Vertical Search Engines Foreclosure[‡]

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Abstract

I analyze the functioning of the Internet (general and vertical) search intermediation market and examine general search engines' incentives to bias search results in order to favor integrated websites. Two forms of manipulating practices are considered: organic search manipulation and sponsored search manipulation. Finally, by employing data on the exit traffic patterns out of Bing and Google, I document that there has been a decrease of the shares of exits that are directed towards web pages that are non-integrated with major general search engines.

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1. Introduction

Vertical search engines are websites that address users' queries related to a particular subject matter. For example, Expedia is a vertical that provides users with information on flights, Yahoo! Finance is specialized on financial information and services, Weather.com on weather news and forecasts.

In *Ciao v. Google* and *Foundem v. Google*, the European Commission is investigating on whether Google has acted to favor its own products and services by distorting search results. At the same time, the FTC has recently announced its intention to investigate on the impact of Google's dominance on the Web.[1] Allegedly, Google would manipulate its search algorithms to push integrated vertical websites to the top of Google search results, possibly at the expenses of superior competing products. In this way, Google would limit competing websites' chances to be clicked by Internet users and threaten Internet plurality and "neutrality".

In Figure 1, I report the organic search results returned by Google after a query with keyword "finance" conducted in June 2011. Google Finance links are at the first and at the second position, whereas Yahoo! Finance links rank third and fourth.[2] In a survey published in April 2010, comScore documents that Yahoo! Finance is the most popular finance vertical and Google Finance ranked sixtieth. The question arises whether the one in Figure 1 is an instance of vertical search engine's foreclosure: although users seem to prefer Yahoo! Finance, Google puts its own pages on top of its organic search results. Was it a case of foreclosure, the intent might be to increase the number of visits received by Google vertical website. Indeed, in a May 2010 report, Chitika Research shows that the first two spots in a standard search outcome on Google receive more than 50% of all clicks. More clicks imply more visits and more visits increase the value of a website to advertisers.

Lately, the issue of vertical search engines foreclosure has been widely debated both in the media[3] and by scholars in the fields of law and economics. Edelman and Lockwood (2011) reviews several examples of potentially deceptive practices carried out by general search engines (and in particular Google). Instead, Manne and Wright (2011) emphasizes the difficulties that a competition authority would incur in when investigating to establish whether a given search engine has engaged in competing verticals' foreclosure. Finally, Etro (2011) focuses on the role of dominance in the Internet search market and its impact on advertising.

In this article, I discuss the structure of the search intermediation market and review the contribution of the economics literature to the understanding of the functioning of Internet search engines. Although a number of features in the industry are well understood, like the role of network effects in the formation of users' scale and the mechanisms that govern advertising auctions, there are still open issues, like the relationship between online and offline advertising and the role of general search engines as information gatekeepers. Then, I analyze general search engines' incentives to bias search results in order to favor integrated websites both in (1) the organic and in (2) the sponsored search realm.

[1] "Feds to Launch Probe of Google", *The Wall Street Journal*, 24 June 2011.
[2] More examples of this sort can be found on Ben Edelman web page (http://www.benedelman.org/).
[3] For example, see "Google's Gatekeepers", *The New York Times*, 30 November 2005, and "Scrutinizing Google's Reign", *The New York Times*, 19 September 2011.

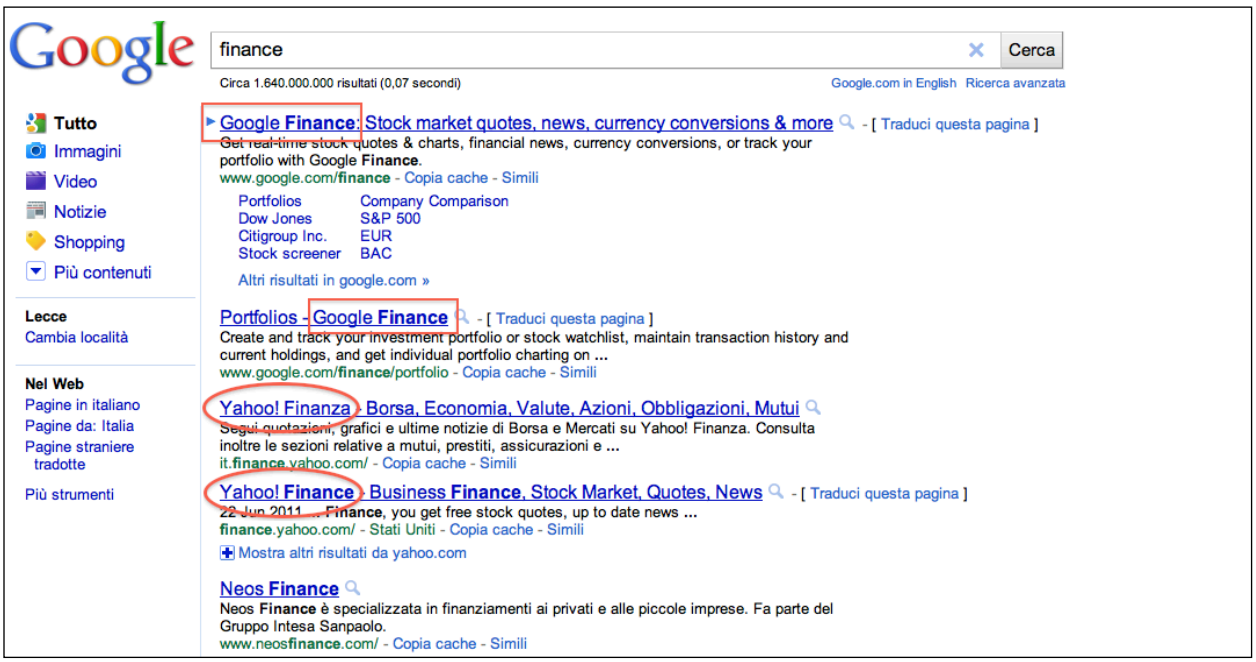


Figure 1

(1) Organic search results are displayed in the main body of the web page in response to users' queries. The manipulation of organic search outcomes can be undertaken by shifting a vertically integrated website's link on top of results' list and it can raise a trade-off for the engine. On the one hand, the manipulating entity can increase the number of visits received by integrated websites. On the other hand, if the experience offered by the integrated site in terms of fitness with the query (and relatively to its position in the list) is lower than expected, then users may realize that a manipulation has taken place and switch to competing platforms.

(2) Sponsored search results are listings of advertisers' links displayed on the top and to the right-hand side of results' page. The exact position of an ad is assigned via an auction in which each advertiser submits a bid relative to a specific keyword and the engine determines the ranking by discounting each bid by a measure of advertiser's relevance to users. Sponsored search manipulation would be undertaken by biasing competing websites' measure of relevance, in order to favor integrated entities. The trade-off associated to this kind of practice is in what follows: on the one hand, the manipulating entity expects to increase the number of visits received by integrated websites, on the other hand, users and advertisers participation in the search platform may be adversely affected. Manipulation can induce users to leave if the experience generated by the integrated page is lower than expected. In the case of advertisers, manipulation may impair their incentives to bid in the auction and therefore reduce auctioneer's revenue.

The major upside for a manipulating general engine is the likely increase in the number of visits received by integrated verticals. Therefore, for a *prima-facie* test on verticals' foreclosure it is interesting to assess the exit traffic patterns featured by major search engines. I report evidence on the entry and exit traffic patterns on Bing and Google. I document a decrease of the shares of exits from Bing and Google that are directed towards web pages that are non-integrated with major general search engines. This is consistent with the patterns that characterize specific vertical sectors, like the maps industry.

Throughout the article, I will refer to data collected for the scope of this analysis by comScore Media Metrix. The data is based on comScore's United States and European Union panels, which number

respectively 1 million and 445,000 individuals. The audiences measured are unique individuals aged more than 2 in the United States and more than 15 in Europe, accessing the Internet from a home or work location during the period analyzed.[4]

2. The Search Intermediation Market.

2.1 Market Structure and Business Model

In Europe, in 2009 the market shares of Google were above 90% in most countries, instead the market shares of Microsoft (Bing) and Yahoo! lied in the 5-10% range (data from the European Commission, Microsoft/Yahoo! decision[5]). In Table 1, it is reported the number of total searches and the share of total searches conducted on Google and Bing between April 2010 and July 2011 in Europe (source: comScore Media Metrix report). Google leads the market with a share that is significantly above 75%. Instead, Microsoft Bing lags behind, with a market share of about 1% throughout the sampled period.

In the United States, the picture is markedly different. Table 2 reports the number of total searches and the share of total searches conducted on Google and Bing between April 2010 and July 2011 in the United States (source: comScore Media Metrix). Like in Europe, Google is the leader in the search intermediation market. However, its market share is barely above 60%. Moreover, Microsoft Bing has a market share that has grown significantly from the 6% of April 2010 to about 9% in July 2011.

Advertising is the major source of revenues for search engines: in its 2010 report to SEC, Google has declared that search and display advertising accounted for 96% of its total revenues. In the United States, eMarketer documents that the 2011 market share of Google in the search advertising market is expected to be equal to 75.9%, with Microsoft and Yahoo! at 8% each. In the Microsoft/Yahoo! decision, the European Commission reports that the European search advertising market exhibits a similar structure. Moreover, according to the European Commission the search advertising market grows at a rate equal to about 25% per year.

In principle, consumers can easily switch between search engines and several pieces of evidence confirm that this is indeed the case. Accuracast.com reports that, over 2006-2007,[6] more than 60% of search engines' visitors used at least two different platforms. Moreover, the evidence (mostly anecdotal) reported by Evans (2008) documents that over the course of a month, more than a third of users visit multiple search platforms. However, Evans (2008) argues that whether a user does multi-homing seems to depend on the platform it primarily uses: while only 40% of Google users employs one of the other platforms, 70% (respectively, 80%) of Yahoo! (respectively, MSN) users visited one of the other two search-platforms in a month.

On the advertisers' side of the market, Evans (2008) argues that major advertisers (like Amazon and WalMart) participate in all platforms. The reason would be simple: the value of a click on a given search engine is independent from the value of a click on competing search platforms. In economic terms, the opportunity cost for an advertising firm of not placing an ad on a search engine amounts to the cost of establishing that search engine and running an ad campaign on it. Of course, things differ when small and medium advertisers are considered, as these tend to do single-homing and typically choose Google to place their ads. In the Microsoft/Yahoo! decision, the evidence provided by the

[4] Traffic from public computers such as Internet cafes and access from mobile phones, tablets and PDAs is not included in this report.
[5] European Commission, case M. 5727, February 2010.
[6] AccuraCast, *Search Engine Statistics for 2006-2007*, February 2007.

European Commission supports the analysis in Evans (2008) and represents a market structure in which advertisers do multi-homing, even though Google is a must-have.

Media/Measures	Apr-2010	Aug-2010	Dec-2010	Apr-2011	Jul-2011
Total Internet					
Searches (MM)	48.296	45.240	45.469	48.301	49.541
Share of Searches	100,0	100,0	100,0	100,0	100,0
Google Sites					
Searches (MM)	38.190	35.011	35.320	38.773	40.631
Share of Searches	79,1	77,4	77,7	80,3	82,0
Bing					
Searches (MM)	546	544	619	810	521
Share of Searches	1,1	1,2	1,4	1,7	1,1

Source: comScore Media Metrix. Searches type: All searches. Area: Europe. Measures: Searches (MM), share of searches.

Table 1

Media/Measures	Apr-2010	Aug-2010	Dec-2010	Apr-2011	Jul-2011
Total Internet					
Searches (MM)	23.658	25.822	26.600	25.615	27.419
Share of Searches	100,0	100,0	100,0	100,0	100,0
Google Sites					
Searches (MM)	13.996	14.742	16.375	15.684	17.043
Share of Searches	59,2	57,1	61,6	61,2	62,2
Bing					
Searches (MM)	1.575	1.718	1.882	2.293	2.436
Share of Searches	6,7	6,7	7,1	9,0	8,9

Source: comScore Media Metrix. Searches type: All searches. Area: United States. Measures: Searches (MM), share of searches.

Table 2

2.2 Vertical Search Engines

Vertical search engines can be defined as websites that provide contents (information and services) tailored to address specific subject matters. The term vertical is used to convey the idea that they are platforms on which users can search on topics *within* a specific industry, rather than *across* industries (as in the case of general search engines). A non-exhaustive list of areas covered by vertical engines includes financial services and intermediation, entertainment products (e.g., music and videos), news (e.g., weather), travel information, maps, patents, etc.

Users click on vertical engines to restrict the terms of their searches. From general engines, it is possible to collect information at a relatively broad level, so they provide an ideal starting reference especially for uninformed users. However, whenever the same uninformed users need to further limit the scope of their queries or informed users need very specific information, vertical engines become valuable sources. This is so because vertical platforms are able to process queries and return results that general platforms would provide behind the use of complex combinations of keywords and longer searches. These features make vertical platforms particularly valuable also to advertisers: verticals attract users with requirements that are very precise so the ads posted on their pages exhibit larger click-through-rates.[7]

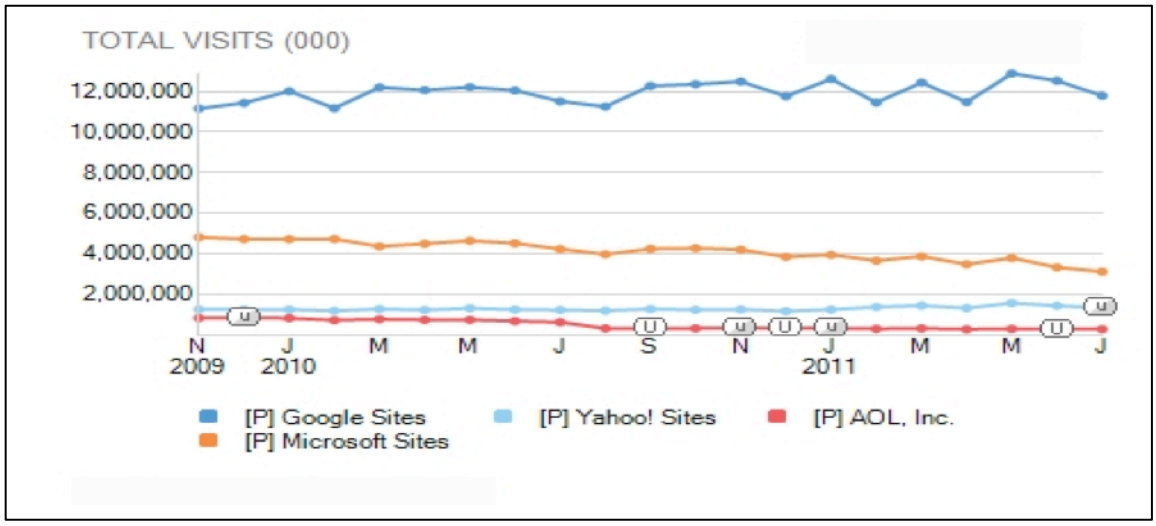
Varian (2006) reports that, on average, a click on a given online ad converts into an actual purchase in the 9‰ of cases, which accounts for a conversion rate that is much higher than the one characterizing

[7] For an empirical analysis performed by DoubleClick concerning the click-through-rates received by verticals see the "DoubleClick Benchmarks Report: 2009 Year-in-Review", at http://www.google.com/doubleclick/research/

TV or newspapers advertising campaigns. Moreover, the May 2010 report published by Chitika Research shows that the first two spots in a standard search outcome on Google receive more than 50% of all clicks. These facts help reveal a possible intent behind (sponsored and organic) search manipulation. Results' manipulation allows general search engines to increase the number of visitors on integrated specialized websites so that the value of placing an ad on the same sites rises.

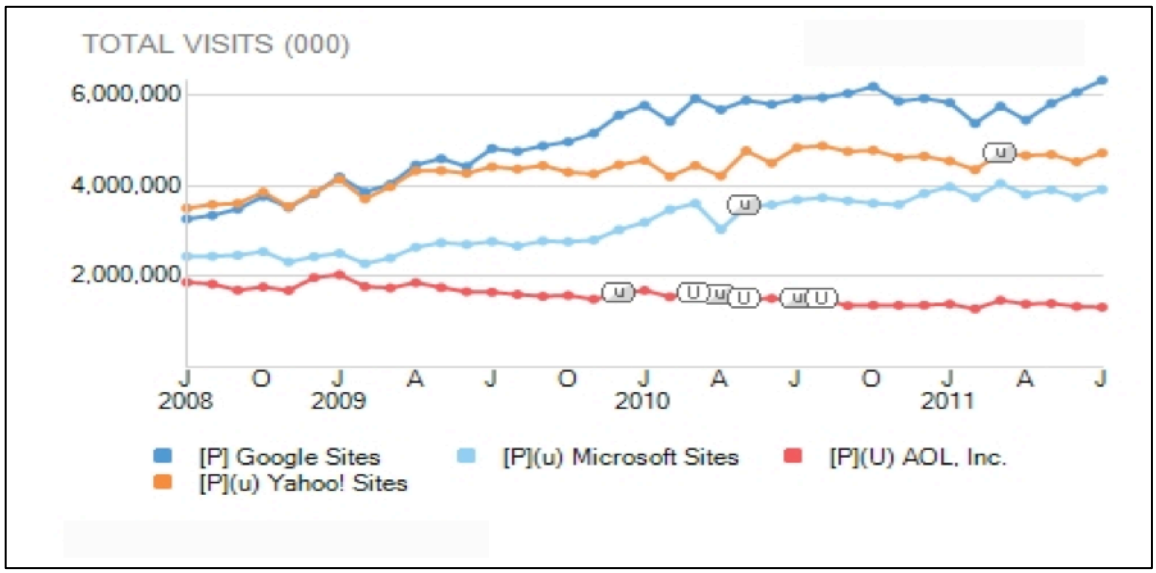
Integration between general and vertical engines is a widespread phenomenon. Google's mission is "to organize the world's information and make it universally accessible and useful";[8] inspired by such a corporate statement the company has undertaken a massive program of investment in vertical engines in multiple industries: from entertainment and news, to maps, patents and financial services. However, Google is by no means an exception, as Microsoft and Yahoo! are also directly active on the vertical platforms' business. At the same time, there are vertical platforms that stand-alone (for example, Expedia in the travel industry). Such heterogeneity of market players and business structures makes of the analysis of the profitability of integration in this context a particularly interesting exercise.

Figure 2 and Figure 3 illustrate the total number of visits received by AOL, Google sites, Microsoft sites and Yahoo! sites in Europe and in the United States, respectively. In Europe, Google is the leader in terms of number of visits received by its sites. Microsoft is the main follower, although the number of visits on its sites exhibits a declining trend. Finally, Yahoo! and AOL lag behind. In the United States, Google is again the leader in the market. However, Yahoo! and Microsoft sites seem more competitive than in Europe and, jointly, account for a number of visits bigger than the ones received by Google sites.



Source: comScore Media Metrix. Media: AOL, Google Inc. Sites, Microsoft Sites, Yahoo! Sites. Area: Europe. Measures: Total Visits (000). Note: For entities carrying [u]-[U], traffic figures are enhanced by a census component of comScore methodology that improves comScore visibility of websites' traffic.
Figure 2

[8] http://www.google.com/about/corporate/company/



Source: comScore Media Metrix. Media: AOL, Google Inc. Sites, Microsoft Sites, Yahoo! Sites. Area: United States. Measures: Total Visits (000). Note: For entities carrying [u]-[U], traffic figures are enhanced by a census component of comScore methodology that improves comScore visibility of websites' traffic.

Figure 3

Inspecting the disaggregate time-series, comScore Media Metrix data documents that Google Search receives the majority of visits received overall by Google. For instance, in July 2011 the visits on Google search were more than 6 billions in Europe and 3,5 billions in the United States. This is not the same for Microsoft, because the majority of the visits on its web sites are directed towards the MSN portal.

United States	Total Unique Visitors (000)			Total Visits (000)		
	Jul-2010	Jul-2011	% Change	Jul-2010	Jul-2011	% Change
Total Internet : Total Audience	213.584	215.054	1	15.891.604	16.767.086	6
Business/Finance	154.773	179.914	16	1.751.621	1.824.768	4
Yahoo! Finance	41.801	39.107	-6	296.070	255.292	-14
Bank of America	24.986	25.254	1	147.756	132.031	-11
PayPal	21.116	24.114	14	70.220	73.235	4
JPMorgan Chase Property	21.455	21.686	1	120.977	114.698	-5
Dow Jones & Company	17.539	19.922	14	81.555	100.688	23
Google Finance	n.a.	n.a.	n.a.	14.101	9.549	

Europe	Total Unique Visitors (000)			Total Visits (000)		
	Jul-2010	Jul-2011	% Change	Jul-2010	Jul-2011	% Change
Total Internet : Total Audience	353.240	370.405	5	20.065.453	21.146.307	5
Business/Finance	191.619	219.413	15	1.461.233	1.502.856	3
PayPal	18.740	21.403	14	52.147	55.558	7
Credit Agricole	11.202	11.224	0	66.190	70.967	7
ING Group	9.729	10.407	7	54.640	56.694	4
Yahoo! Finance	6.561	10.361	58	34.780	61.808	78
Lloyds Banking Group plc	8.671	9.162	6	51.940	56.092	8
Google Finance	n.a.	n.a.	n.a.	1.415	1380	

Source: comScore Media Metrix. Area: United States and Europe. Measures: Total unique visitors and total visits.

Table 3

Focusing on the performance of vertical web pages in specific industries, Tables 3 and 4 illustrate the total unique visitors and the total visits on the main 5 players and Google (if out of the top 5) in Europe and in the United States for two industries, finance and directories/resources and maps.

In the finance industry, Yahoo! Finance is among the top 5 players, and in a comparison with Google Finance, in July 2011 it has received a number of visits that is in a ratio of 1/27 (1/45) in the United States (Europe). In the directories/resources and maps sector, Google is the leader both in the United States and in Europe. In the United States, Google faces the competition of MapQuest, which is not integrated with a general search engine, and of two verticals integrated with a search engine (Bing Maps and Yahoo! Maps). Bing is the player that exhibits the best records in terms of increased number of visitors and total visitors. Instead, MapQuest features a significant decrease of total unique visitors and total visits over the last year. In Europe, Google Maps is the leading vertical and the main competitors are three verticals (ViaMichelin, Yandex Maps and Mappy) that are non-integrated with search engines.

United States	Total Unique Visitors (000)			Total Visits (000)		
	Jul-2010	Jul-2011	% Change	Jul-2010	Jul-2011	% Change
Total Internet : Total Audience	213.584	215.054	1	15.891.604	16.767.086	6
Directories/Resources - Maps	101.671	101.187	0	429.696	385.945	-10
Google Maps	67.098	67.881	1	226.647	224.442	-1
MapQuest	52.120	41.898	-20	167.893	119.354	-29
Bing Maps	7.444	9.564	28	13.857	17.601	27
Yahoo! Maps	10.078	8.608	-15	19.388	16.481	-15
Google Places		5.049			6.692	

Europe	Total Unique Visitors (000)			Total Visits (000)		
	Jul-2010	Jul-2011	% Change	Jul-2010	Jul-2011	% Change
Total Internet : Total Audience	353.240	370.405	5	20.065.453	21.146.307	5
Directories/Resources - Maps	145.783	162.513	11	556.840	594.048	7
Google Maps	112.294	123.647	10	377.120	400.999	6
ViaMichelin	12.937	17.118	32	30.015	31.050	3
Yandex Maps	10.623	13.597	28	40.133	46.981	17
Mappy	9.416	9.687	3	22.730	23.626	4
Google Places		7.242			9.079	

Source: comScore Media Metrix. Area: United States and Europe. Measures: Total unique visitors and total visits.

Table 4

2.3 The Role of Network Effects

The relationship between a search platform and Internet users develops through repeated interactions. In their early queries to an engine, users assess the relevance of the results returned by the search algorithm: if it proves itself to be reliable, then users are more likely to return visiting. In this sense, a search engine that has developed a sizeable scale is an efficient engine. However, there are other factors that contribute to raise the number of users on a platform, beyond engine's technical features (like its search algorithm's effectiveness or its auction system performance). For example, network effects (both between searchers, and searchers and advertisers on the same platform) can contribute to attract new users. The economics literature has deeply investigated the importance of network effects on agents' participation to a platform and the risk of market tipping in markets that exhibit net effects.[9]

[9] See Motta (2004) Chapter 2 for a survey.

In the case of search engines, net externalities may take two directions: from users to advertisers and between users in the same platform. Advertisers value the number of searchers on a platform for a simple reason: the higher is the number of searchers, the larger is the likelihood of a profitable match after an ad gets a click. On top of this, Evans (2008) claims that the presence of a larger number of searchers on a platform generates indirect network effects for other searchers on the same platform, and the rationale is twofold. First of all, an increase in the number of platform's participants implies that advertisers have stronger incentives to join that search platform. Secondly, the presence of a larger number of searchers implies that more queries are processed, so that the search engine is able to extract more information from Internet users and improve the precision of its algorithm: this allows it to return more precise results even for less common combinations of keywords.

Argenton and Prüfer (2011) exploits the indirect network effects that would operate among searchers on the same platform to develop a model of search engines' competition. In the model, users disregard that by carrying on a query on an engine, the latter would store information and employ them so to improve the precision of its algorithm. Information management contributes to inflate the engine's scale due to network externalities among users and the market tips over the engine that gains market's leadership. The conclusion is that the search intermediation market exhibits an inherent tendency towards monopolization, with negative effects on welfare.

2.4 Online Advertising v. Offline Advertising

Advertising is the major source of revenue to general search engines and is therefore important to understand whether offline (e.g., TV and newspapers) advertising campaigns belong to the same market as online (search and non-search) advertising. Clearly, this would help shed light on the competitive forces that limit the profitability of manipulating conducts.

The evidence on the relationship between offline and online advertising services is somewhat mixed. In the Google/DoubleClick[10] and Microsoft/Yahoo! decisions, the European Commission found that online advertising is a relevant market per-se. The French competition authority has recently reached the same conclusion in its "Opinion No 10-A-29 of 14 December 2010 on the competitive operation of online advertising". Analogously, the FTC found that online and offline advertising belong to different markets in its review of the Google/DoubleClick merger.[11]

The investigation conducted by the Commission in Microsoft/Yahoo! documents that advertisers perceive that search ad is in a separate market, mainly for technological reasons: search ad (and to a growing extent also non-search ad) would constitute an inherently different advertising channel because, unlike offline ad, it allows to target Internet users. However, assessing the degree of substitutability between two services by means of a comparison of their characteristics and/or uses can lead to misleading conclusions (Motta, 2004, Chapter 3); it would certainly be more appropriate to conduct an analysis based on the competitive pressures that each service exerts on the other. Unfortunately, though, neither the European Commission nor the FTC hinge their decisions on the results of a hypothetical monopoly test.

In this direction, there is anecdotal and empirical evidence documenting a certain degree of substitutability between online and offline advertising channels. Manne and Wright (2011) cites the example of Pepsi, which turned down its television advertising campaign for the 2010 Super Bowl to invest in an online campaign. At the same time, the results in Goldfarb and Tucker (2011) point to the existence of a relationship of substitutability between the two channels. Goldfarb and Tucker (2011)

[10] European Commission, case M. 4731, March 2008.
[11] See Proposed Acquisition of Click Holding Company by Google Inc., File No. 0710170.

exploits the state level heterogeneity concerning lawyers ability to solicit customers via traditional offline methods in cases related to personal injuries. They find that in the locations where the ban is in place, personal injury keywords cost up to 7% more than other keywords related to legal services: this accounts for a significantly higher premium for personal injury keywords with respect to non-regulated states.

Although the analysis in Goldfarb and Tucker (2011) seems to suggest that advertisers substitute between offline and online campaigns, the thought experiment that characterizes their empirical strategy differs in a crucial aspect from the one of a Small but Significant and Non-transitory Increase in Price (SSNIP) test:[12] the existence of a ban implies that the hypothetical price increase is infinite, instead in a SSNIP test the increase would be significant but small. Still, the results of the article threaten the reliability of the conclusions reached by the European Commission and the FTC, leaving open the issue of whether offline advertising and online advertising belong to the same market.

2.5 Search Engines as Information Gatekeepers

From several pieces of evidence, it emerges that the traffic to verticals is only partly originated by general search engines. For example, eBay reports that in the thirty days before February 2010 less than 10% of visits to its website came from a search engine. Moreover, comScore reports that in June 2011 only 4% of a user's time was spent on a search engine and Accuracast.com documents that during 2006-2007,[13] searchers spent on average 27 minutes on a search engine per month (which accounted for about 3,4% of the time spent online).

At the same time, social networks occupy a growing share of Internet users' eyeball. According to a recent report by comScore, social networking account for 1 out of every 6 minutes spent online.[14] Moreover, comScore Media Metrix documents that, in July 2011, in Europe Facebook was the top domain in terms of total unique visitors and pages viewed. Instead, Google was the leader in terms of total pages viewed and unique visitors in the United States.

top 5 EU domains in July 2005	Total Unique Visitors (000)	Total Pages Viewed (MM)
Total Internet : Total Audience	194.515	453.742
MSN.COM	89.911	11.166
GOOGLE.COM	70.919	3.411
MICROSOFT.COM	71.572	875
HOTMAIL.COM	58.965	6.976
YAHOO.COM	56.026	5.601

top 5 EU domains in July 2011	Total Unique Visitors (000)	Total Pages Viewed (MM)
Total Internet : Total Audience	370.405	960.699
FACEBOOK.COM	244.777	146.509
YOUTUBE.COM	213.088	27.521
GOOGLE.COM	193.760	10.089
WIKIPEDIA.ORG	145.518	1.925
LIVE.COM	139.083	15.488

Source: comScore Media Metrix. Area: Europe. Measures: Total unique visitors and total pages visited.
Table 5

More specifically, Tables 5 and 6 compare the top 5 domains in Europe and in the United States in July 2005 and July 2011. In July 2005, the top domains in both the United States and Europe were portals and general search engines. In 2011, other than portals and search engines, on both sides of the

[12] See Motta (2004) Chapter 3 for a deeper discussion on SSNIP test and its implementation.
[13] AccuraCast, *Search Engine Statistics for 2006-2007*, February 2007.
[14] http://blog.comscore.com/2011/06/facebook_linkedin_twitter_tumblr.html

Atlantic the ranking of top sites features the presence of a social network (Facebook) and two verticals (Wikipedia and Youtube.com).

top 5 US domains in July 2005	Total Unique Visitors (000)	Total Pages Viewed (MM)
Total Internet : Total Audience	167.444	449.841
YAHOO.COM	114.693	30.043
MSN.COM	92.239	16.127
GOOGLE.COM	83.632	5.727
AOL.COM	71.207	7.491
MICROSOFT.COM	59.634	1.797

top 5 US domains in July 2011	Total Unique Visitors (000)	Total Pages Viewed (MM)
Total Internet : Total Audience	215.054	651.309
GOOGLE.COM	172.957	27.946
YAHOO.COM	166.409	36.351
FACEBOOK.COM	162.078	123.667
YOUTUBE.COM	126.816	24.252
MSN.COM	110.211	6.774

Source: comScore Media Metrix. Area: United States. Measures: Total unique visitors and total pages visited.
Table 6

These facts seem to contradict the prevalent approach in the policy debate that treats search engines as only information gatekeepers on the Internet.[15] In this respect, although the economic literature has investigated the role of Internet information gatekeepers on advertisers' pricing decisions (e.g., Baye and Morgan, 2001; Baye and Morgan, 2002), a relatively unexplored question concerns how information gatekeepers endogenously arise in the Internet.

The rationale for a user that is unaware of a specific subject to click on a search engine is easily identifiable: the query would return a list of links that provide her/him a starting point for a deeper search on the web. However, it is less clear whether informed users would employ a search engine to conduct their searches on the web. The question is whether users would rationally run a query on an engine even if already aware of the websites they want to reach. In a model with search costs, this is possible if users expect the engine to provide additional information to the one they are already endowed with: for instance, if the engine would suggest new websites or novel details on the specific subject of the query.

Then, the next question is: in the case of informed users, would results' manipulation work? The answer is somewhat ambiguous. Users of this sort already have a certain knowledge of the subject they are searching on, so if an engine provides them with biased results, they could either realize it or believe that a "new" ranking (in terms of results' relevance) is in place and update their priors accordingly. In other words, informed users' reaction to a manipulation seems to depend on the beliefs they have on the reliability of the engine, relatively to their command of the field of the query.

2.6 The Management of Advertising

Search engines can generate sponsored search results by running a position auction. To participate in the auction, an advertiser needs to submit a bid relative to a (combination of) keyword(s). For example, if a consulting firm would like to participate in an auction for the keywords "business consultancy", it needs to submit a monetary bid that captures its willingness to pay for each click it would receive by Internet users carrying out a query on those keywords.

The position of an advertiser in the list is determined by the value of its bid (b) and a measure of its relevance to users (m). Once the list is compiled by the auction system, advertisers pay a price for each click. The search engine needs to preserve advertisers' incentives to bid in the auction, so the position

[15] As an example, see "Google's Gatekeepers", *The New York Times*, 28 November 2008.

of each advertiser must depend on the monetary value of its bid. At the same time, the search engine wants to prize the websites that ensure a better experience to users; therefore the value of the bid is adjusted by a relevance index. In the case of Google, the system that assesses websites' relevance is the Quality Score[16] and the weights attached to bid and Quality Score to pin down advertisers' order in the list are not public information.

The per-click fee paid by advertiser *i* participating in a position auction is given by the bid of the next bidder, discounted by a relative measure of its relevance (m_i) with respect to the relevance of the next bidder. For example, if the value of b_i and m_i relative to advertiser *i* are such that *i* is ranked in position *k* by the system, then the per-click payment (p_i) due by firm *i* is given by a formula of the following sort:

$$p_i = b^{k+1} m^{k+1} (m_i)^{-1}$$

This scheme implements a mechanism that shares important analogies with second-price auction models, because the advertiser in position *k* pays according to a function of the bid submitted by the advertiser in position *k+1*. Google advertising platform was the first to implement such a second-price system, followed by Overture (Yahoo!).

Edelman, Ostrovski and Schwartz (2007) discusses the evolution of the auctioning systems employed by search engines and presents a generalized second-price auction mechanism to model the real system employed by Yahoo! and Google to sell respective slots. The article also studies the differences between the generalized second-price auction mechanism and the Vickrey-Clarke-Groves second price mechanism, showing that they are not equivalent because the generalized second-price model does not always induce truth-telling by advertisers.

An important assumption in the model developed by Edelman, Ostrovski and Schwartz (2007) is that the weight *m* attached to a bid is determined by ad and position specific factors (private-value assumption). In other words, the value of being in a position is independent of the quality of the other advertisers in the list. Jeziorski and Segal (2010) finds that the private-value assumption is not confirmed in the data, insofar as the click-through-rate on a given ad depends on which other ads are displayed in the list.

Athey and Ellison (forthcoming) develops a position auction model that departs in several respects from the literature that followed Edelman, Ostrovski and Schwartz (2007) (e.g., Varian, 2007; Edelman and Schwartz, 2010). In Athey and Ellison (forthcoming), advertisers differ in terms of their ability to match consumers' needs, consumers bear a cost of clicking an ad, and they rationally choose the number and the sequence of links they click. As a consequence of these three assumptions, the value of being in a given position depends on all the other advertisers published in the list.

Athey and Ellison (forthcoming) delivers several insightful results, which greatly contribute to the comprehension of the functioning of online advertising auctions models. First of all, the model shows that in a context with clicking costs, the imposition of a reserve price can, at the same time, increase consumers' welfare and raise auctioneer's revenue.[17] The intuition is simple: the introduction of a

[16] The exact factors that determine the Quality Score of a website are not public information. However, Google has acknowledged that the history of an advertiser click-through rate, and the landing page relevance and load time are important components in the determination of the score.

[17] This result stands in contrast with standard auction models, in which the introduction of a reserve price increases seller's revenue at the cost of reducing consumers' surplus.

reserve price can avoid inefficient searches and increase the number of links examined by Internet users.

Athey and Ellison (forthcoming) also shows that click-weighted auctions can reduce efficiency. In the model, the weight *m* attached to a given advertiser bid to determine its position in the list captures the probability that the same advertiser meets consumers' needs. Therefore, at equilibrium it can happen that the engine displays the ads of generalists, although their quality is low. This would be inefficient for two reasons. First, if high-quality sites that serve narrower segments of individuals would be displayed, then users could save in search costs. Second, the click-weighted auction mechanism may reduce the amount of information that consumers are able to grasp from ads' listings about the quality of advertisers.

3. Manipulation Incentives

3.1 Organic Search Results

Organic search results are generated at no direct cost to websites they link and to Internet users. They are listings of links that the search engine ranks in order of importance, for given keyword(s) and (whenever possible) user's profile. The algorithm generating the results assesses webpage content relevance by looking at how many other relevant pages link to it and how many clicks it receives.

Google algorithm is based on the PageRank system. PageRank was a major innovation introduced by Google to improve the fit of engine's results to users' queries. As shown by Brin and Page (1998), Google PageRank original model was designed to generate a probability distribution across web pages, so that the sum of all pages' PageRank is one. The early model has been developed to take into account users' language and query models (to handle spelling mistakes and control for people use of language) and time models (to determine whether the best reply is a recent page or an old page).

Organic search manipulation can be undertaken by shifting a vertically integrated website's link on the top of the organic search results' page. A small perturbation to organic results is hardly perceived by users, although it can greatly raise link's popularity. As Brin and Page (1998) put it in the article that presents Google to the academic world:

> *A search engine could add a small factor to search results from "friendly" companies, and subtract a factor from results from competitors. This type of bias is very difficult to detect but could still have a significant effect on the market.*

Of course, this quotation cannot prove that Google itself has effectively engaged in organic results' manipulating practices; still it reveals that, in principle, manipulations of this sort are technically feasible, difficult to detect and (potentially) highly profitable for the manipulating entity.

The incentive to bias organic search results is augmented by a feedback effect that exploits an inherent feature of search engines' algorithm. The pages that appear in prominent spots receive more clicks, are more popular and are therefore likely to receive more links. The algorithm prizes web pages that receive more links and clicks (as in the Google PageRank system mentioned beforehand). Consequently, if, say, Google would bias its results in favor of a "friendly" web page, the same "friendly" page could climb not only Google, but also Bing and Yahoo! organic search results. In other words, this feedback effect generates an externality on the queries processed by a search engine that competes against the manipulating platform: for the former it is difficult to disentangle the clicks and

links received by a page due to its own relevance from the ones obtained because of search results' manipulation. Therefore, the bias can self-reinforce itself across time and search platforms.

The main threat behind organic results manipulation is that after finding the "friendly" page on top of the list (although an unbiased algorithm would not place it there) searchers may decide to leave the platform. After receiving a list of biased results, a user can update downward her/his valuation of engine's quality and the platform's risk to have her/him switching depends on the competition it faces from other search engines. If competition is one click away, i.e., competitors' quality exerts a binding constraint to the manipulating entity, switching is relatively likely. Conversely, manipulation is profitable whenever the quality associated to the engine is so high that engaging in manipulating practices would not result in users' switching.

In this sense, a large scale is crucial to insure an engine against switching. First of all, a large scale allows an engine to improve the quality of its services, attract more advertisers and, in turn, new searchers. Moreover, a large scale makes experimentation easier and experiments help alleviate the nuisances caused by manipulation. Engines regularly engage in experimentation, for example to test users appreciation of a new graphical layout or the efficiency of a new search algorithm.[18]

Experiments' success depends on the accuracy of the design and in this respect, for experiments to be reliable it is crucial that the sample group is adequately representative.[19] The experimenter assesses the impact of the treatment by analyzing the reaction of the individuals that experienced the change; therefore only an engine that has access to a large scale of users is able to implement valid experiments.

For example, to limit the downside caused by manipulation, engines can design experiments of two sorts. They can (a) bias the response to the queries relative to the same keyword(s) across users and/or (b) manipulate the results returned to the queries performed by the same user across keywords. In either case, the outcome would be to render manipulation even more difficult to detect.

For example, in (a) an engine could test the reaction by a sample of users to biased organic search results and compare it with the reaction by a sample of users that did not receive biased listings. In this way, the engine can assess the attitude towards manipulated results across users and sort them according to respective type. At the same time, in (b) the engine could design an experiment consisting in the submission of a biased search outcome to the same user but across a random set of keywords. This test would allow the platform to extract information at the user level regarding the response to manipulation per specific words/topics typed in a query.

Summarizing, the trade-off associated to shifting a "friendly" website on top of organic search results is as in what follows. *On the one hand, an engine profits from the number of clicks (and popularity) gained by the "friendly" website. On the other hand, if the "friendly" website is irrelevant users may realize that a manipulation has taken place and, consequently, they may decide to switch.* The upside from results' manipulation is augmented by the feedback effect discussed above: if Google manipulates its results to make an integrated vertical receive more clicks, then the same vertical is likely to climb Bing and Yahoo! search results. Finally, the cost of organic results' manipulation can be alleviated by experimentation, which is the easier the larger is the scale of engine's users.

[18] For example, for the launch of its new layout in June 2011, Google run a number of experiments concerning the color of the new toolbar and the natural search results' text format (http://www.ghacks.net/2011/05/07/google-search-new-layout-style/).

[19] A sample of Internet users and advertisers is representative if it reflects (as accurately as possible) the characteristics of the population of users and advertisers.

3.2 Sponsored Search Results

The manipulation of sponsored search results would consist in lowering competing advertisers' measure of relevance. The position auction system is designed in such a way that if two advertisers bid on the same combination of keywords, the page with lower measure of relevance has to offer a higher bid to rank at the same position, *ceteris paribus*. Hence, to manipulate the auction system and favor an integrated site, an engine needs to manipulate the relevance measure of a competitor (for a given bid).

As for the case of organic search results' manipulation, by biasing position auctions' results a platform may impair users participation. Assume a "friendly" website is placed by the engine at the first spot of sponsored search results although, overall, its "true" value would be such that it should have been placed second: users clicking on the first ad may realize that the corresponding website quality is not consistent with first slot expected quality and, consequently, they may decide to leave the platform. Of course, leaving depends on the competitive pressure exerted by alternative search engines: if the manipulating entity provides users, on average, with a better experience than competing engines, then users may still decide to stay in the platform.

More importantly, sponsored results' manipulation may impair bidders' incentives. If advertisers perceive that the system is biased then they have weaker incentives to bid consistently with their valuation of the ad per click. This could undermine auction system's internal coherence, induce advertisers to leave the platform and therefore lead to lower expected revenue for the auctioneer. To grasp the intuition of why this is the case, it is useful to remind the result in Edelman, Ostrovsky and Schwartz (2007) that the generalized second-price auction models employed by search engines do not necessarily induce advertisers to bid consistently with their valuation of the spot. It is therefore natural to think that if a search engine would artificially distort the results of the auction, advertisers would have further incentive to misreport their true valuation.

The trade-off associated to manipulating a competing advertiser's measure of relevance to push a "friendly" page on top of sponsored results is as in what follows. *On the one hand, an engine gains from the increased number of clicks potentially leading to conversions in actual purchases from "friendly" web pages. On the other hand, if advertisers and users perceive that the system is corrupt, their participation in the platform is adversely affected. Indeed, the manipulating practice may dilute advertisers incentives to bid "correctly". Moreover, manipulation may imply that users are provided with a worse experience than expected in terms of sponsored search results' composition.* Again, the cost of manipulating is alleviated by experimentation, which is the easier the larger is the scale of advertisers participating in a platform.

4. Search Engines Foreclosure: Some Evidence

The analysis of the incentives behind verticals' foreclosure has identified as major upside for a manipulating general engine the likely increase in the number of visits received by integrated verticals. Therefore, for a *prima-facie* test on verticals' foreclosure it is interesting to assess the exit traffic patterns featured by major search engines. In this Section, I perform such an analysis by means of the comScore Media Metrix data regarding the exit and entry traffic on Bing and Google Search in November 2009 and July 2011. I will focus on the United States because, as discussed above, general and vertical search markets seem more competitive in the United States than in Europe.

I start by looking at Bing (Table 7). Both in November 2009 and July 2011, the major source of traffic on Bing is provided by Microsoft Sites, even though the share of Microsoft sites as source of entries is

more than halved in 2011. Interestingly, the second source of traffic for Bing is provided by Google sites, which, in 2011, feature an increased share of entries with respect to November 2009 (from 3.8% to 5.1%). It is also remarkable the rise of Facebook in terms of share of entries to Bing, which more than doubled in the period under observation. As far as the exit traffic is concerned, in November 2009 the major destinations of Bing's users were Microsoft websites, with a share of exits equal to 12.6%. Instead, in 2011 Google sites are the most clicked websites following a visit on Bing, and Google share of exits is increased in July 2011 with respect to November 2009. At the same time, the share of exits directed towards Microsoft sites in 2011 is about the half of the share in 2011 (6.5% from 12.6%).

It is hard to identify any sort of successful manipulating practice on the side of Bing. In July 2011, Google sites are more clicked than Microsoft's after a visit on Bing. However the share of exits towards AOL web pages decreased in July 2011 with respect to November 2009.

Table 9 reports the data on entry and exit traffic for Google. Google's patterns are markedly different from Bing's. Google sites represent the main source of entries and the first destinations of Google's users both in November 2009 and in July 2011. Moreover, a closer inspection of the pattern of Google exits reveals that both the share of exits directed towards Google sites and the joint share of exits headed to Yahoo! and Microsoft sites increased in the period under consideration. Instead, with the exception of Facebook, the shares of exits directed to AOL, Amazon, CBS, WordPress and the New York Times decreased. The interpretation of these results is consistent with the example of the maps industry in the United States given in Section 2.2: if any manipulating practice has ever been undertaken, it seems to have most of all damaged the websites that are not integrated with general search platforms.

5. Conclusions

Vertical search engines foreclosure is the issue at the core of several antitrust cases on both sides of the Atlantic. In this article, I analyze the structure of the Internet search intermediation market and discuss the costs and the benefits associated to search manipulation. The main upside for the manipulating entity appears to be the likely increase in the number of visits received by integrated websites. However, this is not costs-free: as a consequence of manipulation, users and advertisers participation in the platform may be adversely affected. By means of data on the visits on verticals in major industries and analyzing the exit traffic patterns on major search engines, I document that the visits on the vertical websites that are not integrated with general search platforms significantly decreased.

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BING NOVEMBER 2009		Total Unique Visitors (000)	Entries (000)	Entries (%)
	Bing	**69.532**	**1.376.496**	**100,0**
[P]	**Microsoft Sites**	**40.026**	**545.086**	**39,6**
[M]	*MSN*	*32.748*	*488.847*	*35,5*
[M]	*Windows Live*	*12.858*	*48.469*	*3,5*
[M]	*Microsoft*	*3.481*	*7.311*	*0,5*
[P]	**Google Sites**	**16.653**	**52.182**	**3,8**
[M]	*Google*	*12.603*	*36.814*	*2,7*
[M]	*YOUTUBE.COM*	*5.239*	*12.959*	*0,9*
[M]	*Blogger*	*1.433*	*2.204*	*0,2*
[P]	**Yahoo! Sites**	**13.575**	**44.179**	**3,2**
[P]	**FACEBOOK.COM**	**6.468**	**19.983**	**1,5**
[P]	**AOL, Inc.**	**5.174**	**15.008**	**1,1**
[M]	*MapQuest*	*719*	*1.057*	*0,1*
[P]	**Wikimedia Foundation Sites**	**5.051**	**10.490**	**0,8**
[P]	**Amazon Sites**	**3.716**	**6.715**	**0,5**
[P]	**eBay**	**3.540**	**7.767**	**0,6**

BING NOVEMBER 2009		Total Unique Visitors (000)	Exits (000)	Exits (%)
	Bing	**69.532**	**1.376.496**	**100,0**
[P]	**Microsoft Sites**	**25.867**	**173.885**	**12,6**
[M]	*MSN*	*19.374*	*125.295*	*9,1*
[M]	*Windows Live*	*9.579*	*41.113*	*3,0*
[M]	*Microsoft*	*3.650*	*6.803*	*0,5*
[P]	**Google Sites**	**23.599**	**89.575**	**6,5**
[M]	*Google*	*18.429*	*61.036*	*4,4*
[M]	*YOUTUBE.COM*	*8.140*	*24.950*	*1,8*
[M]	*Blogger*	*2.081*	*3.478*	*0,3*
[P]	**Yahoo! Sites**	**15.709**	**57.385**	**4,2**
[M]	*Yahoo!*	*15.401*	*55.917*	*4,1*
[P]	**FACEBOOK.COM**	**9.180**	**56.550**	**4,1**
[P]	**Wikimedia Foundation Sites**	**7.166**	**17.108**	**1,2**
[P]	**AOL, Inc.**	**6.976**	**21.348**	**1,6**
[M]	*MapQuest*	*2.103*	*3.798*	*0,3*
[P]	**Amazon Sites**	**4.865**	**9.687**	**0,7**

BING JULY 2011		Total Unique Visitors (000)	Entries (000)	Entries (%)
	Bing	**99.231**	**2.663.471**	**100,0**
[P]	**Microsoft Sites**	**41.754**	**417.354**	**15,7**
[M]	*MSN*	*31.896*	*345.328*	*13,0*
[M]	*Windows Live*	*15.718*	*61.768*	*2,3*
[M]	*Microsoft*	*4.794*	*9.329*	*0,4*
[P]	**Google Sites**	**35.110**	**136.540**	**5,1**
[M]	*Google*	*24.235*	*75.403*	*2,8*
[M]	*YOUTUBE.COM*	*16.535*	*54.910*	*2,1*
[M]	*Blogger*	*3.397*	*5.734*	*0,2*
[P]	**FACEBOOK.COM**	**34.578**	**176.175**	**6,6**
[P]	**Yahoo! Sites**	**26.911**	**125.984**	**4,7**
[P]	**AOL, Inc.**	**8.828**	**29.097**	**1,1**
[M]	*MapQuest*	*2.333*	*4.211*	*0,2*

BING JULY 2011		Total Unique Visitors (000)	Exits (000)	Exits (%)
	Bing	**99.231**	**2.663.471**	**100,0**
[P]	**Google Sites**	**44.104**	**206.363**	**7,7**
[M]	*Google*	*31.756*	*117.289*	*4,4*
[M]	*YOUTUBE.COM*	*21.355*	*79.674*	*3,0*
[M]	*Blogger*	*4.421*	*8.866*	*0,3*
[P]	**FACEBOOK.COM**	**36.127**	**239.921**	**9,0**
[P]	**Microsoft Sites**	**30.215**	**174.406**	**6,5**
[M]	*MSN*	*21.032*	*118.576*	*4,5*
[M]	*Windows Live*	*12.008*	*47.518*	*1,8*
[M]	*Microsoft*	*3.838*	*6.981*	*0,3*
[P]	**Yahoo! Sites**	**29.790**	**157.251**	**5,9**
[P]	**AOL, Inc.**	**11.388**	**38.456**	**1,4**
[M]	*MapQuest*	*3.799*	*7.736*	*0,3*

Source: comScore Media Metrix. Area: United States. Measures: Total unique visitors, entries and exits. Top-left table and top-right table report, respectively, the sources of entries on Bing and the websites to which Bing visitors were directed in November 2009. Bottom-left table and bottom-right table report, respectively, the sources of entries on Bing and the websites to which Bing visitors were directed in July 2011. [P] denotes the propriety domain, [M] denotes the media title(s) belonging to a given [P].
Table 7.

GOOGLE NOVEMBER 2009		Total Unique Visitors (000)	Entries (000)	Entries (%)
	Google Search	**147.721**	**8.858.936**	**100,0**
[P]	**Google Sites**	**122.382**	**2.682.241**	**30,3**
[M]	*Google*	*118.222*	*2.416.458*	*27,3*
[M]	*YOUTUBE.COM*	*37.973*	*181.065*	*2,0*
[M]	*Blogger*	*26.391*	*80.174*	*0,9*
[P]	**Yahoo! Sites**	**58.394**	**335.341**	**3,8**
[P]	**Microsoft Sites**	**39.873**	**233.620**	**2,6**
[P]	**FACEBOOK.COM**	**37.836**	**230.367**	**2,6**
[P]	**Wikimedia Foundation Sites**	**35.285**	**149.133**	**1,7**
[P]	**AOL, Inc.**	**26.348**	**108.213**	**1,2**
[P]	**Amazon Sites**	**24.385**	**59.008**	**0,7**
[P]	**Fox Interactive Media**	**24.235**	**101.059**	**1,1**
[P]	**eBay**	**18.407**	**55.311**	**0,6**
[P]	**Ask Network**	**16.370**	**41.196**	**0,5**
[P]	**Answers.com Sites**	**13.673**	**28.664**	**0,3**
[P]	**Comcast Corporation**	**7.197**	**26.467**	**0,3**

GOOGLE NOVEMBER 2009		Total Unique Visitors (000)	Exits (000)	Exits (%)
	Google Search	**147.721**	**8.858.936**	**100,0**
[P]	**Google Sites**	**94.199**	**917.406**	**10,4**
[M]	*Google*	*78.480*	*544.675*	*6,1*
[M]	*YOUTUBE.COM*	*50.104*	*257.982*	*2,9*
[M]	*Blogger*	*33.922*	*110.633*	*1,2*
[P]	**Yahoo! Sites**	**63.807**	**294.365**	**3,3**
[P]	**Wikimedia Foundation Sites**	**45.235**	**219.122**	**2,5**
[P]	**Microsoft Sites**	**39.600**	**156.714**	**1,8**
[P]	**FACEBOOK.COM**	**39.334**	**228.830**	**2,6**
[P]	**AOL, Inc.**	**33.420**	**106.526**	**1,2**
[P]	**Amazon Sites**	**32.078**	**84.900**	**1,0**
[P]	**New York Times Digital**	**30.573**	**64.823**	**0,7**
[P]	**CBS Interactive**	**29.951**	**74.332**	**0,8**
[P]	**Fox Interactive Media**	**29.908**	**117.551**	**1,3**
[P]	**WordPress**	**23.333**	**60.086**	**0,7**
[P]	**eBay**	**21.603**	**58.477**	**0,7**

GOOGLE JULY 2011		Total Unique Visitors (000)	Entries (000)	% of Entries
	Google Search	**160.092**	**8.650.506**	**100,0**
[P]	**Google Sites**	**143.519**	**2.503.621**	**28,9**
[M]	*Google*	*138.389*	*2.131.189*	*24,6*
[M]	*YOUTUBE.COM*	*56.338*	*302.025*	*3,5*
[M]	*Blogger*	*24.773*	*66.145*	*0,8*
[P]	**FACEBOOK.COM**	**72.593**	**574.555**	**6,6**
[P]	**Yahoo! Sites**	**60.799**	**311.919**	**3,6**
[P]	**Microsoft Sites**	**40.084**	**179.694**	**2,1**
[P]	**Wikimedia Foundation Sites**	**33.630**	**127.753**	**1,5**
[P]	**Amazon Sites**	**24.877**	**66.542**	**0,8**
[P]	**AOL, Inc.**	**23.261**	**80.339**	**0,9**
[P]	**eBay**	**19.277**	**63.745**	**0,7**
[P]	**Ask Network**	**15.155**	**29.517**	**0,3**
[P]	**Viacom Digital**	**13.455**	**26.339**	**0,3**
[P]	**New York Times Digital**	**13.143**	**24.651**	**0,3**
[P]	**CBS Interactive**	**12.908**	**24.330**	**0,3**

GOOGLE JULY 2011		Total Unique Visitors (000)	Exits (000)	% of Exits
	Google Search	**160.092**	**8.650.506**	**100,0**
[P]	**Google Sites**	**118.265**	**1.203.876**	**13,9**
[M]	*Google*	*101.603*	*730.518*	*8,4*
[M]	*YOUTUBE.COM*	*70.214*	*370.579*	*4,3*
[M]	*Blogger*	*34.102*	*97.612*	*1,1*
[P]	**FACEBOOK.COM**	**75.927**	**517.505**	**6,0**
[P]	**Yahoo! Sites**	**69.709**	**318.620**	**3,7**
[P]	**Wikimedia Foundation Sites**	**44.040**	**194.318**	**2,2**
[P]	**Microsoft Sites**	**41.631**	**145.688**	**1,7**
[P]	**Amazon Sites**	**33.588**	**89.248**	**1,0**
[P]	**AOL, Inc.**	**30.475**	**89.682**	**1,0**
[P]	**eBay**	**23.463**	**67.740**	**0,8**
[P]	**Ask Network**	**22.695**	**38.090**	**0,4**
[P]	**New York Times Digital**	**20.221**	**35.240**	**0,4**
[P]	**CBS Interactive**	**19.594**	**37.183**	**0,4**
[P]	**WordPress**	**14.146**	**26.699**	**0,3**

Source: comScore Media Metrix. Area: United States. Measures: Total unique visitors, entries and exits. Top-left table and top-right table report, respectively, the sources of entries on Google Search and the websites to which Google Search visitors were directed in November 2009. Bottom-left table and bottom-right table report, respectively, the sources of entries on Google Search and the websites to which Google Search visitors were directed in July 2011. [P] denotes the propriety domain, [M] denotes the media title(s) belonging to a given [P].

Table 8.