.8626***	−4.8368***	0.1579***	−0.7723	0.1354***	−1.4980**	0.1314***
	(0.7081)	(0.6523)	(0.0259)	(0.9264)	(0.0455)	(0.6185)	(0.0471)
Choice Screen × Month 15+	6.1079***	−6.5679***	0.2076***	−2.0048***	0.1486	−1.9138***	0.2052**
	(0.6221)	(0.7089)	(0.0350)	(0.4918)	(0.0938)	(0.4938)	(0.0795)
Pre-treatment mean (EU)	14.5800	84.3176	0.4910	84.0789	1.3580	84.0789	1.3580
Russia included	Yes	Yes	Yes	Yes	Yes	No	No
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clusters	Country	Country	Country	Country	Country	Country	Country
Observations	1,437	1,437	1,437	1,443	1,443	1,404	1,404
R^2	0.9641	0.9657	0.9098	0.9110	0.9683	0.9548	0.9705

Clustered standard errors at the country level in parentheses. EU member states enter as separate treated units. The dependent variable is browser market share in percentage points. Choice Screen equals EU × Post, where Post is 2024-03 onward; its coefficient captures the immediate effect of the choice screen in the policy month (March 2024). Month-specific interaction terms report deviations relative to this first-month effect; the total effect in Month k is the sum of the Choice Screen coefficient and the corresponding Choice Screen × Month k coefficient. Columns (6) and (7) replicate the Android Chrome and Firefox specifications excluding the Russian Federation from the Non-EU control group. All specifications include country and month fixed effects. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

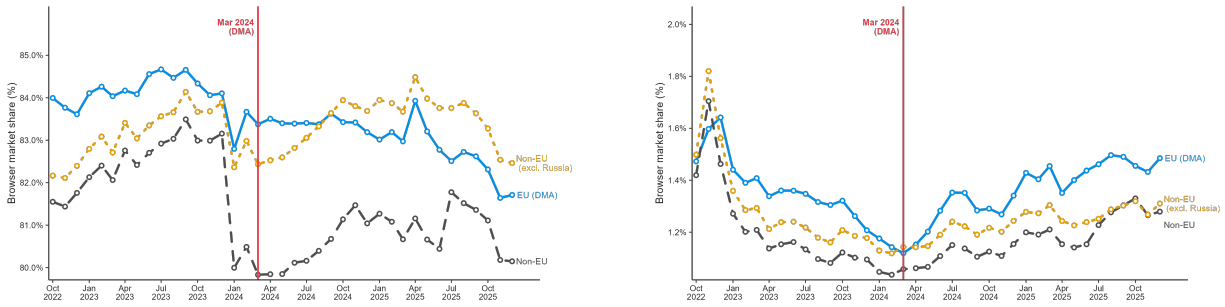
Appendix Figure A4: Browser market share by operating system

iOS



(a) Chrome **(b)** Safari **(c)** Firefox

Android



(d) Chrome **(e)** Firefox

Notes: The figure shows monthly browser market shares for DMA and non-DMA countries. The vertical red line indicates the introduction of the DMA choice screen in March 2024. The vertical blue line indicates the additional iOS 18.2 browser choice screen for existing EU iPhone users in December 2024. Safari is not included in the Android panels because it is not available on Android. Groups are built using a simple average of market shares across EU and non-EU countries. Source: Cloudflare data.

A.7 Statcounter Data

We use data from Statcounter, which do not provide a breakdown by iOS and Android. For this reason, the data are considerably noisier, and there are reasons to prefer the Cloudflare based results. Nevertheless, when conducting the analysis using these data, Tables A7 (Without Russia) and A8 (With Russia) show an increase in Firefox market share for the Month 15+ period. In addition, the descriptive statistics in Table A6 show a substantial increase in Firefox market share in the EU relative to non-EU countries.

The Statcounter data cover the period from January 2022 to December 2025 and include the following countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slo-

vakia, Slovenia, Spain, Sweden, Australia, Canada, India, New Zealand, Russia, South Africa, Switzerland, Turkey, the United Kingdom, and the United States. The EU group consists of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden, while the remaining countries are classified as non-EU.

Appendix Table A6: Descriptive statistics — StatCounter sample (mobile browsers)

	EU (treated)			Non-EU (control)		
Browser	Pre	Post	Δ	Pre	Post	Δ
Chrome	60.22	62.20	+1.98	53.85	58.19	+4.34
	(12.52)	(11.26)		(18.81)	(16.88)	
Safari	29.02	27.64	−1.38	35.23	31.14	−4.10
	(11.65)	(10.32)		(19.58)	(17.43)	
Firefox	0.85	1.04	+0.18	0.78	0.80	+0.02
	(0.42)	(0.59)		(0.45)	(0.48)	

Notes: Cell entries report the mean mobile browser market share in percentage points, with between-country standard deviations in parentheses — computed as the cross-sectional standard deviation of country-level means within each group and period. The sample covers 27 EU countries (treated) and 10 Non-EU countries (control) over 48 months (2022-01 to 2025-12), for a total of 5,328 country-month-browser observations (2,886 pre-DMA and 2,442 post-DMA). Pre denotes months before 2024-03; Post denotes 2024-03 onward (DMA enforcement date). Δ is the within-group change in mean market share between the two periods. Source: StatCounter Global Stats, mobile.

Appendix Table A7: Effects of EU choice screens on mobile browser market share: Cloudflare vs. StatCounter (excluding Russia)

	Cloudflare Radar			StatCounter		
	Chrome (1)	Safari (2)	Firefox (3)	Chrome (4)	Safari (5)	Firefox (6)
Dependent variable: market share (percentage points)						
Choice Screen	0.4224	−0.3668	−0.0574*	−0.6195	1.1612	0.0469
	(0.6119)	(0.3382)	(0.0297)	(1.8676)	(2.0471)	(0.0707)
Choice Screen × Month 2	0.3210**	−0.3668***	0.0494***	−0.9596**	0.8552**	0.0100
	(0.1540)	(0.1336)	(0.0149)	(0.3675)	(0.3734)	(0.0300)
Choice Screen × Month 3	0.0386	−0.1576	0.0826***	−1.8378*	1.0689	0.0678*
	(0.2398)	(0.2161)	(0.0196)	(1.0661)	(0.9437)	(0.0355)
Choice Screen × Month 4	−0.3683	0.2404	0.1107***	−2.4963*	1.6574	0.0870**
	(0.2920)	(0.2372)	(0.0293)	(1.4717)	(1.3796)	(0.0395)
Choice Screen × Month 5	−0.4827	0.2969	0.1296***	−3.1007*	2.0974	0.1307***
	(0.4432)	(0.4223)	(0.0389)	(1.6275)	(1.4658)	(0.0477)
Choice Screen × Month 6	−1.5117***	1.2342***	0.1314***	−2.7467**	2.4459**	0.1422***
	(0.4120)	(0.4243)	(0.0387)	(1.3288)	(1.1730)	(0.0479)
Choice Screen × Month 7	−2.1116***	1.8358***	0.1009***	−3.7363***	3.3344***	0.1215***
	(0.5430)	(0.5506)	(0.0300)	(1.1375)	(1.0351)	(0.0413)
Choice Screen × Month 8	−1.1482**	0.3173	0.1147***	−6.0819***	5.8685***	0.0948*
	(0.4622)	(0.4245)	(0.0375)	(1.8548)	(1.6767)	(0.0537)
Choice Screen × Month 9	−0.6243	−0.1769	0.1055***	−4.4711***	4.1578***	0.0533
	(0.6240)	(0.5670)	(0.0286)	(1.5513)	(1.3253)	(0.0573)
Choice Screen × Month 10	−1.1834*	0.3821	0.1261***	−4.0622**	3.7659**	0.0359
	(0.6304)	(0.5451)	(0.0314)	(1.7244)	(1.6532)	(0.0550)
Choice Screen × Month 11	−1.0951*	0.1746	0.1459***	−1.9748	1.6559	0.0548
	(0.5738)	(0.5905)	(0.0335)	(1.8411)	(1.8018)	(0.0672)
Choice Screen × Month 12	−0.8443	0.0187	0.1454***	−1.0615	0.3930	0.1193
	(0.6040)	(0.6384)	(0.0334)	(2.3192)	(2.4328)	(0.0752)
Choice Screen × Month 13	−0.9765	0.3423	0.1598***	−1.4878	0.9037	0.0452
	(0.7016)	(0.7290)	(0.0343)	(1.9886)	(2.1582)	(0.0749)
Choice Screen × Month 14	−1.0331	0.6768	0.1436***	−1.7104	0.7748	0.1193
	(0.7767)	(0.8367)	(0.0368)	(2.1078)	(2.2961)	(0.0767)
Choice Screen × Month 15+	−1.2353	0.3987	0.1985***	−2.4399	1.1176	0.2611**
	(0.7821)	(0.8730)	(0.0513)	(1.9251)	(2.1747)	(0.1005)
Pre-treatment mean (EU)	64.7587	23.8751	1.0616	60.2245	29.0178	0.8548
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clusters	Country	Country	Country	Country	Country	Country
Observations	1,404	1,404	1,401	1,728	1,728	1,728
R^2	0.9851	0.9841	0.9723	0.9007	0.8858	0.7832

Clustered standard errors at the country level in parentheses. Columns (1)–(3) use Cloudflare Radar; columns (4)–(6) use StatCounter Global Stats. Russia is excluded from the Non-EU control group as a robustness check. Choice Screen equals EU × Post, where Post is 2024-03 onward; its coefficient captures the immediate effect of the choice screen in the policy month (March 2024). Month-specific interaction terms report deviations relative to this first-month effect. Month 15+ pools all months from the 15th post-treatment month onward. All specifications include country and month fixed effects. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Appendix Table A8: Effects of EU choice screens on mobile browser market share: Cloudflare vs. StatCounter

	Cloudflare Radar			StatCounter		
	Chrome (1)	Safari (2)	Firefox (3)	Chrome (4)	Safari (5)	Firefox (6)
Dependent variable: market share (percentage points)						
Choice Screen	1.6632	−0.1419	−0.0530*	−0.2062	1.0556	0.0425
	(1.3378)	(0.3832)	(0.0282)	(1.8415)	(1.9943)	(0.0658)
Choice Screen × Month 2	0.4455**	−0.4832***	0.0359*	−0.8103**	0.7156*	0.0084
	(0.1904)	(0.1717)	(0.0192)	(0.3786)	(0.3811)	(0.0291)
Choice Screen × Month 3	0.2678	−0.3198	0.0736***	−1.6437	0.9006	0.0651*
	(0.3180)	(0.2593)	(0.0205)	(1.0121)	(0.9045)	(0.0341)
Choice Screen × Month 4	−0.1644	0.0144	0.1031***	−2.3954*	1.5796	0.0787*
	(0.3448)	(0.3218)	(0.0285)	(1.3754)	(1.3056)	(0.0395)
Choice Screen × Month 5	−0.1599	0.1136	0.1273***	−2.9454*	1.9821	0.1212**
	(0.5284)	(0.4409)	(0.0367)	(1.5046)	(1.3602)	(0.0465)
Choice Screen × Month 6	−1.1077*	0.9747*	0.1281***	−2.7324**	2.2528*	0.1441***
	(0.5629)	(0.4845)	(0.0366)	(1.2456)	(1.1303)	(0.0467)
Choice Screen × Month 7	−1.7236**	1.6660***	0.0960***	−3.5315***	3.1561***	0.1251***
	(0.6498)	(0.5685)	(0.0281)	(1.0847)	(0.9966)	(0.0405)
Choice Screen × Month 8	−1.0097**	0.3499	0.1135***	−5.8633***	5.8863***	0.0863
	(0.4620)	(0.4114)	(0.0346)	(1.7099)	(1.5397)	(0.0531)
Choice Screen × Month 9	−1.0075	0.0517	0.1068***	−3.8856**	3.9348***	0.0431
	(0.6897)	(0.5753)	(0.0266)	(1.5533)	(1.2562)	(0.0565)
Choice Screen × Month 10	−1.1192*	0.3462	0.1242***	−3.7482**	3.6898**	0.0286
	(0.5889)	(0.5117)	(0.0295)	(1.6185)	(1.5248)	(0.0543)
Choice Screen × Month 11	−0.9037	−0.0799	0.1375***	−1.4175	1.5299	0.0471
	(0.5862)	(0.6195)	(0.0328)	(1.7980)	(1.6928)	(0.0655)
Choice Screen × Month 12	−0.5635	−0.2150	0.1393***	−0.5888	0.3757	0.1234
	(0.6458)	(0.6544)	(0.0323)	(2.2565)	(2.3428)	(0.0731)
Choice Screen × Month 13	−0.5795	0.1715	0.1609***	−0.9466	0.8678	0.0591
	(0.7883)	(0.7302)	(0.0334)	(2.0167)	(2.1264)	(0.0743)
Choice Screen × Month 14	−0.2610	0.3904	0.1446***	−1.3915	0.8015	0.1270
	(1.0561)	(0.8401)	(0.0350)	(2.0918)	(2.2660)	(0.0760)
Choice Screen × Month 15+	−1.0641	−0.0490	0.1523**	−1.9465	1.1072	0.2099*
	(0.7622)	(0.9376)	(0.0667)	(1.9526)	(2.1448)	(0.1118)
Pre-treatment mean (EU)	64.7587	23.8751	1.0616	60.2245	29.0178	0.8548
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clusters	Country	Country	Country	Country	Country	Country
Observations	1,443	1,443	1,434	1,776	1,776	1,776
R^2	0.9762	0.9839	0.9692	0.8981	0.8861	0.7820

Clustered standard errors at the country level in parentheses. Columns (1)–(3) use Cloudflare Radar; columns (4)–(6) use StatCounter Global Stats. All Non-EU economies are included in the control group, including Russia. Choice Screen equals EU × Post, where Post is 2024-03 onward; its coefficient captures the immediate effect of the choice screen in the policy month (March 2024). Month-specific interaction terms report deviations relative to this first-month effect. Month 15+ pools all months from the 15th post-treatment month onward. All specifications include country and month fixed effects. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.