Who benefits from Google's SERP? The impact of the DMA on the Air Travel Market Markets*

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Abstract

This paper examines the impact of Google's Search Engine Results Page (SERP) redesign implemented on March 6, 2024, in response to the Digital Markets Act (DMA), on web traffic to airline and flight comparison websites. The reform removed the Google Flights module and introduced new sections — "Airlines Options" and "Flight Sites"—designed to limit self-preferencing and to improve the visibility of third-party services. Using a Difference-in-Differences (DiD) approach and granular domain-level traffic data for four EU countries, with the United Kingdom and the United States as control markets, we estimate the causal effects of the SERP redesign over the period November 2023 to December 2024. The results show significant increases in organic search traffic to airline websites, driven mainly by low-cost carriers, smaller national airlines, and airlines with limited pre-reform visibility. Organic search traffic to low-cost carriers increased by 14-28% on desktop devices and by 8-22% on mobile devices, while network carriers and dominant national airlines experienced little or no effects. For flight comparison websites, traffic gains were concentrated among smaller platforms, with increases of up to 28.9%, whereas large platforms such as Skyscanner and Booking.com show no significant changes in organic traffic. Overall, the DMA-mandated SERP redesign generated strong redistributive effects, reallocating user attention towards smaller market participants and increasing contestability in digital air travel market.

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Keywords: Digital Markets Act; Self-preferencing; Google, SERP; Air Travel Market

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1. Introduction

This paper examines how the Digital Markets Act (DMA), implemented in the EU on March 6, 2024, changed Google Search's design and affected travel-related search traffic. The DMA aims at enhancing competition in digital markets by limiting the market power of large digital platforms, designated as gatekeepers, and by ensuring fair access and equal treatment for competing services (Franck and Peitz, 2024; Crémer et al. 2023; De Streel et al. 2024; Fletcher et al. 2024).[5] To achieve these objectives, the regulation establishes specific ex ante obligations for gatekeepers, including firms such as Amazon, Apple, Booking.com, Facebook, Google and Microsoft, which require them to modify certain business practices and platform design choices that may distort competition.

A central provision of the DMA is article 6(5), which prohibits gatekeepers from favoring their own services over those of competitors. This prohibition of self-selection has had direct implications for the design of Google's Search Engine Results Page (SERP), which historically has given prominent placement to Google's vertically integrated services, such as Google Shopping, Google Flights, and Google Hotels, over competing platforms. Under the DMA, Google is required to modify how search results are ranked and displayed, so that competing services are treated under equivalent conditions and enjoy comparable visibility to Google's own services.

On March 6, 2024, shortly before the DMA came into effect, Google implemented a substantial redesign of its SERP for users located in the European Economic Area (EEA) in order to comply with the DMA.[6] According to Google, the redesign involved more than 20 distinct and visible changes in its SERP. The company has acknowledged that these changes generate significant tensions between vertical search services (VSS), such as flights, hotels and merchants comparison platforms, and direct suppliers, including airlines, hotels, merchants, and restaurants.[7] Because visibility within the SERP is limited, an increase in visibility for one group necessarily reduces exposure for others. Google reports having conducted internal evidence-based assessments prior to the change of its SERP to balance these competing interests while preserving the user search experience. While the details and results of these assessments have not been made public, Google has emphasized that the redesign involves substantial trade-offs regarding which market participants gain greater prominence in search results.

The air travel sector is particularly well suited to studying the competitive effects of these changes. Prior to the DMA, critics argued that the prominent placement of the Google Flights module conferred a competitive advantage on Google by diverting user attention and traffic

[5] An extensive discussion about the competition problems generated by digital platforms can be found in Scott Morton et al (2019); Crémer et al., 2019; and Fletcher et al., 2023).
[6] From January to march 6th Google introduced several A/B tests to examine their solution.
[7] See a complete explanation of the changes introduce in this video on the DMA Enforcement Workshop Alphabet, organized by the European Commission on March 22th, 2024: https://webcast.ec.europa.eu/compliance-with-the-dma-google-2024-03-21

away from airlines and independent comparison platforms. In response to the DMA, Google removed the Google Flights module from its SERP in European Economic Area (EEA) countries and introduced two new result formats. The first, "Airlines Options", displays direct links to airlines' official websites. The second, "Flight Sites", provides access to independent comparison platforms—such as Skyscanner, Booking.com, Kayak, and Omio—along with price information, and may also include Google Flights as one options among others.

The objective of this paper is to empirically assess how Google's SERP redesign affected search traffic to airline and flight comparison websites operating in the EEA. Although the DMA aims to improve visibility and access for third-party services, it is unclear which types of firms have benefited and how the redesign has affected competition in the airline and travel intermediation markets. Notably, while some comparison sites like Skyscanner have reported traffic losses, Google argues that large aggregators and comparison sites may have benefited, potentially at the expense of direct providers such as airlines. These contrasting narratives motivate a data-based evaluation of the DMA's effects in the air travel sector.

This paper investigates search traffic to airline and flight comparison websites in four EU countries (France, Germany, Italy and Spain) using weekly and monthly domain-level data from Similarweb. We employ a Difference-in-Differences (DiD) framework to estimate the causal effects of the SERP redesign. Web traffic to air travel firms in the United Kingdom and the United States serves as a control group, as these countries lie outside the scope of the DMA and were not affected by the SERP changes. The study covers the period from November 2023 to December 2024, enabling a balanced comparison of traffic patterns before and after the redesign.

Our results show that the SERP redesign led to statistically significant increases in organic search traffic to airline websites. These effects are concentrated among low-cost carriers (LCCs), airlines with smaller domestic market share (as measured by seat capacity), and airlines with relatively low visibility in Google Search prior to the redesign. For LCCs, organic search traffic increased by 14-28% among desktop users and 8-22% for mobile users. In contrast, network carriers and airlines with dominant positions in national market experienced smaller or statistically insignificant effects. These findings suggest that the removal of the Google Flights module and the introduction of the "Airlines Options" primarily benefited low-cost airlines (except airlines with a dominant position in national markets such as Ryanair and EasyJet) and smaller airlines, which were previously less visible in search results.

For flight comparison sites, the average effect of the SERP redesign is positive but heterogeneous, with gains concentrated among less prominent platforms. The most visited sites—those ranked among the top 3 or top 5 comparison platforms at the national level—do not exhibit significant increases in organic search traffic. In contrast, smaller comparison platforms experience statistically significant gains, particularly from desktop users, with increases reaching up to 28.9%. We find that leading platforms such as Skyscanner or Booking.com did not benefit with the redesign. However, these platforms may have benefited

indirectly through increased referral traffic from third-party air travel deal websites, which themselves experienced traffic growth after the SERP changes.

Overall, our results indicate that the SERP redesign had a redistributive effect on search visibility within the digital air travel market. By reducing the prominence of Google's vertically integrated service and reallocating attention toward smaller or less visible market participants, the redesign appears to have enhanced contestability in airline distribution and travel intermediation markets.

Our paper contributes to the growing literature on how the design of search engines' SERP influences search traffic. While several studies have documented the importance of ranking within search results (Baye et al., 2016; Ursu, 2018; Harris et al., 2022; Zhang et al., 2023; Calzada et al., 2023), there is limited empirical evidence on how the SERP redesign can affect user behavior and traffic allocation. Notable exceptions include Pape and Rossi (2025), who study the impact of Google's January 2024 modification in the EU that removed clickable maps and direct links to Google Maps from location-based queries, and Püplichhuisen and Sirries (2025), who analyze the effects of a series of SERP changes that progressively altered the visibility and competitive dynamics of comparison-shopping services.

The article is organized as follows. Section 2 reviews the related literature. Section 3 describes the key changes introduced by the DMA in the search market and outlines the resulting modifications to Google' SERP. Sections 4 and 5 present the data and empirical strategy, respectively. Section 6 shows the results. Section 7 examines the effect of Google' SERP redesign on fares, and Section 8 concludes.

2. Literature Review

This paper is closely related to recent work analyzing the effects of changes to Google's SERP following the implementation of the DMA. Pape and Rossi (2025) examine a change introduced by Google in the EU in January 2024 that removed from its SERP clickable maps and direct links to Google Maps from location-based queries. Using a Difference-in-Differences approach comparing EU and non-EU countries[8], they find that the change led to a 21% increase in search queries for "maps" and "Google Maps," largely redirecting users to Google Maps through additional search steps. While the change could have facilitated the discovery of competing services, it only induced a modest increase in searches for Apple Maps and no significant effect for Bing Maps or others alternatives. Moreover, organic search visits to Google Maps increased by about 40% with no change in direct traffic or total usage, indicating that users adapted by searching for Google Maps rather than switching to rival services. Overall, their findings suggest that the intervention may have reinforced Google's position and reduced the visibility

[8] They consider 25 EU countries affected by the DMA, and 27 countries that are used as a control (13 European non-EU countries and all OECD and BRICS countries). Their analysis uses search query volume data from Google Trends and Glimpse, as well as monthly web traffic data from Semrush, from January 2023 to December 2024.

of competitors. Püplichhuisen and Sirries (2025) study the effects of a sequence of changes in Google's SERP that increasingly modified the visibility and competitive conditions of comparison shopping services (CSS).[9] They show that the introduction of a "Product Websites" (PW) unit that nearly tripled the presence of CSSs on general search results pages. However, this gain was offset by the concurrent launch of a "Product View" (PV) unit, which appears more frequently, is more prominently positioned, and likely captures greater user attention. Although both PW and PV units include tools to refine searches, the authors argue that it remains unclear whether these changes ultimately created a competitive environment for CSS.

This paper is also related with a broader empirical literature analyzing biases and self-preferencuing in algorithm-based platforms.[10] Chiou (2017) shows that Google's acquisition of Google Flights reduced traffic to rival fare comparison sites, while the integration of Zagat increased visibility and clicks to other restaurant websites. Hunold et al. (2017) find that hotel rankings on Booking.com and Expedia differ systematically from ranking based on price or user ratings. Aguiar et al. (2021) document that Spotify's "New Music Friday" rankings favor independent labels and female artists. Huang and Xie (2023) show that repeated promotion of certain sellers on food delivery platforms leads to higher prices and more unequal revenue distribution. Calzada et al. (2023) analyze nine Google core algorithm updates from 2018 to 2020 and find that these updates reduced the visibility and traffic of news outlets, although they had limited effects on media market concentration.

Another strand of the literature examines how Google has maintained its market power in search by preserving its default status and pre-installation on browsers and mobile devices.[11] Allcott et al. (2025) show, using a field experiment, that switching costs play a limited role in explaining Google's dominance, which is instead driven by users' beliefs about Google's superior quality and persistent inattention to alternatives. In a related paper, Decarolis et al. (2024) analyze policy interventions aimed at reducing Google's default status on Android devices in the European Economic Area (EEA), Russia, and Turkey. They find that these interventions reduced Google's market share, but with relevant cross-country heterogeneity, reflectin differences in remedy design and local market conditions.

Several recent empirical papers have documented various forms of self-preferencing by dominant digital platforms subject to the DMA. Chen and Tsai (2024) examine Amazon's 'Frequently Bought Together' (FBT) algorithm and find evidence that the platform

[9] The paper focuses on product-related queries for a representative sample of around 27,000 unique product-related keywords at different periods between 2022 and 2024. As in our case, they focus on the change in Google's SERP.

[10] Our paper relates to the literature that had examined how changes in Google News design have affected the media markets. George and Hogendorn (2021) find increased visits to local news after a 2010 redesign in Google News, while Chiou and Tucker (2017) show reduced traffic during a temporary AP content removal of the aggregator. Calzada and Gil (2020) and Athey et al. (2021) find that the 2014 shutdown of Google News in Spain led to a 8–14% and 10% drop in visits to news outlets, respectively.

[11] Google must comply with the DMA to remedy this situation and allow mobile devices to install competing services. While Article 6(3) requires gatekeepers to enable users to easily modify default settings for search engines and browsers, Article 6(4) mandates the use of choice screens during device setup or browser installation to facilitate access to competing services.

systematically favors its own retail offers over those of third-party sellers. Lee and Musolff (2025) study Amazon's control of the buy box and find evidence of self-preferencing. They show that such behavior may increase consumer welfare in the short run, as consumers ten to prefer products sold by Amazon over those sold by third parties, conditional on price and shipping terms; however, the long run welfare effects appears negligible. Hunold et al. (2022) examine the allocation of the buy box on Amazon and report that it is consistently assigned when Amazon is among the sellers, whereas the buy box is not offered in 39% of cases involving only third-party sellers. Their analysis further shows that Amazon would not receive the buy box in approximately 13% of its listings if the same standards applied to external sellers were applied to Amazon itself. Farronato et al. (2023) find evidence that Amazon systematically ranks its own branded products higher than comparable alternatives in marketplace search results, conferring a visibility advantage equivalent to 30–60% of that granted to sponsored listings. Waldfogel (2024) develops a measure of Amazon's self-preferencing and uses it to evaluate the effect of Amazon's designation as gatekeeper under the DMA. He finds that Amazon systematically ranks its own products more favorably, but this differential decline substantially following the introduction of the DMA obligations.

Evidence of preferential treatment has also been documented in the online travel markets. Hunold et al. (2020) show that hotels receive lower rankings on booking platforms when their prices are lower on their own websites or on rival platforms. Similarly, Cure et al. (2022) find that online booking portals owned by the same parent company as Booking.com are more likely to be featured and highlighted in meta-search results than independent platforms. In contrast, Aguiar and Waldfogel (2021) analyze the influence of Spotify's curated and algorithmic playlists on streaming patterns and find no evidence of systematic bias in favor of major labels, suggesting that not all algorithm-driven curation leads to self-preferencing.

Finally, relatively few studies examine the role of digital platforms in air transportation markets. Brunger (2010) shows a price-reduction effect when the flight is booked online rather than through traditional travel agencies. Martínez et al. (2014) collected detailed airfare data for the Madrid-New York route and find that prices are lower on comparison websites than on the airlines' websites. Ater and Orlov (2015) examined how the transition from traditional travel agencies to online distribution channels transformed competition in air travel markets. Using flight data from 1997 to 2007 and geographic variation in internet adoption across the U.S. domestic market, they found that flight times increased, which they interpret as evidence of a shift from quality-based to price-based competition driven by the rise of online distribution. Bilotkach et al. (2024) study the consequences of a dispute between American Airlines and two major comparison platforms, Expedia and Orbitz. In early 2011, both platforms stopped displaying American Airlines fares following tensions over the airline's plan to introduce its own ticketing channel for agencies. Using an event study design exploiting variation across routes and carriers, the authors find that American Airlines responded by lowering fares, an effect that may partly reflect its financial struggles at the time, while observing no significant change in passenger volumes.

3.The DMA and the redesign of Google's SERP

The Digital Markets Act (DMA) was adopted in the European Union on October 12, 2022 with the primary objective of ensuring fair and contestable digital markets by preventing large online platforms from engaging in practices that distort competition.[12] The DMA targets the so-called "gatekeepers", which are digital platforms that have a significant impact on the internal market, serve as important gateways for business users to reach end users, and enjoy a relevant and durable position in the market.

On September 6, 2023, the European Commission designated six companies as gatekeepers: Alphabet (Google), Amazon, Apple, ByteDance, Meta, and Microsoft.[13] This designation applies to 22 core platform services (CPS), such as Google Search, YouTube, Amazon Marketplace, Facebook, WhatsApp, Windows OS, LinkedIn. Following designation, gatekeepers had a six months period, until March 6, 2024, to comply with the DMA obligations for each relevant service. These obligations are primarily set out in Articles 5, 6, and 7, and aim to prevent self-preferencing, enhance data portability and interoperability, and ensure fair access and non-discriminatory treatment for business users and competitors.

A core principle of the DMA is the prohibition of self-preferencing by gatekeepers. In particular, Article 6(5) require gatekeepers to refrain from treating their own services more favorably in ranking and display than comparable services offered by third parties. This regulation has direct implications for Google Search, which has historically granted prominent placement to Google's vertical services, such as Google Shopping, Google Flights, Google Maps, or Google Hotels. Under the DMA, Google must modify the rank and presentation of search results so that rival services are displayed under equivalent conditions and with comparable visibility.

Beyond search neutrality, the DMA imposes a range of additional obligations on Alphabet across several of its platform services. Within the Google Play Store, Alphabet must allow app developers to promote external offers and direct users to alternative payment systems without facing discriminatory conditions or penalties (Article 5(4) and Article 6(12)). In advertising, Alphabet is required to provide advertisers and publishers with transparent information on the pricing, performance, and remuneration of the ads placed through its platforms (Articles 5(9) and 6(8)). This measure limit platform's advantages arising from vertical integration in advertising technologies such as Google Ads, AdSense, and Ad Manager. The DMA also strengthens data portability and interoperability obligations by mandating gatekeepers to provide simple and secure tools (such as Application Programming Interfaces) that allow users to export their data from services like Google Search, Google Maps, and YouTube (Article 6(9)). These measures aim to reduce switching costs and to lower entry barriers to smaller

[12] The DMA (Regulation (EU) 2022/1925), was adopted by the European Parliament and the Council on 14 September 2022 and published in the Official Journal on 12 October 2022. It entered into force on 1 November 2022 and became applicable on 2 May 2023.

[13] The list of designated gatekeepers and core platform services is published by the European Commission at: https://ec.europa.eu/commission/presscorner/detail/en/ip_23_4328.

providers. In addition, business users must be granted access to data generated through their commercial interactions on Alphabet's platforms (Article 6(10)). Finally, Alphabet is prohibited from setting Google Search or the Chrome browser as default options on Android devices without offering users a neutral choice screen during device configuration (Article 6(3)). This regulation aims to safeguard users' autonomy in the selection of core digital services.

With respect to search activity, compliance with Article 6(5) requires Alphabet to modify the design and functioning of Google's Search Engine Results Page (SERP). Specifically, the company must eliminate practices that systematically favor its own vertical services, such as the prominent placement of Google Shopping carousels at the top of search results, the direct integration of Google Flights data into search results, or the embedding of Google Maps results in location-related queries, often ahead of comparable third-party services. Competing services In addition, Google must be displayed using the same ranking criteria and in formats comparable to those applied to Google's own services. Moreover, Google is required to clearly distinguish its own services from those of third-partly providers, and ensure that any visual prominence is based on objective metrics such as relevance and user benefit, rather than corporate affiliation.[14]

3.1 Changes in Google's SERP

Google has implemented more than 20 changes to its Search Engine Results Page (SERP) to comply with the DMA.[15] These changes include the removal of certain proprietary widgets (interactive modules), such as Google Maps and Google Flights, and the introduction of new modules designed to enhance the visibility of third-party comparison sites in categories like flights, hotels, and shopping.[16] The stated objective of these measures is to facilitate users to compare offers from various providers.

For the purposes of our empirical analysis, it is important to note that the recent changes to Google's SERP apply exclusively to EU countries and do not affect jurisdictions such as the United Kingdom or the United States. As a result, users in the EU are now exposed to a different SERP layout for flight-related queries than users outside the EU. Figure 1 illustrates this divergence: the left panel shows the SERP format in place prior to March 6, 2024—which

[14] Failure to comply with the DMA requirements may result in regulatory sanctions. According to Article 30, the European Commission can impose fines of up to 10% of the gatekeeper's total worldwide annual turnover, and up to 20% in the case of repeated infringements. Also, Article 18 states that in case of systematic non-compliance, the Commission can adopt structural remedies, such as forced separation or divestiture of business units.

[15] Google has explained these changes in different contexts. See https://blog.google/around-the-globe/google-europe/dma-compliance-update/ and https://webcast.ec.europa.eu/compliance-with-the-dma-google-2024-03-21

[16] Google announced these changes before March 2024. Indeed, on January 17, 2024, Google stated that "*Over the coming weeks in Europe, we will be expanding our testing of a number of changes to the search results page. We will introduce dedicated units that include a group of links to comparison sites from across the web, and query shortcuts at the top of the search page to help people refine their search, including by focusing results just on comparison sites. For categories like hotels, we will also start testing a dedicated space for comparison sites and direct suppliers to show more detailed individual results including images, star ratings and more. These changes will result in the removal of some features from the search page, such as the Google Flights unit*". https://blog.google/around-the-globe/google-europe/an-update-on-our-preparations-for-the-dma/

remains in use the UK and the US—while the right panel displays the redesigned SERP observed by users in the European Economic Area (EEA) after that date.[17]

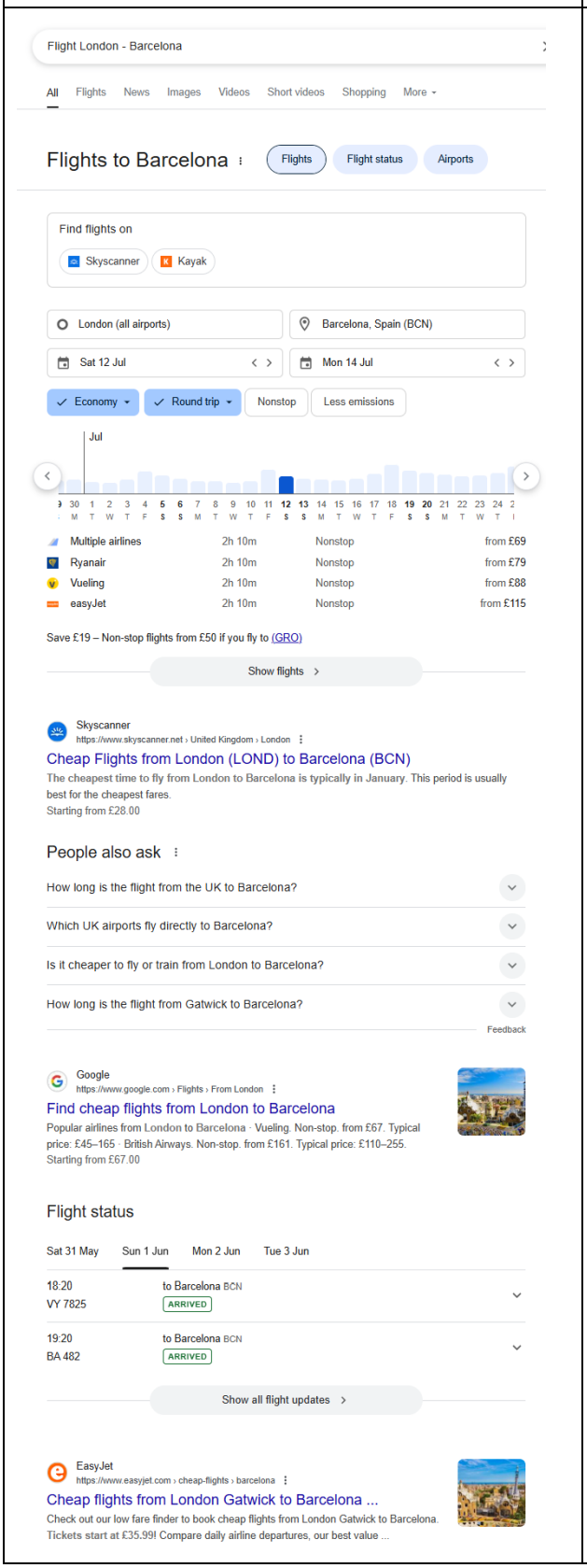
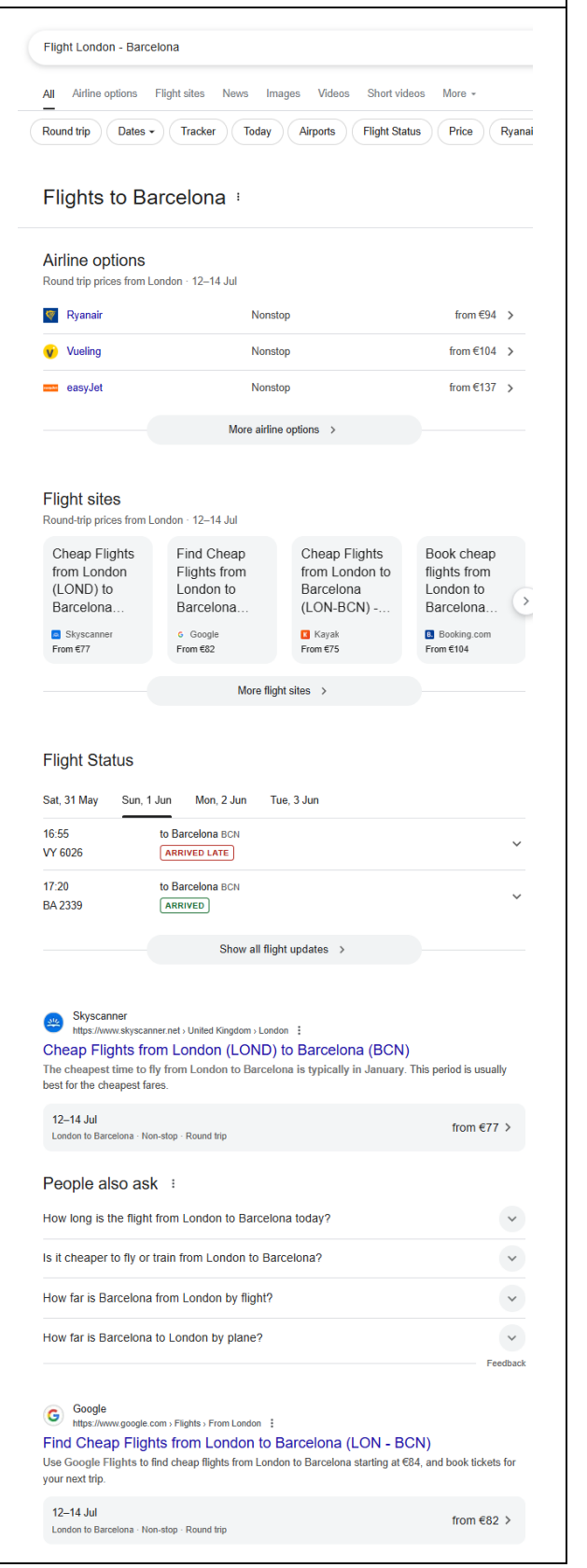
Prior to March 6, 2024, queries related to specific flights or airlines triggered the display of a Google Flights comparison module that redirected users to Google's own platform (left panel in Figure 1). This module allowed users to input travel parameters – such as dates, destination, cabin class, stopovers– and simulated flight searches accordingly. Importantly, links within this module directed users to Google Flights rather than directly to airline websites. In addition, Google displayed a separate unit listing alternative comparison sites (e.g., Skyscanner and Kayak), while maintaining its standard navigation bar (All, Images, Videos, News, More) alongside with the Google Flights module.

Following March 6, Google implemented several changes to its SERP aimed at reducing self-preferencing (right panel of Figure 1). First, Google removed the Google Flights module from the main results. Second, it introduced a new section titled "Airlines Options", which presents direct links to official websites of airlines.[18] Third, it added a section titled "Flight Sites", which provides access not only to Google Flights but also to independent comparison platforms – such as Skyscanner, Kayak, and Omio – accompanied by price information from each aggregator.[19]

According to Google, prices displayed in the "Airlines Options" section are sourced directly from airlines, while those in the "Flight Sites" section are provided by aggregators or online travel agencies (OTAs), with the stated objective of offering accurate and up-to-date information.[20] Notably, the placement of these sections within the redesigned SERP is dynamic and does not follow a fixed pattern, making their exact positioning unpredictable across searches. In addition, Google has modified the "Refinement Chips" – the filtering buttons located beneath the search bar – which allow users to refine flight queries based on criteria such as airline preference, travel dates, or flight type (e.g., one-way or round trip). These refinement chips are randomly repositioned across searcher, further contributing to the variability in users' search experience.

[17] Figure A1 in the Appendix show the SERP's redesign for mobile devices.
[18] This module shows an overview of available flights from various airlines for searched routes. It includes price information for both non-stop and connecting flights. The table only displays flights from airlines, sorted by price, with the cheapest flight appearing first. The links on the airline can take the user to the airline's website homepage or to the Internet Booking Engine. See https://pros.com/navigating-digital-markets-act/
[19] This unit has a carousel format and only shows flight offers from flight aggregators or OTAs. Each tile displays the site's logo, the lowest price for the route, and a link to a flight page (not to the Internet Booking Engine). Users can scroll horizontally to view more flight offers in the carousel. There is not a clear pattern that explains the position of OTAs and flight aggregators within the carousel. https://pros.com/navigating-digital-markets-act/
[20] https://support.google.com/travel/answer/14595885

Figure 1. Google's SERP Resedign - Desktop User

Before March 6, 2024	After March 6, 2024
	

Note: The left panel shows Google's SERP design prior to March 6, 2024, which applied to users in the EEA, the United Kingdom, and the United States and continues to apply in the United Kingdom and the United States. The right panel shows the redesigned SERP introduced for users in the European Economic Area on March 6, 2024.

4. Data

Our analysis of the effects of changes in Google's SERP on traffic to airline and flight comparison websites is based on data from Similarweb, a provider of web traffic measurement and user engagement analytics. Similarweb collects the data through large, multi-country consumer panels, offering broad coverage of online behavior. For this study, we use weekly-domain level data for desktop traffic and monthly-domain level data for mobile traffic, covering the period from November 2023 to December 2024. The consider both desktop and mobile data because user interaction with search results may vary across devices. In particular, the limited screen space on mobile devices is likely to increase the salience and influence of top-ranked results on the SERP.

The dataset includes domains from four European Union member states subject to the Digital Markets Act (DMA): France, Germany, Italy, and Spain. The DMA became fully enforceable in these countries on March 6, 2024, providing both geographic and economic diversity for assessing its effects. As a counterfactual, we include domains from the United Kingdom and the United States, which are not subject to the DMA and did not experience the SERP changes. These countries provide a meaningful benchmark given their comparable economic profile and digital market structures. Differences in web traffic and user behavior between DMA-affected EU countries and the UK and US can therefore be plausibly attributed to the regulatory impact of the DMA.[21]

We analyze web traffic to domains associated with airlines and flight comparison sites. Our sample includes domains that reach a minimum daily market share of 0.5% in SimilarWeb´s air travel category in at least one country in the sample. For airlines, we also include all carriers with at least 0.5% of annual seat capacity in the national market, using data from RDC aviation (Apex schedules). To ensure data reliability, we restrict the sample to domain-country pairs with data for at least 95% of the days during the study period, recognizing that Similarweb may not report data on days with very low traffic. Table A1 in the Appendix lists all domain-country pairs included in the analysis.

We classify airlines and flight comparison websites according to different criteria. First, airlines are categorized as *Low-Cost* or *Network Carriers*, reflecting differences in pricing strategies

[21] As a robustness check, we could use visits to the websites of airlines and comparison platforms by U.S. users as an alternative control group, since these websites were also unaffected by the DMA-related changes. However, due to differences in market dynamics and seasonality between the U.S. and European air travel sectors, we consider traffic to UK websites a more appropriate control group.

and service characteristics that may affect their visibility in Google's SERP.[22] [23] This distinction is relevant because Google algorithms may place greater weight on low fares, potentially benefiting low-cost carriers. Second, airlines are classified based on their domestic market presence. Using RDC Aviation data, we define Top National Airlines and Bottom National Airlines depending on whether an airline's seat capacity in a given country is above or below the national median. This distinction captures substantial cross-country variation in airlines' market presence. For example, EasyJet, British Airways, and Ryanair jointly account for more than 53 percent of seat capacity in the United Kingdom, while carriers such as American Airlines or Lufthansa have shares below 2 percent. We expect airlines with a larger domestic presence to have higher baseline visibility in Google search results. Third, airlines are classified based on their national website ranking in Similarweb. We define *Top Rank Airlines* as those whose national rank above the country-specific median and *Bottom Rank Airlines* otherwise. This classification captures differences in online prominence that may reflect how Google's algorithm weighs factors such as the domain authority and website expertise.[24] Table A2 in the Appendix summarizes these classifications.

For flight comparison websites, we apply a similar ranking-based Platforms are classified as *Top Rank Comparison Sites* or *Bottom Rank Comparison Sites* based on whether their national Similarweb ranking is above or below the country median. While some platforms – such as Booking, Skyscanner, FlightAware, or Wanderlog – are widely used across multiple countries, others are mostly relevant in specific national markets (e.g., vuelosbaratos.es in Spain or worldairfares in United Kingdom). These differences are captured in our classification. In addition, we group comparison sites into *Top 3*, *Top 5*, *and Non-Top* categories within each country, recognizing that user traffic is highly concentrated among a small number of dominant domains. Table A3 in the Appendix shows these classifications.

The main outcome variables of our research are the domain's *Weekly Visits for Desktop Users* and the domain's *Monthly Visits for Mobile Users*, both obtained from Similarweb. These metrics count visits originating from another web domain or from the start of a browsing session and expire after 30 minutes of inactivity. The dataset also reports visits by traffic source, which

[22] The European airline market is primarily composed of two types of carriers: network carriers (NC) and low-cost carriers (LCCs). Network airlines operate hub-and-spoke systems and serve a high proportion of connecting passengers. To optimize traffic through their hubs, they typically join global alliances, namely oneworld, Star Alliance, or SkyTeam. In Europe, these airlines are often former national flag carriers, such as those within the IAG, Air France-KLM, and Lufthansa groups. In contrast, low-cost carriers use point-to-point networks and primarily serve direct, short-haul routes. This group includes large independent operators like Ryanair, easyJet, and Wizz Air, as well as low-cost subsidiaries of network airlines, such as Vueling (IAG), Eurowings (Lufthansa), and Transavia (Air France-KLM).

[23] Network airlines belong to one of the three global alliances—oneworld, Star Alliance, or SkyTeam. We classify low-cost airlines following the International Civil Aviation Organization (ICAO), which defines a low-cost carrier as "an air carrier that has a relatively low-cost structure in comparison with other comparable carriers and offers low fares and rates" (ICAO, Manual on the Regulation of International Air Transport, Ch. 5.1).

[24] Following Chandra et al. (2015), Baye et al. (2016), and Calzada et al. (2023), we define domain authority as the set of page characteristics that are independent of the user query. These include factors such as page speed, length, use of original and updated content, presence of unique images, number of outbound and inbound links, language, and text compression ratio, among others. In contrast, domain expertise refers to the relevance of a page's content to a specific query, which depends on contextual factors such as the keywords used, the timing of the search, the user's location and search history, and the geographic origin of the page.

is central to our analysis.[25] *Organic Search Traffic* measures the organic visits to a domain from a search engine. In the European Union, more than 95% of organic search traffic is generated by Google Search,[26] making this channel is the primary measure for evaluating the impact of changes in Google's SERP. *Direct Traffic* represents visits in which users directly type the URL of the website or use a saved bookmark, without passing through a search engine. *Paid Search Traffic* contains traffic generated through search advertising campaigns and is relevant for assessing whether firms adjusted advertising expenditures in response to changes in organic visibility following the DMA. *Referrals Traffic* includes visits from links on other websites (e.g. travel agencies, blogs, media, or other portals). Therefore, this traffic is generated by sites different than search engines or social networks (e.g. Facebook or Twitter), or from display ads. For airline websites, referral traffic may originate from comparison platforms, making it a potential indirect channel through which SERP changes affect traffic. Figure A1 in the appendix shows the evolution of traffic by source over the study period.

Table 1 presents summary statistics for the main variables used in the analysis. Tables A4 and A5 in the appendix present country-level summary statistics, separately for the periods before and after the implementation of Google's SERP redesign on March 6, 2024.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.
Desktop Total Weekly Visits	29,036	150,461	627,022
Desktop Organic Weekly Visits	29,036	43,140	159,662
Desktop Direct Weekly Visits	29,036	78,086	351,592
Desktop Paid Search Weekly Visits	29,036	16,684	87,258
Desktop Referrals Weekly Visits	29,036	11,146	51,273
Mobile Total Monthly Visits	10,024	695,787	3,415,224
Mobile Organic Monthly Visits	10,024	228,118	1,009,236
Mobile Direct Monthly Visits	10,024	336,190	1,764,400
Mobile Paid Search Monthly Visits	10,024	69,857	508,964
Mobile Referrals Monthly Visits	10,024	37,482	218,376

[25] Similarweb also collects data of traffic from Display Ads, Email, and Social channels, but we discard these channels because their traffic represents less than 0.01% on average of the total traffic received during the examined period. https://support.Similarweb.com/hc/en-us/articles/115004173925-Marketing-Channels
[26] https://seranking.com/blog/top-search-engines/

5. Identification Strategy

The objective of this study is to assess the impact of Google's SERP redesign on search traffic to airline and flight comparison websites. We treat the introduction of the new SERP as an exogenous shock affecting only users in EEA countries subject to the DMA. To identify the causal effect of this change, we use the UK and the US as a control group, as these countries fall outside the scope of the DMA and did not experience the SERP redesign.

Changes in Google's SERP can influence user traffic through multiple channels. To capture these effects, we estimate the impact not only on total traffic but also separately by traffic sources: Organic Search, Direct, Paid Search, and Referrals. Among these, Organic Search is expected to be the most directly affected, given its substantial contribution to traffic for travel-related websites and its direct reliance on the structure and presentation of the SERP.

The SERP redesign may also generate indirect effects on other traffic channels. Changes in a website' s visibility on the SERP may influence direct traffic if users return to sites previously discovered through Google Search. Similarly, shifts in organic reach may lead airlines and comparison sites to adjust their advertising strategies, thereby affecting paid search activity. Disaggregating traffic by source therefore allows us to identify both the direct and indirect mechanisms through which Google's compliance with the DMA may influence user behavior.

Considering this, we estimate the following Difference-in-Differences (DiD) model:

$$\ln(Y_{dct}) = \beta EU_{dc} \times Post_t^{DMA} + \alpha_c + \delta_d + \theta_{cd} + \gamma_t + \varepsilon_{dct} \qquad (1)$$

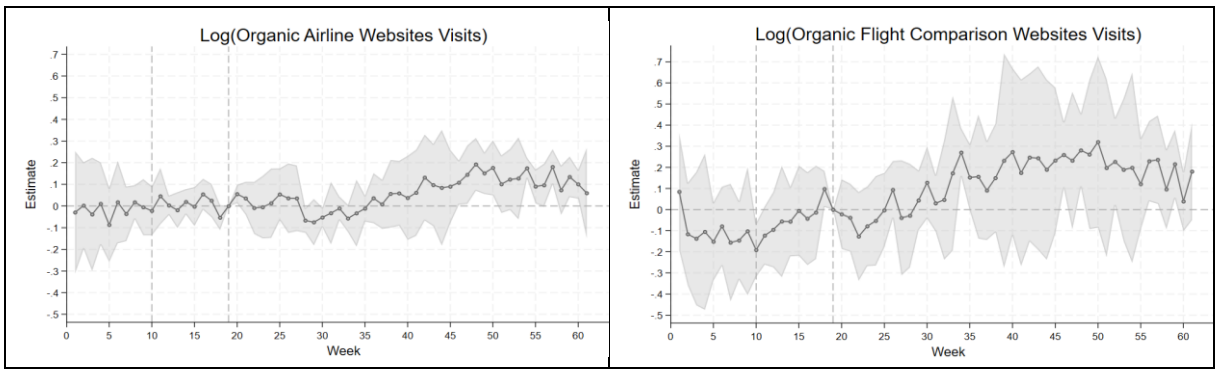
where Y_{dct} denotes the number of visits – total, organic search, direct, paid search or referral - received by the desktop and mobile version of domain *d* in country c during week *t*. The model includes country fixed effects (α_c), domain fixed effects (δ_d), and country-domain fixed effets (θ_{cd}) to control for unobserved heterogeneity across countries and websites. Additionally, γ_t represents a time fixed effect, defined at the week level for desktop traffic and at the month level for mobile traffic, to account for common temporal shocks. The variable EU_{dc} is a dummy variable equal to 1 when domain *d* is visited in an EU country and 0 otherwise (i.e. for domains in the UK and the US). The variable $Post_t^{DMA}$ is a post-treatment indicator equal to 1 for observations after March 6, 2024, the date when compliance with the DMA became mandatory. The coefficient of interest is β, which captures the average treatment effect of the SERP redesign on web traffic. Specifically, it measures the differential change in visits to EU domains (subject to the DMA) relative to domains in the UK and the US domains (serving as a control group) before and after the implementation of the DMA. The error term ε_{dct} is assumed to be independently and identically distributed.

Before presenting the results of our DiD estimation of Equation (1), we assess the validity of the parallel trends assumption during the pre-treatment period, that is, prior to the mandatory implementation of the DMA. To do so, we construct time series plots comparing trends

comparing the evolution of web traffic in EU countries and in the the UK and the US. These visual inspections allow us to evaluate whether traffic dynamics in the two groups evolved similarly before the regulatory intervention.

Figure 2 displays the evolution of the log of organic weekly visits from desktop users over time for EU countries and the UK and the US. The left panel presents results for airline websites, while the right panel focuses on flight comparison sites. In both panels, the first dashed vertical line marks the beginning of 2024, and the second dashed line corresponds to week 19 of the sample period, when Google implemented the SERP redesign in March 6, 2024. The left panel indicates that, prior to the implementation of the DMA, differences in organic traffic between EU airlines websites and the control group remained stable and close to zero, providing support for the parallel trends' assumption. In contrast, the right panel shows greater variability for flight comparison websites during the pre-treatment period. While some short-time fluctuations are visible, there is no clear pattern of divergence between the EU and the UK and the US that would indicate a violation of the parallel trends assumption. Although confidence intervals are wider and the estimates more dispersed than in the airline panel, the absence of a persistent upward or downward trend suggests that the identification strategy remains credible. [27] Figure A3 in the Appendix repeats this analysis for total desktop visits and A5 for low-cost and network carriers, yielding similar conclusions. Overall, the evidence provides reasonable support for the assumption that traffic patterns in treated and control countries evolved similarly prior to the regulatory intervention, reinforcing the validity of the identification strategy for desktop organic traffic.

Figure 2: Pre-Treatment Trends for Desktop Organic Traffic – Airline and Flight Comparison Websites



[27] To evaluate the assumption of parallel trends, we conduct a joint significance test of the pre-treatment coefficients. For airline websites, the null hypothesis that all pre-treatment coefficients are equal to zero cannot be rejected (Prob > F = 0.2667). Similarly, for flight comparison websites, the joint test also fails to reject the null hypothesis (Prob > F = 0.1135). These results are consistent with the validity of the parallel trends assumption.

Figure 3: Pre-Treatment Trends for Mobile Organic Traffic – Airline and Flight Comparison Websites

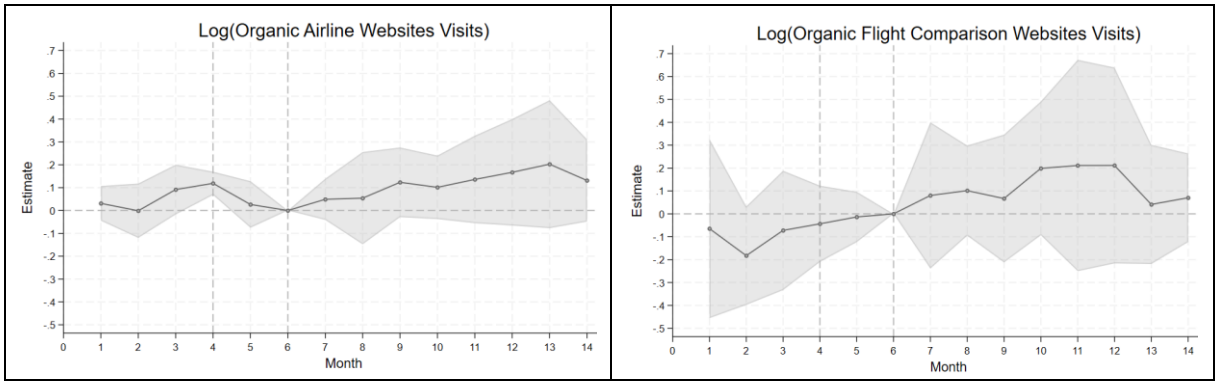


Figure 3 presents the estimated differences in monthly mobile organic visits between EU domains and UK and US domains during the pre-treatment period. The left panel reports results for airline websites. , shows relatively small and stable differences over time, with estimates fluctuating around zero and confidence intervals that largely overlap with the horizontal axis. This pattern supports the parallel trends assumption. Figure A4 in the Appendix show similar analysis for total mobile traffic and A6 for low-cost and network carriers, yielding similar results.

The right panel of Figure 3 presents the corresponding analysis for flight comparison websites and reveals more pronounced deviations between EU and the UK and the US domains at the beginning of the pre-treatment period. In particular, estimated differences are consistently positive in the first half of the period and decline steadily before stabilizing closer to zero. This pattern suggests that parallel trends assumption may not hold uniformly for mobile traffic to comparison websites, especially in the first months of the pre-treatment period. As such, treatment effects estimated for this subgroup should be interpreted with caution. For this reason, we view the mobile results for comparison websites as suggestive rather than definitive. Figure A4 in the appendix repeats this analysis for total mobile visits offering similar conclusions.

6. Impact of changes in Google's SERP on the traffic to air travel websites

This section presents the results of the empirical analysis. Table 2 and Figure 4 display the DiD estimates from Equation (1) for desktop traffic across different traffic sources. The analysis covers the period from November 2023 to December 2024, with March 6, 2024 identified as the treatment date. We compare changes in traffic to air travel websites in four EU countries before and after the SERP redesign, using traffic to air travel websites in the UK and the US as

a control group over the same period. This identification strategy is particularly robust, as the UK and the US share similar digital and market characteristics with the EU countries analyzed, but were not affected by the SERP changes.

Table 2 presents the estimates for total traffic and for four source channels: Organic, Direct, Paid Search, and Referrals. The first five columns report results for airline websites, while the remaining five columns report results for flight comparison websites. The main relevant finding for airline websites is a statistically significant increase of 6.52% in organic search traffic following the SERP redesign (column 2). By contrast, the estimated effect on direct traffic, referrals traffic and total traffic are positive but not statistically significant, while the estimated effect on paid search traffic is negative and not statistically significant.

Table 2: Effects on Airline and Flight Comparison Websites – Desktop traffic

	Airlines Websites					Flight Comparison Websites				
	Total	**Organic**	**Direct**	**Paid Search**	**Referrals**	**Total**	**Organic**	**Direct**	**Paid Search**	**Referrals**
EU x PostDMA	0.0058	0.0652**	0.0096	-0.0692	0.0456	0.1487***	0.2128***	0.1048**	0.1171	0.2483***
	(0.0188)	(0.0203)	(0.0345)	(0.0444)	0.1125	(0.0324)	(0.0509)	(0.0312)	(0.0931)	(0.0167)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Week FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9682	0.9536	0.9663	0.8674	0.9123	0.9651	0.9459	0.9615	0.9099	0.9411
N	20,069	20,069	20,069	17,737	19,917	8,966	8,966	8,966	6,470	8,771

Figure 4: Effects on Airline and Flight Comparison Websites – Desktop traffic

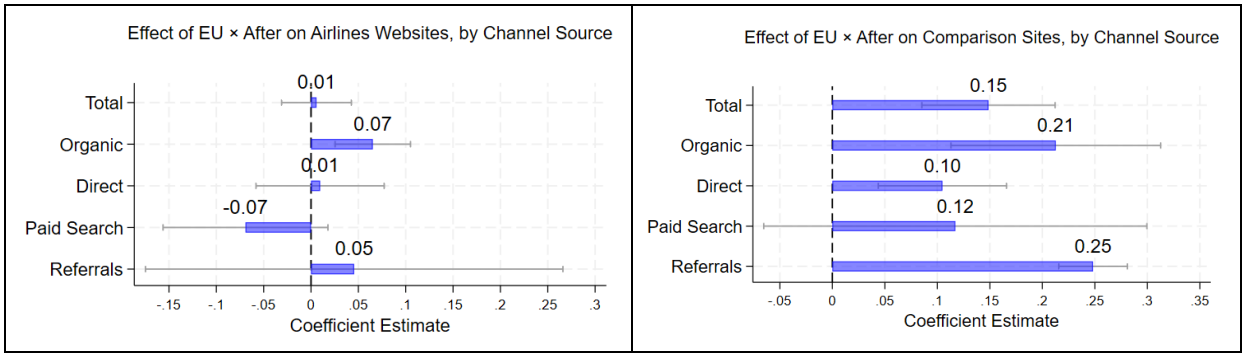
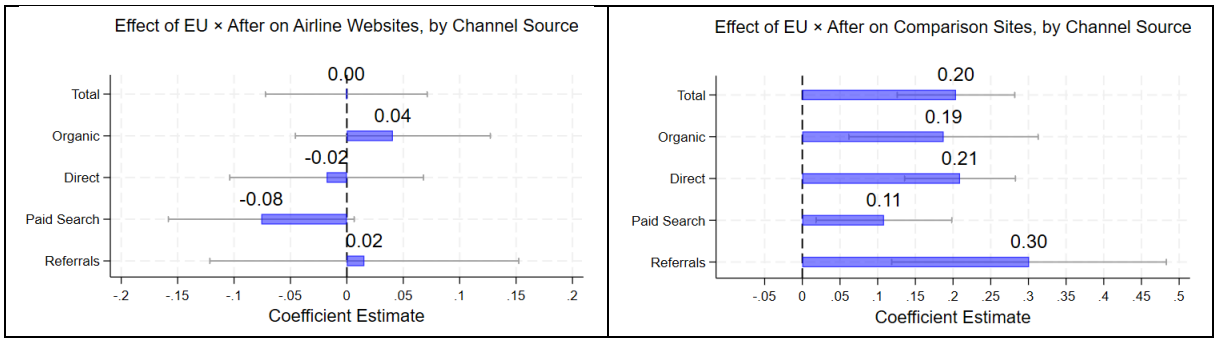


Table 3: Effects on Airline and Flight Comparison Websites – Mobile traffic

	Airlines Websites					Flight Comparison Websites				
	Total	**Organic**	**Direct**	**Paid Search**	**Referrals**	**Total**	**Organic**	**Direct**	**Paid Search**	**Referrals**
EU x PostDMA	-0.0004	0.0408	-0.0180	-0.0758	0.0155	0.2039***	0.1875**	0.2093***	0.1084*	0.3008**
	(0.0366)	(0.0441)	(0.0438)	(0.0420)	(0.0698)	(0.0398)	(0.0641)	(0.0375)	(0.0459)	(0.0930)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9634	0.9575	0.9601	0.9877	0.9400	0.9496	0.9228	0.9408	0.9762	0.9432
N	6,244	6,237	6,244	5,340	6,244	3,780	3,757	3,780	2,829	3,780

Figure 5: Effects on Airline and Flight Comparison Websites – Mobile Traffic



Our second most relevant result is a statistically significant increase of 21.28% in organic search traffic to EU-based flight comparison websites following the SERP redesign (column 7). We also find a 14.87% increase in total traffic (column 6), a 10.48% increase in direct traffic, and a sizable 24.83% increase in referral traffic (column 10). The rise in referral traffic is consistent with a reallocation of user traffic following the removal of the Google Flights module. In particular, large travel deal platforms (such as Chollometro, Viajeros Piratas, Holidayguru, and Chollox in Spain[28]) experienced substantial traffic growth during this period. Although these platforms do not appear in the new "Flight Sites" module, they may have gained visibility in other sections of the SERP. As intermediaries, such platforms frequently redirect users to airlines and comparison websites, suggesting that they now play a more prominent role in the user journey to flight-related content. Finally, the estimated effects of paid search traffic are not statistically significant.

Overall, the results presented in Table 2 indicate that the redesign of Google's SERP and the removal of the Google Flight module are associated with increases in organic search traffic from desktop users to both airline and flight comparison websites. Notice that while some coefficients are relatively large, the underlying variation indicates that the effects are heterogenous across domains or countries.

Table 3 and Figure 5 replicate the previous analysis for traffic from mobile device users. The data are monthly, and the treatment period in the DiD model begins in March 2024. We find that the SERP redesign led to a statistically significant increase of 18.75% in organic search traffic to comparison websites on mobile devices. In contrast, the effect on airline websites is positive but not statistically significant. This discrepancy between desktop and mobile results may reflect differences in SERP presentations across devices. In particular, the more constrained layout of mobile SERPs limits the number of links visible on the screen, potentially amplifying the importance of top-ranked results. If comparison websites occupy the most prominent positions in mobile search results, they are more likely to capture user attention relative to airline websites. Finally, the estimated effect on total traffic is positive and statistically significant only for flight comparison websites.

6.1 Heterogeneous effects across airlines

To better understand the heterogeneous effects of the changes introduced by Google's SERP redesign, this section explores differential impacts across airlines categories. Table 4 replicates the analysis in Table 2 for desktop traffic, disaggregating the sample along several airline classifications. Column 1 reproduces the baseline results from Table 2. Columns 2 and 3 distinguish between *Network Carriers* (NCs) and *Low-Cost Carriers* (LCCs). Network carriers

[28] Some of these deal platforms are part of larger international networks. For example, Chollometro, the leading Spanish deals site, is part of the Pepper.com group, which operates similar platforms across several countries, including HotUKDeals in the UK, MyDealz in Germany, and Dealabs in France. These platforms act as traffic intermediaries by redirecting users to online travel agencies and comparison websites, such as Skyscanner or Kayak.

operate a full-service business model, offering domestic and international routes, multiple passenger classes, and complex hub-and-spoke networks with relatively high fixed costs. Examples include Iberia, Lufthansa, Air France, American Airlines, KLM, and LATAM. By contrast, low costs carriers focus on cost minimization through simplified point-to-point networks, fleet standardization, high aircraft utilization, and short turnaround times. Examples include Ryanair, EasyJet, Spirit, Air Arabia, and Pegasus Airlines.

Columns 4 and 5 classify airlines by their national market share, measured by seat capacity. We define *Top National Airlines* (TNAs) as the five carriers with the highest seat supply in each country, which together account for more than 60% of domestic seat capacity in all countries in our sample.[29] Airlines ranked sixth or lower are classified as *Bottom National Airlines* (BNAs). Columns 6 and 7 distinguish airlines by digital visibility using their national ranking in Similarweb. *Top Rank Airlines* (TRAs) are those whose national rank lies above the country-specific median, while *Bottom Rank Airlines* (BRAs) fall below it. This classification allows us to assess whether airlines with more online prominence benefit differentially from the SERP redesign.

Results in Table 4 show positive effects on organic traffic across all airline categories. The estimated effect is significant for several groups, including network carriers, low-cost carriers, airlines with lower national market shares, and airlines with higher digital rankings. The largest and most robust effect is observed for low-cost carriers, for which the SERP redesign is associated with a 14.27 % increase om organic traffic These results indicate that the redesign of Google's SERP had heterogeneous effects across airlines, with particularly strong gains for low-cost carriers. While network carriers also experienced statistically significant increases, the magnitude of the effect is substantially smaller than for low costs carriers.

Table 5 further explores this heterogeneity by estimating separate models for low-cost carriers and network carriers. Among low-cost carriers, the SERP redesign is associated with a significant 14.27 % increase in organic desktop traffic. This effect is driven by airlines with lower domestic market shares (BNA), which experience a 16.21 % increase, and by airlines with lower digital visibility (BRA), for which the estimated effect reaches 27.39 %. By contrast, effects for top-ranked or nationally dominant low-cost carriers are smaller and not significant. Hence, the SERP redesign disproportionately benefited low-cost airlines that were previously less visible to users or held a minority position in national air travel markets.

For network carriers, the effects are positive but smaller in magnitude. While the overall effect is significant at 3.88 %, gains are concentrated among airlines with high digital visibility (TRA), which experience a 6.29 % increase in organic traffic. Effects for less digitally prominent or nationally dominant network carriers are either smaller or not statistically significant. Taken together, these results suggest that the SERP redesign benefited different segments across carrier types: it primarily improved visibility for less visible low-cost carriers, while reinforcing the visibility advantage of already prominent network carriers.

[29] Specifically, the joint market of the top 5 airlines in each county is 62% in France, 60% in Germany, 64% in Italy, 65% in Spain, 63% in the United Kingdom, and 78% in the United States.

To assess whether the effects of the SERP redesign differ across market environments, Tables A6 and A7 in the Appendix replicate the analysis by tourism intensity. We find that in highly touristic countries, organic traffic increases are concentrated among low-cost carriers, airlines with smaller domestic market shares, and airlines with lower digital visibility. In non-touristic countries, estimated effects are more heterogeneous and generally less precise. Overall, the redistributive effects of Google's SERP redesign appear stronger in markets with high tourism demand and more diversified digital ecosystems.

Table 6 repeats the heterogeneity analysis for organic traffic from mobile users. The estimated effects are generally smaller and less precisely estimated than for desktop traffic. Coefficients for network carriers and low-cost carriers are positive but not significant when considering these groups as a whole. By contrast, significant effects emerge for specific subgroups. In particular, we find a positive and significant increase in organic mobile traffic for Top National Airlines (10.80 %) and for Bottom Rank Airlines (15.89 %). These results suggest that, on mobile devices, gains from the SERP redesign are concentrated among airlines that either hold a strong national market position or were previously less visible online.

Table 7 estimates separate models for low-cost carriers and network carriers. Among low-cost carriers, the SERP redesign led to a statistically significant 21.93 % increase in organic mobile traffic for Bottom Rank Airlines, while no significant effects are observed for other low-cost carrier categories. For network carriers, we find a significant 13.38 increase in organic mobile traffic for TNA, but a statistically significant 6.59% decline for TRA.

Overall, our results point to substantial heterogeneity in the effects of the SERP redesign, particularly for mobile users. The primary beneficiaries are airlines with lower digital visibility—especially among low-cost carriers—while effects for network carriers depend on their national and digital market positions. To sum up, the findings indicate that Google's redesign improved the visibility of smaller or less digitally prominent airlines without uniformly disadvantaging incumbent network carriers, thereby potentially enhancing competition in airline distribution.

Table 4: Effects on Airline Website Traffic - Organic Desktop Traffic

	General	NC	LCC	TNA	BNA	TRA	BRA
EU x PostDMA	0.0652**	0.0388*	0.1427**	0.1147	0.0604*	0.0741**	0.0563
	(0.0203)	(0.0152)	(0.0410)	(0.0726)	(0.0239)	(0.0281)	(0.0448)
Country FE	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓
Week FE	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9536	0.9474	0.9625	0.9873	0.9274	0.9751	0.8133
N	20,069	13,847	6,222	1,830	18,239	10,126	9,943

Table 5: Effects on Airlines Websites Traffic – Organic Desktop Traffic by Carrier Type

	Low Cost Carriers					Network Carriers				
	Total	**TNA**	**BNA**	**TRA**	**BRA**	**Total**	**TNA**	**BNA**	**TRA**	**BRA**
EU x PostDMA	0.1427**	0.0741	0.1621**	0.0667	0.2739*	0.0388*	0.1145	0.0340*	0.0629**	0.0004
	(0.0410)	(0.1042)	(0.0551)	(0.0659)	(0.1231)	(0.0152)	(0.0753)	(0.0161)	(0.0235)	(0.0277)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Week FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9625	0.9778	0.9332	0.9807	0.8551	0.9474	0.9915	0.9264	0.9704	0.7879
N	6,222	1,159	5,063	3,294	2,928	13,847	671	13,176	6,832	7,015

Table 6: Effects on Airlines Websites Traffic– Organic Mobile Traffic

	General	NC	LCC	TNA	BNA	TRA	BRA
EU x PostDMA	0.0408	0.0200	0.0809	0.1080*	0.0364	-0,0706	0.1589*
	(0.0441)	(0.0397)	(0.0718)	(0.0508)	(0.0495)	(0.0374)	(0.0645)
Country FE	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓
Week FE	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9575	0.9519	0.9637	0.9838	0.9409	0.9737	0.8408
N	6,237	3,998	2,239	420	5,817	3,230	3,007

Table 7: Effects on Airlines Websites Traffic – Organic Mobile Traffic by Carrier Type

	Low Cost Carriers					Network Carriers				
	Total	**TNA**	**BNA**	**TRA**	**BRA**	**Total**	**TNA**	**BNA**	**TRA**	**BRA**
EU x PostDMA	0.0809	0.1063	0.0835	-0.0866	0.2193**	0.0200	0.1338*	0.0158	-0.0659**	0.1191
	(0.0718)	(0.0600)	(0.0863)	(0.1117)	(0.0759)	(0.0397)	(0.0544)	(0.0423)	(0.0172)	(0.0703)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Week FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9637	0.9799	0.9417	0.9834	0.7998	0.9519	0.9921	0.9394	0.9642	0.8591
N	2,239	280	1,959	994	1,245	3,998	140	3,858	2,236	1,762

6.2 Heterogeneous effects across flight comparison

Next, we analyze the effects of Google's SERP redesign on traffic to flight comparison websites, classifying platforms by their pre-reform market prominence. Table 8 replicates the baseline analysis from Table 2 for organic desktop traffic, disaggregating comparison sites by size. Column 1 presents the average treatment effect across all comparison sites, while Columns 2 and 3 focus on the top 3 and top 5 most visited platforms in each country, respectively. Column 4 considers the remaining, less prominent comparison sites.

Column 1 shows that the SERP redesign is associated with a 21.28% increase in organic desktop traffic to comparison sites overall. However, columns 2 and 3 show no significant effects for the top 3 or top 5 platforms. In contrast, column 4 shows a 23.47% increase in organic traffic for less prominent comparison sites. These findings suggest that the SERP redesign disproportionately benefited smaller platforms with lower baseline visibility, while leaving the largest platforms largely unaffected.

We further explore heterogeneity across different types of flight comparison websites by distinguishing between aggregators and online travel agencies (OTAs). Aggregators are platforms that allow users to compare prices and frequencies from multiple sources (airlines and OTAs) and redirect them to airlines or OTAs for booking (e.g. Skyscanner, Kayak, Momondo, and Cheapflights) whereas OTAs enable users to search, book, and pay for flights directly. They have agreements with airlines and access to global distribution systems (GDS), allowing them to issue tickets and provide after-sales services (e.g. Booking, Expedia, Expedia, eDreams, and eSky).

Table 9 reports the effects on desktop organic traffic by platform type, considering the division between aggregators and OTAs. While the average effect across all comparison sites remains positive and significant, the estimates reveal meaningful differences across business models. The SERP redesign is associated with a significant 28.85 % increase in organic traffic for aggregators, compared with a smaller but still significant 15.44 % increase for OTAs. This pattern suggests that aggregators benefited more strongly from the redesign in desktop environments. Column 1 presents the average treatment effect across all comparison sites, while Columns 2 and 3 show the effects for OTAs and aggregators, respectively. According to these results, the redesign of the SERP led to a statistically significant increase of 28.85% for aggregators and 15.44% for OTAs.

Table 10 replicates the analysis replicates the analysis for organic traffic from mobile users. The average effects remain positive, with an estimated increase of 18.75%. However, when disaggregated by site prominence, only the group of less popular platforms shows a significant increase in traffic (20.09%). As in the desktop analysis, the leading comparison websites appear largely unaffected by the reform. Table 11 examines organic mobile traffic by platform type. Both aggregators and OTAs experience statistically significant and similar increases in traffic—approximately 18 percent. This convergence is consistent with the more constrained layout of mobile SERPs, which may limit differentiation across platform types. Finally, Tables A8 and

A9 in the appendix extend this analysis by grouping countries according to tourism intensity. In highly tourist countries, the SERP redesign generated significant increases in organic traffic for less established comparison sites, while top-ranked platforms (Top 3 and Top 5) experienced no significant changes. In non-tourist countries, estimated effects are smaller and generally not significant. These findings suggest that the new SERP particularly favors emerging platforms in tourist markets, where competition for digital visibility is more intense.

Overall, the results indicate that Google's redesigned SERP has increased competitive visibility primarily for less dominant platforms in the flight comparison market. While top-ranking comparison sites show no significant changes, smaller and less established platforms experience sizable gains in organic search traffic. When combined with the results for airlines, our analysis reveals a redistributive impact of the SERP redesign, potentially reducing the structural advantages of established platforms and contributing to a more balanced allocation of user attention in digital markets.

Table 8: Effects on Flight Comparison Websites– Organic Desktop Traffic

	General	Top 3	Top 5	Non-Top
EU x PostDMA	0.2128***	0.0217	0.0967	0.2347***
	(0.0509)	(0.0346)	(0.1101)	(0.0450)
Country FE	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓
Week FE	✓	✓	✓	✓
R2 Adjust	0.9459	0.9872	0.9820	0.8734
N	8,966	1,037	1,464	7,502

Table 9: Effects on OTAs and Aggregators Websites– Organic Desktop Traffic

	General	OTA	Agregator
EU x PostDMA	0.2128***	0.1544*	0.2885***
	(0.0509)	(0.0664)	(0.0723)
Country FE	✓	✓	✓
Domain FE	✓	✓	✓
Country-Domain FE	✓	✓	✓
Week FE	✓	✓	✓
R2 Adjust	0.9459	0.9414	0.9514
N	8,966	5,001	3,965

Table 10: Effects Flight Comparison Websites– Organic Mobile Traffic

	General	Top 3	Top 5	Non-Top
EU x PostDMA	0.1875**	0.0402	0.0551	0.2009**
	(0.0641)	(0.0632)	(0.0407)	(0.0703)
Country FE	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓
Week FE	✓	✓	✓	✓
R2 Adjust	0.9228	0.9779	0.9837	0.8562
N	3,757	238	350	3,407

Table 11: Effects on OTAs and Aggregators Websites– Organic Mobile Traffic

	General	OTA	Agregator
EU x PostDMA	0.1875**	0.1896*	0.1824**
	(0.0641)	(0.0893)	(0.0697)
Country FE	✓	✓	✓
Domain FE	✓	✓	✓
Country-Domain FE	✓	✓	✓
Week FE	✓	✓	✓
R2 Adjust	0.9228	0.9137	0.9355
N	3,757	2,077	1,680

7. SERP Redesign and Airline Fares

This section completes our assessment of the DMA in the air travel market by analyzing whether Google's SERP redesign affected airline fares. We use monthly route–airline panel data from RDC Aviation covering March 2023 to March 2025. Each observation corresponds to an airport-pair ("route"), an airline, and a month (e.g., easyJet on Manchester–Barcelona in April 2023). Our main outcomes variable is the mean posted on-way fare collected from airlines' own websites, measured for bookings made one month and one week before departure, as well as a weighted fare measure based on booking volumes. We complement fares with route–airline flight frequency data, which allows us to construct market-structure controls (e.g., airport-level and airline-level flight volumes, and route-level concentration based on flight shares). The panel is unbalanced because some route–airline pairs are inactive in some months, and fare coverage may be thinner for very small carriers.

Our empirical design exploits a directional treatment definition motivated by the DMA's geographic scope. We classify as treated those route–airline pairs with an origin airport in the EU and a destination airport in the UK, and as controls those with an origin airport in the UK and a destination airport in the EU. Treatment starts in March 2024. The identifying assumption is that bookings initiated from EU origins are exposed to the DMA-induced redesign of Google's SERP, whereas bookings initiated from the UK are not.

We estimate the following route-airline fixed-effects specification:

$$\ln(Fares_{imt}) = \beta\ Post_t^{DMA} + \lambda X_{imy} + \delta_i + \theta_m + \gamma_t + \varepsilon_{imt} \qquad (2)$$

where $Fares_{imt}$ denotes the mean posted fares (one-month-ahead, one-week-ahead, or weighted). $Post_t^{DMA}$ equals 1 from March 2024 onward for treated EU observations, and 0 otherwise. X_{imt} includes controls for the log number of flights at the origin and destination airports and the log number of flights operated by the airline, capturing factors such as congestion, airport charges, and scale economies. The model includes route-airline fixed effects (δ_i), month fixed effets (θ_m), and γ_t year fixed effects. Standard errors are clustered at the route level. All continuous variables are in logs so coefficients can be interpreted as semi-elasticities and the influence of outliers is reduced. Finally, in order to focus on routes where consumers face meaningful choice sets, our baseline sample restricts attention to routes with at least two active carriers (HHI < 0.5). Table A10 in the Appendix reports descriptive statistics.

Table 12 shows the baseline estimates. We find no detectable effect of the DMA on weighted fares or on fares posted one month before departure. The only robust effect appears for fares posted one week before departure. Specifically, after March 2024, treated EU observations exhibit about a 3% decline relative to UK controls. This pattern suggests that any fare effects of the SERP redesign are concentrated among late bookers, whose purchases may be less planned and more sensitive to the set of options surfaced by search. We also find that bigger airlines charge lower fares perhaps due to the better exploitation of scale economies. The size

of the airport of origin has a positive effect on weighted fares and one month fares, but not on one week fares. Results for the size of the airport of destination are mixed as they vary according to the fare measure used.

We interpret these results cautiously because fares exhibit strong seasonality and our sample is heavily concentrated in tourist-oriented routes (predominantly UK connections with Spain and, to a lesser extent, Italy).[30] Finally, a broad set of robustness checks are reported in Table A11 in the Appendix: 1) considering all routes regarding the HHI, 2) Considering all EU countries, 3) Considering different types of FE (origin and destination airport FE, airline FE), 4) Routes operated by network airlines, 5) Routes operated by low-cost airlines, 6) Routes operated by top national airlines, 7) Routes operated by bottom national airlines. These exercises confirm the negative effect on one-week fares, with estimates typically ranging from −2% to −6%. The effect is less precisely estimated for network carriers and bottom national airlines, largely due to smaller sample sizes. Overall, the evidence suggests that any price response to the DMA-linked SERP redesign is limited and concentrated in last-minute fares.

[30] Figure A9 shows that the pattern we find in the descriptive statistics is repeated to some extent when we display the coefficients that identify the month-to-month differences between control and treatment routes.

Table 12: Effects on the DMA on Airline Fares

	lweightedaverage	lonemonthfare	loneweekfare
DMA	0.0161	0.0153	-0.0375**
	(0.0138)	(0.0162)	(0.0195)
ln(flights_origin_airport)	0.206***	0.110**	-0.00864
	(0.0551)	(0.0519)	(0.0533)
ln(flights_destination_airport)	0.0821*	0.0629	-0.0810*
	(0.0442)	(0.0443)	(0.0472)
ln(flights_airline)	-0.243***	-0.248***	-0.268***
	(0.0393)	(0.0422)	(0.0464)
Constant	4.234***	5.246***	7.508***
	(0.784)	(0.789)	(0.841)
Observations	10,134	10,134	10,134
R-squared	0.477	0.424	0.370
Number of routeairline	692	692	692
Year FE	YES	YES	YES
Route-airline FE	YES	YES	YES
Month FE	YES	YES	YES
Unit	Route-airline	Route-airline	Route-airline
Sample	UK-big EU	UK-big EU	UK-big EU
Airline	All	All	All
HHI	<0.5	<0.5	<0.5
Period	20233 to 20253	20233 to 20253	20233 to 20253
Clusters	Route	Route	Route

8. Conclusions

This paper examines the impact of Google's Search Engine Results Page (SERP) redesign, implemented in March 6, 2024 in response to the Digital Markets Act (DMA). Focusing on web traffic to airline and flight comparison websites in four EU countries, and using a Difference-in-Differences framework with granular domain-level data from Similarweb, we provide evidence that the reform generated substantial redistributive effects within the digital air travel ecosystem.

A central element of Google's compliance strategy was the removal of the Google Flights module from flight-related search results in European Economic Area (EEA) countries. Prior to the DMA, this module occupied a prominent position on the SERP and was considered a source of self-preferencing. Its removal was accompanied by the introduction of new results modules—such as "Airline Options" and "Flight Sites"—designed to increase the visibility of airlines and third-party intermediaries under comparable conditions.

Our empirical analysis show that these changes significantly increased organic traffic for smaller and less visible firms. Among airlines, low-cost carriers, airlines with smaller domestic market shares, and airlines with lower digital visibility experienced the largest gains, with increases in organic traffic ranging from approximately 15% to 28% across specifications and devices. By contrast, dominant network carriers and airlines with strong pre-reform visibility show little or no response. For flight comparison websites, traffic gains are concentrated among platforms outside the national top five in terms of seat capacity, particularly on desktop devices, with effects reaching up to 28.9%. By contrast, leading comparison platforms exhibit no significant changes in organic traffic, although they may have benefited indirectly through referral channels.

Taken together, these findings suggest that the SERP redesign induced by the DMA reduced the structural advantages enjoyed by incumbent platforms and reallocated user attention toward smaller and less established actors. While the magnitude of the effects varies across devices and market segments—and some estimates are less precisely identified, particularly for mobile comparison sites—the overall pattern is consistent with a leveling of the competitive playing field in flight-related search. More broadly, our results provide empirical evidence that the DMA meaningfully affected traffic allocation and competitive outcomes in digital markets.

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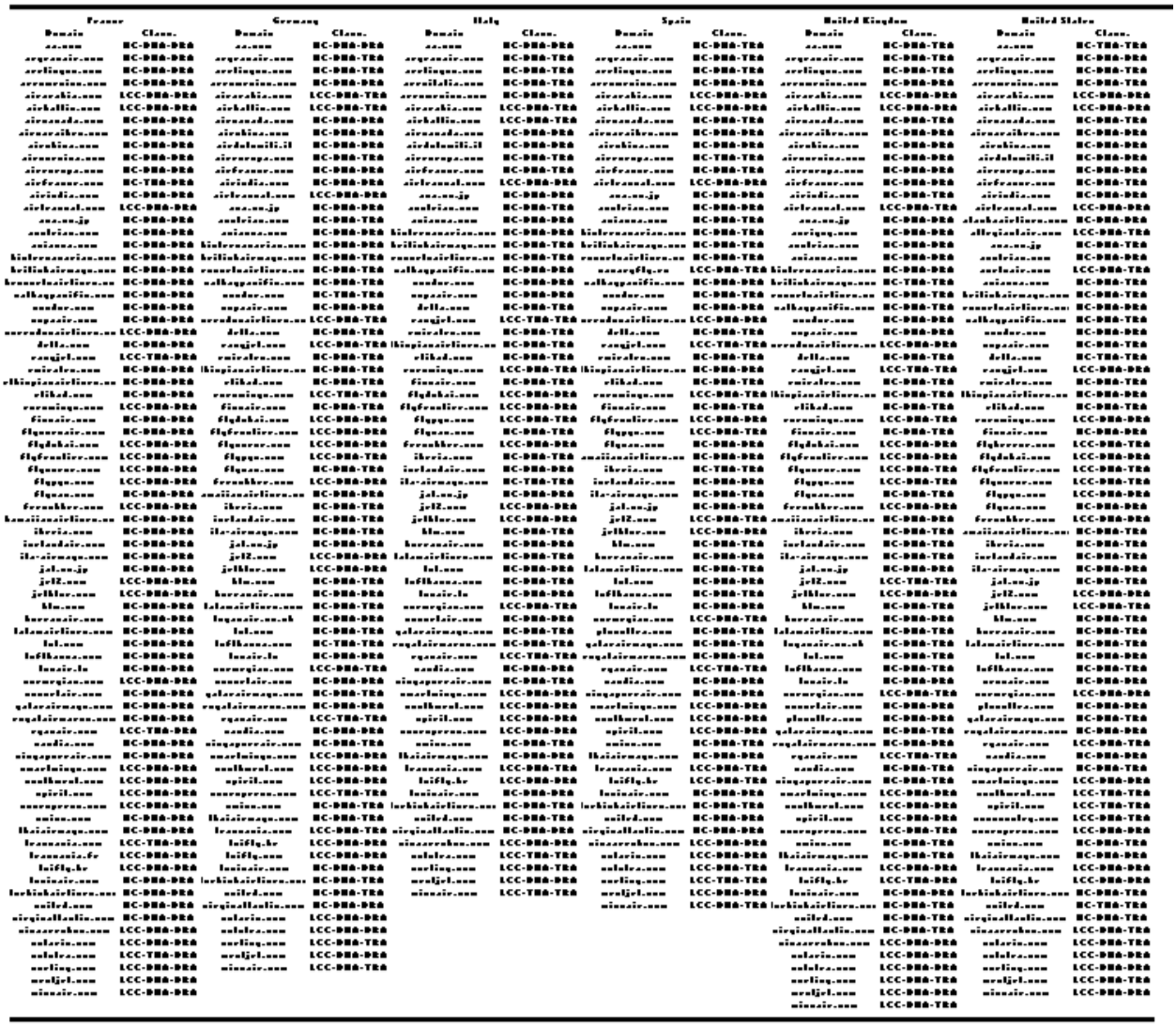
Appendix

Table A1: List of Domains by Country

Domain	Country	Domain	Country	Domain	Country
aa.com	FR-GE-IT-SP-UK-US	etihad.com	FR-GE-IT-SP-UK-US	momondo.fr	FR-UK
aegeanair.com	FR-GE-IT-SP-UK-US	eurowings.com	FR-GE-IT-SP-UK-US	momondo.it	GE-IT-UK
aerlingus.com	FR-GE-IT-SP-UK-US	expedia.co.uk	FR-GE-IT-SP-UK-US	mytrip.com	FR-GE-IT-SP-UK-US
aeroitalia.com	IT	expedia.com	FR-GE-IT-SP-UK-US	neosair.com	US
aeromexico.com	FR-GE-IT-SP-UK-US	expedia.de	FR-GE-IT-SP-UK-US	netflights.com	UK-US
airarabia.com	FR-GE-IT-SP-UK-US	expedia.es	FR-GE-IT-SP-UK-US	norwegian.com	FR-GE-IT-SP-UK-US
airbaltic.com	FR-GE-IT-SP-UK-US	expedia.fr	FR-GE-SP-UK-US	nouvelair.com	FR-GE-IT-UK
aircanada.com	FR-GE-IT-SP-UK-US	expedia.it	FR-GE-IT-SP-UK-US	omio.it	FR-GE-IT-SP-UK
aircaraibes.com	FR-SP-UK-US	expedia.nl	FR-SP-UK	onetwotrip.com	FR-GE-IT-SP-UK-US
airchina.com	FR-GE-SP-UK-US	finnair.com	FR-GE-IT-SP-UK-US	plusultra.com	SP-UK-US
aircorsica.com	FR-UK	flightcentre.co.uk	UK-US	qatarairways.com	FR-GE-IT-SP-UK-US
airdolomiti.it	GE-IT-US	flighthub.com	FR-GE-UK-US	royalairmaroc.com	FR-GE-IT-SP-UK-US
aireuropa.com	FR-GE-IT-SP-UK-US	flightnetwork.com	FR-GE-IT-SP-UK-US	ryanair.com	FR-GE-IT-SP-UK-US
airfrance.com	FR-GE-IT-SP-UK-US	flights.com	FR-GE-SP-UK-US	saudia.com	FR-GE-IT-SP-UK-US
airhint.com	FR-GE-UK-US	flighttix.de	GE	secretflying.com	FR-GE-IT-SP-UK-US
airindia.com	DE-FR-UK-US	flug.de	GE	singaporeair.com	FR-GE-IT-SP-UK-US
airline-direct.de	DE	fluge-buchen.de	GE	skiplagged.com	FR-GE-IT-SP-UK-US
airpaz.com	FR-GE-SP-UK-US	fly4free.com	FR-GE-IT-SP-UK-US	skyscanner.com	FR-GE-IT-SP-UK-US
airtransat.com	FR-GE-IT-SP-UK-US	fly4free.pl	FR-GE-SP-UK-US	skyscanner.de	FR-GE-IT-SP-UK-US
alaskaairlines.com	US	flybreeze.com	US	skyscanner.es	FR-GE-IT-SP-UK-US
allegiantair.com	US	flycorsair.com	FR	skyscanner.fr	FR-GE-IT-SP-UK-US
alternativeairlines.com	FR-GE-IT-SP-UK-US	flydubai.com	FR-GE-SP-UK-US	skyscanner.it	FR-GE-IT-SP-UK-US
ana.co.jp	FR-GE-IT-SP-UK-US	flyfrontier.com	FR-GE-IT-SP-UK-US	skyscanner.net	FR-GE-IT-SP-UK-US
aurigny.com	UK	flynorse.com	FR-GE-UK-US	skyscanner.nl	FR-GE-IT-SP-UK-US
austrian.com	FR-GE-IT-SP-UK-US	flypgs.com	FR-GE-IT-SP-UK-US	skyscanner.pl	FR-GE-IT-SP-UK-US
aveloair.com	US	flysas.com	FR-GE-IT-SP-UK-US	smartwings.com	FR-GE-IT-SP-UK-US
avianca.com	FR-GE-IT-SP-UK-US	flysmarter.de	GE	southwest.com	FR-GE-IT-SP-UK-US
azair.com	DE	frenchbee.com	FR-GE-IT-UK-US	spirit.com	FR-GE-IT-SP-UK-US
azair.eu	FR-GE-IT-SP-UK	getaflight.co.uk	UK	suncountry.com	US
billigfluege.de	GE	gotogate.co.uk	GE-UK-US	sunexpress.com	FR-GE-IT-UK-US
billigflug.de	GE	gotogate.com	FR-GE-IT-SP-UK-US	swiss.com	FR-GE-IT-SP-UK-US
bintercanarias.com	FR-GE-IT-SP-UK	gotogate.it	IT	thaiairways.com	FR-GE-IT-SP-UK-US
booking.com	FR-GE-IT-SP-UK-US	hawaiianairlines.co	FR-GE-SP-UK-US	transavia.com	FR-GE-IT-SP-UK-US
britishairways.com	FR-GE-IT-SP-UK-US	hopper.com	FR-GE-IT-SP-UK-US	transavia.fr	FR
brusselsairlines.com	FR-GE-IT-SP-UK-US	iberia.com	FR-GE-IT-SP-UK-US	travelcenter.uk	UK
budgetair.it	IT	icelandair.com	FR-GE-IT-SP-UK-US	traveloka.com	FR-GE-IT-SP-UK-US
canaryfly.es	SP	ita-airways.com	FR-GE-IT-SP-UK-US	traveltrolley.co.ul	UK
cathaypacific.com	FR-GE-IT-SP-UK-US	jal.co.jp	FR-GE-IT-SP-UK-US	tuifly.be	FR-GE-IT-SP-UK-US
cheapfareguru.com	US	jet2.com	FR-GE-IT-SP-UK-US	tuifly.com	GE
cheapflights.co.uk	FR-GE-SP-UK-US	jetblue.com	FR-GE-IT-SP-UK-US	tunisair.com	FR-GE-IT-SP-UK
cheapflightsfares.com	US	jetbluevacations.c	UK-US	turkishairlines.co	FR-GE-IT-SP-UK-US
cheapoair.com	FR-GE-IT-SP-UK-US	justfly.com	GE-SP-UK-US	united.com	FR-GE-IT-SP-UK-US
condor.com	FR-GE-IT-SP-UK-US	kayak.com.co	US	virginatlantic.com	FR-GE-IT-SP-UK-US
copaair.com	FR-GE-IT-SP-UK-US	kayak.com.mx	SP-US	vivaaerobus.com	FR-IT-SP-UK-US
corendonairlines.com	FR-GE-SP-UK	kayak.pl	GE-SP-UK	volagratis.com	FR-GE-IT-SP-UK
delta.com	FR-GE-IT-SP-UK-US	kissandfly.de	GE	volaris.com	FR-GE-IT-UK-US
direktflug.de	GE	klm.com	FR-GE-IT-SP-UK-US	voli-diretti.it	IT
easyjet.com	FR-GE-IT-SP-UK-US	koreanair.com	FR-GE-IT-SP-UK-US	volotea.com	FR-GE-IT-SP-UK-US
edreams.com	FR-GE-IT-SP-UK-US	latamairlines.com	FR-GE-IT-SP-UK-US	vueling.com	FR-GE-IT-SP-UK-US
emirates.com	FR-GE-IT-SP-UK-US	loganair.co.uk	GE-UK	vuelosbaratos.es	SP
esky.co.uk	GE-UK	lookbyfare.com	US	wanderlog.com	FR-GE-IT-SP-UK-US
esky.es	GE-SP	lot.com	FR-GE-IT-SP-UK-US	westjet.com	FR-GE-IT-SP-UK-US
eskytravel.de	GE-SP	lufthansa.com	FR-GE-IT-SP-UK-US	wizzair.com	FR-GE-IT-SP-UK-US
eskytravel.it	IT	luxair.lu	FR-GE-IT-SP-UK	worldairfares.com	UK
ethiopianairlines.com	FR-GE-IT-SP-UK-US	momondo.es	FR-GE-SP-UK-US		

Note: The country codes listed in the table represent the following: FR = France, DE = Germany, IT = Italy, SP = Spain, UK = the United Kingdom, and US = the United States.

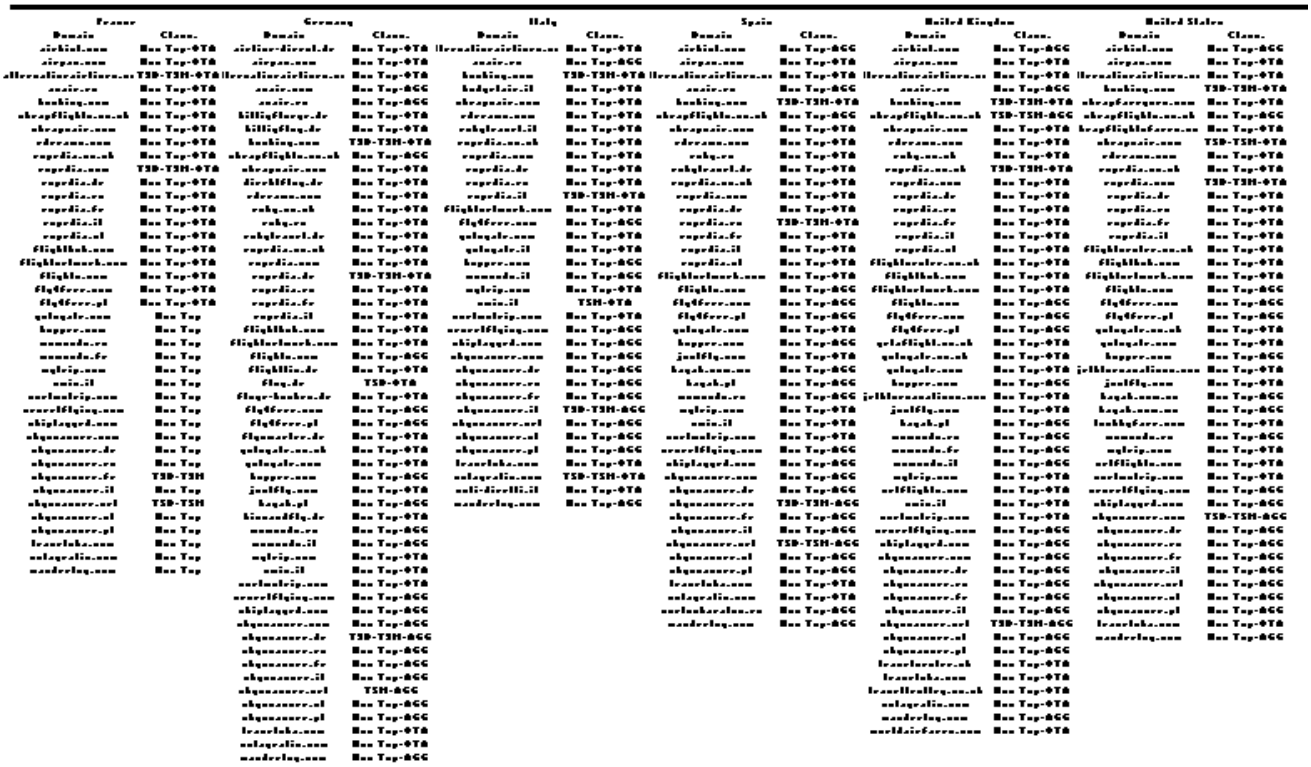
Table A2: Classification of Airline Domains by Country



France		Germany		Italy		Spain		United Kingdom		United States	
Domain	Class.	Domain	Class.	Domain	Class.	Domain	Class.	Domain	Class.	Domain	Class.
aa.com	NC-DNA-DRA	aa.com	NC-DNA-DRA	aa.com	NC-DNA-DRA	aa.com	NC-DNA-DRA	aa.com	NC-DNA-TRA	aa.com	NC-TNA-TRA
argonair.com	NC-DNA-DRA	argonair.com	NC-DNA-TRA	argonair.com	NC-DNA-TRA	argonair.com	NC-DNA-TRA	argonair.com	NC-DNA-TRA	argonair.com	NC-DNA-DRA
arelinqueen.com	NC-DNA-DRA	arelinqueen.com	NC-DNA-TRA	arelinqueen.com	NC-DNA-TRA	arelinqueen.com	NC-DNA-TRA	arelinqueen.com	NC-DNA-TRA	arelinqueen.com	NC-DNA-DRA
arrowprime.com	NC-DNA-DRA	arrowprime.com	NC-DNA-DRA	arrowprime.com	NC-DNA-TRA	arrowprime.com	NC-DNA-DRA	arrowprime.com	NC-DNA-DRA	arrowprime.com	NC-DNA-TRA
airarabia.com	LCC-DNA-DRA	airarabia.com	LCC-DNA-TRA	airarabia.com	LCC-DNA-TRA	airarabia.com	LCC-DNA-DRA	airarabia.com	LCC-DNA-DRA	airarabia.com	LCC-DNA-DRA
airhallin.com	LCC-DNA-DRA	airhallin.com	LCC-DNA-TRA	airhallin.com	LCC-DNA-TRA	airhallin.com	LCC-DNA-DRA	airhallin.com	LCC-DNA-DRA	airhallin.com	LCC-DNA-DRA
airxanada.com	NC-DNA-DRA	airxanada.com	NC-DNA-DRA	airxanada.com	NC-DNA-TRA	airxanada.com	NC-DNA-TRA	airxanada.com	NC-DNA-TRA	airxanada.com	NC-DNA-DRA
airxcaribe.com	NC-DNA-DRA	airxcaribe.com	NC-DNA-DRA	airxcaribe.com	NC-DNA-DRA	airxcaribe.com	NC-DNA-DRA	airxcaribe.com	NC-DNA-DRA	airxcaribe.com	NC-DNA-DRA
airxchina.com	NC-DNA-DRA	airxchina.com	NC-DNA-DRA	airxchina.com	NC-DNA-DRA	airxchina.com	NC-DNA-DRA	airxchina.com	NC-DNA-DRA	airxchina.com	NC-DNA-DRA
airxcrossing.com	NC-DNA-DRA	airxcrossing.com	NC-DNA-TRA	airxcrossing.com	NC-DNA-TRA	airxcrossing.com	NC-TNA-TRA	airxcrossing.com	NC-DNA-DRA	airxcrossing.com	NC-DNA-DRA
airxeuropa.com	NC-DNA-DRA	airxeuropa.com	NC-DNA-DRA	airxeuropa.com	NC-DNA-TRA	airxeuropa.com	NC-DNA-TRA	airxeuropa.com	NC-DNA-DRA	airxeuropa.com	NC-DNA-DRA
airxfrancer.com	NC-TNA-DRA	airxfrancer.com	NC-DNA-DRA	airxfrancer.com	NC-DNA-TRA	airxfrancer.com	NC-DNA-TRA	airxfrancer.com	NC-DNA-DRA	airxfrancer.com	NC-DNA-DRA
airxindia.com	NC-DNA-DRA	airxindia.com	NC-DNA-DRA	airxtransat.com	LCC-DNA-DRA	airxtransat.com	LCC-DNA-DRA	airxindia.com	NC-DNA-DRA	airxindia.com	NC-DNA-DRA
airxtransat.com	LCC-DNA-DRA	airxtransat.com	LCC-DNA-DRA	asa.co.jp	NC-DNA-DRA	asa.co.jp	NC-DNA-DRA	airxtransat.com	LCC-DNA-DRA	airxtransat.com	LCC-DNA-DRA
asa.co.jp	NC-DNA-DRA	asa.co.jp	NC-DNA-DRA	asalrian.com	NC-DNA-TRA	asalrian.com	NC-DNA-TRA	asa.co.jp	NC-DNA-DRA	alaskairlines.com	NC-DNA-DRA
asalrian.com	NC-DNA-DRA	asalrian.com	NC-DNA-DRA	asianaa.com	NC-DNA-TRA	asianaa.com	NC-DNA-TRA	asriqaq.com	NC-DNA-DRA	allegiantair.com	LCC-DNA-TRA
asianaa.com	NC-DNA-DRA	binlevenserian.com	NC-DNA-DRA	binlevenserian.com	NC-DNA-DRA	binlevenserian.com	NC-DNA-TRA	asalrian.com	NC-DNA-DRA	asa.co.jp	NC-DNA-TRA
binlevenserian.com	NC-DNA-DRA	brilliskairmaqa.com	NC-DNA-DRA	brilliskairmaqa.com	NC-DNA-TRA	brilliskairmaqa.com	NC-DNA-TRA	asianaa.com	NC-DNA-TRA	asalrian.com	NC-DNA-DRA
brilliskairmaqa.com	NC-DNA-DRA	ceanerlairlines.com	NC-DNA-TRA	ceanerlairlines.com	NC-DNA-TRA	ceanerlairlines.com	NC-DNA-TRA	binlevenserian.com	NC-DNA-DRA	asarlair.com	LCC-DNA-TRA
ceanerlairlines.com	NC-DNA-DRA	calkapanifin.com	NC-DNA-TRA	calkapanifin.com	NC-DNA-DRA	calkapanifin.com	NC-DNA-DRA	brilliskairmaqa.com	NC-TNA-TRA	asianaa.com	NC-DNA-DRA
calkapanifin.com	NC-DNA-DRA	condor.com	NC-TNA-TRA	condor.com	NC-DNA-TRA	condor.com	NC-DNA-TRA	ceanerlairlines.com	NC-DNA-TRA	brilliskairmaqa.com	NC-DNA-TRA
condor.com	NC-DNA-DRA	copair.com	NC-DNA-DRA	copair.com	NC-DNA-TRA	copair.com	NC-DNA-DRA	calkapanifin.com	NC-DNA-DRA	ceanerlairlines.com	NC-DNA-TRA
copair.com	NC-DNA-DRA	corendonairlines.com	LCC-DNA-TRA	dellx.com	NC-DNA-TRA	corendonairlines.com	LCC-DNA-DRA	condor.com	NC-DNA-DRA	calkapanifin.com	NC-DNA-DRA
corendonairlines.com	LCC-DNA-DRA	dellx.com	NC-DNA-TRA	evangjet.com	LCC-TNA-TRA	dellx.com	NC-DNA-TRA	copair.com	NC-DNA-DRA	condor.com	NC-DNA-DRA
dellx.com	NC-DNA-DRA	evangjet.com	LCC-DNA-TRA	ibinjonairlines.com	NC-DNA-TRA	evangjet.com	LCC-TNA-TRA	dellx.com	NC-DNA-TRA	copair.com	NC-DNA-DRA
evangjet.com	LCC-TNA-DRA	evivalva.com	NC-DNA-TRA	elikad.com	NC-DNA-TRA	evivalva.com	NC-DNA-TRA	evangjet.com	LCC-TNA-TRA	dellx.com	NC-DNA-TRA
evivalva.com	NC-DNA-DRA	ibinjonairlines.com	NC-DNA-TRA	evrowings.com	LCC-DNA-TRA	ibinjonairlines.com	NC-DNA-DRA	evivalva.com	NC-DNA-TRA	evangjet.com	LCC-TNA-TRA
ibinjonairlines.com	NC-DNA-DRA	elikad.com	NC-DNA-TRA	finnair.com	NC-DNA-TRA	elikad.com	NC-DNA-TRA	evrowings.com	LCC-DNA-DRA	evivalva.com	NC-DNA-TRA
elikad.com	NC-DNA-DRA	evrowings.com	LCC-TNA-TRA	flydubai.com	LCC-DNA-DRA	evrowings.com	LCC-DNA-DRA	ibinjonairlines.com	NC-DNA-TRA	ibinjonairlines.com	NC-DNA-DRA
evrowings.com	LCC-DNA-DRA	finnair.com	NC-DNA-TRA	flyfrontier.com	LCC-DNA-DRA	finnair.com	NC-DNA-TRA	elikad.com	NC-DNA-TRA	elikad.com	NC-DNA-DRA
finnair.com	NC-DNA-DRA	flydubai.com	LCC-DNA-DRA	flyppa.com	LCC-DNA-TRA	flyfrontier.com	LCC-DNA-DRA	evrowings.com	LCC-DNA-TRA	evrowings.com	LCC-DNA-DRA
flyporair.com	NC-DNA-DRA	flyfrontier.com	LCC-DNA-DRA	flyqas.com	NC-DNA-TRA	flyppa.com	LCC-DNA-TRA	finnair.com	NC-DNA-TRA	finnair.com	NC-DNA-DRA
flydubai.com	NC-DNA-DRA	flyporair.com	LCC-DNA-DRA	forexbkr.com	LCC-DNA-DRA	flyqas.com	NC-DNA-DRA	flydubai.com	LCC-DNA-DRA	flydubai.com	LCC-DNA-TRA
flyfrontier.com	LCC-DNA-DRA	flyppa.com	LCC-DNA-TRA	iberia.com	NC-DNA-TRA	smalliairlines.com	NC-DNA-DRA	flyfrontier.com	LCC-DNA-DRA	flyfrontier.com	LCC-DNA-DRA
flyporair.com	LCC-DNA-DRA	flyqas.com	NC-DNA-TRA	icelandair.com	NC-DNA-TRA	iberia.com	NC-TNA-TRA	flyporair.com	LCC-DNA-TRA	flyporair.com	LCC-DNA-TRA
flyppa.com	LCC-DNA-DRA	forexbkr.com	LCC-DNA-DRA	ilo-airmaqa.com	NC-TNA-TRA	icelandair.com	NC-DNA-DRA	flyppa.com	LCC-DNA-TRA	flyppa.com	LCC-DNA-DRA
flyqas.com	NC-DNA-DRA	smalliairlines.com	NC-DNA-DRA	jal.co.jp	NC-DNA-DRA	ilo-airmaqa.com	NC-DNA-TRA	flyqas.com	NC-DNA-TRA	flyqas.com	NC-DNA-DRA
forexbkr.com	LCC-DNA-DRA	iberia.com	NC-DNA-TRA	jet2.com	LCC-DNA-DRA	jal.co.jp	NC-DNA-DRA	forexbkr.com	LCC-DNA-DRA	forexbkr.com	LCC-DNA-DRA
kmalliairlines.com	NC-DNA-DRA	icelandair.com	NC-DNA-TRA	jetblue.com	LCC-DNA-DRA	jet2.com	LCC-DNA-TRA	smalliairlines.com	NC-DNA-DRA	iberia.com	NC-DNA-TRA
iberia.com	NC-DNA-DRA	ilo-airmaqa.com	NC-DNA-TRA	klm.com	NC-DNA-TRA	jetblue.com	LCC-DNA-DRA	iberia.com	NC-DNA-TRA	smalliairlines.com	NC-DNA-TRA
icelandair.com	NC-DNA-DRA	jal.co.jp	NC-DNA-DRA	kuwaitair.com	NC-DNA-TRA	klm.com	NC-DNA-TRA	icelandair.com	NC-DNA-TRA	iberia.com	NC-DNA-TRA
ilo-airmaqa.com	NC-DNA-DRA	jet2.com	LCC-DNA-DRA	lalmairlines.com	NC-DNA-TRA	kuwaitair.com	NC-DNA-DRA	ilo-airmaqa.com	NC-DNA-TRA	icelandair.com	NC-DNA-TRA
jal.co.jp	NC-DNA-DRA	jetblue.com	LCC-DNA-DRA	lot.com	NC-DNA-TRA	lalmairlines.com	NC-DNA-TRA	jal.co.jp	NC-DNA-DRA	ilo-airmaqa.com	NC-DNA-DRA
jet2.com	LCC-DNA-DRA	klm.com	NC-DNA-TRA	lufthansa.com	NC-DNA-TRA	lot.com	NC-DNA-DRA	jet2.com	LCC-TNA-TRA	jal.co.jp	NC-DNA-DRA
jetblue.com	LCC-DNA-DRA	kuwaitair.com	NC-DNA-DRA	lunair.is	NC-DNA-DRA	lufthansa.com	NC-DNA-TRA	jetblue.com	LCC-DNA-DRA	jet2.com	LCC-DNA-DRA
klm.com	NC-DNA-DRA	lalmairlines.com	NC-DNA-TRA	norwegian.com	LCC-DNA-TRA	lunair.is	NC-DNA-DRA	klm.com	NC-DNA-TRA	jetblue.com	LCC-DNA-DRA
kuwaitair.com	NC-DNA-DRA	loganair.co.uk	NC-DNA-DRA	nouvelair.com	NC-DNA-DRA	norwegian.com	LCC-DNA-DRA	kuwaitair.com	NC-DNA-DRA	klm.com	NC-DNA-DRA
lalmairlines.com	NC-DNA-DRA	lot.com	NC-DNA-TRA	qatarairways.com	NC-DNA-TRA	plusultra.com	NC-DNA-TRA	lalmairlines.com	NC-DNA-TRA	kuwaitair.com	NC-DNA-DRA
lot.com	NC-DNA-DRA	lufthansa.com	NC-TNA-TRA	royalairmaroc.com	NC-DNA-TRA	qatarairways.com	NC-DNA-TRA	loganair.co.uk	NC-DNA-TRA	lalmairlines.com	NC-DNA-DRA
lufthansa.com	NC-DNA-DRA	lunair.is	NC-DNA-DRA	ryanair.com	LCC-TNA-TRA	royalairmaroc.com	NC-DNA-DRA	lot.com	NC-DNA-TRA	lot.com	NC-DNA-TRA
lunair.is	NC-DNA-DRA	norwegian.com	LCC-DNA-TRA	saudia.com	NC-DNA-DRA	ryanair.com	LCC-TNA-TRA	lufthansa.com	NC-DNA-TRA	lufthansa.com	NC-DNA-DRA
norwegian.com	LCC-DNA-DRA	nouvelair.com	NC-DNA-TRA	singaporair.com	NC-DNA-DRA	saudia.com	NC-DNA-TRA	lunair.is	NC-DNA-TRA	norwegian.com	LCC-DNA-DRA
nouvelair.com	NC-DNA-DRA	qatarairways.com	NC-DNA-DRA	smartwings.com	LCC-DNA-DRA	singaporair.com	NC-DNA-DRA	norwegian.com	LCC-DNA-TRA	nouvelair.com	LCC-DNA-DRA
qatarairways.com	NC-DNA-DRA	royalairmaroc.com	NC-DNA-DRA	southwest.com	LCC-DNA-DRA	smartwings.com	LCC-DNA-DRA	nouvelair.com	NC-DNA-DRA	plusultra.com	NC-DNA-DRA
royalairmaroc.com	NC-DNA-DRA	ryanair.com	LCC-TNA-TRA	spirit.com	LCC-DNA-DRA	southwest.com	LCC-DNA-DRA	plusultra.com	NC-DNA-DRA	qatarairways.com	NC-DNA-TRA
ryanair.com	LCC-TNA-DRA	saudia.com	NC-DNA-DRA	sunexpress.com	LCC-DNA-DRA	spirit.com	LCC-DNA-DRA	qatarairways.com	NC-DNA-TRA	royalairmaroc.com	NC-DNA-DRA
saudia.com	NC-DNA-DRA	singaporair.com	NC-DNA-DRA	swiss.com	NC-DNA-TRA	swiss.com	NC-DNA-TRA	royalairmaroc.com	NC-DNA-DRA	ryanair.com	LCC-DNA-TRA
singaporair.com	NC-DNA-DRA	smartwings.com	LCC-DNA-DRA	thaiairways.com	NC-DNA-DRA	thaiairways.com	NC-DNA-DRA	ryanair.com	LCC-TNA-TRA	saudia.com	NC-DNA-DRA
smartwings.com	LCC-DNA-DRA	southwest.com	LCC-DNA-DRA	transavia.com	LCC-DNA-TRA	transavia.com	LCC-DNA-TRA	saudia.com	NC-DNA-TRA	singaporair.com	NC-DNA-DRA
southwest.com	LCC-DNA-DRA	spirit.com	LCC-DNA-DRA	tuifly.be	LCC-DNA-DRA	tuifly.be	LCC-DNA-TRA	singaporair.com	NC-DNA-TRA	smartwings.com	LCC-DNA-DRA
spirit.com	LCC-DNA-DRA	sunexpress.com	LCC-TNA-TRA	tunisair.com	NC-DNA-DRA	tunisair.com	NC-DNA-DRA	smartwings.com	LCC-DNA-DRA	southwest.com	LCC-TNA-TRA
sunexpress.com	LCC-DNA-DRA	swiss.com	NC-DNA-TRA	turkishairlines.com	NC-DNA-TRA	turkishairlines.com	NC-DNA-TRA	southwest.com	LCC-DNA-DRA	spirit.com	LCC-TNA-TRA
swiss.com	NC-DNA-DRA	thaiairways.com	NC-DNA-TRA	united.com	NC-DNA-TRA	united.com	NC-DNA-DRA	spirit.com	LCC-DNA-DRA	sunexpress.com	LCC-TNA-TRA
thaiairways.com	NC-DNA-DRA	transavia.com	LCC-DNA-TRA	virginatlantic.com	LCC-TNA-TRA	virginatlantic.com	NC-DNA-DRA	sunexpress.com	LCC-DNA-TRA	sunexpress.com	LCC-DNA-DRA
transavia.com	LCC-TNA-DRA	tuifly.be	LCC-DNA-DRA	vivaerobus.com	LCC-DNA-DRA	vivaerobus.com	LCC-DNA-DRA	swiss.com	NC-DNA-TRA	swiss.com	NC-DNA-DRA
transavia.fr	LCC-DNA-DRA	tuifly.com	LCC-DNA-DRA	volaris.com	LCC-TNA-TRA	volaris.com	LCC-DNA-DRA	thaiairways.com	NC-DNA-TRA	thaiairways.com	NC-DNA-DRA
tuifly.be	LCC-DNA-DRA	tunisair.com	NC-DNA-DRA	volotea.com	LCC-TNA-TRA	volotea.com	LCC-DNA-TRA	transavia.com	LCC-DNA-DRA	transavia.com	LCC-DNA-DRA
tunisair.com	NC-DNA-DRA	turkishairlines.com	NC-DNA-TRA	vueling.com	LCC-TNA-TRA	vueling.com	LCC-TNA-TRA	tuifly.be	LCC-TNA-DRA	tuifly.be	LCC-DNA-DRA
turkishairlines.com	NC-DNA-DRA	united.com	NC-DNA-TRA	wizzair.com	LCC-TNA-TRA	wizzair.com	LCC-DNA-TRA	tunisair.com	NC-DNA-DRA	turkishairlines.com	NC-DNA-TRA
united.com	NC-DNA-DRA	virginatlantic.com	NC-DNA-DRA					turkishairlines.com	LCC-DNA-TRA	united.com	NC-DNA-TRA
virginatlantic.com	NC-DNA-DRA	volaris.com	LCC-DNA-DRA					united.com	NC-DNA-TRA	virginatlantic.com	NC-DNA-DRA
vivaerobus.com	LCC-DNA-DRA	volotea.com	LCC-DNA-DRA					virginatlantic.com	NC-DNA-DRA	vivaerobus.com	LCC-DNA-DRA
volaris.com	LCC-DNA-DRA	vueling.com	LCC-DNA-DRA					vivaerobus.com	LCC-DNA-DRA	volaris.com	LCC-DNA-DRA
volotea.com	LCC-TNA-DRA	wizzair.com	LCC-DNA-DRA					volaris.com	LCC-DNA-DRA	volotea.com	LCC-DNA-DRA
vueling.com	LCC-DNA-DRA							volotea.com	LCC-DNA-DRA	vueling.com	LCC-DNA-DRA
wizzair.com	LCC-DNA-DRA							vueling.com	LCC-DNA-TRA	wizzair.com	LCC-DNA-DRA
								wizzair.com	LCC-DNA-DRA		

Note: Airlines classification: NC = Network Carriers, LCC = Low Cost Carriers, TNA = Top National Airlines, BNA = Bottom National Airlines, TRA = Top Ranking Airlines, BRA = Bottom Ranking Airlines.

Table A3: Classification of Flight Comparison Domains by Country



Note: Comparison site classifications are defined as follows: T3D = Top 3 on desktop traffic; T3M = Top 3 on mobile traffic; T5D = Top 5 on desktop traffic; T5M = Top 5 on mobile traffic; Non-Top = sites not ranked among the top 5 in either category.

Table A4: Summary Statistics of Desktop Weekly Visits by Country

Country	Obs.	Total	Organic	Direct	Paid Search	Referrals
France	4,758	61,853 (61,853)	17,691 (63,624)	27,868 (146,368)	8,379 (53,358)	7,180 (50,191)
Germany	5,368	66,336 (320,292)	17,191 (56,351)	32,676 (173,523)	7,873 (45,527)	7,788 (44,877)
Italy	3,721	99,363 (419,682)	31,866 (100,433)	42,408 (195,109)	15,027 (81,157)	9,238 (52,229)
Spain	3,599	83,688 (329,384)	23,596 (67,164)	39,920 (172,705)	12,292 (57,340)	7,330 (37,262)
UK	5,978	100,010 (397,823)	32,000 (101,484)	47,116 (212,955)	11,872 (62,008)	8,235 (38,255)
US	5,612	436,495 (1,181,695)	121,413 (311,625)	245,220 (682,048)	41,194 (153,817)	24,532 (71,132)

Note: The values in Columns 3 to 7 represent the means, with standard deviations indicated in parentheses.

Table A5: Summary Statistics of Mobile Monthly Visits by Country

Country	Obs.	Total	Organic	Direct	Paid Search	Referrals
France	1,638	311,259 (1,460,960)	108,425 (328,655)	126,835 (649,347)	47,802 (363,814)	21,806 (161,162)
Germany	1,806	354,291 (1,808,487)	113,917 (383,002)	160,828 (893,792)	53,194 (451,910)	19,842 (114,705)
Italy	1,456	448,851 (2,057,683)	164,832 (608,744)	186,999 (947,795)	59,909 (416,065)	24,002 (156,329)
Spain	1,596	349,509 (1,708,446)	109,397 (401,954)	160,291 (828,215)	49,969 (382,245)	18,792 (126,277)
UK	1,820	512,515 (2,098,366)	179,498 (642,298)	247,603 (1,103,079)	42,346 (289,605)	30,437 (169,387)
US	1,708	2,155,010 (7,025,438)	680,354 (2,136,407)	1,108,326 (3,687,749)	165,006 (890,852)	107,628 (410,927)

Note: The values in Columns 3 to 7 represent the means, with standard deviations indicated in parentheses.

Table A6: Effects on Airline Websites Traffic – Desktop Organic Traffic by Country Type

	Tourist countries							Non-tourist countries						
	Total	**LLC**	**NC**	**TNA**	**BNA**	**TRA**	**BRA**	**Total**	**LLC**	**NC**	**TNA**	**BNA**	**TRA**	**BRA**
EU x PostDMA	0.0699*	0.1372*	0.0475**	0.0670	0.0710*	0.0590	0.0803	0.0533***	0.1568***	0.0163***	0.2579**	0.0336***	0.1116**	-0.0076
	(0.0277)	(0.0578)	(0.0173)	(0.0658)	(0.0300)	(0.0317)	(0.0508)	(0.0016)	(0.0086)	(0.0011)	(0.0490)	(0.0022)	(0.0188)	(0.0154)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Week FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9592	0.9657	0.9546	0.9900	0.9358	0.9790	0.8393	0.9585	0.9623	0.9580	0.9898	0.9382	0.9778	0.8451
N	16,653	5,246	11,407	1,525	15,128	8,357	8,296	11,285	3,721	7,564	915	10,370	5,734	5,551

Note: "Tourist countries" include France, Italy, and Spain, which rank among the top destinations in Europe by international tourist arrivals. "Non-tourist countries" include Germany which exhibits a comparatively level of tourism. The classification is based on data from Eurostat and UNWTO. Estimates are based on the Difference-in-Differences (DiD) specification described in Equation (1), using desktop organic traffic. Standard errors are reported in parentheses. LLC = Low-Cost Carriers; NC = Network Carriers; TNA = Top National Airlines; BNA = Bottom National Airlines; TRA = Top Ranking Airlines; BRA = Bottom Ranking Airlines, as defined in TableA2.

Table A7: Effects on Airline Websites Traffic – Mobile Organic Traffic by Country Type

	Tourist countries							Non-tourist countries						
	Total	**LLC**	**NC**	**TNA**	**BNA**	**TRA**	**BRA**	**Total**	**LLC**	**NC**	**TNA**	**BNA**	**TRA**	**BRA**
EU x PostDMA	0.0640	0.0911	0.0506	0.0605*	0.0649	-0.0688	0.2039**	-0.0257	0.0521	-0.0689**	0.2506***	-0.0452	-0.0756	0.0280
	(0.0444)	(0.0761)	(0.0359)	(0.0260)	(0.0486)	(0.0386)	(0.0630)	(0.0353)	(0.0760)	(0.0136)	(0.0013)	(0.0377)	(0.0416)	(0.0294)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9607	0.9658	0.9561	0.9873	0.9453	0.9751	0.8556	0.9686	0.9710	0.9678	0.9874	0.9575	0.9790	0.8815
N	5,187	1,861	3,326	350	4,837	2,684	2,503	3,220	1,176	2,044	210	3,010	1,680	1,540

Note: "Tourist countries" include France, Italy, and Spain, which rank among the top destinations in Europe by international tourist arrivals. "Non-tourist countries" include Germany which exhibits a comparatively level of tourism. The classification is based on data from Eurostat and UNWTO. Estimates are based on the Difference-in-Differences (DiD) specification described in Equation (1), using mobile organic traffic. Standard errors are reported in parentheses. LLC = Low-Cost Carriers; NC = Network Carriers; TNA = Top National Airlines; BNA = Bottom National Airlines; TRA = Top Ranking Airlines; BRA = Bottom Ranking Airlines, as defined in TableA2.

Table A8: Effects on Flight Comparison Websites– Desktop Organic Traffic by Country Type

	Tourist countries						Non-tourist countries					
	General	**Top 3**	**Top 5**	**Non-Top**	**OTAs**	**Aggregators**	**General**	**Top 3**	**Top 5**	**Non-Top**	**OTAs**	**Aggregators**
EU x PostDMA	0.2537***	0.0534*	0.1549	0.2738***	0.2350***	0.2839**	0.1438*	-0.0734***	-0.0779	0.1760**	0.0356	0.2976*
	(0.0443)	(0.0203)	(0.0999)	(0.0376)	(0.0362)	(0.0788)	(0.0397)	(0.0047)	(0.1032)	(0.0321)	(0.0220)	(0.0766)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9587	0.9884	0.9867	0.9002	0.9576	0.9590	0.9351	0.9894	0.9788	0.8696	0.9273	0.9447
N	7,014	854	1,220	5,794	3,842	3,172	5,673	488	732	4,941	3,294	2,379

Note: "Tourist countries" include France, Italy, and Spain, which rank among the top destinations in Europe by international tourist arrivals. "Non-tourist countries" include Germany which exhibits a comparatively level of tourism. The classification is based on data from Eurostat and UNWTO. Estimates are based on the Difference-in-Differences (DiD) specification described in Equation (1), using desktop organic traffic. Standard errors are reported in parentheses. “Top 3” and “Top 5” refer to the most visited comparison websites by country, while “Non-Top” includes platforms not ranked among the national top five, as defined in Table A3.

Table A9: Effects on Flight Comparison Websites Traffic – Mobile Organic Traffic by Country Type

	Tourist countries						Non-tourist countries					
	General	**Top 3**	**Top 5**	**Non-Top**	**OTAs**	**Aggregators**	**General**	**Top 3**	**Top 5**	**Non-Top**	**OTAs**	**Aggregators**
EU x PostDMA	0.1427	0.0463	0.0695	0.1500	0.0970	0.1856	0.0822	0.0217	0.0086	0.3078***	0.3612***	0.1737**
	(0.0702)	(0.0707)	(0.0402)	(0.0783)	(0.0623)	(0.0940)	(0.0974)	(0.0630)	(0.0418)	(0.0316)	(0.0348)	(0.0305)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-Domain FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2 Adjust	0.9241	0.9791	0.9844	0.8564	0.9143	0.9383	0.5697	0.9787	0.9848	0.8688	0.9155	0.9432
N	3,001	196	294	2,707	1,615	1,386	3,608	112	168	1,937	1,223	882

Note: ""Tourist countries" include France, Italy, and Spain, which rank among the top destinations in Europe by international tourist arrivals. "Non-tourist countries" include Germany which exhibits a comparatively level of tourism. The classification is based on data from Eurostat and UNWTO. Estimates are based on the Difference-in-Differences (DiD) specification described in Equation (1), using mobile organic traffic. Standard errors are reported in parentheses. “Top 3” and “Top 5” refer to the most visited comparison websites by country, while “Non-Top” includes platforms not ranked among the national top five, as defined in Table A3.

Table A10: Descriptive statistics of the variables used in the fare analysis

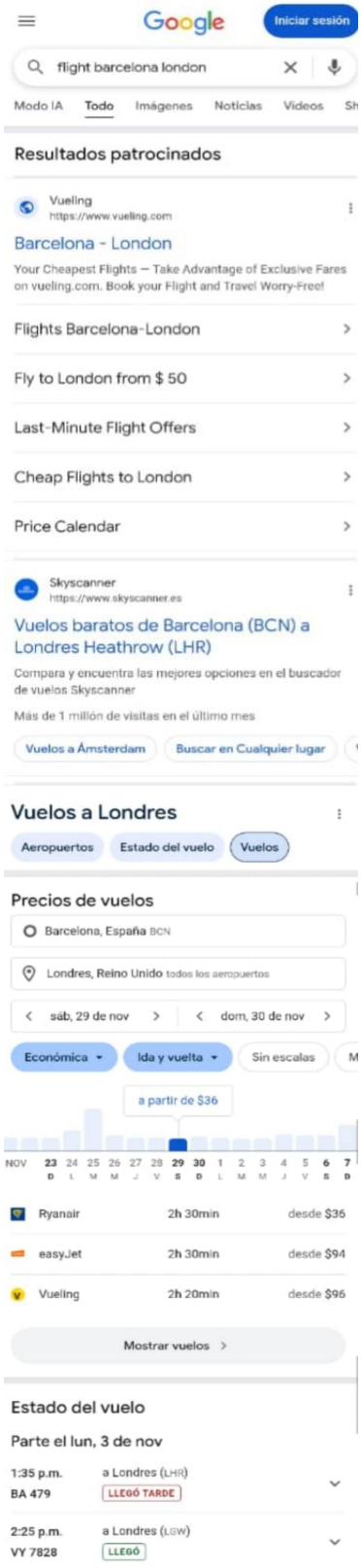
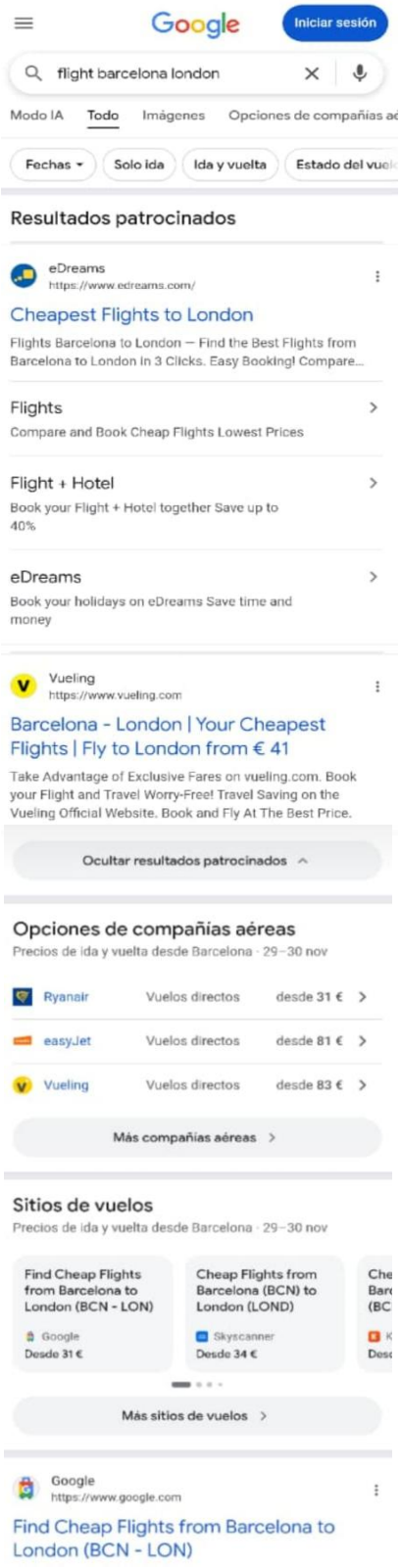
	Mean	Std. Deviation	Min	Max
One month fares (€)	112.34	65.56	8.27	633.57
One week fare (€)	115.95	66.93	10.73	581.74
Weighted fare (€)	114.47	62.77	14.83	582.27
DMA (dummy)	0.27	0.44	0	1
Flights_origin_airport (#)	5297.65	3582.95	134	18787
Flights_destination_airport (#)	5312.04	3583.08	134	18787
Flights_airline (#)	45173.5	33071.28	3732	104950
Network airline (dummy)	0.06	0.24	0	1
Low-cost airline (dummy)	0.94	0.24	0	1
Top national airline (dummy)	0.78	0.41	0	1
Bottom national airline (dummy)	0.22	0.41	0	1

Note: All variables display substantial dispersion, particularly the fare measures. The sample is dominated by low-cost carriers (94% of observations) and top national airlines (78%). In terms of destinations, most observations correspond to UK routes connected to Spain (86%) and Italy (11%), with only a small share involving France and Germany (about 4%). As a result, the data primarily capture UK traffic to major tourist destinations in Southern Europe.

Table A11: Additional Results - one-week fares

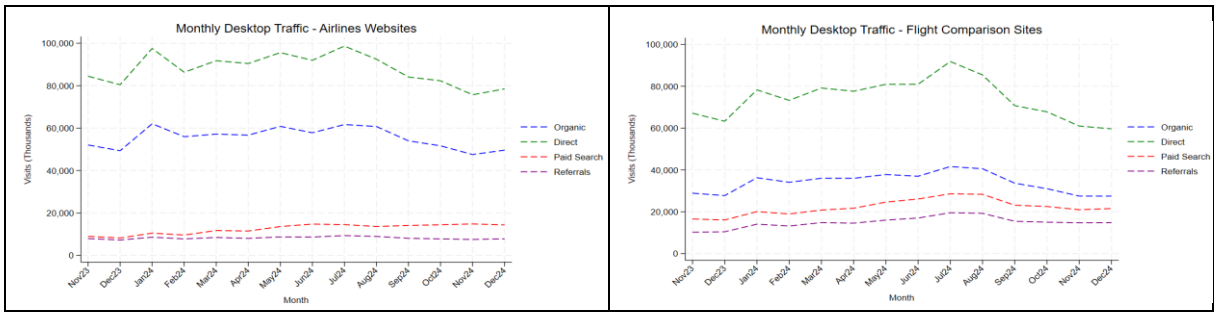
	1	2	3	4	5	6	7
	loneweekfare	loneweekfare	loneweekfare	loneweekfare	loneweekfare	loneweekfare	loneweekfare
DMA	-0.0233**	-0.0336**	-0.0460**	0.0604	-0.0434**	-0.0591**	-0.0497
	(0.0112)	(0.0145)	(0.0196)	(0.0680)	(0.0187)	(0.0236)	(0.0432)
Observations	32,953	18,337	10,134	627	9,507	7,906	2,228
R-squared	0.276	0.295	0.526	0.346	0.389	0.389	0.366
Number of routeairline	1,902	1,388		57	635	527	165
Year FE	YES	YES	YES	YES	YES	YES	YES
Route-airline FE	YES	YES	NO	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES
Origin FE	NO	NO	YES	NO	NO	NO	NO
Destination FE	NO	NO	YES	NO	NO	NO	NO
Airline FE	NO	NO	YES	NO	NO	NO	NO
Unit	Route-airline	Route-airline	Route-airline	Route-airline	Route-airline	Route-airline	Route-airline
Sample	UK-big EU	UK-all EU	UK-big EU	UK-big EU	UK-big EU	UK-big EU	UK-big EU
Airline	All	All	All	Network	LCC	Top national	Bot national
HHI	All	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Clusters	Route	Route	Route	Route	Route	Route	Route

Figure A1. Google's SERP Redesign – Mobile Users

Before March 6, 2024	After March 6, 2024
	

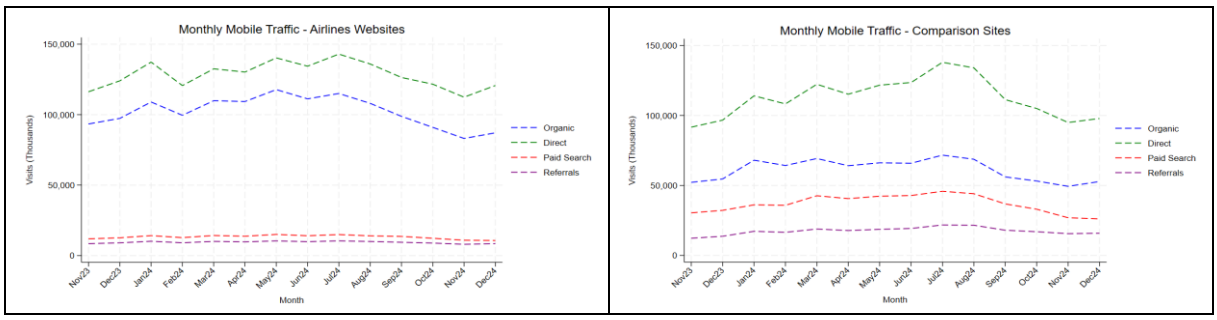
Note: The left panel shows Google's mobile SERP design before March 6, 2024. This version was used in the EEA, the United Kingdom, and the United States and it still applies in the United Kingdom and the United States. The right panel shows the redesigned SERP introduced for users in the EEA after March 6, 2024.

Figure A2: Evolution Desktop Traffic for Airline and Flight Comparison Websites



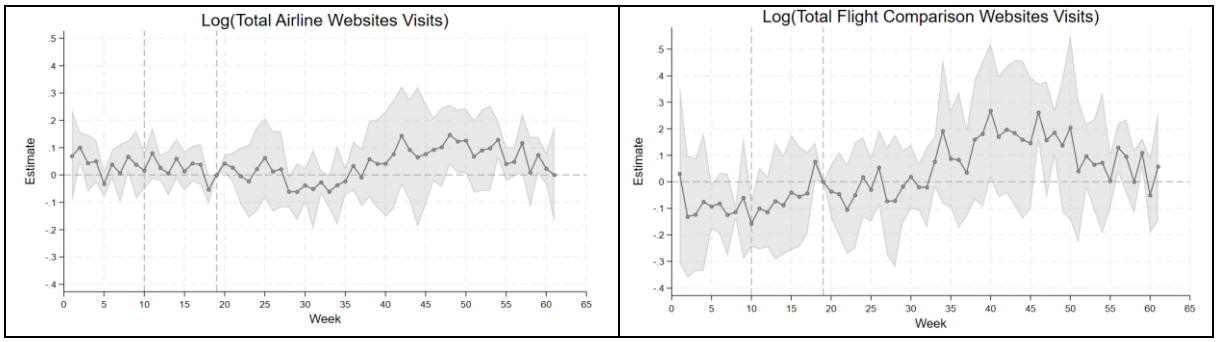
Note: This figure shows the monthly evolution of desktop traffic to airline websites (left panel) and comparison sites (right panel) from November 2023 to December 2024, for four EU countries in our sample and the two control countries. For airline websites, organic and direct traffic are comparable and substantially higher than paid search and referrals. In contrast, comparison sites receive a larger overall volume of visits, with direct traffic dominating—suggesting that users rely less on Google Search to reach these platforms. Overall, these patterns underscore the central role of Google Search in shaping users' search behavior in the air travel market.

Figure A3: Evolution Mobile Traffic for Airline and Flight Comparison Websites



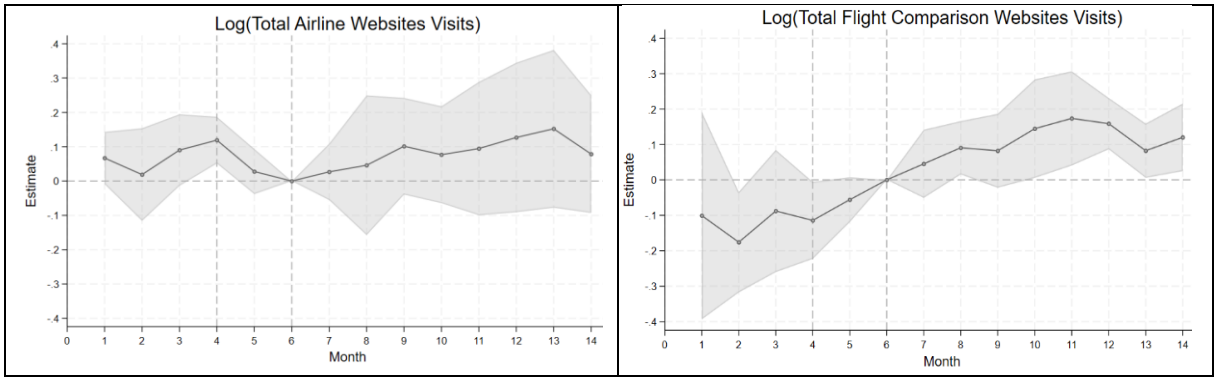
Note: This figure shows the monthly evolution of mobile traffic to airline websites (left panel) and comparison sites (right panel) from November 2023 to December 2024, for four EU countries in our sample and the two control countries. The results are similar to those for desktop traffic. For airline websites, organic and direct traffic are comparable and substantially higher than paid search and referrals. In contrast, comparison sites receive a higher overall volume of visits, with direct traffic dominating. As in Figure A2, these patterns show the central role of Google Search in shaping users' search behavior in the air travel market.

Figure A4: Pre-Treatment Trends for Total Desktop Traffic – Airline and Flight Comparison Websites



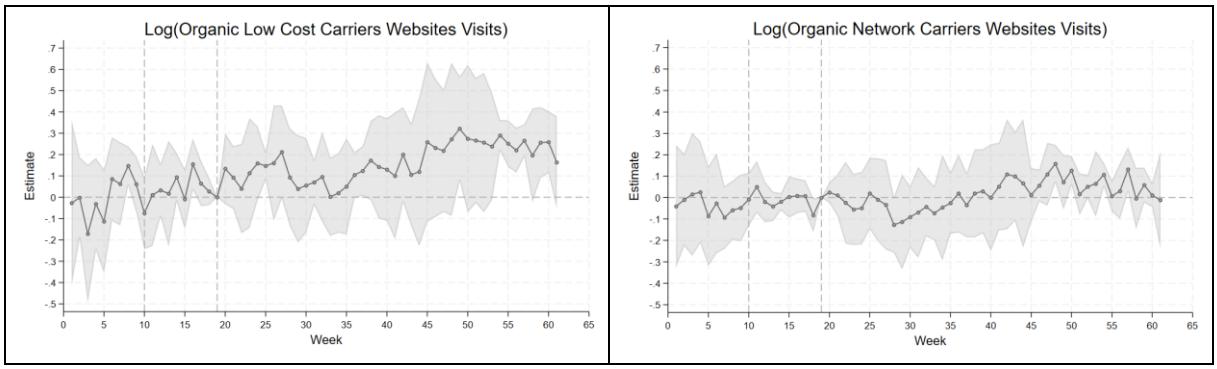
Note: This figure shows the pre-treatment trends in total for desktop traffic for airlines (left panel) and flight comparison websites (right panel), comparing EU countries and the United Kingdom and the United States. The left panel shows a stable and flat pre-treatment trend for airline websites, with estimates fluctuating around zero, supporting the parallel trends assumption. In the right panel, traffic to comparison sites exhibits greater variability, particularly early in the sample period. However, no clear divergence is between the EU and the control group is observed prior to week 19. Overall, the figure provides support for the validity of the identification strategy for total traffic on desktop.

Figure A5: Pre-Treatment Trends for Total Mobile Traffic – Airline and Flight Comparison Websites



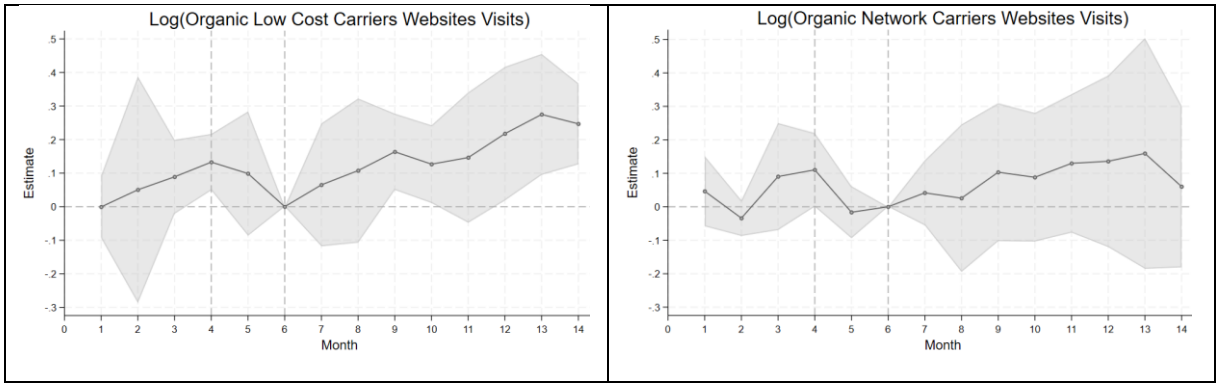
Note: This figure shows the pre-treatment trends in total mobile traffic for airlines (left panel) and comparison sites (right panel), comparing EU countries with the United Kingdom and the United States. The left panel shows relatively stable and modest deviations from zero prior to the reform, consistent with the parallel trends' assumption. In contrast, the right panel exhibits greater volatility in the estimates for comparison sites. Although the estimates converge toward zero over time, the initial fluctuations raise some concerns regarding pre-treatment dynamics. Accordingly, while the identification strategy appears plausible for airline websites, treatment effects for comparison websites should be interpreted with caution due to potential deviations from parallel pre-trends.

Figure A6: Pre-Treatment Trends for Desktop Organic Traffic – Low Cost Carriers and Network Carriers



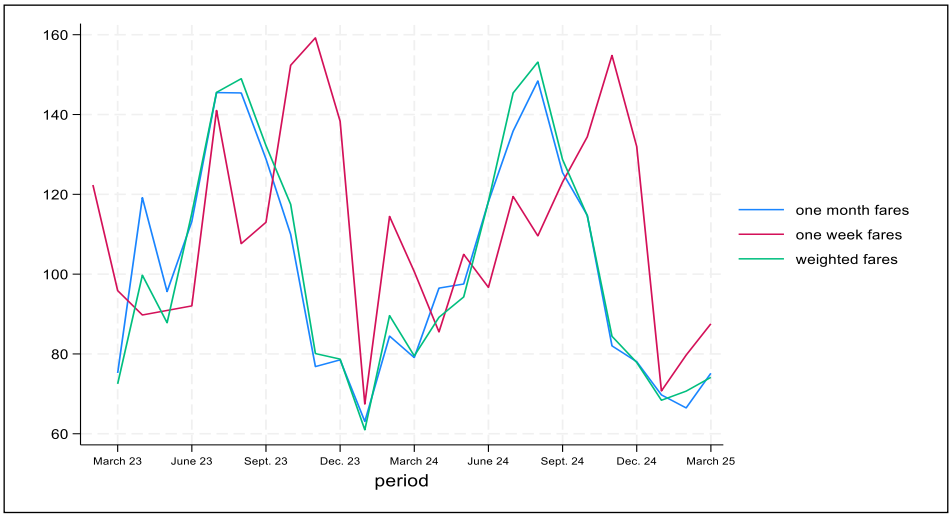
Note: This figure shows the pre-treatment trends in organic desktop traffic for low cost carriers (left panel) and network carriers (right panel), comparing EU countries with the United Kingdom and the United States. In both panels, differences between EU and control-group domains remain relatively stable around zero prior to the SERP redesign, supporting the validity of the parallel trends assumption.

Figure A7: Pre-Treatment Trends for Mobile Organic Traffic – Low Cost Carriers and Network Carriers



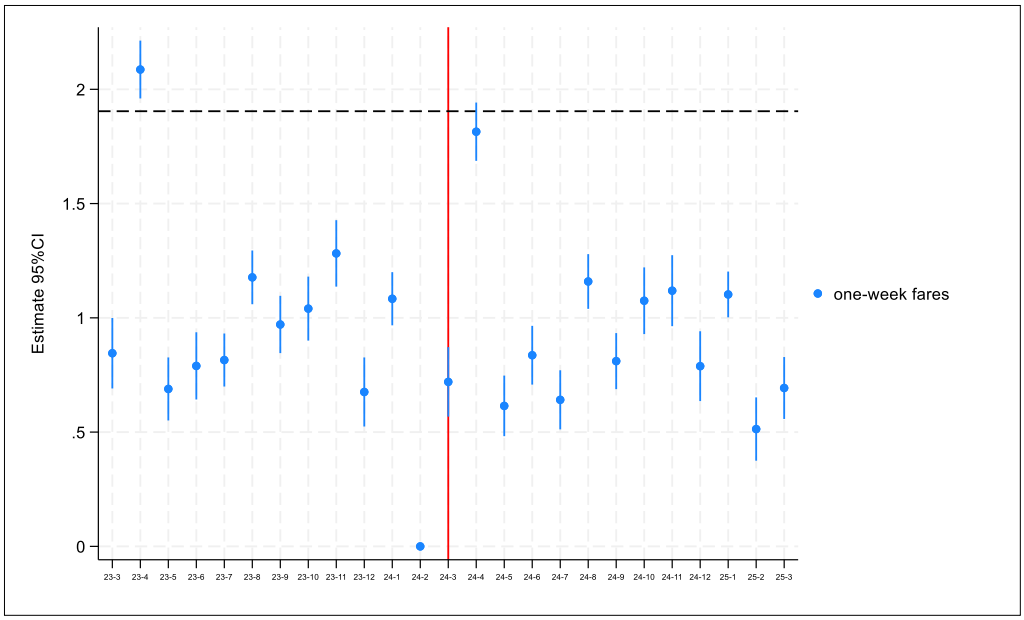
Note: This figure shows the pre-treatment trends in organic mobile traffic for network carriers (left panel) and low-cost carriers (right panel), comparing EU countries with the United Kingdom and the United States. In both panels, estimates fluctuate around zero in the months preceding the SERP redesign, although confidence intervals are wider. Despite some short-term fluctuations, no systematic divergence between EU and control-group domains is observed, supporting the parallel trends assumption.

Figure A8: Evolution of fares over time



Note: Fares are particularly high during the summer season, and a peak in one-week fares is also observed in December. Given this pronounced seasonality, we use data covering one year before and one year after the treatment period to avoid distortions in the identification of the treatment effect.

Figure A9: Month-on-month estimates



Note: The pattern observed in the descriptive statistics is broadly reflected in the estimated month-to-month differences between control and treatment routes. Flights originating in the EU tend to exhibit higher fares, particularly when compared with the baseline period of February 2024, although some outliers—such as April—may reflect holiday effects related to Easter. We do not observe systematic differences in pre-trends between treatment and control routes. However, the strong seasonality of airfares makes it difficult to visually assess whether the parallel trends assumption holds. Given this pronounced seasonality, the most appropriate comparisons are between the same months across different years (e.g., March 2023 versus March 2024). Differences between non-comparable months—such as November 2024 and March 2024—are more likely driven by seasonal patterns than by treatment effects.