What Do News Aggregators Do?

Evidence from Google News in Spain and Germany*

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September 30, 2016

Abstract

The impact of aggregators on news outlets is ambiguous. In particular, the existing theoretical literature highlights that although aggregators create a market expansion effect when they bring visitors to news outlets, they also generate a substitution effect if some visitors switch from the news outlets to the aggregators. Using the shutdown of the Spanish edition of Google News in December of 2014 and difference-in-differences methodology, this paper empirically examines the relevance of these two effects. We show the shutdown of Google News in Spain decreased the number of daily visits to Spanish news outlets by 11%, and that this effect was larger in sports outlets than in national and regional outlets. We then analyze the effect of the opt-in policy adopted by the German edition of Google News in October of 2014. Although such policy did not significantly affect the daily visits of all outlets that opted out, it reduced by 7% the number of visits of the outlets controlled by the publisher Axel Springer. Our results demonstrate the existence of a market-expansion effect through which news aggregators increase consumers' awareness of news outlets' contents, thereby increasing their number of visits. We find no evidence of a substitution effect in our two empirical settings.

*We thank Lesley Chiou and Gerard Llobet for their valuable comments and suggestions. The usual disclaimer applies.

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1 Introduction

Online platforms and aggregators have drastically changed how consumers and businesses gain access to information and interact with each other. While consumers now use aggregators and search engines to find all sorts of goods and services such as flights, accommodation, or insurance, firms have adapted their online distribution channels to the growing presence of aggregators to remain competitive. The academic community has also noticed the importance of this shift in consumption patterns and business practices; consequently, the shift has generated considerable interest among researchers in economics and management who aim to understand the role of aggregators in online markets.

A type of aggregator that has rapidly grown in importance is the one simplifying the search of news stories such as Google News, Yahoo! News, Bing News, or Summify. News aggregators offer links to news stories published by news outlets, which are usually complemented with excerpts and images. They allow consumers to save considerable time and effort in finding news. But in spite of the growing appeal of these websites to internet users, traditional news outlets around the world have been reticent to their introduction, because they are concerned about the potential effects on their audiences and on the consumers' browser activity. Even though news outlets can opt-out of aggregators by using software that blocks the links to their content, most publishers want to be indexed while receiving some economic compensation for the use of their news stories. This situation has generated multiple frictions between Google and publishers in Europe, and has led to changes in intellectual property laws in several countries.[1] This paper examines two recent events of disputes of Google News in Spain and Germany that prove useful to understand the role and impact of news aggregators on the news market in different ways. Whereas Google News completely shut down its Spanish edition, in the German case, a group of publishers decided to reduce their presence in the German edition of Google News.

The theoretical literature has identified an important trade-off in the effects that news aggregators might have on news outlets' audiences (Dellarocas et al., 2013; George and Hogendorn, 2012; Jeon and Nasr, 2015; and Calzada and Ordoñez, 2015). On the one hand, aggregators create a "market expansion effect" because they allow consumers to discover news stories and outlets that otherwise they would not know. Consumers also save time that they can dedicate to reading more news stories. Thus, the linked outlets may benefit from the market-expansion effect as long as enough consumers click through their links and access their web sites. However, the number of these indirect visits to a news outlet is not independent of the information displayed by the aggregators and of the interest that information might raise (Dellarocas et al., 2015). On the other hand, aggregators also create a "substitution effect" because consumers may (partly or completely) substitute their visits to traditional news outlets for visits to the news aggregator. Therefore, determining whether the indirect visits generated by the market-expansion effect compensate for the direct visits lost by the substitution effect is a relevant empirical question. Moreover, from a policy

[1] Google News was launched in 2002 and today is present in more than 70 countries in 35 different languages. Additionally, it also has many regional editions that are adapted to the specific needs of the audiences.

perspective, knowing which news outlets are more likely to benefit from news aggregators and how they modify consumers' engagement habits is also important.

This paper sheds light on these questions by first analyzing the impact of the shutdown of Google News in Spain in December of 2014. At the beginning of 2014, a reform of the Spanish intellectual property law established that firms posting links and excerpts of news stories have to pay a compulsory link fee (Google tax) to the original publishers. As a consequence, on December 16, 2014, Google News decided to shut down its Spanish edition, arguing that under the new regulation, this service would not be profitable. We then complement this analysis by considering the effects of a recent change in the German copyright law that induced Google News to change from an "opt-out" to an "opt-in" linking policy. Under the new opt-in rule, those German publishers that want to be indexed by Google News must give up receiving any compensation from the aggregator. According to the German regulation, Google can still link for free the contents of the outlets that do not opt in, but in those cases, it can only use short excerpts for those news stories. After this change in Google News' linking policy, on October 23, 2014, more than 200 publishers decided not to opt in to protect their contents, but soon reversed their decision and accepted Google's opt-in conditions, allegedly due to drastic traffic losses.

Our study draws from a rich data set obtained from SimilarWeb containing information for 109 newspapers in Spain, Germany, and France. This data set includes information about each domain's visits, the origin of the visits (direct, from a social platform, from a search engine, or referrals), and several engagement metrics (page views per visit, visit duration, and bounce rate). Taking into account the source of plausible exogenous variation provided by Google's shutdown in Spain and its opt-in policy in Germany, we apply a model of difference-in-differences to assess the role of this aggregator in the news market, using French newspapers as the control group. Our results show that after Google News' shutdown in Spain, Spanish news outlets experienced an 11% reduction in the number of visits, with a growing impact during the first six weeks. We repeat our analysis, focusing on news outlets with a high percentage of foreign visits, in an attempt to homogenize our sample of outlets in both the treated and control group, and obtain a reduction of 19% in the number of daily visits after the Google News' shutdown. Our findings confirm previous analysis in the empirical literature showing that news aggregators have a net positive impact in outlets' traffic (Chiou and Tucker, 2015). We are also able to show the net impact of the market-expansion effect depends on the outlets' specialization. Specifically, we find the shutdown affected sports outlets the most, had a lower effect on national and regional outlets, and did not significantly affect business outlets.

We also find the shutdown of Google News reduced the number of pages viewed by consumers by 8%, but we do not observe a long-term impact in other engagement metrics. When we decompose the effect by week, our results show that in the first few weeks, a reduction occurred in the number of pages visited and in the bounce rate, but these effects vanished in the long term. These findings suggest the shutdown did not produce a significant change in the composition of the consumers that visit the news outlets. Perhaps more surprisingly, we observe that search and direct traffic decreased by 12% and 14%, respectively, after the shutdown. Although these results directly suggest

the existence of a market-expansion effect, they are inconsistent with the premise of a substitution effect whereby search traffic (partly) replaces the outlets' direct traffic. A reconciling explanation for both findings may be that aggregators also increase direct visits to news outlets because they increase the consumers' awareness of their existence (Athey and Mobius, 2013).

The analysis of the German case shows Google News' opt-in policy generated a negligible effect on the visits to the news outlets that decided to stay out. Only when we restrict the analysis to the news outlets controlled by the publisher Axel Springer, do we find a 7% reduction in daily visits. We also find that during the two-week interval that Axel Springer opted out, search and direct visits of Axel Springer's outlets decreased by 10% and 7%, respectively. Axel Springer controls (and owns stock in) a number of important media firms and news outlets in Germany, and strongly advocated for a change in the German copyright law. When Google adopted the opt-in policy, Axel Springer and other publishers promoted the opt-out option, but only the outlets in the VG Media consortium followed. Consequently, the loss of visits to these outlets can be related to their shorter excerpts (market-contraction effect) and to their lower attractiveness relative to other outlets (competition effect) that opted in. Eventually, the latter effect and the salient loss of positions in the national ranking for some of its most emblematic newspapers motivated Axel Springer to finally accept Google's opt-in conditions.

A few papers have analyzed the effects of aggregators in the news market. Athey and Mobius (2012) examine the impact that introducing local news headlines and links in Google News has on consumers' browsing activity. In 2009, the French edition of Google News enabled a local news feature that allowed those users that entered their zip code to obtain news from local outlets. Using a data set of user browsing behavior, the authors compare users who adopted the localization feature with a sample of control users that exhibited similar consumption patterns in the past. They find the addition of local news content led consumers to rely more on Google when initiating a browsing session. Moreover, after the introduction of this feature, direct navigation to local outlets increased by 5% (bypassing Google News altogether), and clicks on local outlets from the Google News page increased by 13%. In a related paper, George and Hogendorn (2013) use a major redesign in the US edition of Google News on June 30, 2010. Similar to the previous case, the redesign placed a permanent strip of geo-targeted local news headlines onto the Google News front page. Using a sample of news visits by US households before and after the introduction of the geo-targeted links, the authors find local news visits increased by less than 1% and the likelihood of a local news visit increased between 4% and 6% from a low baseline for heavy Google News users. Interestingly, the results show no evidence of substitution away from direct outlet visits. Adding geo-targeted links increased the number of different local outlets visited per day, but not the number of unique sites visited per month.

To the best of our knowledge, the closest paper to ours is Chiou and Tucker (2015), who analyze the impact of a contract dispute between Google News and The Associated Press (AP). As a consequence of the dispute, Google News removed all AP news articles on December 24, 2009 (weeks before the contract expiration date), and indexed them back again around August 30, 2010 (after reaching a new agreement). Using weekly data on the top 150 sites users navigated

immediately after visiting Google News or Yahoo! News, their paper compares users' website visits before and after the removal of the AP from Google News with the visits of users of Yahoo! News (which continued to provide AP content). The authors find Google News users were less likely to visit other news websites after visiting Google News following the removal of AP content, relative to Yahoo! News users, who did not experience such a content change. Interestingly enough, they also report that the overall traffic to Google News and Yahoo! News remained relatively comparable during this event, suggesting that competing news aggregators do not act as substitute platforms for one another.

Our paper adds to this literature by providing evidence of the change in daily visits per news outlet before and after the Spanish edition of Google News stopped operations. This natural experiment allows us to compare the treatment group (Spanish outlets) with a control group (French outlets) for which no changes to the same news aggregator occurred. We complement the analysis of this event with the examination of the opt-in policy of Google in Germany. This case allows us to measure whether the impact of news aggregators on news outlets depends on how the news aggregator exhibits information. Our data set contains information about all the daily visits that outlets receive from different sources (direct, search, referrals, and social), which allows us to identify the direct relevance of a market-expansion and a substitution effect. Moreover, we use consumers' engagement metrics to examine the navigation habits of outlets' direct and search visitors.[2] The singularity of the two events described and the granularity of the data collected allows us to test these predictions from the theoretical literature.

Finally, the paper can also be related to other recent research that has examined the effects of news aggregators and indexing beyond the Google News case. Roos et al. (2015) investigate the influence of excerpts on consumers' decisions to consume news. They show that observing just one excerpt reduces consumers' uncertainty about their match with the excerpted site's content by about 33%. They conclude that excerpting benefits the linked site by increasing the share of traffic originating at the linking site, and benefits the linking site by making it more popular at the start of consumers' browsing sessions. The paper also finds that excerpting increases news consumption, leading consumers to browse more frequently and visit a wider range of sites. Finally, Cage et al. (2015) examine 84 general information media outlets in France (including newspapers, television channels, radio stations, and news agencies), and track every article these sites offered online in 2013, with the help of a plagiarism-detection algorithm that quantifies the copy rate between an article and all the articles previously published about the event. They find that half of online information production is copy-and-paste. They also explain that those outlets that produce more content receive more visits, but the rapid spillover of information occurring in the last few years has reduced the incentives of newspapers to produce original news stories.

The rest of the paper is structured as follows. Section 2 explains the main institutional details of the Spanish and German cases. Section 3 describes our data set. Section 4 analyzes the shutdown

[2] Aggregators may reduce the number of loyal users and increase the number of casual consumers. This substitution between user types can reduce advertising revenues at some news outlets (Athey, Calvano, and Gans, 2011).

of Google News in Spain. Section 5 assesses the impact of the opt-in policy adopted by Google News in Germany. Finally, section 6 concludes.

2 Institutional Details: Google's Disputes with European Publishers

Since the release of Google News in 2002, news publishers around the world have fought against the free indexation of their content while advocating for receiving some economic compensation from Google. Even though this situation has generated several legal disputes, some European governments have recently considered creating a link fee (Google tax) that would force news aggregators to compensate the linked outlets. This section first depicts the earlier history of the relationship between Google and the European news publishers and later describes the creation of a link fee in Spain and Germany, which motivate our empirical analysis.

Belgium was among the first countries to regulate the activities of news aggregators. In 2006, Copiepresse (representing French- and German-language Belgian publishers) sued Google News over alleged copyright infringement. Consequently, in 2006 and 2007, two sentences forbid Google News to link the contents of Belgian publishers without their consent.[3] In 2011, the Belgian Appeals Court ratified these decisions and established that the mere linking of newspaper websites should be considered infringement. Soon after this resolution, the Belgian publishers asked to be linked back to Google News, and on December 12, 2012, Google agreed to index Copiepresse newspapers under the condition of no future legal action for copyright infringement. The agreement also established that the two parts would partner on several business initiatives to promote both the publishers' and Google's services.[4] Thierry Geerts, Google Belgium's managing director, clearly announced how Google aimed to address similar disputes in other countries[5]: "Instead of continuing to argue over legal interpretations, we have agreed on the need to set aside past grievances in favor of collaboration. This is the same message we would like to send to other publishers around the world - it is much more beneficial for us to work together than to fight."

Similar to the Belgian case, several publishers in France lobbied the French government in 2012 to create a link fee. Google reacted to this initiative by threatening to close its French edition if this measure were approved. By February 1, 2013, French President François Holland and Google Executive Chairman Eric Schmidt reached an agreement such that French publishers agreed to forego the establishment of a link fee and Google agreed to create a €60 million Digital Publishing Innovation Fund that would support transformative digital publishing initiatives for French readers. Google also offered to help French publishers increase their online revenues using its advertising

[3] Today, Google offers news outlets the option to opt out of Google News if they feel harmed by the links. See, for example, the agreement between Google and the Italian anti-trust authorities in 2011. http://www.nytimes.com/2011/01/18/technology/18iht-google18.html?_r=2

[4] http://www.theverge.com/2012/12/13/3764692/google-copyright-lawsuit-settlement-belgium

[5] http://googlepolicyeurope.blogspot.de/2012/12/partnering-with-belgian-news-publishers.html

technology, which allow for better targeting of consumers.[6]

More generally, an overall revision of Google News' disputes in Europe shows the firm's strategy has been to lobby against the establishment of a link fee while investing numerous resources to gain the publishers' support. A clear example of such strategy is the launch by Google on April 2015 of the Digital News Initiative (DNI), partnering with Les Echos (France), FAZ and Die Zeit (Germany), the Financial Times and the Guardian (UK), NRC Group (Netherlands), La Stampa (Italy), and El Pais and Grupo Godo (Spain). DNI will dedicate €150 million to projects that support innovation in digital news journalism over the next three years, and will invest in training and development resources for journalists and newsrooms across Europe.[7]

2.1 The Shutdown of Google News in Spain

The main dispute between Google News and the European publishers took place in Spain. On January 1, 2015, the Spanish Parliament passed a reform of the Law of Intellectual Property (LPI).[8] The new law established that online outlets posting links and excerpts of news articles originated elsewhere must pay a link fee (*canon*) to the original publishers. The creation of the link fee was initially promoted by the publishers association AEDE (Asociación de Editores de Diarios Españoles), which lobbied the government to force news aggregators to compensate them for the use of their content.[9]

A unique feature of the Spanish regulation is that publishers cannot refuse to receive a fee from news aggregators. The link fee is compulsory to prevent publishers from giving away their right to receive compensation, and to enforce coordination among publishers. Note that if the fees were voluntary, some publishers could negotiate exclusivity agreements with Google and put their rivals at a competitive disadvantage.

Although the implementation of the law involved a lot of uncertainty, on December 11, 2014, Richard Gingras, world responsible of Google News, unexpectedly announced that on December 16, Google News would shut down its Spanish edition.[10] Google justified this action by claiming that the new regulation made the service unprofitable because Google News had no direct source of revenues (the firm does not show any advertising on this site).[11] Google's decision was shortly followed by other, yet smaller, Spanish news aggregators such as Planeta Ludico, NiagaRank, Multifriki, InfoAliment, and Beeeinfo. Others tried to modify their content to avoid the effects of the law (Planet Ubuntu, Astrofisica, and Fisica).

The shutdown of Google News had an important and immediate impact on the Spanish news

[6] https://googleblog.blogspot.fr/2013/02/google-creates-60m-digital-publishing.html

[7] See http://googleespana.blogspot.com.es/2015/04/google-y-editores-de-medios-de-europa.html

[8] https://www.boe.es/boe/dias/2014/11/05/pdfs/BOE-A-2014-11404.pdf

[9] The passing of this regulation was not free of controversy. Whereas some of the biggest Spanish publishers argued in favor of it, others, such as AEEPP (Asociación Española de Editoriales de Publicaciones Periódicas) and Coalición Pro-Internet, opposed it. The Spanish regulator CNMC (Comision Nacional de los Mercados y la Competencia) also advocated for the modification of several aspects of the new regulation. See CNMC (2014) and Llobet (2015).

[10] http://googleespana.blogspot.com.es/2014/12/novedades-acerca-de-google-noticias-en.html

[11] https://support.google.com/news/answer/6140047?hl=es

market. Some reports have estimated a reduction in the daily visits of the largest newspapers of more than 8%, and even bigger for smaller newspapers (NERA, 2015). As a result, the publishers in AEDE and other associations have urged the government to negotiate a solution with Google.[12] Some large publishers in AEDE have even announced they would renounce any compensation payment for sharing content with news aggregators. In spite of this backlash, the solution to this case may be delayed until the European Commission approves its new copyright legislation, which could modify the regulatory framework to protect publishers in the European Union.[13]

2.2 The Opt-in policy of Google News in Germany

The second case that we examine in this paper is a dispute between Google News and the German news publishers. On March 1, 2013, the German Parliament passed an addendum to the copyright law that granted publishers the right to charge search engines and other online aggregators for reproducing their content, but the law also allowed the free use of text in links and brief excerpts. This addendum meant publishers can prohibit aggregators from using their news articles beyond headlines and short excerpts, and they can charge aggregators a link fee if the aggregators make a larger use of their contents. The main differences in this regulation with regards to the Spanish case are that (1) link fees have to be negotiated between the parties and (2) it does not affect brief excerpts.

In June 2014, VG Media,[14] a consortium of more than 200 publishers, including Axel Springer, sued Google and other news aggregators for displaying excerpts and preview images along with the links to their news articles. VG Media alleged that aggregators were using their content without their consent, and that according to the new law, they should receive compensation.[15] Google refused to pay the publishers, and instead modified its linking policy. On October 2, 2014, the German edition of Google News announced the change from an opt-out to an opt-in system. This change implied that those German publishers that want to be indexed by Google News must explicitly grant permission and renounce any type of compensation.[16]

After this change in Google's policy, publishers and TV and radio stations associated with VG Media decided not to opt in. A leading publisher in this group was Axel Springer, which asked VG Media not to issue free licenses for its websites (welt.de, computerbild.de, sportbild.de, and autobild.de). Other publishers that followed the same course of action were Burda (bunte.de), Funke, Madsack, and M. DuMont Schaubergas. Phillip Justus, Managing Director of Google Ger-

[12] http://www.aede.es/wp-content/uploads/2015/02/AEDEPrensa-CierreGoogleNewsDic14.pdf

[13] https://ec.europa.eu/digital-single-market/en/news/public-consultation-role-publishers-copyright-value-chain-and-panorama-exception

[14] In December 2015, VG Media had 332 members. https://www.vg-media.de/de/alle-wahrnehmungsberechtigte.html

[15] VG Media accused Google of "extortion" and "discrimination" against its members, saying the law passed the previous year guaranteed news providers a "reasonable compensation for the use of their content." http://phys.org/news/2014-10-google-news-snippets-germany-legal.html

[16] Google continues to use an opt-out policy outside Germany. Publishers must take several actions to prevent indexing of their contents. For example, they must use a robot.txt file or metadata to let Google's crawlers know what to ignore.

many, answered that Google "will not show in the future snippets and thumbnails of the publishers members of VG Media."[17]

On October 23, 2014, Google News and other German news aggregators stopped showing large excerpts, video, and images from the publishers that did not opt in, in order to avoid paying them a link fee. This change allegedly significantly reduced the number of daily visits VG Media news sites received from Google and overall. Mathias Döpfner, Axel Springer Chief Executive, estimated that the downgrading of search notices resulted in a loss of nearly 40% in traffic volume, and that the traffic from Google News was down by almost 80%. Moreover, welt.de dropped below its competitors in the IVM and AGOF rankings, and computerbild.de lost its Top 10 rank of all AGOF offerings in Germany.[18] Shortly after, on November 5, 2014, Axel Springer and other VG Media publishers decided to opt in and gave Google a license to add excerpts to their search results for free.[19]

3 Data

In this study, we use data at the domain level from SimilarWeb, a web measurement company providing traffic data and user-engagement statistics. This firm collects data on browsing behavior from rich and diversified panels of consumers in several countries. The data we use in this study come exclusively from desktop users. The information covers the period from June 1, 2014, to May 31, 2015, which includes the two events analyzed in the paper. Google News' shutdown on December 16, 2014 affected Spanish news outlets. Therefore, our data cover roughly half a year before and after Google News' shutdown in Spain. Google's remove of excerpts and images from October 23, 2014, to November 5, 2014, affected the German news outlets belongs to the VG Media consortium.

Our data set contains information for 109 domains, including 46 news outlets from Spain, 33 from Germany, and 30 from France. Table 1 offers a complete listing of all 109 domains. It also includes information about the Spanish, German, and French editions of Google News (news.google.es, .de, and .fr) and about two additional Spanish news aggregators (meneame.net and kiosko.net). As we explain later, we use French domains as a control group in our regressions. All domains are classified according to different criteria. First, we categorize them according to their specialization. They can be *National, Regional, Business*, or *Sports*. Spain also has four regional newspapers written in the *Catalan* language. Second, we divide domains according to their national rank. Specifically, we distinguish between the *Top 50%* and the *Bottom 50%* of

[17] https://germany.googleblog.com/2014/10/news-zu-news-bei-google.html

[18] Axel Springer SE detailed that the financial damage resulting from lost marketing revenues could be in the seven-figure range per brand over the year as a whole. http://www.axelspringer.de/en/presse/Axel-Springer-concludes-its-data-documentation-Major-losses-resulting-from-downgraded-search-notices-on-Google_22070687.html

[19] Mathias Doepfner used this case to illustrate Google's ability to modify competition in the media market: "As sad as it is, at least now we know precisely how enormous the consequences of discrimination are, how Google's market power really plays out, and how Google punishes those who exercise the right to protect content." http://www.ibtimes.com/news-media-no-match-google-axel-springers-about-face-1720494

domains of our sample. Third, we classify domains according to the number of visits they receive from other countries. *Top International* outlets are those that receive more than 25% of the visits from abroad. *Top International 50%* and *Bottom International 50%* separate the outlets of the sample into two groups according to whether their share of international visits is above or below the median in our sample. Finally, in the case of Germany, we also consider whether the domains belong to the *VG Media* consortium and whether *Axel Springer* (completely or partly) owns them. Table 1 reports the list of domains analyzed and their classification.

The basic measure of our analysis is the domain's *Daily Visits*. This variable is defined as the daily entries to a web domain from a different web domain or from the beginning of an empty browsing session, and expires after 30 minutes of inactivity. We also consider several engagement metrics. *Visit Duration* is the "session" length, which is the time that elapses between the first and the last page visit, on the analyzed domain. Note that according to this definition, the visit duration is equal to zero when the visitor only visits one page within the domain. On the other hand, during the duration of the visit, all the activities such as clicking on articles and images are considered page views. *Pages per Visit* is the daily page views divided by the daily visits of the domain. Finally, *Bounce Rate* is an indicator that shows the percentage of daily single-page sessions out of all daily sessions for the domain. This variable measures how often a consumer reaches a web page and then leaves without navigating to any other page. In such instances, the visitor stays in the domain for a very short period of time.

SimilarWeb also provides information about traffic sources. Traffic coming to a domain is defined as *Direct* when the visitors type the website's URL into their browser. Traffic can also be the result of the consumers' search activity. We consider *Search* to be the traffic coming from search engines such as Google, Bing, and Yahoo (not an exhaustive list). SimilarWeb similarly classifies the traffic coming from news aggregators such as Google News. *Referrals* is traffic coming from links on other websites. Finally, *Social* is the traffic coming from social networks.[20] Note that although the domain's daily visits can be used to measure the overall impact of the shut down or change in the design of a news aggregator, the information about traffic sources is useful to study the relevance of the market-expansion and the substitution effects for the domain.

Table 2 shows the summary statistics for all the variables obtained from SimilarWeb, and Table 3 separates the data by country. See from Table 2 that the average site in our data receives 257,000 daily visits, and 43% come from direct searches, 29% from search engines, 14% from referrals of other pages, and 13% from social media pages. On average, a visit lasts 10 minutes and users see four pages during that time. When comparing the values of these variables across sites of different countries, we see French domains have characteristics similar to those domains in Spain and Germany. This observation validates the fact that we use French domains as a control group for Spanish and German sites in our empirical analysis. Note, however, that Spanish domains have on average fewer daily visits than French and German domains. The fact that our sample contains

[20] SimilarWeb also collects information about traffic originated in emails and display ads, which we do not consider in our work, because their shares of activity are far smaller than those included in the paper, and therefore less relevant.

more Spanish sites with lower rankings perfectly explains this finding. Therefore, controlling for domain type (national, regional, or specialized such as business and sports), and whether the domain is in the top or bottom 50% of the distribution of domains across countries, is important. Outlets in all three countries have similar percentages of foreign visits and, if anything, our variable definition means German outlets are less likely to appear among the top international outlets in our full sample.

4 Empirical Analysis of the Shutdown of Google News Spain

This section describes the empirical methodology we use to identify the "market contraction effect" and the "substitution effect" generated by the shutdown of Google News in the Spanish news market. We then show the results of implementing our empirical strategy, and relate them to the recent changes in the Spanish market.

4.1 Empirical Methodology

We use a difference-in-differences methodology to investigate both the impact of the shutdown of Google News in Spain and the opt-in policy of Google News in Germany. Our analysis of the Spanish case mainly uses three specifications. We introduce the first one to examine the total impact of the Google News shutdown in the newspapers' daily visits and consumers' engagement, therefore capturing the joint net effect of the market expansion and the substitution effects. Although we expect the shutdown of the news aggregator to reduce the outlet's search visits, it could also generate a change in the consumers' navigating behavior that increases the outlet's direct visits. We identify the overall net effect of the shutdown on the domains with the following model:

$$\ln y_{ijt} = \theta SPAIN_i * After12/16/14?_t + \gamma_i + \delta_t + \eta_{jt} + u_{ijt},$$

where y_{ijt} is the outcome and dependent variable (e.g., daily visits to site i in country j in day t), $SPAIN_i$ is a dummy variable that takes the value of 1 if site i belongs to Spain, and 0 otherwise. $After12/16/14?_t$ is another dummy variable that takes the value of 1 if day t is after December 16, 2014, and 0 otherwise, and γ_i, δ_t, and η_{jt} are site, date, and year-country-specific fixed effects. We assume the error term u_{ijt} to be iid and normally distributed as usual. The main objective of our analysis is to identify the impact of the shutdown in the daily visits, but we also analyze other engagement visitor metrics such as average pages viewed per visit per day and site, average duration of visits per day and site, and average bounce rate per day and site. We consider that news aggregators and news outlets' direct visitors have different navigation habits, and thus we expect that after the shutdown, the average news outlet's visitor will navigate through the domain for a longer period and will visit more pages.

Because we use site and date fixed effects in all specifications, the dummies $SPAIN_i$ and $After12/16/14?_t$ are not separately identified. Our parameter of interest is θ (the diff-in-diffs parameter), and it captures the effect of Google News' shutdown on Spanish news outlets. Therefore,

the treatment group is all Spanish outlets in our sample, and the treatment period is the days after December 16, 2014. The control group is all French news outlets during the same period. As a robustness check, in some specifications, we add the German outlets to the control group, but we limit the use of these outlets as a control group, because Google introduced its opt-in policy in Germany just two month before the shutdown of its Spanish edition.

The second specification divides the impact of the treatment by week from the first week to seventh week and beyond after the shutdown of the Spanish edition of Google News. It is as follows:

$$\ln y_{ijt} = \sum_{k=1}^{7} \theta_k SPAIN_i * kWeekthAfter12/16/14?_t + \gamma_i + \delta_t + \eta_{jt} + u_{ijt},$$

where θ_k is a parameter that captures both the market expansion and the substitution effects on Spanish newspapers k weeks after the shutdown of Google News. All other parameters and variables remain the same from the explanation above. If anything, in some specifications, we introduce a dummy for the fourth week after the shutdown in French newspapers (the control group). We do so to control for the unanticipated increase in the number of visits French news outlets received due to the Charlie Hebdo terrorist attacks in Paris. These events took place in the fourth week after the shutdown of the Spanish edition of Google News.

Finally, to complete our analysis, we introduce a third specification that aims to identify separately the aggregators' market-expansion and substitution effects. Specifically, we want to measure the effect of the shutdown on the news outlets' search and direct visits, although we also examine the effect on other traffic sources. This new specification differs from the first one in that our data are available at the month level and not the day level. Therefore, we consider the following:

$$\ln y_{ijm} = \theta SPAIN_i * After12/2014?_m + \gamma_i + \delta_m + \eta_{jm} + u_{ijm},$$

where the dependent variable y_{ijm} is now monthly percentages of visits coming from direct searches, search engines (google, yahoo, etc.), social network websites, or referrals from other sites. The percentages of visits coming from emails or display ads are minor, so we choose not to study them here. The dummy variable $After12/2014?_m$ takes the value of 1 if month m is from January 2015 and on, and 0 if in 2014.

4.2 Results

Before showing the results of our investigation for the Spanish case, we want to confirm that the shutdown of Google News in Spain did not affect the activity of Google News in France and in Germany. Figure 1 plots the log of daily visits for all three Google News webpages. Note that although the jump downward in visits to Google News in Spain is clear after December 16, 2014, the number of visits to Google News does not change in either France nor Germany.

Importantly, note that the shutdown of Google News in Spain is an isolated event and did not affect other news aggregators. Figure 2 compares the log of daily visits of Google News to

meneame.net and kiosko.net, which are two alternative news aggregators. Note that the number of visits to these two domains did not change around the time of the shutdown of Google News. Hence, the event we study here is not a confounder of major changes in Google News everywhere (Figure 1) or of changes to news aggregators in Spain in particular (Figure 2).

We now describe the overall effect of the Google News shutdown. Table 4 uses specifications (1) and (2) to analyze the effects of the shutdown on the number of daily visits. Columns 1 and 2 differ from columns 3 and 4 in that the former includes only French outlets as a control group, and the latter includes both French and German outlets. Regardless of the control group used, columns 1 and 3 show that in the long term, the shutdown of Google News in Spain decreases the number of visits to Spanish news outlets by 17%-20%. Additionally, columns 2 and 4 show this effect is not uniform over time and that the decrease in the first couple of weeks is half the size, around 10%, and reached steady state around six weeks after the shutdown occurs. Note that, as expected, the number of visits increased significantly in the fourth week after the Google News shutdown in France due to the Charlie Hebdo terrorist attacks. Columns 5 and 6 complete our analysis by including France-specific year fixed effects for French domains in order to control for differences in long-term trends across the two countries. The introduction of these fixed effects reduces the long-term impact of the Google News shutdown to 11% in column 5, but we still find the effect reached its steady state around six weeks after the shutdown, with an 18% reduction in the number of daily visits.

Table 5 investigates whether news outlets with different types of content are more or less sensitive to news aggregators. Therefore, we classify Spanish outlets into different types – national, regional, business, sports, in Catalan language, and ranked among top and bottom 50% – and run separate analyses for each of them. Column 1 in Table 5 shows that national and regional outlets are the most representative groups, with an 8% long-term decline in daily visits, whereas sports and Catalan outlets seem to have experienced the largest decline, with a 17% and 26% drop, respectively. We do not find a significant effect on business outlets. When we analyze the impact on top- and bottom-ranked outlets, we observe that the number of visits on the bottom-ranked outlets decreased by 13%, a much larger effect than the 8% reduction in top-ranked outlets. This result implies that smaller outlets (those that traditionally had fewer visitors) are also those that experienced a greater reduction in the number of visits after the shutdown of Google News. Columns 3 to 8 then investigate how the effect over time differs across outlet types relative to their French counterparts (no Catalan-language subcategory). As categories, national and top-ranked outlets present a stronger impact, with softer declines in the first two weeks and leveling off by their sixth week after the shutdown.

A potential caveat of our results is that the Spanish and French outlets may have different characteristics that affect their audiences in different ways. To make the two groups more comparable, Table 6 repeats the analysis in Table 4, splitting the data by the degree of internationalization of each outlet. Columns 1 and 4 focus on those outlets that receive more than 25% of their visits from other countries, confirming the main insights of Table 4. On the other hand, columns 2 and 5 consider the Top International 50% outlets in our sample, and columns 3 and 6 consider the

Bottom International 50% outlets. Overall, the results in this table illustrate that our findings are robust to homogenizing the treatment and control groups. If anything, the effect of the shutdown is larger when we compare a priori more similar outlets in columns 1 and 4 than when we compare less similar outlets (less international outlets) in columns 2, 3, 5, and 6.

Table 7 analyzes the impact of the shutdown of Google News on the consumers' engagement metrics. Interestingly, we find a long-term change in the number of pages consumers visited, but not in the duration of the visits or the bounce rate (see columns 1, 4, and 7). When we decompose the effect by week, we find the pages per visit and the bounce rate decreased initially, but this effect vanished after the third week. On the other hand, the duration of the visits increased in the fourth week because of the terrorist attacks in France. To interpret these results, bear in mind that the shutdown could have changed the composition of the consumers who visit news outlets. First, news outlets lost the search visitors who previously arrived to their web site via Google News. Second, after the shutdown, some consumers could substitute the news aggregator for some news outlets. In principle, these two effects should have left news outlets with users that spend more time reading the news articles and visiting more pages, but this table leads us to very different conclusions.

To further understand the results above, we need to study the evolution of the outlets' traffic sources. To do so, we directly investigate the relevance of the market-expansion and substitution effects after the shutdown. Because our data do not detail the traffic sources at the day level, we create a daily variable by multiplying daily visits by the monthly percentage of visits from each traffic source (direct, social, search, and referrals) and run specifications (1) and (2) in Table 8. Results in columns 1, 4, 7, and 10 show that direct visits decreased by 14% while search visits decreased by 12%, referrals by 10%, and social by 13%. Because SimilarWeb classifies Google News as a search engine, a reduction in search visits is precisely what we could expect after the shutdown. In the case of direct visits, by contrast, the large reduction of traffic is less intuitive. We consider two potential explanations for this result on direct visits. First, the visits to news aggregators may make consumers more aware of the existence of other news sites and generate an increase in direct visits. In other words, news aggregators may be considered complements to news outlets rather than substitutes. Note this explanation is consistent with findings in Athey and Mobius (2012). In their case, links to local news articles increased both search and direct visits to local outlets. Second, anecdotal evidence has documented the diffusion of news through social networks. In that case, visitors of news aggregators may spread news to their social contacts who then visit directly the news outlets. In the absence of news aggregators, this diffusion would not take place and would decrease the number of direct visits.

Finally, Table 9 uses as a dependent variable the percentages of visits per month from search engines (columns 1 to 3), direct (4 to 6), referral (7 to 9), and social (10 to 12). We do not find significative changes in the percentage of visits received from the four traffic sources, which is consistent with our results in Table 8, where we found similar percentage reductions in the number of daily visits across traffic sources. We obtain similar results when we compare the impact of the shutdown across news outlet types. Only business outlets saw their share of search visits statistically go down by 1%.

In summary, the results of the Spanish case reflect that the shutdown of Google News significantly reduced the number of daily visits to news outlets. Our findings suggest the reduction in the number of daily visits concentrated around both search and direct visits. Therefore, and according to our results, we conclude that news aggregators play a positive role in the news market by attracting additional visitors to news outlets. In contrast to the general view, we do not find evidence in support of a substitution effect that reduces the direct visits to news outlets. In fact, we find that aggregators increase the number of direct visits to news outlets, possibly by allowing consumers to discover new information sources. The shutdown of Google News in Spain did not seem to cause a long-run effect on the consumers' engagement metrics and on the percentages of traffic sources.

5 The Opt-in Policy in Germany

This section studies the impact of Google's opt-in policy in Germany. Two major differences exist between the German case and the previously analyzed Spanish case. First, after the introduction of the opt-in policy in Germany, Google News continued to index all news outlets, but the aggregator could only complement the links with long excerpts and images from outlets that had opted in. The different amount of information portrayed in the links of outlets that opted in and outlets that opted out implies that, in addition to the market-expansion and the substitution effects, a competition effect existed that could alter the daily visits the outlets received. Second, the treatment period we examine took place for a finite amount of time from October 23 to November 5, 2014.[21] After this period, Axel Springer and the other news outlets that initially stayed out decided to opt in.

5.1 Empirical Methodology

We analyze the impact of VG Media's decision to not opt in to Google's policy, by comparing German and French news outlets during the treatment period. Our first specification compares German news outlets (treated group) with French news outlets (control group) before, during, and after the *de facto* opt-out period from October 23 to November 5, 2014 (treatment period). It is as follows:

$$\ln y_{ijt} = \theta Germany_i * Opt\_Out_t + \gamma_i + \delta_t + \eta_t + u_{ijt},$$

where all dependent variables are defined as in the previous section. $Germany_i$ is a dummy that equals 1 if online newspaper i is German, and 0 otherwise. The dummy Opt_Out_t takes the value of 1 if day t is between October 24 and November 5, 2014, and 0 otherwise. On the other hand, γ_i, δ_t, and η_t are site, date, and group-specific month fixed effects. We also consider other specifications in which the treated group is the outlets that opted out. Specifically, we run separate regressions

[21] Notice that this event took place before the Google News shutdown in Spain and the Charlie Hebdo terrorist attacks in France. But for expositional reasons we present the Spanish case first.

for the members of the VG Media association and for the group of news outlets controlled by Axel Springer, which was one of the more active publishers in advocating for a change in German copyright law and was the first to announce its opt-out choice in October 2014. Finally, we also break the Opt_Out_t dummy into $1stWeekOptOut_t$ and $2ndWeekOptOut_t$ that take the value of 1 if day t falls in either the first or second week, respectively, of the full opt-out period.

5.2 Results

We begin the analysis of the German case by estimating the effects of the opt-out decision on the outlets' daily visits. Column 1 in Table 10 shows that after the opt-out decision, the number of visits to German outlets increased by around 4% relative to French outlets, but column 2 points out that this effect is not statistically significant when we break the dummy into the two weeks of the treatment. Columns 3 and 4 show, if anything, a reduction in the daily visits to the 16 outlets belonging to the VG Media association that opted out, although the estimates are not significant.

At this point, note that during the period we examine, European news outlets had a relevant increase in their visits as a consequence of the expansion of the ebola virus in several African countries and the arrival of infected people to developed countries. Both German and French outlets covered these events, but the increase in daily visits observed in Germany could be capturing a difference in the evolution of the news audiences in the two countries. To deal with this problem, the rest of our specifications use German outlets only and focus on the news outlets that decided not to opt in. Columns 5 and 6 still show the existence of a negative but non-significant effect of the opt-out decision on the visits to the VG Media outlets. Finally, columns 7 and 8 repeat the analysis, now focusing on the 10 outlets of our data set that Axel Springer controlled during this time.[22] We find a negative and significant reduction in daily visits of around 7% in Axel Springer outlets relative to all other German outlets in our data. This effect was stable across weeks during the treatment period. These results suggest the change in Google's linking policy created a market-contraction effect and possibly a competitive effect that diverted some of Axel Springer's visitors to other outlets that opted in.

Next, we perform a robustness check to determine whether the Axel Springer dummy variable may be capturing the impact of shocks on the demand for news that only affected specific outlet types during the treatment period. We do so in Table 11 by repeating the analysis for the Axel Springer outlets in columns 7 and 8 of Table 10 while including as independent variables the interaction between the *OptOut* dummy variable and the specialization categories of outlets. Columns 1 and 2 take into account the classification of the news outlets according to their content (national, regional, business, and sports), and columns 3 and 4 according to their ranking (top 50%). Results in columns 1 and 2 show the effect of the opt-out decision was only significant in the second week of the treatment. However, the estimates in columns 3 and 4 offer similar insights to those in Table 10.

[22] The six VGM's outlets not considered in this group are regional outlets with a low domestic ranking, business and sports outlets.

Table 12 examines the effects of Axel Springer's opt-out decision on the engagement metrics, but we do not observe statistically significant changes in the engagement metrics of consumers during the opt-out period in Axel Springer outlets. Finally, we use the monthly data in traffic sources to analyze the relevance of the market-expansion and substitution effects for Axel Springer outlets. Table 13 considers the percentages of visits from search engines (columns 1 and 2), direct traffic (3 and 4), referrals (5 and 6) and social platforms (columns 7 and 8). Whereas column 1 shows an overall 10% decrease in search traffic, the results in column 2 indicate this effect mainly took place in the first week of the treatment period. Note that our data and empirical methodology cannot disentangle whether this finding is due to a market-expansion effect (fewer visitors coming from Google News) or a competition effect (Axel Springer news stories were less attractive in Google News for consumers relative to other outlets because they exhibited shorter excerpts). More surprisingly, column 3 shows a 7.2% reduction in the number of direct visitors, and column 4 finds this effect took place in the second week of the treatment. Hence, similar to the Spanish case, our findings suggest news aggregators may increase the number of direct visitors.

6 Concluding Remarks

Amidst the growing importance of online platforms and aggregators, news aggregators are one of the most successful new players in the internet's new era, quickly rising to occupy top positions in audience rankings. Yet, since their introduction, they have faced the opposition of news publishers, who consider aggregators as free-riders that resell their content. This situation has motivated the amendment of copyright laws in several countries, which have limited the use aggregators can make of the publishers' content. Google News' strategy in this new environment has been to avoid paying any link fee for the indexation of news stories. In Spain, after the government created a compulsory link fee, Google shut down its Spanish edition, sending a clear message to the publishers of other countries. In Germany, where the linking fee could be negotiated, Google has adopted an opt-in policy that, in practice, forces news outlets to waive any linking fee. Google is complementing this strategy with other actions, such as the creation of the Digital News Initiative, which gives support to European publishers for developing products that increase their revenue and traffic, stimulate innovation in digital news journalism, and promote training and academic research into journalism. These solutions do not seem to compensate traditional publishers, who in the last decade have seen how the significant increase in their online visits and advertising revenues have not compensated for the reduction in advertisement revenues of printed newspapers. Consequently, the debate about regulating this market continues, and in the last year, it has moved from the national arena to continent-level institutions.

The goal of this research has been to examine the role of online news aggregators and their effect on the number of visits to news outlets (and therefore in revenues). The economics literature has identified two potential types of effects news aggregators may have on news outlets. Whereas the market-expansion effect increases the search visits they receive by bringing new visitors that otherwise would not be aware of their presence, the substitution effect reduces their direct visits

because they compete with news aggregators for the same audience. Our main contribution to the existing literature is to estimate the relative strength of these effects and shed light on how aggregators help news outlets expand their audience.

Our analysis of the shutdown of the Spanish edition of Google News shows a significant reduction in the audience of news outlets, driven by the reduction in both search and direct visitors. This result confirms that news aggregators are an important channel for attracting visitors to news outlets. Moreover, we do not observe the existence of a substitution effect that may have increased the number of direct visits to news outlets upon the shutdown of Google News Spain. On the contrary, our findings suggest aggregators may increase direct visits to news outlets by allowing consumers to "rediscover" new sources of information.

The examination of the German case is also useful because we show that changes in the size of the excerpts the aggregators release modify the traffic news outlets receive. The decision to opt out significantly reduced the number of daily visits to Axel Springer outlets, and similar to the Spanish case, the reduction in direct and search visits drove this effect. Note, however, that in the German case, the reduction in search visits was also motivated by a competition effect, because Google only exhibited short excerpts for Axel Springer's links, whereas it showed regular excerpts and images for the outlets that had opted in since the beginning of the policy.

Although our research answers the question of whether news aggregators are predominantly expanding the market audience of news outlets, we believe future research may expand our findings by further examining the impact of news aggregators on consumers' engagement metrics. A full understanding of the effect of news aggregators on news consumption is essential for copyright policy design that benefits consumers and societies overall.

References

[1] Athey, S., E. Calvano and J. Gans (2011). "The Impact of Internet on Advertising Markets for News Media," Discussion paper, Harvard University.

[2] Athey, S. and Mobius, M. (2012). "The impact of news aggregators on Internet news consumption: The case of localization," Working Paper, Microsoft Research.

[3] Cage, J., N. Herve, and M.-L. Viaud. (2015). "The Production of Information in an Online World," NET Institute Working Paper #15-05.

[4] Calzada, J. and Ordóñez, G. (2012). "Competition in the News Industry: Fighting Aggregators with Versions and Links," NET Institute Working Paper No. 12-22.

[5] Chiou, L. and Tucker, C. (2015). "Content Aggregation by Platforms: The Case of the News Media," NET Institute Working Paper No. 11-18.

[6] CNMC (2014). "Propuesta referente a la modificacion del articulo 32.2 del proyecto de ley que modifica el texto refundido de la Ley de Propiedad Intelectual," Comisión Nacional de los Mercados y la Competencia; PRO/CNMC/0002/14.

[7] Dellarocas, C., Katona, Z. y Rand, W. M. (2013). "Media, Aggregators, and the Link Economy: Strategic Hyperlink Formation in Content Networks," *Management Science*, 59(10): 2360-2379.

[8] Dellarocas, C. J. Sutanto, M. Calin, E. Palme. (2015). "Attention Allocation in Information-Rich Environment: the case of Aggregator," *Management Science*, forthcoming.

[9] George, L. and Hogendorn, C. (2012). "Aggregators, search and the economics of new media institutions," *Information Economics and Policy*, 24, issue 1: 40-51.

[10] George, L. and Hogendorn, C. (2013) "Local News Online: Aggregators, Geo-Targeting and the Market for Local News," Working paper.

[11] Isbell, K. (2010). "The Rise of the News Aggregator: Legal Implications and Best Practices," Berkman Center Research Publication No. 2010-10.

[12] Jeon, D.S. and N. Nasr (2016). "News Aggregators and Competition Among Newspapers in the Internet," *American Economic Journal: Microeconomics*, forthcoming.

[13] Llobet, G. (2015). "Los agregadores de noticias y la prensa escrita en la era de Internet," *Papeles de Economía Española*, N. 145, 172-179.

[14] NERA (2015). "Impacto del Nuevo Artículo 32.2 de la Ley de Propiedad Intelectual Informe para la Asociación Española de Editoriales de Publicaciones Periódicas (AEEPP)," http://www.aeepp.com/pdf/InformeNera.pdf

[15] Roos, J., C.F. Mela and R. Shachar. (2015). "The Effect of Links and Excerpts on Internet News Consumption," mimeo.

[16] Rutt, J. (2011): "Aggregators and the News Industry: Charging for Access to Content," Working Papers 11-19, NET Institute.

Figure 1. Log Daily Visits Google News

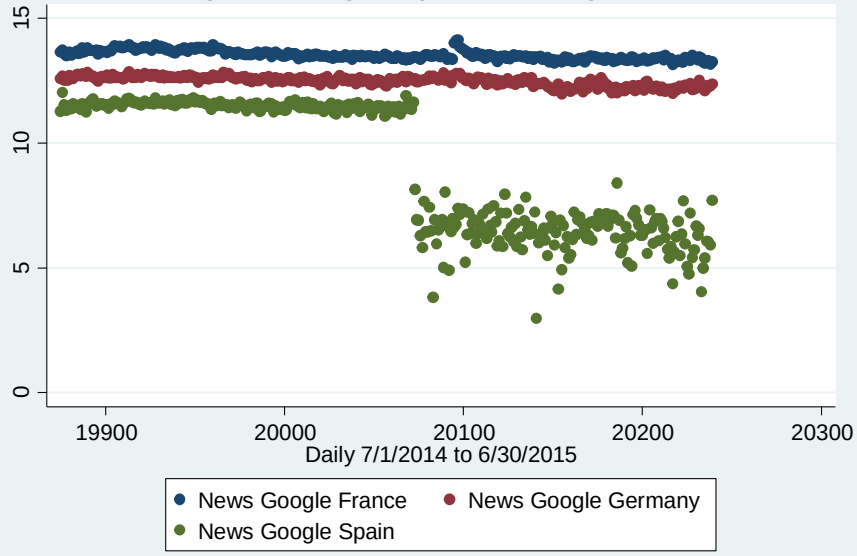

Figure 2. Log Daily Visits News Aggregators in Spain

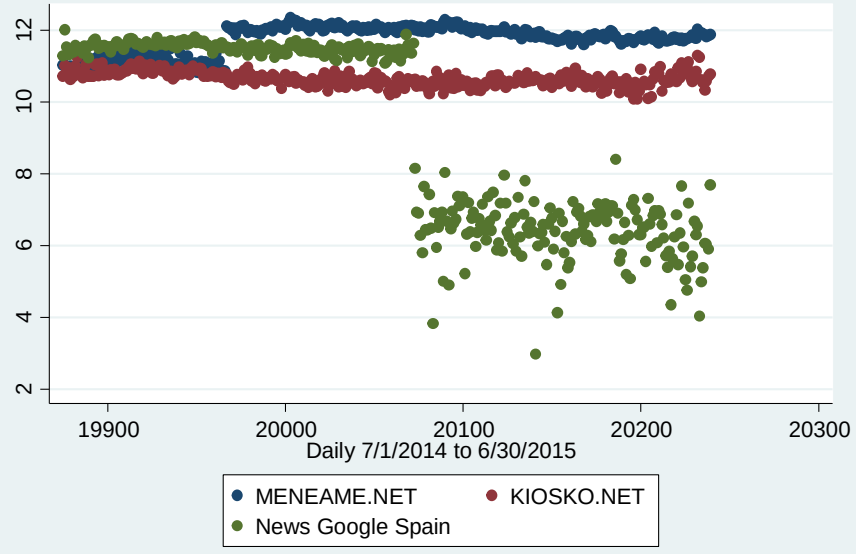

Table 1. List of Domains per Country

Spain		Germany		France	
Domain	**Classification**	**Domain**	**Classification**	**Domain**	**Classification**
20minutos.es	N, TOP, TI, TOPI	abendblatt.de	N,BOT, BOTI	20minutes.fr	N,TOP, TOPI
abc.es	N,TOP, TOPI	autobild.de	B,BOT, TI, TOPI **	boursorama.com	B,TOP, TOPI
ara.cat	N,C,BOT, BOTI	berliner-zeitung.de	R,BOT, BOTI **	capital.fr	B,BOT, TOPI
as.com	N,TOP, TI, TOPI	bild.de	N,TOP, BOTI **	challenges.fr	B,BOT, TOPI
bolsamania.com	B,BOT, BOTI	computerbild.de	B,TOP, BOTI **	eurosport.fr	S,TOP, TI, TOPI
cincodias.com	B,TOP, TOPI	derwesten.de	R,BOT, BOTI **	footmercato.net	S,BOT, TI, TOPI
diaridegirona.cat	R,C,BOT, BOTI	deutsche-wirtschafts-n.	B, BOT, TI, TOPI	huffingtonpost.fr	N,TOP,TI, TOPI
diariosur.es	R,BOT, BOTI	express.de	R,BOT, BOTI *	journaldesfemmes	N,TOP, TI, TOPI
diariovasco.com	R,BOT, BOTI	faz.net	N,TOP, TOPI	journaldunet.com	B,TOP, TOPI
e-noticies.cat	R,BOT, BOTI	finanzen.net	B,TOP, TI, TOPI **	ladepeche.fr	R,TOP, BOTI
elcomercio.es	R,BOT, BOTI	focus.de	N,TOP, BOTI **	laprovence.com	R,BOT, BOTI
elconfidencial.com	N,TOP, TOPI	fr-online.de	R,BOT, BOTI	latribune.fr	N,BOT, TOPI
elconfidencialdigital.com	N,BOT, BOTI	handelsblatt.com	B,BOT, TOPI *	lavoixdunord.fr	R,BOT, BOTI
elcorreo.com	R,BOT, BOTI	hna.de	R,BOT, BOTI *	ledauphine.com	R,BOT, BOTI
eldiario.es	N,TOP, BOTI	huffingtonpost.de	N,TOP, BOTI **	lefigaro.fr	R,TOP, TI, TOPI
eldiariomontanes.es	R,BOT, BOTI	kicker.de	S,TOP, BOTI	lemonde.fr	R,TOP, TI, TOPI
eleconomista.es	B,TOP, TOPI	ksta.de	R,BOT , BOTI*	leparisien.fr	R,TOP, BOTI
elmundo.es	N,TOP, TOPI	manager-magazin.de	B,BOT, TOPI *	lepoint.fr	R,TOP, TOPI
elpais.com	N,TOP, TI, TOPI	n24.de	N,TOP, BOTI **	leprogres.fr	R,BOT, BOTI
elperiodico.com	N,TOP, TOPI	news.de	N,BOT, BOTI	lequipe.fr	R,TOP, TOPI
europapress.es	N,TOP, TOPI	news.google.de	A,TOP	lesechos.fr	R,TOP, BOTI
expansion.com	B,TOP, TOPI	rp-online.de	R,BOT, BOTI *	letelegramme.fr	R,BOT, BOTI
heraldo.es	R,BOT,BOTI	spiegel.de	N,TOP, TOPI	liberation.fr	R,TOP, TOPI
huffingtonpost.es	N,TOP, TOPI	sport1.de	S,TOP, BOTI *	metronews.fr	R,TOP, TOPI
ideal.es	R,BOT, BOTI	sportbild.bild.de	S,TOP **	midilibre.fr	R,BOT, BOTI
invertia.com	B,BOT, BOTI	stern.de	N,TOP, BOTI **	news.google.fr	R,TOP
kiosko.net	A,BOT	sueddeutsche.de	R,TOP, BOTI	ouest-france.fr	R,TOP, BOTI
lainformacion.com	N,BOT, TI, TOPI	tagesschau.de	N,TOP, TOPI	rugbyrama.fr	R,BOT, BOTI
larazon.es	N,BOT, BOTI	tagesspiegel.de	N,BOT, BOTI	sudouest.fr	R,BOT, BOTI
lasprovincias.es	R,BOT, BOTI	taz.de	N,BOT, BOTI	tempsreel.nouvelobs	R,TOP, TI, TOPI
lavanguardia.com	N,TOP, TOPI	transfermarkt.de	S,TOP, BOTI **		
laverdad.es	R,BOT, BOTI	welt.de	N,TOP . TOPI**		
lavozdegalicia.es	R,TOP, BOTI	zeit.de	N,TOP, TOPI		
levante-emv.com	R,BOT, BOTI				
libertaddigital.com	N,TOP, BOTI				
lne.es	R,BOT, TOPI				
marca.com	S,TOP, TI, TOPI				
meneame.net	A,TOP, TOPI				
mundodeportivo.com	S,TOP, TI, TOPI				
naciodigital.cat	R,C,BOT, BOTI				
news.google.es	A,TOP				
periodistadigital.com	N,BOT, BOTI				
publico.es	N,BOT, BOTI				
sport.es	S,TOP, TI, TOPI				
vilaweb.cat	R,C,BOT, BOTI				
vozpopuli.com	N,BOT, BOTI				

Note: List of domains in our sample per country.
Outlets classification: N= National; R= Regional; B= Business; S= Sports; A=Aggregator; C=Catalan language outlets; TOP=Top-ranked outlets; BOT=Bottom-ranked outlets: TI=Top international; TOPI= Top 50% international outlets; BOTI= Bottom 50% international outlets. In the case of German outlets, * VG Media and ** Axel Springer.
Note Axel Springer outlets also belong to VG Media.

Table 2. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Daily Visits	40,150	257867.00	331105.50	19.54	3314330
Pages per Visit	40,150	3.61	2.30	1	130.97
Visit Duration	40,150	606.68	596.98	0	23641.75
Bounce Rate	40,150	0.53	0.11	0	1
Spain	40,150	0.43	0.49	0	1
Germany	40,150	0.30	0.46	0	1
France	40,150	0.27	0.45	0	1
After 12/16/2014?	40,150	0.45	0.50	0	1
National	40,150	0.36	0.48	0	1
Regional	40,150	0.34	0.47	0	1
Business	40,150	0.15	0.35	0	1
Sports	40,150	0.11	0.31	0	1
Catalan Language	40,150	0.05	0.23	0	1
News Aggregator	40,150	0.05	0.21	0	1
National Rank	39,055	273.38	377.13	11	3134
Top 50% Rank	39,055	0.50	0.50	0	1
International Visits	38,325	81.29	8.38	58.40	97.50
Top International	38,325	0.15	0.36	0	1
Top International 50%	38,325	0.46	0.50	0	1
% Search Visits	1,320	0.29	0.14	0	0.80
% Direct Visits	1,320	0.43	0.13	0.13	0.77
% Social Visits	1,320	0.13	0.10	0.0003	0.53
% Referrals Visits	1,320	0.14	0.09	0.04	0.72

Note that the variables % are monthly, whereas other variables are daily. Google News sites in France, Germany, and Spain are not ranked here because google.com is #1 everywhere.

Table 3. Summary Statistics per Country

	Spain (17155 obs)				France (10950)				Germany (12045)			
Variable	**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**
Daily Visits	204950.80	306133.10	19.54	2616957	312705	295028.50	18324.36	3314330	283379.90	381413.20	9413.13	2552446
Pages per Visit	3.60	2.11	1	50.42	3.82	1.59	1.43	18.46	3.45	2.98	1.17	130.97
Visit Duration	758.13	563.33	0	23641.75	733.79	646.94	75.18	4183.07	275.43	445.50	32.48	4376.13
Bounce Rate	0.51	0.11	0	1	0.54	0.10	0.19	0.80	0.54	0.10	0.25	0.82
After 12/16/2014?	0.45	0.50	0	1	0.45	0.50	0	1	0.45	0.50	0	1
National	0.36	0.48	0	1	0.33	0.47	0	1	0.39	0.49	0	1
Regional	0.38	0.49	0	1	0.33	0.47	0	1	0.27	0.45	0	1
Business	0.11	0.31	0	1	0.17	0.37	0	1	0.18	0.39	0	1
Sports	0.09	0.28	0	1	0.13	0.34	0	1	0.12	0.33	0	1
Catalan Language	0.13	0.33	0	1	0	0	0	0	0	0	0	0
News Aggregator	0.06	0.24	0	1	0.03	0.18	0	1	0.03	0.17	0	1
National Rank	321.33	510.77	11	3134	222.28	196.21	19	810	250.78	243.90	12	783
Top 50% Rank	0.43	0.50	0	1	0.59	0.49	0	1	0.50	0.50	0	1
International Visits	80.82	10.01	58.4	97.5	80.72	8.18	65	94.5	82.52	5.26	72.8	91.9
Top International	0.16	0.36	0	1	0.24	0.42	0	1	0.06	0.25	0	1
Top International 50%	0.47	0.50	0	1	0.58	0.49	0	1	0.35	0.48	0	1
% Search Visits	0.27	0.12	0	0.61	0.34	0.14	0.01	0.80	0.26	0.15	0.01	0.64
% Direct Visits	0.46	0.13	0.17	0.77	0.36	0.11	0.13	0.60	0.46	0.13	0.21	0.75
% Social Visits	0.13	0.10	0.00	0.53	0.16	0.09	0.004	0.47	0.12	0.09	0.002	0.51
% Referrals Visits	0.14	0.10	0.05	0.72	0.13	0.10	0.04	0.60	0.15	0.08	0.04	0.51

Note: The variables in % are monthly, whereas other variables are daily. Google News sites are not ranked here, because google.com is #1 everywhere.

Table 4. Diff-in-Diffs of Shutting Down Google News in Spain after December 16th 2014

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Variable	**ln(Daily Visits)**					
After 12/16/2014?*Spain	-0.204***		-0.169***		-0.116***	
	(-6.549)		(-5.494)		(-3.192)	
First Week After*Spain		-0.120***		-0.175***		-0.120***
		(-3.194)		(-5.530)		(-3.194)
Second Week After*Spain		-0.107***		-0.145***		-0.107***
		(-2.835)		(-4.495)		(-2.835)
Third Week After*Spain		-0.149***		-0.173***		-0.142**
		(-3.714)		(-4.661)		(-2.320)
Fourth Week After*Spain		0.00835		-0.262***		0.0159
		(0.137)		(-5.981)		(0.194)
Fifth Week After*Spain		-0.298***		-0.256***		-0.291***
		(-6.680)		(-6.631)		(-4.144)
Sixth Week After*Spain		-0.214***		-0.209***		-0.207***
		(-6.250)		(-5.967)		(-3.115)
Seventh Week + After*Spain		-0.191***		-0.151***		-0.183***
		(-5.811)		(-4.675)		(-2.809)
Fourth Week After*France		0.633***		0.350***		0.633***
		(6.787)		(4.288)		(6.787)
Constant	11.94***	11.94***	11.92***	11.92***	11.98***	11.94***
	(382.7)	(382.6)	(453.8)	(453.8)	(347.3)	(296.2)
Site FE	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES
France Year FE	NO	NO	NO	NO	YES	YES
Control Group	France	France	France & Germany	France & Germany	France	France
Observations	26,280	26,280	37,960	37,960	26,280	26,280
R-squared	0.96	0.96	0.96	0.96	0.96	0.96

Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Diff-in-Diffs by Online News Outlet Type and National Ranking Position

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep Variable	**ln(Daily Visits)**							
After 12/16?*Spain*National	-0.0850**							
	(-2.175)							
After 12/16?*Spain*Regional	-0.0878**							
	(-2.194)							
After 12/16?*Spain*Business	-0.012							
	(-0.228)							
After 12/16?*Spain*Sports	-0.170***							
	(-3.935)							
After 12/16?*Spain*Catalan	-0.259**							
	(-2.625)							
After 12/16?*Spain*Top 50%		-0.0871**						
		(-2.220)						
After 12/16?*Spain*Bottom 50%		-0.138***						
		(-3.170)						
First Week After*Spain			-0.158**	-0.082	-0.050	-0.180*	-0.145**	-0.0762*
			(-2.510)	(-1.528)	(-0.603)	(-2.030)	(-2.669)	(-1.725)
Second Week After*Spain			-0.114*	-0.110*	-0.080	-0.131	-0.0925*	-0.115**
			(-1.764)	(-1.732)	(-0.886)	(-1.117)	(-1.819)	(-2.198)
Third Week After*Spain			-0.262**	-0.028	-0.218*	-0.070	-0.202**	-0.087
			(-2.432)	(-0.307)	(-2.050)	(-0.478)	(-2.298)	(-1.082)
Fourth Week After*Spain			-0.120	-0.090	0.765**	-0.109	-0.041	0.089
			(-0.996)	(-0.775)	-2.554	(-0.765)	(-0.389)	-0.715
Fifth Week After*Spain			-0.556***	-0.151*	-0.251	-0.021	-0.432***	-0.116
			(-6.197)	(-1.849)	(-1.582)	(-0.160)	(-4.585)	(-1.261)
Sixth Week After*Spain			-0.382***	-0.087	-0.169	-0.111	-0.327***	-0.072
			(-3.735)	(-0.951)	(-1.011)	(-1.230)	(-3.818)	(-0.733)
Seventh Week + After*Spain			-0.304**	-0.098	-0.106	-0.185	-0.259***	-0.101
			(-2.637)	(-1.036)	(-0.650)	(-1.783)	(-2.816)	(-1.126)
Fourth Week After*France			0.873***	0.584***	1.022***	-0.175	0.697***	0.529***
			(6.263)	(5.861)	(4.344)	(-1.572)	(5.201)	(4.984)
Constant	11.98***	11.98***	12.34***	11.41***	11.28***	13.21***	12.67***	11.20***
	(357.2)	(347.8)	(274.7)	(227.1)	(86.9)	(151.7)	(262.9)	(179.8)
Site FE	YES	YES	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES	YES	YES
France Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Control Group	France	France	France	France	France	France	France	France
Sample	All	All	National	Regional	Business	Sports	TOP 50%	BOTTOM 50%
Observations	26,280	26,280	9,855	9,855	3,650	2,920	13,140	13,140
R-squared	0.96	0.96	0.97	0.95	0.92	0.97	0.93	0.89

Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Diff-in-Diffs by Internationalization Level

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Variable	**ln(Daily Visits)**					
After 12/16?*Spain	-0.196*	-0.0943*	-0.125**			
	(-1.866)	(-1.853)	(-2.650)			
First Week After*Spain				-0.221*	-0.103*	-0.120**
				(-2.151)	(-1.925)	(-2.419)
Second Week After*Spain				-0.159	-0.0744	-0.134**
				(-1.540)	(-1.472)	(-2.569)
Third Week After*Spain				-0.282	-0.176*	-0.0882
				(-1.633)	(-2.014)	(-1.135)
Fourth Week After*Spain				-0.0792	0.0371	0.0184
				(-0.464)	-0.376	-0.138
Fifth Week After*Spain				-0.428**	-0.371***	-0.170**
				(-2.178)	(-3.553)	(-2.358)
Sixth Week After*Spain				-0.359*	-0.290***	-0.0875
				(-2.068)	(-3.082)	(-1.100)
Seventh Week + After*Spain				-0.354*	-0.240**	-0.108
				(-2.001)	(-2.570)	(-1.300)
Fourth Week After*France				0.570**	0.636***	0.637***
				-2.404	-4.843	-5.076
Constant	13.08***	12.46***	11.47***	13.00***	12.38***	11.47***
	(227.6)	(249.4)	(262.5)	(143.8)	(208.5)	(244.5)
Site FE	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES
France Year FE	YES	YES	YES	YES	YES	YES
Control Group	France	France	France	France	France	France
Sample	Top International	Top 50% International	Bottom 50% International	Top International	Top 50% International	Bottom 50% International
Observations	5,110	13,505	12,775	5,110	13,505	12,775
R-squared	0.95	0.95	0.93	0.95	0.95	0.93

Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Diff-in-Diffs using Engagement Metrics

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Variable	**ln(1+pages per visit)**		**ln(1+visit duration)**		**ln(1+bounce rate)**	
After 12/16/2014?*Spain	-0.0812**		-0.097		-0.004	
	(-2.193)		(-1.343)		(-0.739)	
First Week After*Spain		-0.0712*		-0.081		-0.00881*
		(-1.894)		(-1.209)		(-1.678)
Second Week After*Spain		-0.0831**		-0.108		0.001
		(-2.008)		(-1.356)		(0.194)
Third Week After*Spain		-0.138**		-0.134		0.002
		(-2.439)		(-1.308)		(0.268)
Fourth Week After*Spain		0.020		0.206*		-0.002
		(0.326)		(1.969)		(-0.160)
Fifth Week After*Spain		-0.023		0.050		-0.008
		(-0.385)		(0.501)		(-1.055)
Sixth Week After*Spain		-0.090		0.055		-0.005
		(-1.645)		(0.596)		(-0.611)
Seventh Week + After*Spain		-0.005		0.147		-0.004
		(-0.102)		(1.531)		(-0.434)
Fourth Week After*France		-0.0001		0.138**		0.013
		(-0.002)		(2.076)		(1.664)
Constant	1.378***	1.405***	5.938***	6.027***	0.427***	0.426***
	(56.1)	(52.4)	(135.0)	(126.6)	(115.8)	(97.1)
Site FE	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES
France Year FE	YES	YES	YES	YES	YES	YES
Control Group	France	France	France	France	France	France
Observations	26,280	26,280	26,280	26,280	26,280	26,280
R-squared	0.65	0.65	0.86	0.86	0.80	0.80

Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8. Diff-in-Diffs of Daily Visits per Source: Search, Direct, Referral or Social

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep Variable	**ln(search Daily Visits)**		**ln(Direct Daily Visits)**		**ln(Referral Daily Visits)**		**ln(Social Daily Visits)**	
After 12/16/2014?*Spain	-0.119**		-0.139***		-0.0976**		-0.134**	
	(-2.431)		(-4.000)		(-2.280)		(-2.259)	
First Week After*Spain		-0.123**		-0.143***		-0.102**		-0.139**
		(-2.516)		(-3.987)		(-2.350)		(-2.228)
Second Week After*Spain		-0.111**		-0.130***		-0.0894*		-0.126**
		(-2.196)		(-3.485)		(-1.971)		(-2.160)
Third Week After*Spain		-0.146**		-0.165***		-0.124*		-0.161**
		(-1.997)		(-2.908)		(-1.985)		(-2.068)
Fourth Week After*Spain		-0.052		-0.053		0.074		0.219**
		(-0.560)		(-0.654)		(0.827)		(2.218)
Fifth Week After*Spain		-0.294***		-0.314***		-0.273***		-0.309***
		(-3.532)		(-4.724)		(-4.162)		(-3.699)
Sixth Week After*Spain		-0.210***		-0.230***		-0.189***		-0.226***
		(-2.660)		(-3.746)		(-2.975)		(-2.781)
Seventh Week + After*Spain		-0.237***		-0.232***		-0.152**		-0.071
		(-2.926)		(-3.967)		(-2.165)		(-0.782)
Fourth Week After*France		0.568***		0.587***		0.672***		0.854***
		(5.60)		(6.95)		(6.78)		(7.66)
Constant	10.90***	10.85***	10.95***	10.91***	9.714***	9.682***	9.580***	9.588***
	(265.9)	(232.8)	(312.4)	(269.7)	(262.8)	(213.9)	(196.8)	(175.5)
Site FE	YES	YES	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES	YES	YES
France Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Control Group	France	France	France	France	France	France	France	France
Observations	26,280	26,280	26,280	26,280	26,280	26,280	26,280	26,280
R-squared	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.95

Note: Daily visits are daily information, but the percentage of searches coming from social media, search engines, direct searches or monthly referrals is calculated. Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 9. Diff-in-Diffs using % of visits per Source and Month

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dep Variable	**ln(1 + % Search)**			**ln(1 + % Direct)**			**ln(1 + % Referral)**			**ln(1 + % Social)**		
After 12/16/2014?*Spain	0.001			-0.005			0.001			-0.005		
	(0.119)			(-0.914)			(0.211)			(-1.077)		
After 12/16?*Spain*National		0.001			0.001			0.001			-0.0136*	
		(0.150)			(0.197)			(0.233)			(-1.988)	
After 12/16?*Spain*Regional		-0.00003			-0.007			0.005			0.002	
		(-0.004)			(-1.113)			(1.081)			(0.272)	
After 12/16?*Spain*Business		-0.0127**			-0.008			0.0145**			-0.002	
		(-2.144)			(-1.257)			(2.209)			(-0.336)	
After 12/16?*Spain*Sports		0.004			-0.015			-0.0205*			0.004	
		(0.302)			(-1.190)			(-1.912)			(0.609)	
After 12/16?*Spain*Catalan		0.008			0.0002			-0.004			-0.010	
		(0.601)			(0.011)			(-0.814)			(-0.762)	
After 12/16?*Spain*Top 50%			0.003			-0.001			0.001			-0.0138**
			(0.395)			(-0.219)			(0.206)			(-2.004)
After 12/16?*Spain*Bottom 50%			-0.001			-0.008			0.001			0.001
			(-0.137)			(-1.191)			(0.155)			(0.217)
Constant	0.308***	0.308***	0.308***	0.319***	0.319***	0.319***	0.108***	0.108***	0.108***	0.117***	0.117***	0.117***
	(84.89)	(85.33)	(84.94)	(108.10)	(111.10)	(109.10)	(41.52)	(42.96)	(41.47)	(35.71)	(36.00)	(36.81)
Site FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year/Month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
France Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control Group	France	France	France	France	France	France	France	France	France	France	France	France
Observations	864	864	864	864	864	864	864	864	864	864	864	864
R-squared	0.96	0.96	0.96	0.97	0.97	0.97	0.91	0.91	0.91	0.95	0.95	0.95

Note: Observations are monthly. Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 10. Diff-in-Diffs of Opting-out Period in Germany, October and November 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep Variable	**ln(Daily Visits)**							
Opt Out*Germany	0.0430**		0.0583**	0.0629***				
	(2.392)		(2.250)	(2.801)				
1st Week Opt Out*Germany		0.0354						
		(1.488)						
2nd Week Opt Out*Germany		0.0368						
		(1.442)						
Opt Out*VGM			-0.0304		-0.0304			
			(-1.158)		(-1.141)			
1st Week Opt Out*VGM				-0.0389		-0.0338		
				(-0.930)		(-0.930)		
2nd Week Opt Out*VGM				-0.0439		-0.0439		
				(-1.103)		(-1.103)		
Opt Out*Axel Springer							-0.0715***	
							(-2.888)	
1st Week Opt Out*Axel Springer								-0.0755*
								(-2.003)
2nd Week Opt Out*Axel Springer								-0.0869**
								(2.214)
Constant	11.95***	11.95***	11.94***	11.94***	11.87***	11.87***	11.89***	11.89***
	(239.4)	(239.4)	(181.8)	(181.8)	(187.4)	(187.4)	(240.9)	(240.9)
Site FE	YES	YES	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	France	France	France & VGM	France & VGM	VGM	VGM	Axel Springer	Axel Springer
Sample	France & Germany	France & Germany	France & Germany	France & Germany	Germany	Germany	Germany	Germany
Observations	22,265	22,265	22,265	22,265	11,680	11,680	11,680	11,680
R-squared	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95

Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 11. Diff-in-Diffs Germany Opt-out Robustness Check

	(1)	(2)	(3)	(4)
Dep Variable	**ln(Daily Visits)**			
Opt Out*Axel Springer	-0.0592**		-0.0786***	
	(-2.151)		(-1.215)	
1st Week Opt Out*Axel Springer		-0.0641		-0.0824**
		(-1.430)		(-2.353)
2nd Week Opt Out*Axel Springer		-0.0750**		-0.0940**
		(-2.128)		(-2.406)
Opt Out*TOP 50%			0.0492	0.0496
			(1.478)	(1.487)
Opt Out*Regional	0.0388	0.0388		
	(1.459)	(1.459)		
Opt Out*Sports	0.0372	0.0384		
	(0.565)	(0.591)		
Opt Out*Business	-0.0719	-0.0707		
	(-1.477)	(-1.442)		
Constant	11.89***	11.89***	11.89***	11.89***
	(240.6)	(240.6)	(241.2)	(241.2)
Site FE	YES	YES	YES	YES
Day FE	YES	YES	YES	YES
Axel Springer Month FE	YES	YES	YES	YES
Observations	11,680	11,680	11,680	11,680
R-squared	0.95	0.95	0.95	0.95

Robust t-statistics are in parentheses and clustered at the site level.
*** p<0.01, ** p<0.05, * p<0.1

Table 12. Diff-in-Diffs using Engagement Metrics Germany Opt-out

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Variable	**ln(1+pages per visit)**		**ln(1+visit duration)**		**ln(1+bounce rate)**	
Opt Out*Axel Springer	0.015		-0.0366		0.000	
	(0.781)		(-1.001)		(-0.0553)	
1st Week Opt Out*Axel Springer		-0.015		-0.0659		0.005
		(-0.505)		(-1.524)		(0.964)
2nd Week Opt Out*Axel Springer		0.036		-0.0169		-0.004
		(1.682)		(-0.407)		(-0.935)
Constant	1.384***	1.384***	5.225***	5.225***	0.436***	0.436***
	(43.51)	(43.50)	-162.5	(162.50)	(74.10)	(74.10)
Site FE	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES
Axel Springer Month FE	YES	YES	YES	YES	YES	YES
Observations	11,680	11,680	11,680	11,680	11,680	11,680
R-squared	0.74	0.74	0.79	0.79	0.866	0.866

Robust t-statistics are in parentheses and clustered at the site level. *** p<0.01, ** p<0.05, * p<0.1.

Table 13. Diff-in-Diffs of Daily Visits per Source Germany Opt-out: Search, Direct, Referral or Social

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep Variable	**ln(1 + Visits Search)**		**ln(1 + Visits Direct)**		**ln(1 + Visits Referral)**		**ln(1 + Visits Social)**	
Opt Out*Axel Springer	-0.101*		-0.0723*		-0.056		-0.011	
	(-1.998)		(-1.933)		(-1.471)		(-0.278)	
1st Week Opt Out*Axel Springer		-0.120**		-0.069		-0.018		-0.001
		(-2.197)		(-1.458)		(-0.300)		(-0.0265)
2nd Week Opt Out*Axel Springer		-0.0959		-0.0969**		-0.127*		-0.044
		(-1.576)		(-2.124)		(-2.019)		(-0.810)
Constant	10.39***	10.39***	11.07***	11.07***	9.843***	9.843***	9.647***	9.647***
	(292.0)	(292.0)	(342.0)	(342.1)	9.843***	9.843***	(255.9)	(255.9)
Site FE	YES	YES	YES	YES	YES	YES	YES	YES
Day FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
Axel Springer Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	11,680	11,680	11,680	11,680	11,680	11,680	11,680	11,680
R-squared	0.95	0.95	0.96	0.96	0.95	0.95	0.94	0.94

Robust t-statistics are in parentheses and clustered at the site level. Dependent variables are results of multiplying daily visits*% source.
*** p<0.01, ** p<0.05, * p<0.1