CMA
Competition & Markets Authority

Online search: Consumer and firm behaviour

A review of the existing literature

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1. Executive summary

1.1 The Internet has triggered a revolution in how consumers can search for information and make purchases. Consumers are now routinely using the Internet to look for products online, to compare different prices and offers and to investigate the quality of a specific item before purchase.

1.2 As the UK's consumer and competition authority, to perform its functions effectively the Competition and Markets Authority (CMA) needs to keep abreast of changes in the UK economy directly affecting consumers. With e-commerce becoming increasingly important for UK consumers, it is crucial for the CMA to understand how companies compete online and how this affects UK consumers in different markets.

1.3 Traditionally, it has often been assumed that online consumers face little search costs and that traditional barriers to entry have been lowered through increased Internet usage. Both beliefs have clear implications for the functioning of competition online. Understanding whether these beliefs are supported by evidence, and if not how Internet markets really do operate, is therefore vital for the CMA.

1.4 This report attempts, through a review of the available literature on the subject (drawn from the economics and marketing disciplines, as well as from reports by digital marketing, consulting and technology firms), to improve the CMA's understanding of:

(a) how consumers search online when shopping on the Internet; and

(b) how firms compete online given consumer search behaviour.

This research project does not seek to determine whether competition concerns exist in relation to specific areas of Internet markets or in relation to particular firms.

1.5 In this research project, the CMA has been supported by Professor Christopher Holland,[1] who provided academic advice and guidance throughout the project.

1.6 The literature review has highlighted a number of findings in relation to how consumers search online:

[1] Christopher Holland is Professor of Information Systems at Manchester Business School, University of Manchester. More information can be found on the university's website. The contents of the report remain the responsibility of the CMA.

(a) **Consumer search online can be complex but consumers seem to compare fewer options than might be expected:** the evidence available so far in the literature suggests that consumers consider on average 2.1 – 3.0 brands[2] when they want to purchase a product online, despite the fact that search on the Internet appears fairly easy and simple. However, there is some limited evidence that consumers spend more time searching for more complex, differentiated products.

(b) **Consumers often use multiple channels in a given search**: even though consumers may compare relatively few brands, the online paths consumers take before proceeding to their final purchase can be complex and involve multiple channels, both digital (eg search engines, display advertising, price comparison websites and social media) and traditional (eg offline visits to physical stores, telephone).

(c) **Consumers focus mostly on results at the top of the search results, even more so on mobile:** the evidence strongly suggests that, across different digital channels such as search engines and price comparison websites, consumers disproportionately focus their attention, clicks and purchases on links at the top of returned search results. On average, the first three links seem to account for 40-65% of the total clicks on desktop devices. On mobile devices, this tendency is even more accentuated, with the top three links on average accounting for more than 70% of the total clicks. The evidence suggests that this is not simply due to the fact that top links are more likely to be relevant to consumers' searches, but also to the fact that consumers seem to display an inherent bias to click on links in higher positions.

(d) **Consumers differ markedly in their propensity to search**: whereas the majority of consumers seem to search relatively little, there seems to be a significant minority of consumers that engage in large amounts of search.

(e) **Consumer search is sensitive to website characteristics**: website structure and available search tools have a measurable impact on the search activity of consumers. Therefore, online firms appear to have a degree of control over how much consumers search on their websites.

(f) **Consumers may sometimes have significant brand loyalty online**: across numerous sectors and for different types of goods, consumers seem to have a certain propensity to purchase from established, well-

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[2] The CMA reported similar findings in its consumer survey concerning the use of Digital Comparison Tools (DCT): 44% of consumers reported looking at two or three offers when using DCTs. See the full CMA report on its Market Study on DCTs.

known online retailers and brands. This preference holds even after accounting for observable differences in price and other attributes (eg speed of delivery, shipping charges, availability of return policies).

(g) **Online reviews are an important factor in consumers' search and purchase process:** a significant proportion of online shoppers report reading online reviews and feedback ratings, and it seems these do influence to some degree consumers' choices when shopping online: more positive online reviews for a certain product or firm seem on average to be associated with higher sales for that product or firm, even though this has been shown to vary by sector.

1.7 Consumers, however, are only one side of the market. Which strategies have firms selling products or services online employed to compete in markets where consumer search is important?

1.8 The key findings from the literature in relation to online firm behaviour are the following:

(a) **Online retailers have successfully differentiated themselves:** to soften intense online price competition, retailers have managed to distinguish their offering from their competitors' even when the good they sell is the same irrespective of the retailer selling it (eg CDs or books). Some online retailers have specialised in niche markets, while others have developed unique selling points that consumers seem to value and reward with higher prices, such as superior shipping capabilities, easy-to-use website interfaces, secure payment methods and advantageous return and refund policies.

(b) **Online firms can potentially exploit consumers' behavioural biases:** the literature on this aspect of online competition is not extensive but it has documented a few cases in which online retailers have successfully adopted strategies to induce consumers to purchase, such as employing low prices to then present consumers with more expensive products (known as 'bait and switch' strategies) or high shipping charges (known as drip pricing or partitioned pricing strategies), or to use misleading advertising practices to sell lower-quality goods to consumers.

(c) **No clear evidence of underprovision of quality goods on the Internet**: some theoretical concerns may arise on the quality of goods sold over the Internet, given that buying goods online may make it hard for consumers to assess the quality of the product they are buying. However, the available evidence does not suggest that there is systematic consumer harm emerging from the provision of low-quality goods on the Internet.

1.9 Finally, most online firms actively adopt paid search and SEO[3] strategies to make the most of the opportunity presented by online search. More than 60% of online firms are estimated to carry out these activities in-house and paid search often represents the largest expenditure in their digital marketing budget. Overall these two strategies contribute significantly to the visits online firms receive, with organic search accounting for 15-50% of visits on average and paid search usually accounting for 5-50% of total visits.[4]

1.10 These findings on online search have implications for the work of the CMA in five important areas:

(a) **Barriers to entry**: barriers to entry in online markets are conventionally assumed to be low due to the low cost of setting up a website. However, the evidence contained in this review suggests that consumers focus on top links (especially on mobile) and consider a relatively limited number of brands during the search process. These aspects of consumer behaviour may make entry and expansion in online markets less easy than traditionally assumed. On the other hand, consumers' tendency to use multiple digital channels when searching online and the availability of other online platforms commonly used for search, such as marketplaces, offer opportunities for recent entrants to increase their visibility. A careful analysis of barriers to entry in online markets should consider the relative weight of these factors.

(b) **Potential exploitation of consumer biases in relation to online search**: the evidence surveyed here points to some examples where firms have been able to use tactics such as loss-leading strategies, partitioned pricing and misleading advertising to exploit consumers' biases and induce them to purchase. This suggests that the CMA (or other enforcers) should be vigilant and potentially use its consumer enforcement powers so that consumers have access to transparent and easy-to-interpret information online.

(c) **Assessing closeness of competition between firms**: several online data sources could offer evidence of how closely companies are competing with each other:

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[3] Search Engine Optimisation, or SEO, is best defined as a set of techniques that can be used by online companies to rank highly on a search engine's unpaid (organic) results. SEO is discussed in detail in sections 3 and 5 of this review.
[4] The large variation reflects the fact that these averages are computed across different sectors, which may have very different distributions of visits across marketing channels.

(i) Online panel data: this data would allow competition authorities to estimate, for instance, the fraction of a given website's visitors that also visit another, competing website.

(ii) Web server data: these track user behaviour and traffic sources within an individual website, which could be useful when investigating cases in which firms compete on a third-party platform (eg Amazon or eBay).

(iii) Keywords and search terms: if two firms overlap significantly in the search terms they target for their paid search and SEO activities, it may be more likely they are trying to cater to the same customer needs and may thus be close competitors.

Results emerging from the analysis of these data sources should be interpreted with caution and these approaches are best thought of as complements to other, more traditional methods of assessing the closeness of competition between players in the market.

(d) **Practices aimed at limiting online search**: overall, the evidence suggests that the ability to search online is of great benefit to consumers, who can learn quickly about alternative options for the products or services they want, and compare prices and key product features with relative ease. The CMA should thus be alert to practices that might have the effect of restricting the ability of consumers to search online, such as online sales bans or agreements to collude on which keywords to target. It is important to note that, while these agreements may have the effect of reducing competition to the detriment of consumers, they may also have goals other than restricting online search, and thus no general rule concerning them can be made.

(e) **Possibility of price discrimination online**: as the extent of consumers' search activity seems to vary across different individuals, firms operating online may have an incentive to engage in price discrimination between groups of consumers with different propensities to search. When coupled with the increased ability of online firms to track and analyse consumer behaviour, this may suggest that price discrimination could be more common online than offline. However, just as in the offline world, the overall effects of price discrimination can be ambiguous, and therefore a case-by-case analysis would be required to determine whether consumers on aggregate are being made worse or better off.

2. Introduction

Purpose and structure of this report

2.10 The Internet has triggered a revolution in how consumers can search for information and make purchase decisions. Consumers are now routinely using the Internet to look for products online, to compare different prices and offers and to investigate the quality of a specific item before purchase.

2.11 As the UK's consumer and competition authority, to perform its functions effectively the CMA needs to keep abreast of changes in the UK economy directly affecting consumers. With e-commerce becoming increasingly important for UK consumers,[5] it is crucial for the CMA to understand how companies compete online and how this affects UK consumers in different markets.[6]

2.12 This report, which is part of a larger CMA project on online search, attempts to improve the CMA's understanding of certain aspects of consumer search on the Internet through a thorough review of the available literature on the subject. In this research project, the CMA has been supported by Professor Christopher Holland,[7] who provided academic advice and guidance throughout the project.

2.13 Specifically, this report seeks to address the following research questions:

(a) **How do consumers search online?**

(i) What are the main methods consumers use to identify and choose suppliers on the Internet?

(ii) Do consumers differ according to their sociodemographic characteristics in how they use (and benefit from) online search?

(iii) How does this vary across sectors?

(b) **How do firms compete for customers online?**

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[5] eMarketer estimates that in 2015 retail e-commerce accounted for 14.5% of the UK's total retail sales, and is projected to account for 19.3% by 2019. See the full article.
[6] Examples of sectors where the Internet is an important and integral part of the market are online retailers, travel, online betting websites, or gaming websites.
[7] Christopher Holland is Professor of Information Systems at Manchester Business School, University of Manchester. More information can be found on the university's website.

(i) How do firms formulate their strategies for online customer acquisition?

(ii) How does online competition affect product characteristics and positioning?

(iii) How does this vary across sectors?

2.14 A number of other areas relevant to Internet markets are outside the scope of this project. For instance, this report does not cover the following topics:

(a) How search engines compete with each other.

(b) Whether search engines have financial incentives to distort search results.

(c) Other online customer acquisition strategies such as banner advertisements, email and newsletters, retargeting and affiliate programs.

(d) The strategies adopted by firms operating both through the Internet and through brick-and-mortar stores to integrate the two sales channels.

2.15 This report aims to collect evidence from the available literature on how consumers search online and how firms operate given this behaviour. This knowledge has the potential to help the CMA in at least three useful ways:

(a) Enabling the CMA to build more robust theories of harm around the way information is presented and communicated in search channels.

(b) Helping the CMA assess whether scope for consumer harm exists in a market characterised by extensive online search activity.

(c) Suggesting ways of collecting information and evidence from online data that might help the CMA in defining the relevant market and assessing the competitive constraints within that market.

2.16 The literature surveyed includes academic publications from the economics and marketing disciplines, as well as a range of consultancy and business reports to gain access to leading edge ideas from participants in the industry and to present empirical data not available in the academic literature.

2.17 Most of the evidence presented in this review comes from research carried out in the United States, as most of the leading authors and institutions involved in research on online search are based in the US. However, findings from the US are likely to be informative for the UK as well since the two countries share many common aspects in relation to Internet usage and

online search. The following statistics from Google's Consumer Barometer[8] point to similar patterns in many key aspects of Internet search between the two countries:

Metric	*UK*	*US*
Percentage of Internet users going online for personal usage on a daily basis	89%	86%
Percentage of Internet users having made a recent purchase reporting having used the Internet to compare choices online	53%	53%
Percentage of smartphone users using search engines on their mobile devices at least weekly	64%	59%
Percentage of consumers considering only one brand before an online purchase	34%	37%
Percentage of internet users reporting using search engines to make a purchase decision	45%	36%
Percentage of internet users reporting using price comparison websites to make a purchase decision[9]	10%	9%

Nevertheless, we have made reference to UK-specific findings when these were available.

2.18 This project does not seek to determine whether competition concerns exist in relation to specific Internet markets and does not aim to suggest avenues for further investigation by the CMA. However, we have highlighted when findings in the literature suggest there is potential for consumer harm on the Internet.

2.19 The remainder of this paper is structured as follows:

(a) Section 2.2 presents an overview of the different factors at play in the online purchase process.

(b) Section 3 presents some basic facts about the tools that online consumers use to search, with a focus on search engines.

(c) Section 4 discusses the empirical evidence available on consumer behaviour online in the presence of search.

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[8] The consumer barometer is compiled by Google using as data sources two main surveys: the Consumer Barometer survey, which uses a sample of at least 3,000 individuals per country to target online consumers who use at least one connected device and made at least one recent online purchase, and the Connected Consumer Survey, which uses a sample of 1,000 consumers per country representative of the overall total population aged 16 and above (both active online and not active online). See Google's Consumer Barometer.

[9] It is important to note that these estimates are an average across sectors, and may therefore hide significant differences between countries in how price comparison websites are used. For instance, in the UK, this percentage ranges from 0-1% for various sectors (music, restaurants, cinema tickets, hair care, groceries) to 21% for hotels, 24% for personal loans, 25% for flights and 52% for car insurance. US consumers, on the other hand, report using price comparison websites much less frequently for financial products (10% use them for car insurance, and 14% for personal loans), but they seem to use them more frequently for other types of products (23% for hotels, 30% for flights).

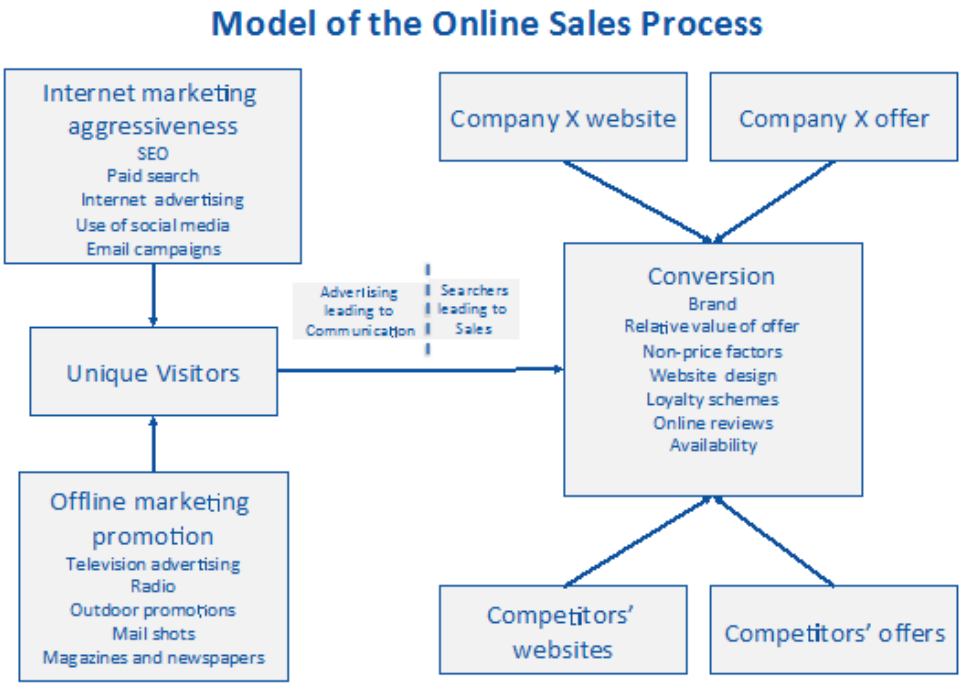
(d) Section 5 presents findings on the strategies firms adopt to compete in online markets characterised by search.

(e) Section 6 discusses the implications of the review for the CMA.

A model of the online sales process

2.20 Before presenting the results of the literature, we present below a model of an online purchase process to show a broad picture of the main factors that are involved when companies sell to consumers directly online:

Figure 1: The online sales process



Source: Holland (2017), teaching slides and working paper.

2.21 The diagram depicts various stages of the online search process as well as the factors at play in each stage. In order to sell goods or services online, online companies have two objectives:

(a) To draw consumers to their website. How retailers decide to generate visits to their website will depend on their sector and their specific marketing strategy, but in general retailers have two options to advertise their online presence:

(i) Internet or digital channels: these involve using search engines, social media, email campaigns and other forms of digital advertising (eg banners on other websites) to generate visits to their own websites. The role played by these channels for both consumers and firms,

especially search channels, is the main focus of this report and is explored in detail in sections 4.1 – 4.5 and 5.2.

(ii) More traditional means of advertising represented in the bottom-left box, such as TV, television or print advertising. This report will not cover extensively these more traditional means of advertising.

(b) Once consumers are on the website, retailers need to make these potential customers 'convert', ie purchase an item or service. Various factors may be important in making consumers purchase from a website, such as price, non-price factors such as delivery options, the website's user-friendliness or the breadth of product selection. The role of these factors will be discussed mainly in sections 4.6, 4.7 and 5.1 of this report.

2.22 It is important to remember that sales may not be the only objective of a firm's website. Indeed, consumers may access a specific retailer's website for other purposes – for instance, they may use the website to benefit from certain after-sale services (eg to track the status of an order they previously made, or to contact the firm's customer service department) or simply to look for information about the company. However, the focus of this report is going to be on consumers who are searching to buy goods and services online.

3. Online search and online shopping at a glance

3.1 This section presents some basic summary statistics which should provide an introduction to online shopping and online search, together with a discussion of recent developments in this field. Its purpose is to provide context for the more detailed findings reported in sections 4 and 5 on consumer and firm behaviour.

Searching on the Internet

3.2 The large amount of information stored online nowadays is such that being able to search quickly through it is a necessity. It is therefore to a degree unsurprising that many search tools have developed over time to sift through the large amount of information on offer on the World Wide Web. Today, online consumers have a vast array of search tools available to them:[10]

(a) They can use search engines (eg Google, Bing, Yahoo!) to look for products through specific keywords to obtain lists of links redirecting to the websites of firms offering those products.

(b) Consumers can also use price comparison websites allowing them to quickly compare price and non-price features of the products they are looking for.[11]

(c) Large marketplaces such as Amazon or eBay can also be used as search tools, where consumers can evaluate offers from competing sellers who use these marketplaces as sales channels.

(d) They can use specialised search tools for particular goods or services, such as online travel agents (eg Expedia, Booking.com or Hotels.com).

(e) Consumers can use social networks (eg Facebook, Twitter, Pinterest and Instagram) and/or entertainment websites (eg YouTube) to look for products or additional information on retailers and brands.

(f) Alternatively, consumers can browse directly through the websites of the retailers they know and trust.

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[10] Notice that some online firms may operate services which fall in more than one of the categories mentioned below. For instance, Google operates as a search engine but also runs an online travel agent called Google Flights (https://www.google.co.uk/flights/).
[11] For example, popular price comparison websites in the UK are www.moneysupermarket.com, www.gocompare.com and www.comparethemarket.com.

(g) Finally, consumers can combine physical search in bricks-and-mortar stores with online search (eg consumers may select a specific drill model by visiting a hardware store and then compare online the prices offered by different retailers), or retailers may redirect consumers to their online portals through offline advertising.

3.3 Among these tools, search engines are a very popular and widely used instrument to gather information[12] online. Already in 2005, Pew Internet[13] estimated that 84% of online users in the US were using search engines. By 2010, McKinsey[14] estimated that this had climbed to 90% globally, and that search engines accounted for 10% of the time spent online by users, amounting roughly to 4 hours per month per person, which climbs to 5 hours per week for knowledge workers in enterprises.[15]

3.4 The most popular and widely used search engine in the world is Google, which is now processing more than 2 trillion queries worldwide per year,[16] which amounts to at least 5.5 billion daily searches (approximately 64,000 per second). According to StatCounter,[17] in August 2016 Google accounted for almost 86% of all searches conducted on search engines through desktop devices in the UK, with Bing and Yahoo accounting for most of the rest with 10% and 3% search share respectively.[18] Google's share of mobile searches in the UK is even higher, at 97%.[19] [20]

3.5 Search is also an essential activity for consumers when it comes to looking for products or services they could purchase online. Online shopping is increasingly important for the majority of UK consumers. The Office for National Statistics (ONS)[21] estimates that, in 2016, 77% of adults in the UK bought goods or services online, up from 53% in 2008. Online shopping is especially widespread among consumers aged 55 or below (nearly 90% reported having purchased goods or services online in the previous 12 months), but it is increasingly becoming commonplace also among older

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[12] We are referring here to any kind of information, not necessarily information related to shopping activities or product information.
[13] Pew Internet & American Life Project – 'Search Engine Users' (2005).
[14] McKinsey – 'The impact of Internet technologies: Search' (2011).
[15] This research was carried out in 2010 – it could be that since then figures might have slightly changed, perhaps with social media taking over some of the time previously spent on search engines.
[16] Search Engine Land article (2016), 'Google now handles at least 2 trillion searches per year'.
[17] StatCounter is a free online tool providing web-related statistics by collecting and aggregating data from a sample of over 15 billion webpages from 3 million websites. See the statistics related to Google.
[18] Other smaller search engines include AOL and DuckDuckGo.
[19] This figure likely depends on what assumptions have been made in its computation about the percentage of iOS users who install Google as default for their search engine when searching on Safari. Google is so far the default thanks to a deal with Apple, but users may manually change it. It is unclear how StatCounter's data account for users who switch to a different search engine.
[20] This statistic includes any kind of search activity conducted on the Web, including searches unrelated to shopping or product information.
[21] ONS – 'Internet Access: households and individuals' (2016).

consumers (77% of consumers aged 55-64 and 45% of those aged 65 and above bought at least once online in 2016, compared to 44% and 16% respectively in 2008). The most frequent shoppers appear to be consumers in the age range 35-44: 38% of them reported buying online eleven times or more in the last 3 months (versus a total average of 30%).

3.6 The expansion of online shopping[22] among the UK population has, unsurprisingly, resulted in consumers using the search tools available to them to look for products and shopping opportunities online. The ONS[23] reports that 76% of Internet users in the UK have used the Internet to find information about goods and services in 2016, compared to 58% in 2007. The same study reports that 51% of Internet users are now using online services related to travel or travel accommodation, up from 42% in 2007.

3.7 Among the search tools consumers can use to look for products or services online, marketplaces have become increasingly important as platforms on which consumers can browse through a wide selection of products.[24] A recent report[25] by BloomReach estimates that in 2016 55% of product-related[26] searches were started on Amazon (up from 44% in 2015), with search engines following at a rather distant 28%, suggesting that Amazon is a very powerful search tool for consumers looking to buy products online. Even though the real figure among the general population is likely to be lower,[27] this result at least suggests that a sizeable proportion of consumers use Amazon to start their product searches, and that this proportion may have increased recently.

3.8 Still, search engines play an important role in the life of UK consumers when it comes to looking for products. For instance, Google has a dedicated service for consumers looking for products, called 'Google Shopping'.[28] Alternatively, users can simply use the basic search engine's interface to search for specific

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[22] eMarketer estimates that in 2015 retail e-commerce accounted for 14.5% of the UK's total retail sales, and is projected to account for 19.3% by 2019. See the full article.
[23] ONS – 'Internet Access: households and individuals' (2016).
[24] A search on Amazon, the most widely used marketplace for generic merchandise in the UK, has returned 5,520 products for 'digital camera', 26,389 results for 'pink dress' and 42,457 results for 'screwdriver set'.
[25] BloomReach – 'State of Amazon 2016' (2016).
[26] Product-related searches are search queries containing terms referring specifically to a product. For instance, 'buy digital cameras online' and 'long blue dress' are all product-related searches.
[27] We note that this may be an over-estimate for the general Internet population. BloomReach's data is collected through Survdata, an online survey company which reaches out to respondents by partnering with online publishers to let their visitors take a Survdata survey to unlock the publisher's premium content (eg premium articles, e-books, videos, etc.). As such, the sample may not be representative of the general online population as visitors of publisher websites may be more likely to be interested in books, which also happen to be often purchased online on Amazon. Therefore, those sampled may initiate searches on Amazon more often than the average internet user.
[28] www.google.co.uk/shopping.

keywords associated to the purchases they wish to make (eg they could look for 'life insurance online').

3.9 When a consumer inputs a keyword in the search engine's search box, the search engine returns a list of results relevant to the search the user has made (the result page is often called a 'Search Engine Result Page'). Typically, results in a given result page can be classified into two categories according to how they are generated:

(a) Organic results;

(b) Paid search results.

3.10 Organic results are generated by the search engine's sorting algorithms, which rank webpages according to their relevance to a specific query.[29] These algorithms are not public and may well be covered by patent protection.[30] Every time a user types a query into a search engine, the search engine's proprietary algorithm runs to return the best predicted matches to the user's query. The matches are sorted in order of 'relevance', ie the score that the algorithm assigns to a specific webpage in relation to the keyword(s) being searched.

3.11 The details of the algorithms used by search engines to determine the 'relevance' of a link to a given search term are not known, but in general they employ many different factors[31] to determine the relevance of a specific link to a given query, including:

(a) How closely the webpage content matches the keywords entered in the search;

(b) How many links redirect to a given webpage, and how authoritative and popular the sites originating these links are;

(c) And, probably, how many 'social recommendations' (eg 'likes' obtained by a webpage or website on social media platforms) the page has.

3.12 In contrast, paid search results are a form of online advertising. Online firms can decide to submit bids to the search engine in order to have the chance to display an ad (consisting usually of a short description and a link to the advertiser's website) redirecting to their own website among the search

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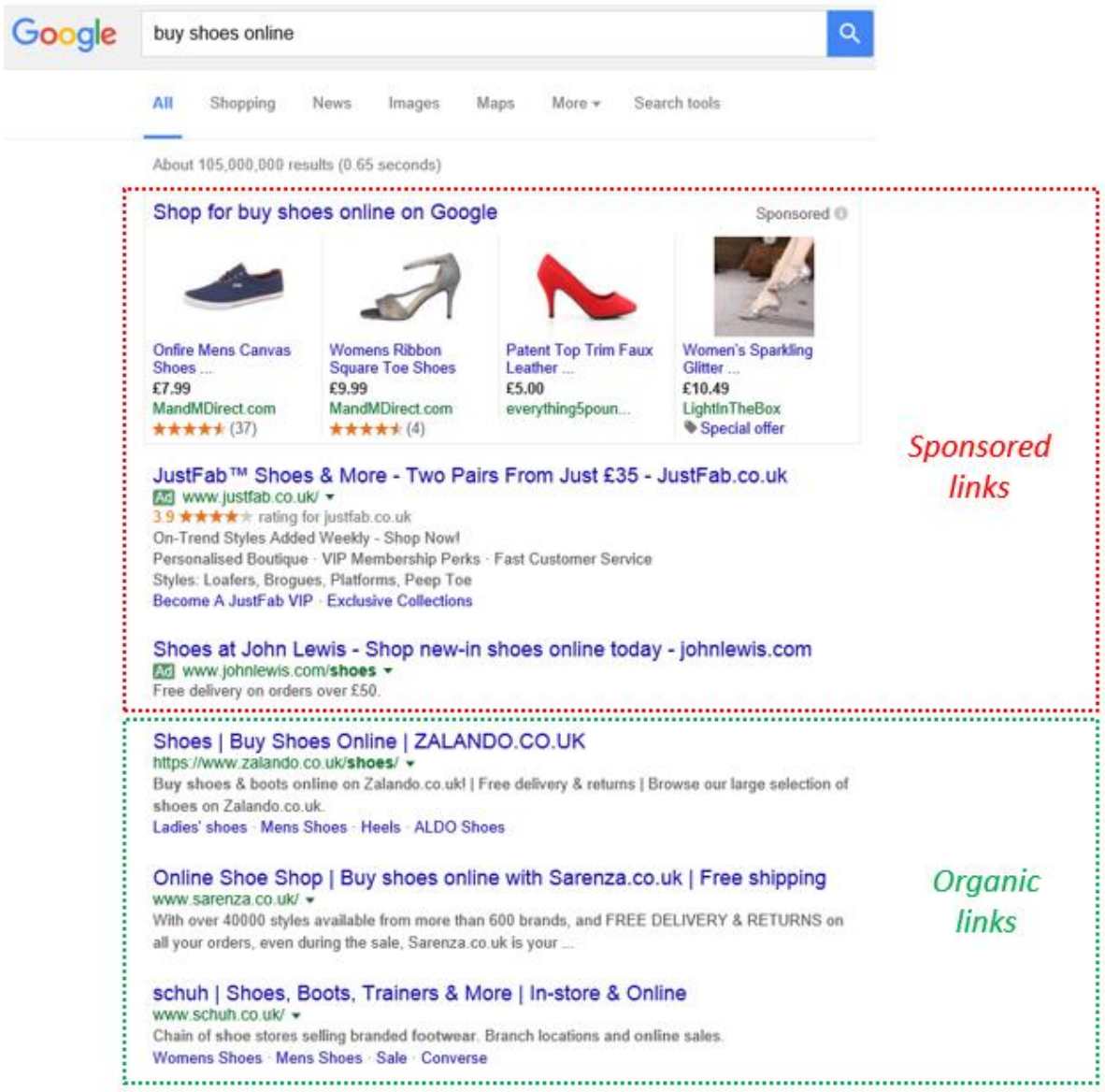
[29] See more information about Google's organic search results.
[30] For instance, Google has patented its 'Method for node ranking in a linked database', the core principle behind its PageRank algorithm.
[31] For an overview of these, see Google's Search Engine Optimization Starter Guide.

results for specific keywords. Whether the ad is displayed or not, and if so in which position, is determined by the search engine considering several factors including the bidding amount and the overall relevance of the website to the user's search query (for more details, see Box 2).

3.13 Figure 2 below illustrates the difference between organic and paid search results in Google:

Figure 2: Organic and paid search results on Google



3.14 Firms that want to be displayed highly on search engine results have two options (and many firms might well do both):

(a) They can design their webpages in ways that would make them appear high on a search engine's organic search results (this is called Search Engine Optimisation, or SEO). Firms engaging in SEO will try to improve

different aspects of their website that affect their ranking on these results. This may involve including more of the keywords consumers search for in different sections of their website, or promoting the website to have more links redirecting to it.[32]

(b) Firms can bid for paid search results to appear when consumers search for certain keywords, for which they will be charged usually on a 'cost per click' (CPC) basis, ie the firm will be charged a fee for every click it receives through that link. The main drawback of this approach is that as soon as a firm stops paying, the advert will disappear from the search engine results.[33]

3.15 Boxes 1 and 2 give further details about how SEO and paid search[34] work in practice:

Box 1 – What is SEO and how does it work?

SEO (acronym for Search Engine Optimisation) is best defined as a set of techniques that can be used by online companies to rank highly on a search engine's unpaid (organic) results. Businesses who want to rank highly on search engines' result pages for certain keywords need to improve and optimise various aspects of their websites and webpages for those keywords. For instance, a seller of blue jeans might try to optimise its website for keywords such as 'blue jeans', 'denim', 'jeans' and so on.

SEO is a complex activity that involves actions on multiple different aspects of the business' website. However, typical activities that an online company might undertake to improve its rankings in search engines are:

- **Keyword research:** clearly the first step is to find out what keywords the company should optimise its website for. These are essentially the keywords for which the company wants to be shown in search results. To understand and select which keywords to target, online companies consider factors such as search volume (ie how often people search for specific keywords), relevance (how relevant these keywords are to their specific business) and competition (how many competitors are targeting the same keywords). Several tools are available to online companies to conduct these activities, such as Google's Webmaster Tools, Moz's Keyword Explorer and Wordstream's Keyword Tool.

[32] More results on the actual strategies used by online companies in relation to SEO are discussed in section 5.2.1.
[33] More results on the actual strategies used by online companies in relation to Paid Search are discussed in section 5.2.2.
[34] Sometimes paid search is referred to in the industry under the name of Search Engine Marketing (SEM) or Search Engine Advertising (SEA). 'Sponsored search' is another equivalent term.

Once businesses have identified the keywords they would like to optimise their website for, they can employ several techniques to rank higher on search engines' algorithms:

- **Create informative 'title tags' and 'meta descriptions' for the webpages:** title tags and description tags are what is shown in search engines' results (see Figure 3 for an illustration). Search engines' algorithms scan these elements to determine the relevance of a webpage to a given search query;

- **Improve the website's structure:** search engines favour websites that are clearly structured and whose URLs (the web address of each page) are informative and contain relevant keywords;

- **Create unique content on their webpages:** search engines favour unique, long content on a webpage over duplicate and sparse content;

- **Generate links to the website:** one of the most important factors that determine search engines' rankings is the number of links redirecting to a given webpage. Search engines interpret links as signals that the content of that webpage is relevant to a search query. Also, the more authoritative and popular the origin of the link, the higher will be the value of such link to search engines' algorithms. Thus SEO specialists may spend time trying to have popular websites (eg bloggers, celebrities, brand advocates) place links to their own website;

- **Building mobile-friendly versions of the website:** search engines usually employ different algorithms for mobile and desktop search to determine the relevance of a given webpage to a search query. Thus it is important for businesses with a high share of mobile visits to have a website that takes into account the specificities of the mobile consumer experience.

In addition to these, other factors such as improving the pages' loading times and making sure the website's content is shared on social media may help in getting a website a higher position in search results. More information on SEO techniques can be found in Google's SEO Starter Guide and Wordstream's Guide to SEO Basics.

Box 2 – What is paid search and how does it work?

'Paid Search' refers to the practice by which online businesses display advertisements on a search engine's result pages when certain keywords are searched. These advertisements are typically composed of a link to a specific webpage on their website (called the 'landing page') together with a short description (see Figure 4 for an example).

Advertisers bid to place their advertisements in response to specific word searches, usually by expressing their bids in terms of the cost they are willing to pay for each click their ad will get (what is known as cost-per-click, or CPC, in the industry). Advertisers may end up paying less than their initial bid because the final cost is determined by the search engine as the minimum cost necessary to hold the ad position.

In the case of Google, the search engine then determines the position of the ad on the targeted keywords (as well as whether it appears at all) by using a combined score, called **AdRank**, taking into account mostly two factors:

- The **bid** of the advertiser (the higher the bid, the higher the likelihood that the ad will show on top of search results);
- A **Quality Score** calculated by the search engine, which is independent of the bid and depends on a number of factors such as the ad's expected number of clicks, the quality of the landing page and the relevance of the ad to the search term (the higher this score, the higher the rank the ad will achieve).

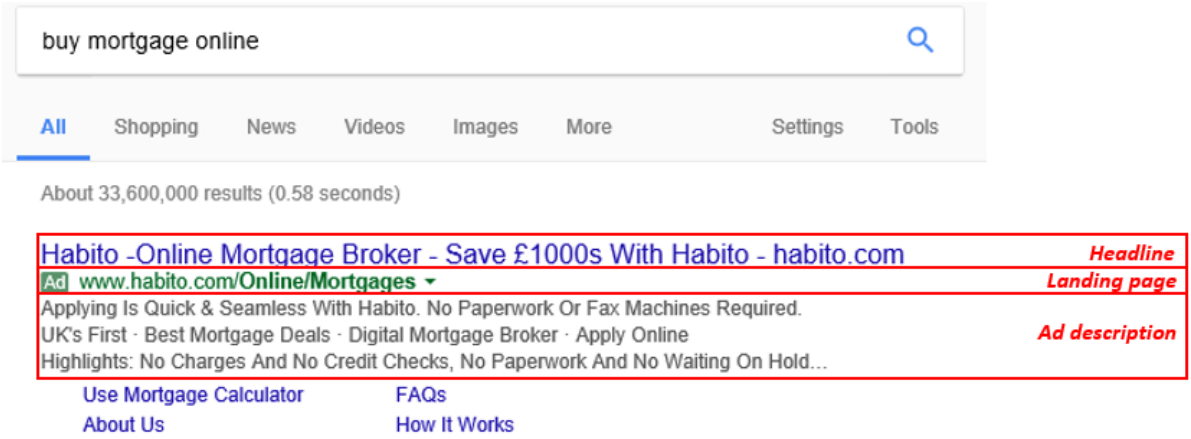
Online companies can adjust several settings of their search ads, some of which are:

- **Match type**: advertisers may choose if they want the ad to be displayed when users search for certain exact keywords (exact match) or whether they want their ad to be displayed when users search for text strings including the keyword they are targeting (broad match). There are also other match types available such as phrase match (where ads may show on searches that are a complete phrase instead of a single keyword) and negative match (where ads would not show when certain keywords are searched);
- **Extensions**: advertisers may decide to include certain additional elements in their advertisements such as seller ratings, consumer ratings, business address or phone number;
- **Bidding type**: users may choose to engage in manual bidding, whereby they set their CPC bids on each keyword they are targeting, or automatic bidding, where advertisers let the search engine adjust their CPC bids in order to achieve a specific goal (eg generate as many clicks as possible), usually with the option to set a CPC bid limit;
- **Charging mechanism**: the most widely used option is for advertisers to be charged on the basis of the number of clicks received, but advertisers may choose alternatively to be charged on the basis of the number of purchases generated or on the number of 'impressions', ie on the basis of how many times the ad was displayed to searchers;
- **Ad scheduling**: advertisers may choose to display their ad only according to a specific time schedule (eg on Tuesdays between 10 and 12 AM).

Given that large online companies may bid on a large number of different keywords, some companies manage their online search ad expenditures through dedicated third-party software such as Marin Software or Kenshoo. Additional information on the settings available to advertisers on Google's and Bing's Paid Search network (AdWords and Bing Ads, respectively) can be found here and here.

Figure 3: Different components of an organic search result

Figure 4: Different components of a paid search result:



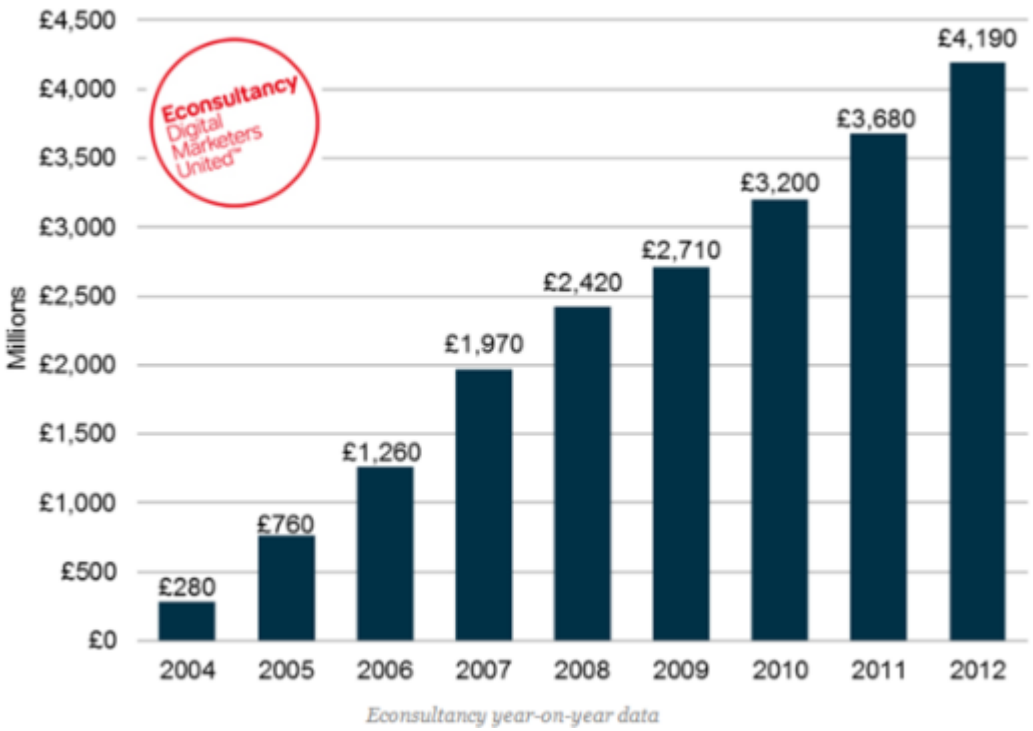
3.16 It is worth noting that investments in paid search often constitute a significant percentage of the total digital marketing budget of the average online firm. A study[35] conducted by PwC and Internet Advertising Bureau estimated that in 2015 paid search accounted for 51% of the total digital advertising spend in the UK, even though this percentage has slightly decreased since 2009 when search accounted for 61% of the total digital advertising spend.

3.17 Paid search results are the most significant source of revenue for search engines. Put simply, search engines monetise their business by making it possible for advertisers to show up on its search engine results. Given search engines' widespread usage, advertisers value the possibility of being exposed to a large pool of potential customers, and the possibility of targeting exactly those individuals who are more likely to be interested in their goods and services by selecting the keywords they wish to bid on.

[35] PwC / IAB – '2015 Full Year Digital Adspend' and '2009 Full-Year Digital Adspend'.

3.18 According to Econsultancy,[36] a digital marketing consulting firm, the size of the UK paid search market has been growing constantly over time and was estimated at £4.2 billion in 2012:

Figure 5: Growth of the UK paid search market



Source: Econsultancy.

The rising relevance of mobile for search and online shopping

3.19 Online shoppers and Internet users in general are increasingly turning to their mobile devices to access the Internet. According to the ONS,[37] in 2016 mobile phones and smartphones were the most commonly used devices to access the Internet in the UK, with 71% of UK adults reporting doing so. By comparison, 62% of UK adults are accessing the Internet using a laptop or portable computer, 52% using a tablet and only 40% through a desktop computer. This increasing trend is also reflected in the share of Google clicks coming from mobile devices: Merkle[38] reported that in Q3 2016, 62% of clicks on Google search ads came from mobile devices or tablets.

[36] Econsultancy blog (2012), 'UK paid search market worth more than £4bn - new report'.
[37] ONS – 'Internet Access: households and individuals' (2016).
[38] Merkle Inc. press release (2016): 'Merkle Releases Q3 2016 Digital Marketing Report'.

3.20 Perhaps not surprisingly, younger consumers are more likely to be mobile-only consumers. According to a survey conducted by comScore,[39] 13% of consumers aged 18-24 are now using only mobile devices to access the Internet (versus 7% for all users), even though consumers aged 25-34 are also often mobile-only users.

3.21 Mobile devices are also increasingly being used as the UK's preferred method for shopping online. According to research conducted by IMRG[40] and Capgemini,[41] in the period from October to December 2015 mobile accounted for 66% of visits to e-commerce websites in the UK, and 51% of UK online retail sales happened on a mobile device.

3.22 Online firms are starting to recognise this trend. A survey of 500 e-commerce professionals carried out by IBM[42] in 2013 found that 75% of the interviewed businesses considered mobile crucial or important to their business, and that mobile accounted for more than 20% of total visits for 41% of the respondents' businesses.

3.23 The increase in mobile usage is not only affecting online commerce, but may have implications for more traditional bricks-and-mortar stores as well. There is some limited evidence that at least the most active consumers may be using their smartphone devices to conduct price comparisons while shopping offline: according to a recent survey by UPS,[43] 29% of heavy online shoppers surveyed used their smartphones while at a physical store to compare its prices with the prices they could find online and 30% used it to read product reviews, even though these figures are unlikely to be representative of the proportion of consumers among the general population engaging in such activities.[44] Similarly, 44% of the online firm executives who participated in an IBM survey on mobile trends[45] believed their customers researched products and prices online before an offline purchase, while 17% believed that their customers were using mobile devices to conduct research while in a store.

3.24 The rise of mobile has important implications for online competition and online search. For instance, Figures 6.a and 6.b compare the search results on

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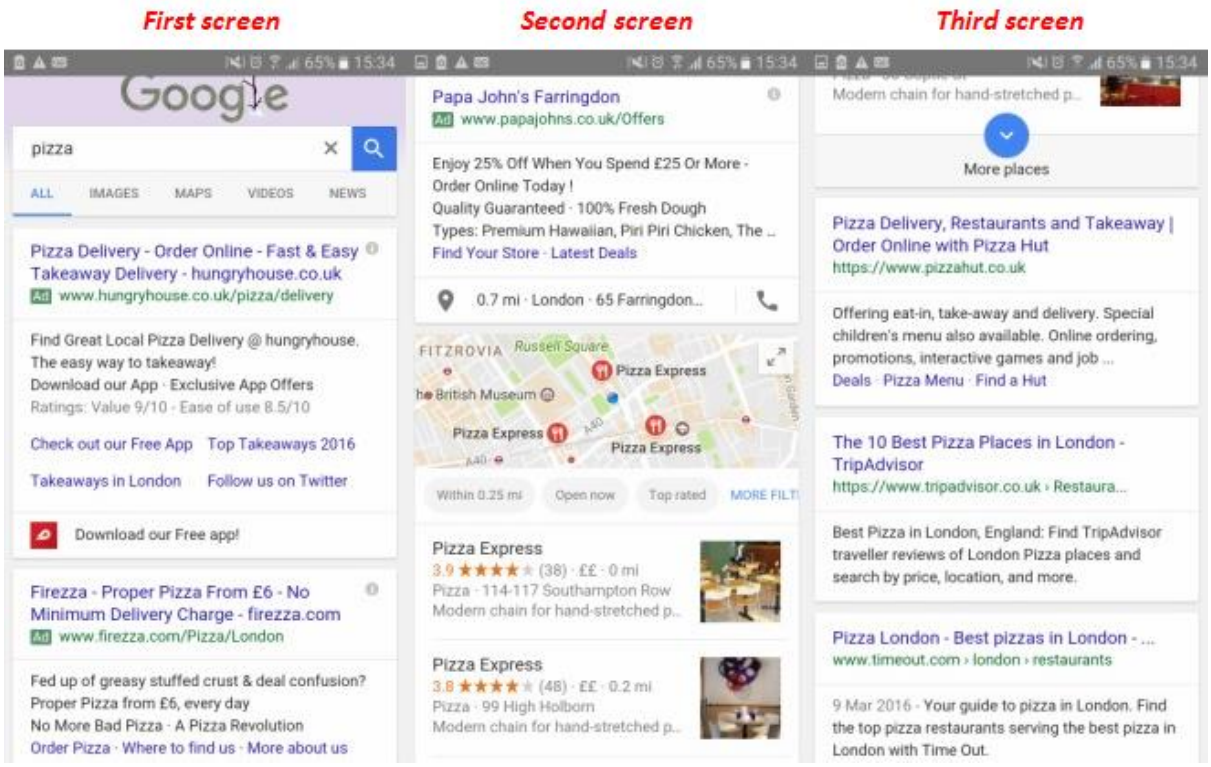
[39] comScore – 'Global Digital Future in Focus' (2016).
[40] IMRG is the UK's industry association for online retail.
[41] Capgemini article (2016) 'IMRG Capgemini Quarterly Benchmarking: Over half of online sales now made through mobile devices'.
[42] IBM – 'The rise of the mobile customer' (2014).
[43] UPS – 'Pulse of the Online Shopper: Empowered shoppers propel retail change' (2015).
[44] This is because the UPS survey consists of 5,118 individuals who are 'heavy shoppers' (ie they completed at least 2-3 online purchases in three months). Given the familiarity respondents have with online shopping, they are probably more likely than the average consumer to compare prices of offline stores with online prices and to explore online product reviews.
[45] IBM – 'The rise of the mobile customer' (2014).

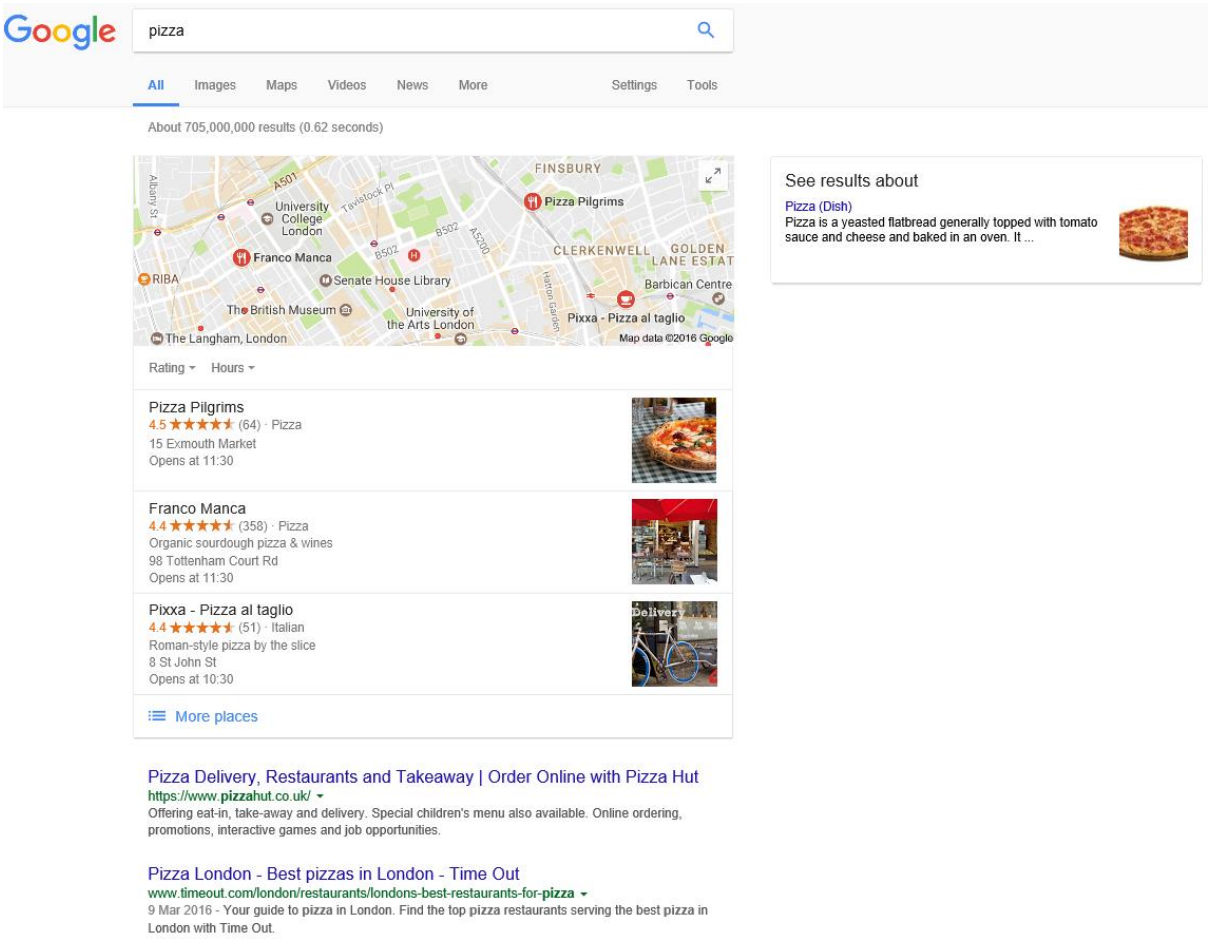
Google for the keyword ‘pizza’ between a desktop device and a mobile device:

Figure 6.a: Search results for ‘pizza’ on mobile



Source: Search conducted on 20 December 2016 from the CMA offices in Victoria House, 37 Southampton Row, London WC1B 4AD.

Figure 6.b: Search results for 'pizza' on desktop



Source: Search conducted on 20 December 2016 from the CMA offices in Victoria House, 37 Southampton Row, London WC1B 4AD.

As it can be clearly seen, in this case the organic results are much less prominent on the mobile phone, appearing only after the consumer scrolls at least two screens. This could have important consequences for consumer behaviour and firms' online strategies, as will be explored in more detail in sections 4 and 5.

3.25 Another important element of the expanding role played by mobile in online shopping is the importance of mobile applications (henceforth, apps).[46] According to comScore,[47] in the UK apps account for 82% of the total minutes spent on mobile[48] by the average mobile user and are thus a potentially

[46] A mobile application, commonly known as an app, is a software application designed to run on a mobile device. Today many of the biggest online retailers (eg eBay or Amazon) have their own dedicated mobile app that consumers can use to place orders on these platforms.
[47] comScore – 'Global Digital Future in Focus' (2016).
[48] Other research agencies have come to broadly similar figures: Forrester Research presents a comparable figure of 85% (see a summary), Yahoo's Flurry Analytics reported a figure of 90% (see a summary) and EMarketer estimated the figure at 86% (see the article).

important channel through which online retailers may be able to sell to final consumers.

3.26 However, it seems that consumers do not install apps very frequently on mobile: according to the same comScore report, 64% of mobile users in the UK typically download no new apps in a given month. It is thus possible that the emergence of mobile and the widespread usage of apps may favour larger, more established players relative to new entrants, even though no empirical evidence for this has so far been produced.[49]

Recent developments in online search

3.27 How consumers search online is essentially dependent on the technology available to them. Therefore, as the technology enabling search evolves, we can expect consumer behaviour to adjust to the most recent developments in online search. There are two relatively recent and interesting developments in online search that are worth discussing briefly:

(a) Search personalisation.

(b) Local search.

3.28 The term 'search personalisation' refers to the situation where two consumers, upon entering the same keyword in a search engine, are not necessarily presented with the same search results: the search results each individual consumer is returned are personalised. For instance, upon searching for '*blue jeans',* consumer A might have Firm A among the search results and consumer B might have Firm B instead. Personalisation works by including information about the user beyond its specific query into the decision on which results to display and in what order. For example the algorithm might decide to display Firm A or Firm B first depending on the observed click behaviour of that specific user in a previous similar query.[50]

3.29 Google has included personalisation of its search results for all users since 2009, even though the degree to which search results change from user to user is not fully understood.[51,52]

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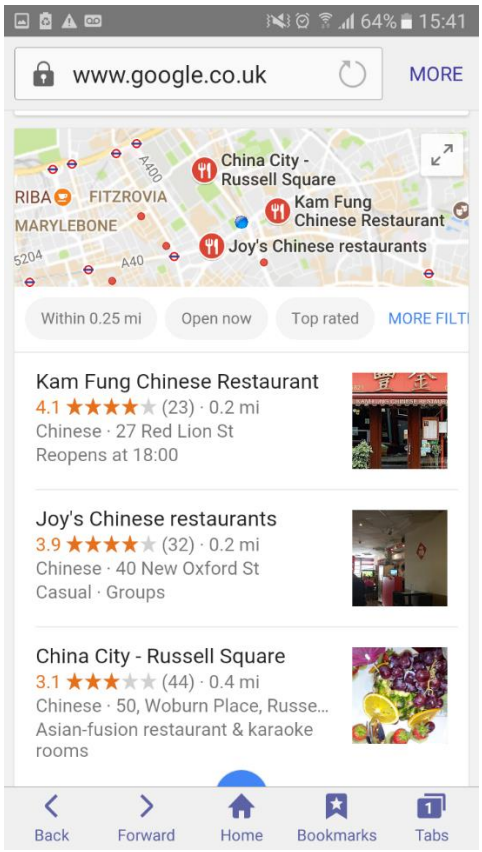
[49] A separate concern relates to apps that are pre-installed on mobile phones. Pre-installed apps might make it difficult for competitors offering similar services to gain access to consumers.
[50] This is a fictitious example to illustrate the idea behind search personalisation, and should not suggest that the brands displayed among the search results are actually changing according to the user's click history.
[51] A team of researchers at Northeastern University have compiled a series of examples on how personalisation might affect search results.
[52] In addition to search personalisation, a recent development in online markets is the possibility to personalise the prices that consumers pay, for instance according to the consumer's location or previous purchase history.

3.30 Another recent development is what is known in the industry as 'local search'. Local search refers to situations where the search results are tailored to a specific location, such as:

(a) 'Implicit' local search: search engines may use location information implicit in the users' IP address[53] (if the search is conducted through a desktop device) or GPS connection[54] (if conducted on a mobile device) to return search results that are relevant to the users' search terms and are physically close to them. For instance, by looking for 'Chinese food' on a mobile handset in Holborn, search results will display links to the websites of restaurants serving Chinese food operating in the area.

Figure 7: Mobile local search results for 'Chinese food' in Holborn



Source: Search conducted on 20 December 2016 from the CMA offices in Victoria House, 37 Southampton Row, London WC1B 4AD.

This topic is outside the scope of this report, but the Office of Fair Trading published a report on personalised pricing in 2013.

[53] The IP address (acronym for Internet Protocol address) is a unique number identifying a specific device connected to an Internet network. Knowledge of the IP address allows to identify the approximate location of the device.

[54] GPS (acronym for Global Positioning System) is a geographical location system providing devices equipped with GPS receivers (such as most smartphones) with accurate information about their geographical location.

(b) 'Explicit' local search: this encompasses all searches mentioning explicitly among the search terms a specific location, eg 'Los Angeles hotels' or 'best Sunday roast in London'.

3.31 Both personalisation and local search have important implications for firms trying to become more prominent in search results:

(a) Personalisation means that not every consumer sees the same set of results when searching for a specific keyword, making it harder for a firm to organise and plan its Search Engine Optimisation activities;

(b) Local search also means that firms need to adjust their optimisation efforts to reflect the factors that search engines take into account when returning local search results.[55]

3.32 However, given that these developments are quite recent, no systematic evidence has been produced on their effects on consumer behaviour or on their consequences for online competition. Thus, while it is important to be aware of these developments as they are shaping the way consumers and firms interact and find each other online, we will only make sporadic reference to these concepts throughout the rest of this literature review.

[55] For instance, Google's guidelines for local listings.

4. Online consumer behaviour

4.1 As discussed in the previous section, search is critical to consumers shopping online and has quickly become one of the main tools through which online retailers seek to acquire customers. As such, search plays an essential role for competition in online markets: it facilitates encounters between suppliers and consumers, it may provide a way for consumers to discover competitors' offers and may thus be in certain circumstances a prerequisite for consumers to switch from one supplier to the other.

4.2 The relative importance of the various search tools listed at paragraph 24 in section 3 has been varying over time. In their overview of the history of product search, *De Los Santos, Baye and Wildenbeest (2013)* give some interesting descriptive statistics on the relative usage of these different platforms and tools. Using data from the qSearch[56] database they are able to track the browsing activity of 2 million US users over 1,800 domains, and they find that between October 2010 and June 2012 visits to e-retailers[57] increased by 300% and visits to marketplaces increased by 40%, whereas visits to price comparison websites have remained relatively constant. This suggests that, at least until 2012 in the US, more and more search activity was taking place within retailers' and marketplaces' websites.

4.3 However, it is important to note that these alternatives are by no means mutually exclusive: consumers might search for 'blue jeans' on a search engine and compare the results to the prices on their favourite brand's website. Also, a consumer might type 'high resolution camera' in Amazon's search box, read the product reviews contained there to select a model, and finally go to a price comparison website to find out which retailer is willing to offer the lowest price for that specific model.

4.4 Given the importance of these search channels for many online companies and the steady increase in the usage of online search tools, it is not surprising that academics in the marketing and economics fields have dedicated considerable attention to the issue. There is today a very large body of literature studying empirically how consumers search online on all of the tools mentioned above.

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[56] The qSearch database is compiled by comScore, a leading internet marketing firm which tracks the browsing behaviour of about 2 million households. Their qSearch database specifically tracks users' web search behaviour at 1,800 domains and measures search volume and intensity across and within websites.

[57] The authors classify in this category the online arms of traditional retailers (eg Best Buy, Walmart) as well as pure online retailers (eg Zappos.com), which typically sell products from the company's inventory. Amazon has also been classified for the analysis as 'e-retailer' despite also having a sizeable marketplace business acting as a platform for third-party sellers.

4.5 Despite its large size, the existing literature still suffers from two main weaknesses:

(a) Studies of consumer behaviour usually focus on only one of the search tools available to consumers, thus giving a partial picture of how consumers look for products online. This is mainly due to data constraints: to be able to study the complete path of consumer search across tools one would need to track consumer behaviour both within and across domains, and such data is either very hard or very expensive to obtain. Nevertheless, a few recent papers have taken important steps towards analysing the consumer search process end-to-end;

(b) It mostly focuses on relatively homogeneous goods such as specific CDs, books and videogames. This is done because using homogeneous goods allows the authors to interpret the results more easily, without having to worry about the extent to which product differentiation might explain part of their findings. However, a few recent contributions also explore the process of consumer search in the context of differentiated products.

4.6 The literature is vast but overall it broadly agrees on a key set of findings. Here we discuss seven key themes that emerge from the literature:

(a) Consumer search online can be complex but consumers seem to compare fewer options than might be expected;

(b) Consumers often use multiple channels for a single search;

(c) Consumers mostly focus on the results displayed on top of the search results page, even more so on mobile;

(d) Consumers vary strongly in how they search online;

(e) Consumer search is sensitive to website characteristics;

(f) Consumers sometimes have significant brand loyalty online;

(g) Online reviews are an important factor in consumers' search and purchase process.

Finding 1: Consumer search online can be complex but consumers seem to compare fewer options than might be expected

4.7 Conventional wisdom would suggest that, as the Internet makes it easier for consumers to compare and evaluate different offers, consumers should search more extensively to find the best deal.

4.8 However, empirical evidence from the economics and marketing literature suggests that the majority of consumers, when looking to purchase a good on the Internet, do not seem to consult many different brands' websites. When purchasing a service or a good online, they evaluate relatively few offers independently of how their search is carried out (through a search engine, by browsing websites of different providers, or using aggregators such as online travel agencies or price comparison websites).

4.9 One of the first papers to analyse how consumers search on the web was *Johnson et al (2004)*. The authors analysed the search behaviour of online shoppers for CDs, books and travel by tracking the websites visited and the searches made by 10,000 US households between July 1997 and June 1998.[58] They find that the amount of search conducted for these undifferentiated goods is surprisingly low: households searched on average only 1.23 stores for CDs, 1.1 stores for books and 1.8 stores for travel, despite having a much wider selection of websites available[59] and despite there being significant price variation in these markets.[60] 70% of CD and book shoppers and 42% of travel shoppers were observed to be loyal to just one site.

4.10 This descriptive result alone is significant. All things equal, we might expect lower search costs to lead to higher levels of search, although this might depend on the extent to which firms reacted to a decrease in switching costs by improving their offering and reducing the expected benefits of searching. The fact that Internet search seems actually not to be very extensive could then signify that either:

(a) the Internet does not reduce search costs;

(b) the Internet reduces price dispersion in the market, making gains from search small and therefore reducing the incentives for consumers to search extensively;[61] or

(c) some other effect not captured in the standard models of search is restraining the amount of search consumers do. For instance, when purchases are repeated in time, as consumers become more comfortable

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[58] The authors obtained the data collected by MediaMatrix, a firm recording every web address visited by families participating in its panel via a computer programme installed on the families' home PC. It is worth noting that the representativeness of the sample used by the paper relies on the assumption that MediaMatrix's own sampling methodology results in a sample which is representative of the larger population.
[59] The authors had data on 13 book sites, 16 music sites and 22 travel sites.
[60] See Brynjolfsson and Smith (2000b) for a clear documentation of price dispersion in the early 2000s in these markets.
[61] In section 5 we document how in practice price dispersion is still very persistent even in online markets. For more details, refer to section 5.1.1 and Table 1.

with online shopping they may come to develop preferences for certain websites (for instance, because they find out they offer consistently the lowest prices), and may thus reduce the amount of search conducted.

4.11 Following Johnson's findings, other studies have investigated online consumer search and have mostly confirmed that online shoppers typically search little:

(a) *Zhang et al (2007)*, using comScore data[62] on the browsing activity of 100,000 US households from July to December 2002, find that the average number of websites visited by consumers of music, hardware and travel products were 2.1, 3.3 and 3.3 respectively - higher than the values estimated by Johnson, but still relatively small when it would seem easy to check more;

(b) *Holland and Jacobs (2014)*, using comScore data on purchases of airline tickets in the US, find that only 26% of consumers consulted more than one airline website before their purchase, and the average number of airline websites visited among those consumers who browsed through more than one was just 2.46;

(c) In *Holland, Jacobs and Klein (2016)* the authors confirm that consumers consulted on average 2.5 - 3.0 airline websites.[63] They also provide evidence that the use of price comparison websites for airline tickets does not act as a substitute for direct search on the companies' websites: analysing 42 airline pairs, they find that visitors of an airline website who had used a price comparison website in their search were 2.5 to 4 times more likely to visit also the other flight operator's website than visitors who had not used one;[64]

(d) *Holland and Mandry (2012)* provide evidence of limited search across multiple sectors such as flights, phones, cars, banking products and groceries in the US and UK. The average number of suppliers considered by consumers ranges between 2.1 and 2.8 in every market, with consumers comparing fewer offers for comparatively more complex goods;

(e) In a slightly different context, *Jerath, Ma and Park (2014)* find that consumers do not search many alternatives even when using a search engine to look for products. To do so they analyse data on search results

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[62] comScore is an Internet marketing firm which tracks the browsing behaviour of about 2 million households.
[63] We note that, for a given flight route, the number of available options is usually limited.
[64] Note that this might be driven by the fact that, as consumers went through the options returned by the price comparison engine, they clicked on more than one option and were redirected to several airlines' websites.

from a Korean search engine on 120 keywords for products and services, and show that on average consumers click on only 1.44 links among the search results.

4.12 Overall these results suggest that consumers seem to compare fewer options than we might expect them to in a setting such as the Internet where search is relatively easy and quick to carry out. However, these findings do not say much about why this might be the case, which is going to be explored in the next subsection.

Exploring explanations for low amounts of Internet Search

4.13 Explanations for the fact that consumers do not seem to compare many offers may be multiple and the main reason may vary by sector. One possible explanation is that the availability of advanced search tools allows consumers to target and focus their research, leading them to consider only those options that suit their needs and tastes best. *Parra and Ruiz de Maya (2009)* ran an experiment with 366 subjects who were tasked with purchasing a stereo set online with different search tools. The authors find that subjects who could avail themselves of advanced search tools during the experiment considered fewer options for purchase (an average of 2.77 versus 4.41 for subjects who could not use such search tools[65]).

4.14 Another explanation is simply that the studies reporting these findings do not capture the whole search process of online consumers. In fact, we have to keep in mind that these studies are limited in three important ways:

(a) They do not track user behaviour for a long period of time. Indeed, consumers might very well spread out their search effort over several days or possibly even longer;

(b) They only study consumer behaviour across domains (and might therefore miss searches that consumers undertake within a specific domain such as a price comparison website);

(c) Conversely, they might study consumer behaviour within a specific domain (and might therefore miss searches related to the same purchase carried out on other domains).

4.15 Indeed, there is some evidence that consumers' search patterns are a lot more complex than a simple process of narrowing down their choice from a

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[65] The search tools allowed participants to filter the search results by brand, guarantee, price, sound quality, number of CD readers and several other technical characteristics.

pre-existing set of brands under consideration. In a survey of 20,000 consumers in 5 different countries, McKinsey[66] found that consumers online may start the search process for a specific product with only a few options in mind. As they search more on the Internet through multiple channels such as search engines, marketplaces and social media, consumers may discover additional suppliers on top of the ones they initially considered (the report estimates that 1 – 2.2 brands are usually added to the ones they initially considered when starting the search, depending on the sector).

4.16 *Blake, Nosko and Tadelis (2016)* study user search behaviour for a longer period of time by tracking the behaviour of 500,000 eBay users over 30 days. With this more complete dataset they find evidence of extensive search by consumers, who conduct approximately 36 searches per transaction, spanning an average of 11 distinct days.[67]

4.17 *Mela, Bronnenberg and Kim (2016)* aim to paint a more complete picture of search by relying on an extensive dataset tracking consumers' search behaviour both across and within domains. The paper is also innovative in that it studies search behaviour in the context of a differentiated good, in this case cameras. Their study paints a rather different picture of how consumers search online, suggesting that the search process for differentiated goods may be complex and quite extensive:

(a) The average search activity in their sample spans 3.5 domains[68], 2.8 brands,[69] 6.4 camera models and takes place over an average of 15 days and 5.9 Internet sessions.

(b) However, a consistent minority of consumers remain loyal to a specific retailer or brand (41% and 39% respectively), suggesting that there are some highly active searchers at the upper end of the distribution.[70]

(c) Consumers tend to search relatively specific products as their final choices are often very close to their previously searched items in terms of price and non-price attributes (eg resolution, zoom features, etc.),

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[66] McKinsey – 'The consumer decision journey' (2009).
[67] The study tracks users who are *registered, logged in* eBay users. It could be possible that the sample is not representative of the average 'online shopper' because *registered* eBay users are more likely to be regular shoppers, already familiar with eBay and hence more inclined than the average online shopper to search for longer. Also, it is possible that some of the searches conducted prior to the purchase were simply 'explorative' searches or might have been unrelated to the purchase eventually made (that could be the case if a consumer looked for more than one product simultaneously).
[68] These may include retailer websites, price comparison websites, marketplaces, etc.
[69] Notice that 2.8 brands is actually consistent with the estimates discussed previously of how many different suppliers are considered by consumers when searching online.
[70] See section 4.4 for an explicit discussion of this point.

suggesting that consumers start their search with quite a good idea of what they are looking for.

(d) Consumers frequently revisit previously searched items (31% of the visits in their sample are revisits).

(e) There is no support for the hypothesis that consumers first select a model and then 'price shop' around to find the best price, as most consumers in their dataset search for the model they eventually end up purchasing at only one retailer.[71]

4.18 These contributions suggest that, whereas consumers may indeed be comparing fewer brands than might be expected when shopping online, their whole search process is fairly complex and may be quite extensive, especially in the case of more complex and expensive goods.

4.19 The table below summarises the results presented above:

Source	*Industry*	*Average number of brands/suppliers considered by consumers*
Johnson et al (2004)	CDs	1.23
Johnson et al (2004)	Books	1.1
Johnson et al (2004)	Travel	1.8
Zhang et al (2007)	Music	1.2
Zhang et al (2007)	Hardware	3.3
Zhang et al (2007)	Travel	3.3
Holland and Mandry (2012)	Flights, Cars, Phones, Banking Products and Groceries	2.1 – 2.8
Holland and Jacobs (2014)	Travel	2.43
Holland et al (2016)	Travel	2.5 – 3.0
Mela et al (2016)	Cameras	2.8

Finding 2: Consumers often use multiple channels for a single search

4.20 With the wealth of search tools available to consumers to access web-based shopping opportunities, it should not be surprising that consumers may use more than one as they search for products and services online.

[71] However, we note that price dispersion for a given camera model is low, and there may thus be little benefit for consumers to engage in extensive price comparison.

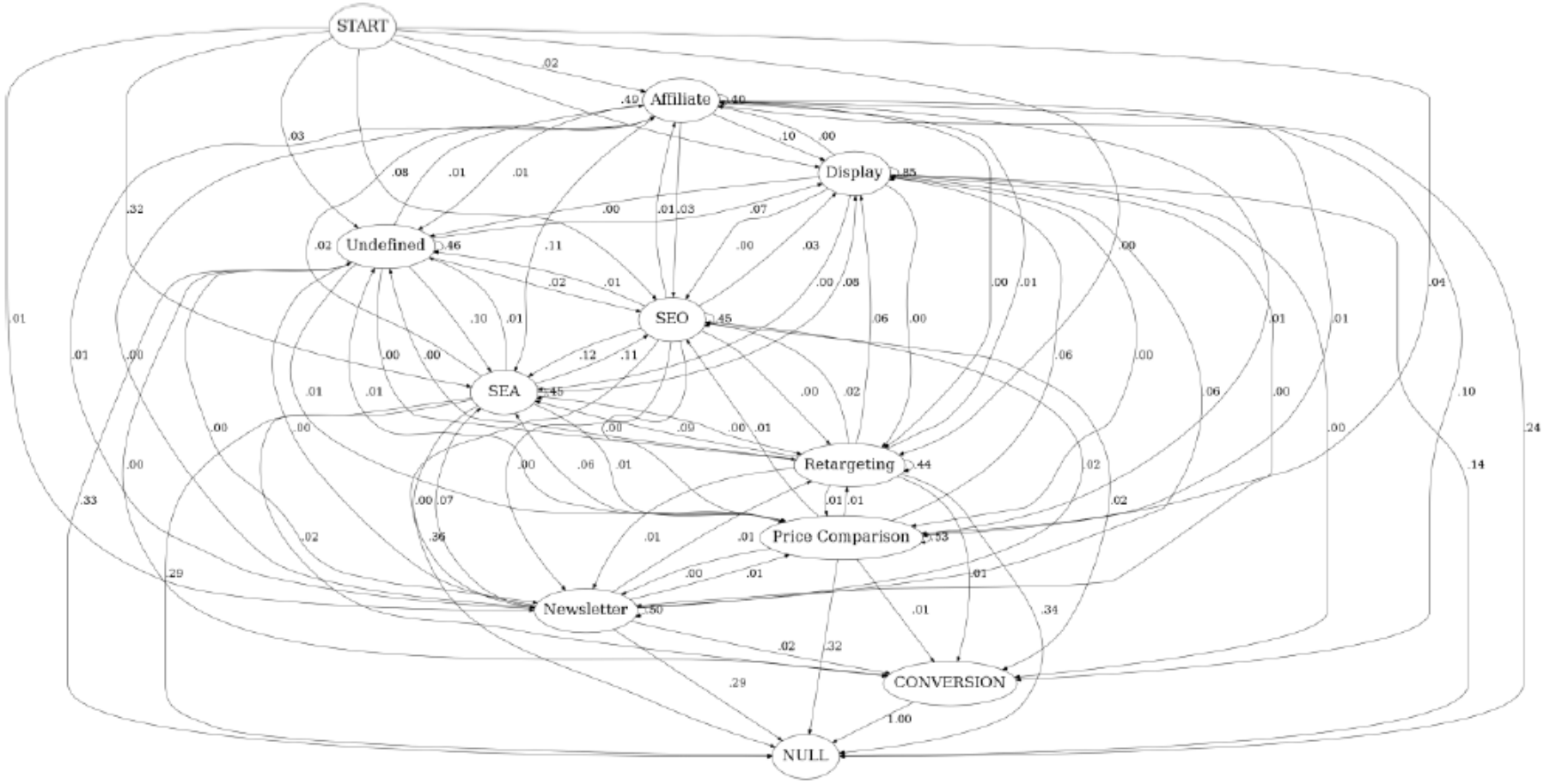
4.21 As an example, imagine consumers wishing to purchase a pair of sport shoes. They may be browsing through Facebook and notice an advertisement which has been shown to them on the basis of the pages they 'liked' on the social media platform. As a result, they might click on the ad to visit the advertiser's website, and then proceed to search for 'sport shoes online' on a search engine to learn more about alternative retailers, perhaps also checking on Amazon their selection of sport shoes for comparison. They may eventually settle on a model and proceed to purchase it offline in order to test the fit of the shoe before completing the purchase.

4.22 This is just an example, but it suggests that the path consumers may take when purchasing online may be complex and characterised by interactions with more than one marketing channel.

4.23 Due to the complexity of the issue, not a great deal of research has been conducted to study the interactions between these different marketing channels, but there is at least some initial evidence that consumers may indeed take complex paths in their journey toward their final online purchase.

4.24 For instance, *Anderl et al (2016)* examine datasets from four different retailers in the fashion, travel and luggage sectors to study the journey consumers take before their final purchase. On average, they find that the average consumer journey consists of 2.86 – 5.25 different 'steps' (where a step is essentially a marketing channel for the firm, eg an ad on Facebook, or a paid search listing on Google, or an organic search result on Yahoo!), suggesting that consumers can indeed take quite complicated paths to their final purchase. The picture below gives an idea of the wide array of possible different paths consumers may take:

Figure 8: Depiction of the online consumer journey for an online retailer



Source: Anderl et al (2016), page 49.

4.25 Figure 8 is what is known as a 'Markov Graph': it aims to represent the possible paths consumers may take across the different nodes (which, in this case, are represented by marketing channels) from the beginning of their journey (the node 'START') to the end of their journey (which could be the node 'CONVERSION', in case the consumer journey ends with a purchase, or the node 'NULL' in case the consumer does not purchase anything). The numbers next to each connecting line represent the probability that a consumer reaches the destination node when starting from the origination node.[72]

4.26 By examining four different datasets, the authors also find that the distribution of visitors across different channels varies strongly according to the sector under consideration. For instance, the value contribution of paid search ranges from 18.5% to 55.5%. A summary table of the estimated value contributions by channel for the four online companies they analyse is reproduced in Annex 1.

4.27 Other studies confirm the existence of these complex interaction patterns:

(a) *Li and Kannan (2014)* analyse the individual visit histories of a random sample of 1,997 visitors of a firm in the hospitality sector over 68 days. They estimate that the average time between the first visit to a website by a consumer and the first purchase from that website is 9.2 days, and that an initial contact with a user through a given channel stimulates further future visits and purchases by that user not only through that same channel but through other channels as well.

(b) *Chan et al (2012)* also find in a different sector (a company selling laboratory equipment) that investments in online search advertisement generate significant offline sales. These 'spill-over' effects are so large that they completely change the economics of paid search for the company under consideration: without considering these effects, paid search would only have been profitable for the company if the cost per click of the ads was less than $0.37. Considering the spill-over effects, investing in paid search for the company was profitable as long as the cost per click did not exceed $10.22.

(c) *Rutz and Bucklin (2011)* analysing data from a US-based lodging company also find that investments in search advertisement on generic

[72] For instance, the probability of going from 'START' to 'SEA' ('Search Engine Advertising', another term for Paid Search) is estimated at 0.52, suggesting that 52% of the consumers in this dataset started their journey by clicking on a paid search advertisement.

keywords (such as ‘cheap hotels’) generated brand awareness and future purchases for the company. Consumers started by conducting a generic search on a search engine, ‘learnt’ about the company by seeing its paid advertisements, and this awareness generated more sales in the future. The authors estimate that 95 clicks on ‘generic keyword’ search advertisements generated 5.5 reservations for the company, of which only 1 was made directly from the clicks on the generic keyword ads. The remaining 4.5 were generated as ‘spill-over’ effect through subsequent visits.

4.28 Overall the literature is too young to be able to identify precisely the strength of these effects, but one conclusion that can be drawn is that these effects do indeed seem quite common, suggesting that today’s consumers are indeed moving across channels fluidly and that the paths they take may be more complex than is traditionally assumed.

4.29 This finding may have important implications for online competition. If it were the case that investments into search advertisements on generic keywords help generate brand awareness for the advertiser, this might mean that smaller or more recent online companies may be able to build a base of organic, sustainable traffic over time starting from investments in paid search and may thus be able to compete with more established companies (assuming they have the resources needed to make the initial investment in paid search). At the same time, early entrants and incumbents may benefit from an advantage since they have had more time to get their brands known to potential consumers through online advertising.

Finding 3: Consumers mostly focus on results at the top, and even more so on mobiles

4.30 One common feature of all online search intermediaries (eg search engines, marketplaces, online travel agents) is that results are displayed in a given order. One obvious question is whether the order in which competing offers are presented influences consumer decisions on which offer to select.

4.31 The literature mostly finds that it does, and that consumers are disproportionately attracted to links shown at the top. This recurrent finding is sometimes called ‘ranking effect’ or ‘position bias’ by economists and marketing experts, and is found to be present in all search intermediaries.

4.32 There are two main reasons why we could expect consumers to be more attracted to top links:

(a) By design, search engines (but other search tools such as online travel agents as well) display the most relevant results to the users' search queries on top. Similarly, price comparison websites usually display the cheapest options on top. Therefore, we might expect consumers to click on these results more often *because they are more relevant to their queries.*

(b) Consumers may also focus their attention on the first links displayed simply because they are the first. In this case consumers may click on results on top not because they are more relevant, but simply *because they are on top*.

4.33 Disentangling these two effects is not straightforward but as we will discuss in the sections that follow the literature has established that both effects take place and both are quite strong in magnitude.

Descriptive evidence of consumers clicking on top links

4.34 In this subsection we will present evidence on the fact that consumers tend to concentrate their click activity among the first search results, without attempting to explain whether this is due to the higher relevance of these links or to other factors such as consumers' bias for links positioned near the top of the screen. We will be discussing in turn:

(a) Where do consumers focus their visual attention when confronted with a search result page?

(b) How do consumers' propensities to *click* on a given link change according to the rank of the link?

(c) How do consumers' propensities to *purchase* from a firm listed in a search result page change according to the position the link occupied in the page?

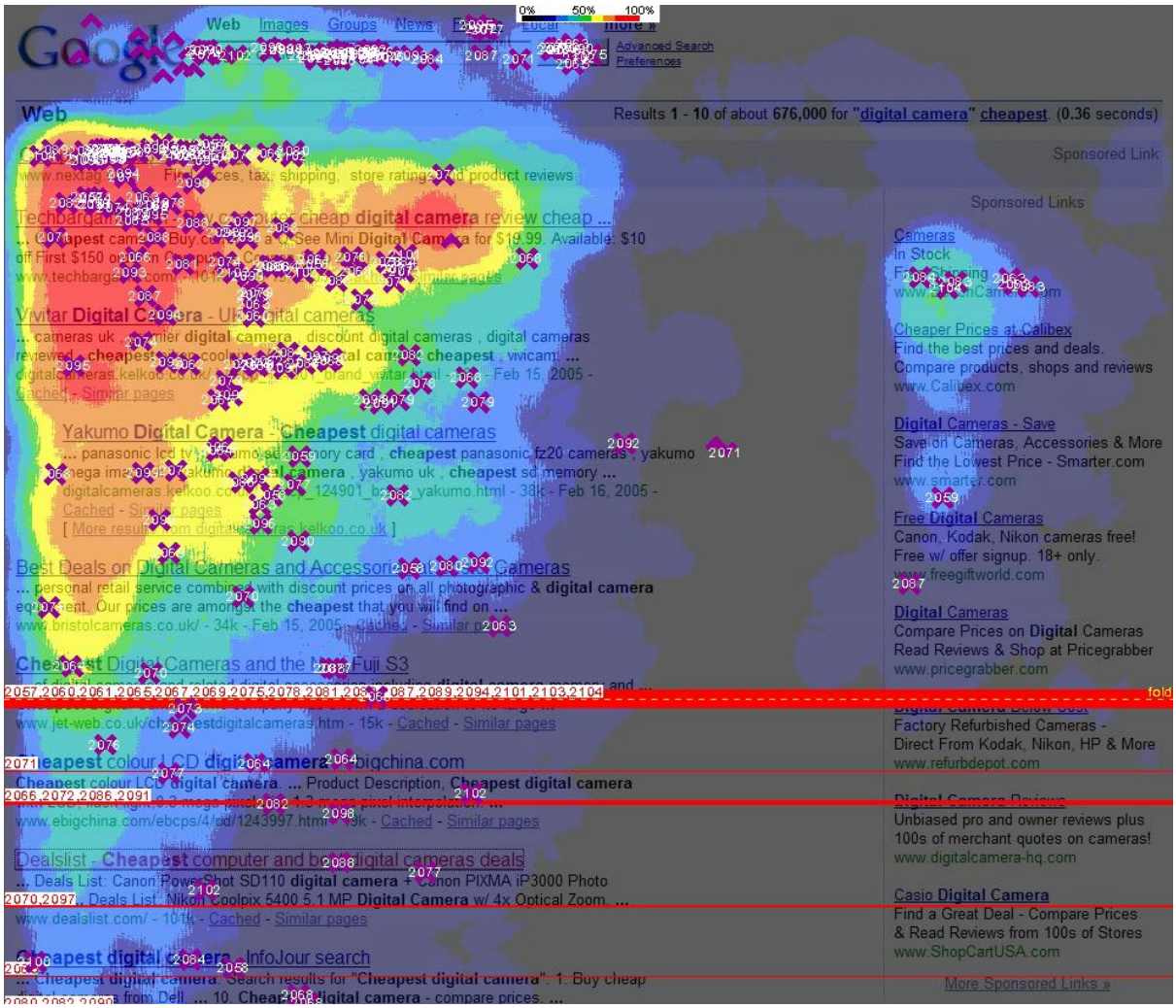
What do consumers see when faced with a list of search result?

4.35 In order to understand where consumers focus their attention when presented with a list of search results, researchers have conducted experiments using an eye-tracking device[73] to measure the subjects' eye movements when reading such pages. One of the early studies in this area has been conducted by *Hotchkiss et al (2005)*, who find that consumers' attention focuses on an

[73] This device tracks the eye movements of the user and maps them to specific locations on the search engine result page.

area largely comprised of the first three organic listings, which they called ‘The Golden Triangle’. A heat map of consumers’ attention areas on a typical Google search results page is represented in Figure 9:

Figure 9: The ‘Golden Triangle’



Source: Hotchkiss et al (2005).

4.36 The authors estimate that the percentage of consumers seeing a given link varies with the position and type of link according to the following schedule:

Position of the link	*Percentage of consumers seeing the link (organic)*	*Percentage of consumers seeing the link (Sponsored)*
1	100%	50%
2	100%	40%
3	100%	30%
4	85%	20%
5	60%	10%
6	50%	10%
7	50%	10%
8	30%	10%
9	30%	N/A
10	20%	N/A

4.37 One important thing to note is that, at the time of the study, Google's result pages looked quite different from today's, and therefore attention patterns may have changed. For instance, in 2005 Google displayed a single banner display ad on top, with paid search results showing only on the side of the screen and not on top of search results. As a result of the introduction of 'top' paid search results, it is conceivable that the proportion of consumers seeing these links has increased since the 2005 study.

4.38 A follow-up study conducted in 2015 by Mediative[74] highlighted significant changes from the earlier 2005 study: the 'Golden Triangle' does not seem to exist any longer, with users seeming to follow a vertical pattern when searching for relevant results, as displayed in Figure 10 below:

[74] Mediative – 'The Evolution of Google's Search Result Pages and Effects on User Behaviour'.

Figure 10: Consumers' attention areas on Google result pages

Source: Mediative (2015).

Because of the new search result page display, now a full 91% of searchers are estimated to see the top paid search result, compared with 50% in the previous study.[75]

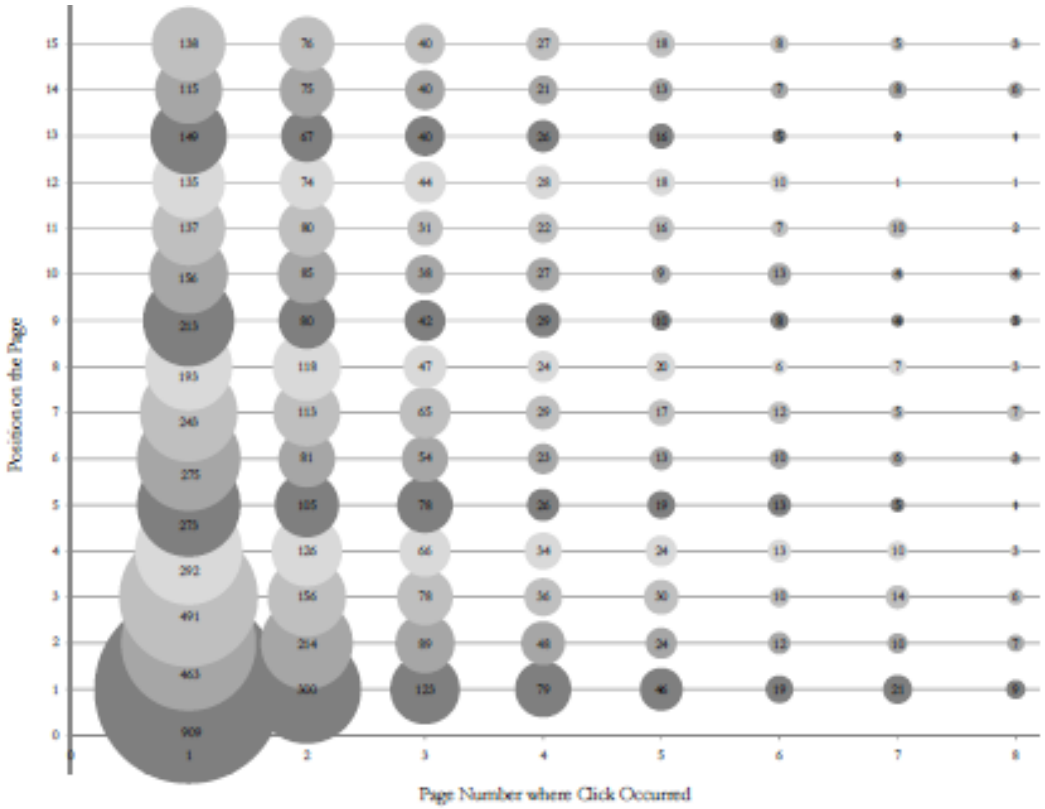
4.39 However, these results only look at the attention span of a consumer over the search engine's results. Does this extra attention actually translate into measurable activity such as clicks and purchases? This question is of prime importance to marketing professionals, and as a result several studies have analysed the relationship between the rank and type (paid, organic) of a search result and its measurable click and purchase activity. In the sections below we summarise these results.

[75] For a visual illustration of how consumers' search patterns have changed over the years as measured by eye-tracking devices, see www.mediative.com and www.marketingprofs.com.

Where do consumers click on when faced with a list of search results?

4.40 One of the studies presenting detailed findings on the distribution of total clicks across link positions is *De Los Santos and Koulayev (2012),* who analysed consumers' propensity to click on different links using a sample of 23,959 unique search histories on listings from a travel and accommodation website. They find that the top three links account for 44% of the total clicks,[76] with 22% being concentrated on the very first link. Additionally, 50% of the consumers who click do so only on one link. We reproduce here below an interesting representation by the authors showing how links on top of each result page tend to be clicked on disproportionately more:

Figure 11: Distribution of clicks by screen page and position



Source: De Los Santos and Koulayev (2012), pg. 35.

4.41 What is especially interesting in the figure above is that the first links on any page obtained more clicks than the last link on the previous page: this suggests that consumers may tend to click on certain links just because they are on top of the list rather than because they expect links higher up in the ranking to be more relevant to their searches.

[76] It is important to notice that the authors here do not attempt at disentangling the 'relevance' effect from the 'position bias' effect.

4.42 *Baye, De Los Santos and Wildenbeest (2015)* test whether the same findings apply also to organic links returned by a search engine. To do so, they use a dataset constructed from over 12,000 search terms and 2 million users to identify drivers of the organic clicks that the largest 759 US retail websites (based on annual web sales) received from search engines[77] in August 2012. Their findings confirm that ranking has a strong impact on the likelihood of a link being clicked. Specifically, a link not appearing in the first 5 pages of results receives 90% fewer clicks on a given search term. For firms appearing within the first 5 pages, a 1% decline in rank for a given keyword implies a 1.3% decline in organic clicks from that keyword. This is a large effect. Take a firm listed in 3rd position. If it slips to the 4th, it suffers a 33.3% decline in rank, which implies a 1.3 * 33.3% ~ 43% decline in organic clicks.[78] Notice, however, that this effect is not merely due to the position of the search result: since search engines try to put more relevant links on top, this effect is the combination of consumers' natural propensity to click on links at the top and consumers' propensity to click on more relevant links.

4.43 The same effects can be observed also in the context of a price comparison website. *Baye et al (2009)*, using a database from the UK website Kelkoo[79] on search activity for 18 of the most popular Personal Digital Assistants, find that the top two links account for roughly 65% of the total clicks and that, all other things being equal, a firm which moves up one screen position enjoys an 18.6% increase in clicks.[80]

4.44 All the previous studies show that click behaviour is strongly influenced by the position of a specific offer within a given list. However, clicks do not imply purchases. Is it the case that offers listed at the top of search results are more likely to be purchased? As we will see in the next subsection, the literature mostly suggests that being ranked at the top of the list has a positive effect on sales.

Do higher rankings translate into higher sales?

4.45 *Ghose et al (2009)* look at the performance of different paid search results on Google from a large US retail chain over a period of six months and find that

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[77] The database included data from different search engines (Google, Bing, Yahoo, AOL and Ask).
[78] This calculation assumes that the effect of rank on clicks estimated across all positions is close to the effect of slipping from the third to the fourth position specifically.
[79] One of the crucial feature of Kelkoo is that, unlike most price comparison websites, the order of the product as displayed to the consumer is independent of its price. This fact therefore rules out the interpretation that consumers are clicking more often on the first offers displayed because of their lower price.
[80] Of course screen position is not everything that matters to consumers: the study also found that a firm offering the best price experienced 60% more clicks than if it had not charged the lowest price, independently of its screen position.

ads placed close to the top generated consistently higher sales for the advertisers. This is because being placed in a lower rank reduced both:

(a) the probability that a consumer would click on the link;[81] and

(b) the probability that consumers would eventually make a purchase once they had clicked on a link.[82,83]

4.46 *Ghose, Ipeirotis and Li (2011)* expand the previous analysis by focusing on paid search results on a large online travel agency. The authors use data on consumer searches, clicks and conversions from 1 million visits between November 2008 and January 2009. They find that being one position higher on the ranking resulted in the ad generating, on average, not only a 7.31%[84] increase in clicks but also a 4.56% increase in actual purchases.

4.47 Overall the evidence presented here suggests that higher positions are indeed associated with measurable activity by consumers: they receive more attention and clicks and seem to be ultimately associated with higher sales for the firms achieving these positions. However, the evidence presented here is purely descriptive and does not attempt to determine the underlying reasons behind this finding, which are going to be explored in the next subsection.

Exploring why consumers click disproportionately on the first links

4.48 As mentioned in paragraph 86, consumers may be acting more on the top links for two reasons:

(a) By design, search engines (but other search tools such as online travel agents as well) display the most relevant results to the users' search queries on top. Similarly, price comparison websites usually display the cheapest options on top. Therefore, we might expect consumers to click on these results more often *because they are more relevant to their queries.*

(b) Consumers may also focus their attention on the first links displayed simply because they are the first. In this case consumers may click on

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[81] This probability is known in the online marketing and e-commerce industry as 'click-through rate', or CTR.
[82] This probability is known in the online marketing and e-commerce industry as 'conversion rate', or CR.
[83] Notice that, while the first effect is expected, this second effect might not be. It could very well be that the propensity to purchase was lower among the top positions if these were clicked upon by users who are just browsing for options and are less inclined to make an actual purchase.
[84] Notice that this effect is quite small compared to some of the findings presented earlier on. This might be due to the fact that this analysis focuses on *paid* links, for which the order of display might be less important than for organic links.

results on top not because they are more relevant, but simply *because they are on top*.

4.49 To be able to disentangle these two effects, descriptive statistics such as the ones presented in the preceding subsection are not enough, and a more thorough analysis is needed. In the paragraphs that follow, we will summarise the research employing techniques that are able to independently estimate the size of these two effects.

4.50 *Craswell et al (2008)* study the effect of ranking position on the probability that an organic search result is clicked. The authors employ an experimental approach to vary the position of the links without changing the links themselves (and hence their relevance): they use 108,000 instances of 'experiments' by a major search engine in which the ranking of results was randomly flipped and find that position bias is particularly strong among the first 3 links (ie, consumers seem to be drawn to click on the top 3 links irrespectively of their relevance). However, after position 4 the authors don't find strong evidence of any position bias.

4.51 More details on this paper are summarised in Box 3 below:

Box 3 – Measuring click position bias (Craswell et al.)

In the preceding paragraphs we presented evidence for the fact that consumers tend to concentrate their clicks among the first search results. However, as discussed at the beginning of section 4.3, this pattern may be due to two different reasons:

1 Because the link appears to be relevant to the consumer's search query, since search engines and other search platforms usually sort search results in descending order of relevance.

2 Because the link is displayed at a higher rank and is thus more visible and more prominent.

Craswell et al. (2008) try to disentangle the two effects above through an experimental approach.

The authors collect data from a major search engine on the links that searchers clicked on after a search query when presented with a list of results. Crucially, some of these result lists were altered by the search engine by flipping adjacent results: for instance, whereas normally the search engine would present link A in position x and link B in position (x+1), in the altered search results link B will be presented in position x and link A in position (x+1). By comparing the probability of a link being clicked between the 'altered' and the 'standard' result displays, the authors are able to estimate the change in the probability of a click that is solely driven by a change in the ranking position and not by a change in the relevance of the link.

The authors find that the difference in the probability of a link being clicked when its position was changed was significant for links placed in positions 1-3 (ie links which went from position three to position two and from position two to position one saw an uplift in their probability of being clicked), suggesting strong evidence for consumer position bias at these links. However, after position 4 the authors do not find significant evidence of position bias (ie, links placed in fifth position on average did not increase significantly their probability of being clicked when they switched to fourth position).

Overall this suggests that consumers may be influenced in their decision-making by the position of the link only when this link appears very high in the search engine results. For positions 4 and below, the observed data suggests consumers may assess each link solely on the basis of their relevance without being influenced by the specific position of that link among the list of results.

4.52 Another paper using experimental techniques to isolate the position bias effect is *Novarese and Wilson (2013).* The authors monitor economists' downloads of papers on a scientific update newsletter. Even when the order of the papers in the newsletter was randomised, so that the link's position in the list had no relationship to the paper's relevance or importance, economists were much more likely to click on the links appearing at the top of the list: papers listed on top received an average 30-40% more downloads than papers in other positions.

4.53 Curiously, the authors also find evidence of weaker 'bottom effects', ie papers at the bottom of the list tended to be downloaded more frequently than average, ruling out possible explanations that downloaders had learnt to expect that the top links were more likely to be more relevant links. This also suggests that downloaders exhibited propensity to click on certain links for reasons unrelated to the expected relevance of the link but purely because of the position at which the results were displayed.

4.54 In contrast to *Ghose et al (2009)* (cf paragraph 99)*, Ursu (2015)* finds that once we control for the relevance of the link, ranking in and of itself may affect clicks but may not affect conversion rates.[85] To do so the author studies an interesting dataset to compare the effect of two different ranking systems on Expedia:

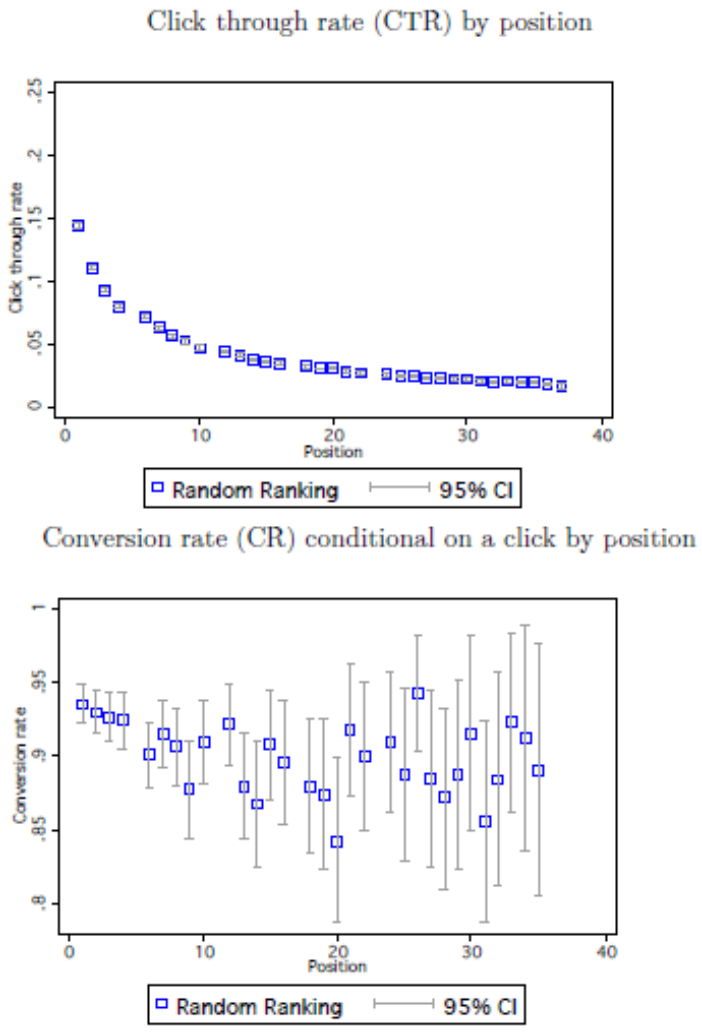
[85] In this context the conversion rate is defined as the proportion of consumers who purchase an offer over the number of consumers who clicked on that offer's link. In other words, it is the estimated probability that a consumer will purchase a specific offer, conditional on the consumer having clicked on that offer's link.

(a) Expedia's proprietary ranking, that sorts alternatives according to their 'relevance'.[86]

(b) A random ranking system, in which the order of results was chosen randomly.

The author finds that, whereas a higher position in the Expedia proprietary rank was associated with an increase in both click-through rates and conversion rates,[87] a higher position in the random ranking was only associated with an increase in the click-through rate and had no significant effect on the conversion rate (ie the proportion of consumers clicking on a specific link who make a purchase), as is apparent from Figure 12:

Figure 12: Effects of random ranking on click-through rates and conversion rates



Source: Ursu (2015), pg. 12.

[86] As with many other online websites, Expedia displays on top results that are deemed to be more 'relevant' based on criteria such as the history of conversion and clicks of these specific results.
[87] Of course this is partly because results displayed on top are identified by Expedia as being more relevant to the customer's query.

4.55 It is still worth noting that links at higher positions likely generated more orders and sales, as a higher position increased the proportion of visitors clicking on the link (the click-through rate) and did not affect the proportion of customers clicking on a specific link who make a purchase (the conversion rate).

4.56 This study uses data from the travel industry and its findings may not necessarily generalise to other sectors or industries. Whereas the search process on Expedia shares several key aspects with the search process on other search engines (eg results are presented in descending order of relevance over multiple pages), the specific nature of the industry may play a role in explaining the results. For instance, when choosing a hotel or other accommodation users may tend to analyse the offers in detail comparing them across multiple dimensions such as price, location, facilities and others. Since consumers scrutinise attentively search results after clicking on them, we may not be surprised by the fact that the conversion rate on a given link does not seem to be influenced by the rank position of the link (if the position is unrelated to the relevance of the link to the search query). This may not be true for other types of goods that may be characterised by more 'impulse' purchases.

4.57 In contrast, *Narayanan and Kalyanam (2015)* find that a higher position on Google search ads increased clicks but not orders. Ads placed one position higher saw their probability of being clicked on increase by 10%-20% but this did not imply that higher ranks generated a higher number of orders: orders only increased between the 6th and 5th ranked link (the final link included on the first page of search results). This result may be explained by the specific nature of the industry studied by the authors: whereas the precise industry is not revealed due to confidentiality reasons, the authors specify that it is characterised by slow-moving, high-margin goods with infrequent purchases. The infrequency of such purchases may cause the results on orders to be statistically not significant, as acknowledged by the authors themselves in the paper. Another possibility is that these are relatively expensive goods, inducing consumers to scrutinise offers attentively before making a final purchase.

4.58 *Narayanan and Kalyanam (2015)* report also some interesting results on how position effects might vary across different advertisers and keyword types.[88]

[88] One of the most interesting features of the study is that the authors have complete data on search ad positions, clicks and orders for four different advertisers (not just one like most of the studies mentioned before). This allows them to compare the magnitude of position effects across a number of different variables.

For instance, they find that position effects are weaker for larger firms.[89] Also, they find that keywords containing references to specific brands or products (eg '*Rayban sunglasses'*) show weaker position effects than more generic keywords, as should be expected since consumers start with a more targeted search in the first place.

4.59 Overall the evidence discussed above suggests the following three implications:

(a) Links at the top of the list will tend to be clicked on more often by consumers. Consumers overall seem to place a large fraction of their clicks, ranging roughly from 40 to 65%, on the top three links in a list.

(b) Consumers do not only click on the top links because of their higher relevance, but also because they seem to have an inherent bias for links shown higher up in the results page.

(c) The position of the link may in some instances not affect the propensity of consumers to complete a purchase from that link. However, for firms it might still be valuable to be displayed among the top links because, due to the higher number of clicks they receive, they still generate more sales than links in lower positions.

How does this change on mobile?

4.60 Finally, it needs to be stressed that all the previous results use data generated from consumers using the Internet from their desktop devices. However, online shopping is increasingly taking place on mobile devices as discussed in section 3. Do ranking effects play a role also in a mobile environment? And if so, are they stronger or weaker than the effects observed on desktop computers?

4.61 *Ghose et al (2013)* investigate this specific question and find that ranking effects are even stronger on mobile devices. They analyse data from a Korean microblogging site, finding that posts one position higher see an increase in clicks of 37% amongst mobile visitors, whereas the increase for PC users was only 25%. The authors suggest this might be due to smaller screens that make it harder to scroll through all the links. As the share of online shopping done on mobile devices is very likely to keep on increasing in

[89] One may speculate that this is due to larger firms being more well-known, leading to consumers being influenced more by the brand name than by the ad position when selecting which ad to click on. Additional evidence on the role of brand name is discussed in Finding 6.

the near future, these findings suggest that ranking effects may become more prevalent among the population of online consumers.

4.62 These results are confirmed in an eye-tracking study run by Mediative,[90] a firm specialised in offering digital marketing solutions to businesses. The study found that consumers' tendency to click on the top links is exacerbated on mobile:

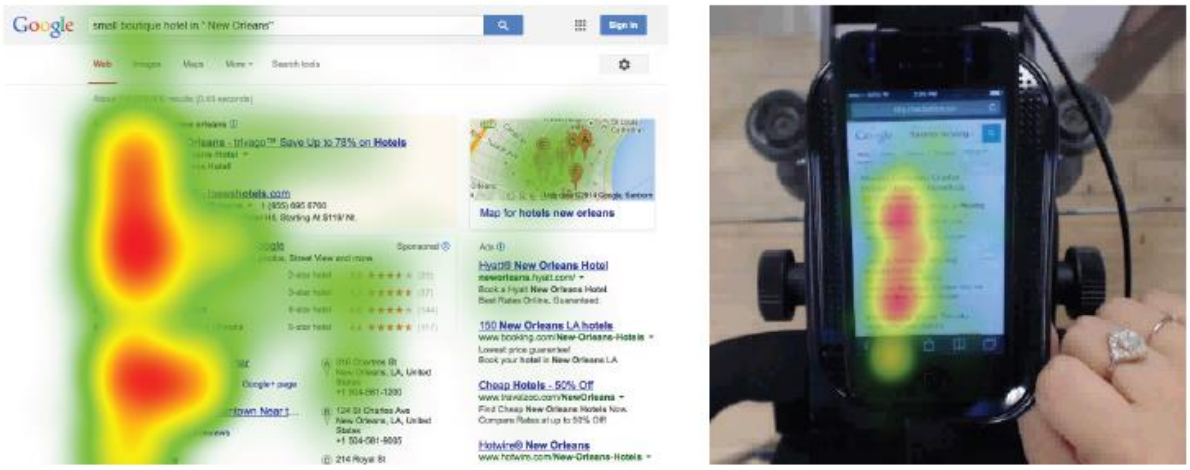
(a) The time it took for consumers to read the first organic link was 87% longer on mobile than on desktop.

(b) On mobile, 19.2% of the clicks happened on the top two paid search results (versus 14% on desktop).

(c) Overall on mobile 92.6% of the clicks happened on the area above the fourth organic listing.

4.63 These heat-maps produced as part of the Mediative study display the differences we can observe between where consumers' attention is focused on desktop and on mobile:

Figure 13: Attention areas on desktop and mobile



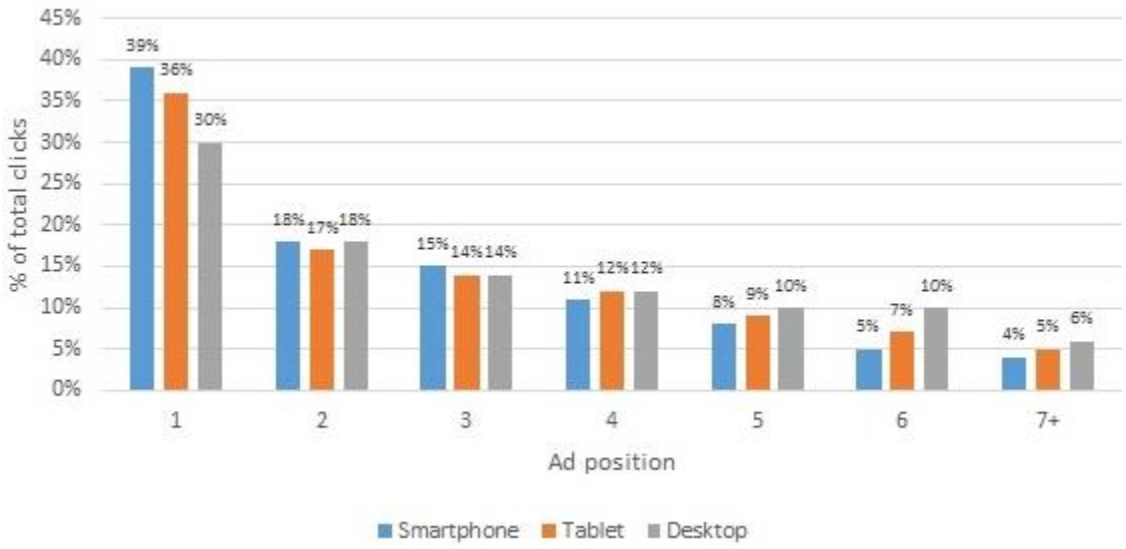
Source: Mediative.

4.64 Another study by Marin Software[91] confirmed that the tendency to click more often on the results at the top when using a mobile device applied to paid search results as well. In fact, they found that the highest-ranking search ads accounted for a larger share of the total clicks on mobile (39%) and tablet

[90] Mediative – 'The Evolution of Google's Search Results Pages & Effects on User Behaviour' (2014).
[91] Marin Software website.

(36%) than on desktop (30%), as summarised in the graph presented here below.

Figure 14: Click share by ad position for different devices



Source: Marin Software, 2014.

4.65 Overall these studies broadly agree in confirming that the share of clicks captured by top links is larger on mobile devices than on desktop devices, possibly due to reduced screen size or to the different arrangement of search results on mobile. As more and more shopping takes place on mobile devices, this might mean that for online firms it may be more and more important to achieve a good ranking in order to acquire customers from search. The table below summarises the results discussed above:

Source	*Share of clicks first 3 links (Desktop)*	*Share of clicks first 3 links (Mobile)*
De Los Santos and Koulayev (2012)	44%	N/A
Baye et al (2015)	~73%	N/A
Mediative	N/A	92.6%*
Marin Software	62%	72%

* This figure refers to clicks on links above the fourth organic listing. So it includes the top three organic listings as well as the top paid links.

Finding 4: Consumers vary strongly in how they search online

4.66 Several of the results outlined above rely on averages. However, there is some evidence pointing to the fact that consumer behaviour online may be highly polarised between a small group of very 'active' consumers, who

engage in extensive search, and a large group of largely 'passive' consumers who engage in minimal search.

4.67 For instance, *Jerath, Ma and Park (2014)* in their study of search results on a Korean search engine (cf paragraph 65) also conduct a customer segmentation analysis, finding that consumers could be grouped in two distinct customer segments: 'low-involvement' customers, representing 94% of customers, and 'high-involvement' customers, representing the other 6%. Whereas low-involvement customers only clicked on an average of 1.22 links per search, high-involvement customers clicked on average on 4.85 links per search, four times as much.

4.68 *Brynjolfsson, Dick and Smith (2009)* also find large differences in consumer search behaviour in their study of a dataset of 10,627 consumer searches at a price comparison website for books over a 12-month period which resulted in 460,814 separate retailer offers.

4.69 The authors conduct an interesting 'consumer segmentation' analysis showing that consumers differed markedly in their propensity to search. They classify consumers into four categories, of which we report the incidence in the sample in square brackets:[92]

(a) 'First screen' consumers who only click on offers on the default screen [91%];

(b) 'Low screen' consumers, who scroll on lower screens to click on offers not displayed on the default screen [9%];

(c) 'Sorting' consumers who choose to sort by a column other than total price [<1%];[93]

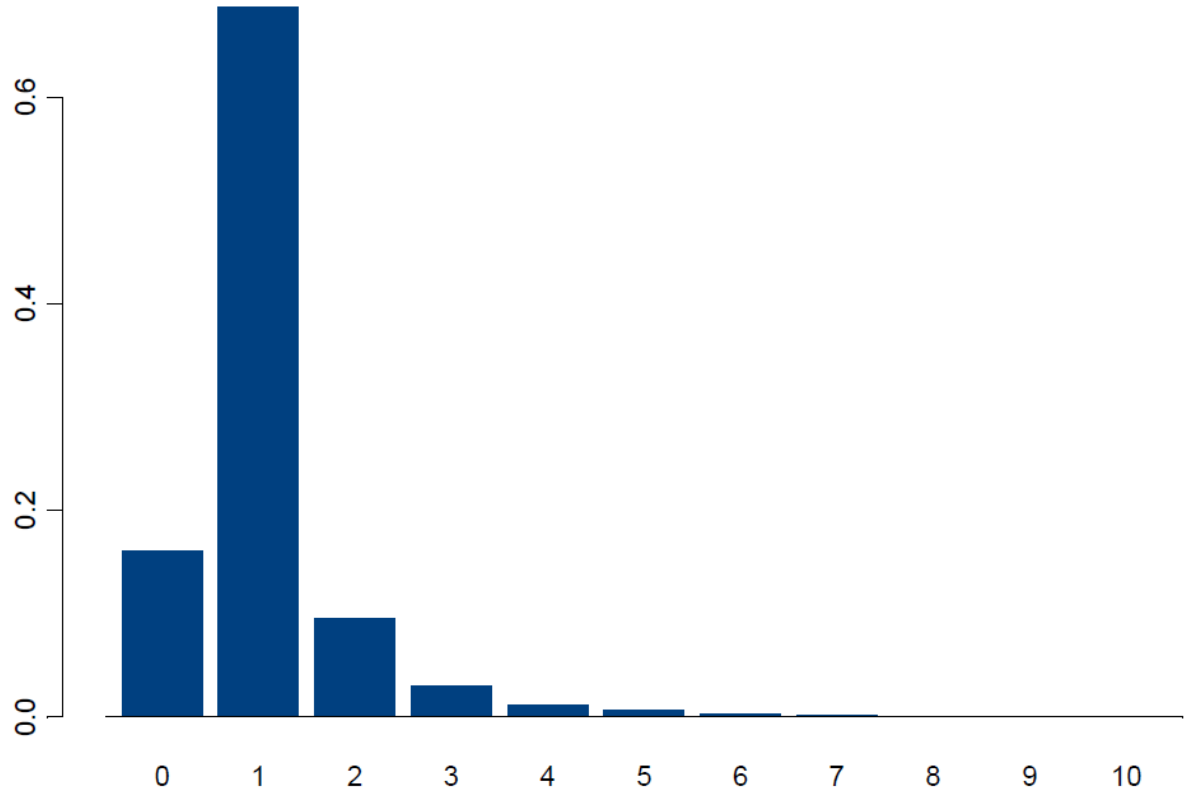
(d) 'Multiple click' consumers who click on more than one offer [16%].

4.70 *Brynjolfsson, and Smith (2000a)* also come to similar conclusions when they observe that the vast majority of consumers using a price comparison website

[92] Notice that the four categories are not mutually exclusive, and hence the percentages in square brackets do not sum to 1. For instance, a consumer might be both a 'first screen' and a 'multiple click' consumer.
[93] We note that the fact that only 1% of consumers sort by results other than price could be due to the specific item being sold on the website (books). One could imagine that for other, more complex types of goods or services such as mortgages or flights, this percentage would be higher. For instance, the CMA found in its consumer survey on the usage of Digital Comparison Tools that 49% of DCT users either re-ranked or filtered results. This could be due to the fact that their survey included consumers who had purchased more complex types of goods such as flights, hotels, motor insurance and energy, which consumers may be interested in ranking by factors other than price. See the full report on the CMA DCT market study.

for books (Dealtime) click on less than 2 offers among the search results.[94,95] The rest of the consumers constitute a long tail that clicks on significantly more offers, as shown in Figure 15:

Figure 15: Observed frequency of offers selected during a session



Source: Brynjolfsson and Smith (2000a).

4.71 In an experimental setting, *Karimi, Papamichail and Holland (2015)* also find evidence that consumers differ in how they search online. The authors use a questionnaire to classify 55 participants into 'maximizers' (ie, consumers who have a tendency to look for the optimal choice) and 'satisficers' (ie, consumers who settle with options that are 'good enough'). They then monitor the online purchasing behaviour of the subjects who were asked to choose a bank account and a mobile phone. They find that 'satisficers', as expected, compared significantly fewer options and spent less time searching than 'maximizers'.

[94] It should be noted that the majority of consumers going to a price comparison website could be more likely to be 'deal-hunters' and that therefore could be expected to click just on the offers with the lowest price without being interested in exploring more. Also, it could simply be that the price comparison website's algorithms work well in presenting the most relevant results to consumers, who as a result do not need to search extensively.
[95] Similarly, the CMA found that 51% of Digital Comparison Tool users consider less than three offers when using DCTs. The full report on the CMA DCT market study.

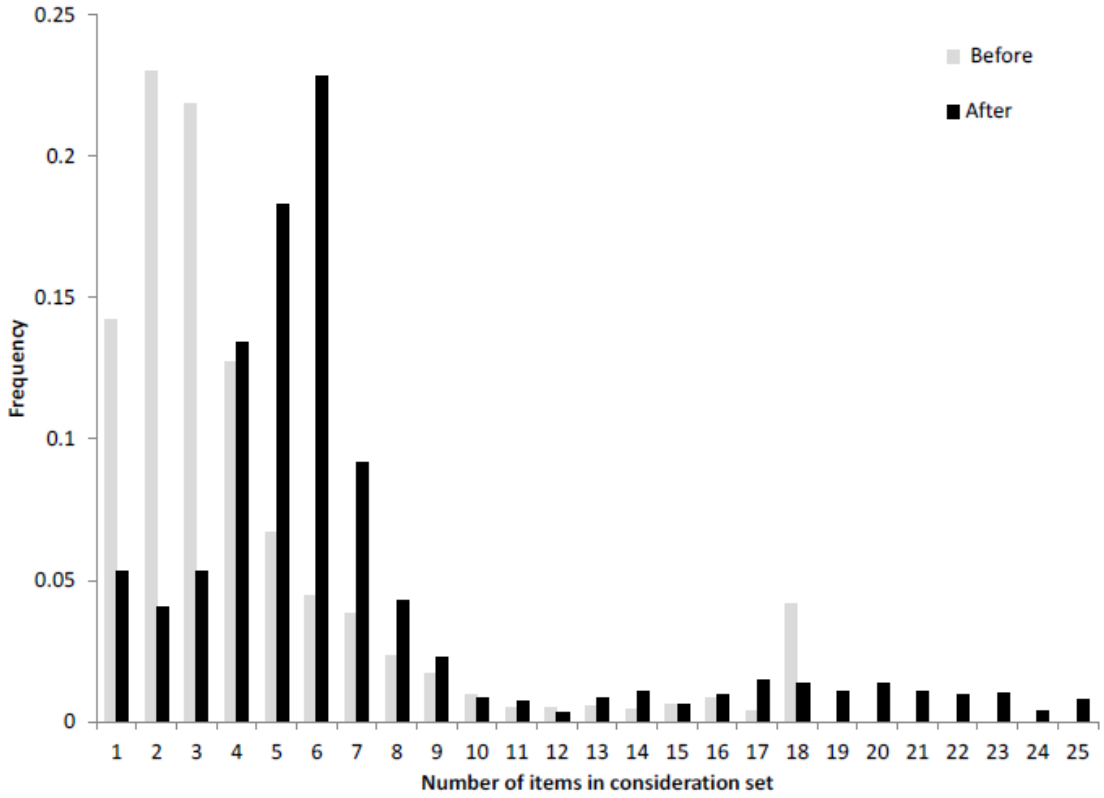
4.72 Overall the literature seems to suggest that the relatively low average amounts of search identified in Finding 1 may be hiding skewed distributions of consumers, with the majority of consumers engaging in little search and a minority of consumers searching relatively extensively, even though the relative proportions of these two groups are likely to vary by sector.

Finding 5: Consumer search is sensitive to website characteristics

4.73 How consumers search is clearly dependent on the technology available to them. In many cases, this technology can be controlled by online firms (eg Google may change its algorithm for ranking results, or an online marketplace could redesign how its search results appear to online shoppers), thus potentially giving them a degree of control over how and how much consumers search online. The literature discussed below offers some empirical evidence for this fact.

4.74 *Dinerstein et al (2014)* provide evidence that the website interface has a tangible effect on how consumers search for products on an online marketplace. To do so, they study the effects of a change in how eBay displayed its search results, which made it easier for consumers to compare the prices charged by different sellers for the same good, by making the price comparison more prominent on the website. By analysing searches conducted for a specific video game, the authors find that the number of offers consumers clicked on increased markedly after the change, as shown in the picture below:

Figure 16: Change in the number of offers considered by consumers



Source: Dinerstein et al (2014), Figure 3.

4.75 This result provides evidence for the intuitive fact that simply making comparison more prominent on the website, and hence easier for the consumer to use and interpret, might increase the number of alternatives considered by consumers during their decision process.

4.76 Another study showing that consumers' search intensity is largely dependent on the characteristics of the technology they are using is *Ghose, Ipeirotis and Li (2011)*. In a controlled experiment where subjects were asked to complete a simulated online hotel booking, the authors found that the default ranking of the simulated online travel agent they were using had a significant impact on the measured click-through rate of subjects. Specifically, subjects whose search results were ranked by 'Best Value'[96] clicked on more hotels, searched for more time and had a higher overall propensity to purchase.

4.77 Interestingly, the study also found that consumers who could personalise their search results[97] spent more time searching and clicked on more hotels on average, but had a lower propensity to purchase. The authors speculate that

[96] This ranking was determined through an algorithm that showed the results most likely to convert at the top.
[97] Subjects could personalise their search results by controlling various variables, for instance the weight that the ranking algorithm would attach to different hotel parameters such as price and location.

this might be because personalisation should be especially useful to consumers who are browsing through the website without having any specific purchase in mind, whereas subjects in the experiment had clear instructions on what to look for and were thus not interested in personalising the results to match their preferences.

4.78 These findings seem to confirm the intuition that firms, to the extent that they can control how their websites are designed and which search tools are available on their websites, can have a degree of control over how much consumers search and compare options. How they choose to exercise this degree of control will likely depend on their incentives: in certain instances firms might have an incentive to promote extensive search and comparisons (eg platforms such as marketplaces may be designed to encourage consumers to search more), whereas in others firms might have an incentive to 'steer' consumer search towards products that are most profitable for the firm (eg by setting their search algorithms to display more profitable products in higher positions).

Finding 6: Consumers sometimes have significant brand loyalty online

4.79 Sections 4.1 and 4.3 presented evidence that consumers may compare only a few offers when shopping online, and that they tend to concentrate on the offers ranked at the top of search results. These results could be explained by the fact that consumers may have a preference for well-known firms or firms they associate with a positive reputation. In the marketing and economics disciplines, the value of having a well-known brand with an established reputation is often referred to as 'brand equity'.

4.80 The role played by an online firm's reputation in shaping consumers' purchasing decisions has been explored in several studies, among which is *Baye, De Los Santos and Wildenbeest (2015)* already mentioned at paragraph 96. The authors seek in this paper to estimate the impact of a given set of variables on the number of clicks on organic links in search engine results. They are particularly interested in comparing the effects of two different variables: the rank position of the link and the consumer's perception of a retailer's reputation.

4.81 The authors construct a measure of 'brand equity'[98] which is shown to have a large effect on total organic clicks:[99] a 1% increase in brand equity leads to 0.084% increase in total organic clicks. By comparison, paragraph 96 reported that a 1% decline in rank implied a 1.3% decline in organic clicks on any given keyword. Given that the average retailer in the authors' sample was relevant for about 60 keywords, and assuming that each keyword generates the same number of clicks, a 1% decline in rank on a given keyword only implies a 0.02% decline in total organic clicks, roughly one fourth of the estimated magnitude of the brand equity effect.[100]

4.82 Their findings are confirmed in a follow-up paper, *Baye, De Los Santos and Wildenbeest (2016)* which, using the same data, confirms that 'brand prominence' is a major predictor of whether a consumer will click on any given link. The authors estimate that going from the median to the top spot in name prominence would yield a 154% increase in number of clicks (much higher than the impact of moving from the median to the top spot in terms of ranking, which they estimate at 80%).

4.83 Another paper looking at the effects of brand reputation online is *Jeziorski and Moorthy (2016)*: they investigate whether the effect of rankings on clicks differs between well-known firms and lesser-known firms. The hypothesis behind their research is that, while famous online retailers should not suffer much if their links see their rank decrease (because consumers still recognise their name among the search results and are drawn to click on their links), the effect of the link's ranking on the clicks received by lesser-known online firms should be much more pronounced.

4.84 To test their hypothesis the authors rely on a dataset composed of 20 million search impressions, related to the purchase of digital cameras, over a period of 3 months at Microsoft's Live Search (the precursor to today's Bing). Their main finding is that, for lesser-known[101] firms, switching from second position to first position in the search rankings led to a 33-50% increase in their click-through rate. This effect was less pronounced for more well-known firms, for which switching from second to first position only increased the click-through rate by 0-13%, confirming thus that link position is less important for well-

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[98] The measure they construct relies on counting searches that include the specific name of the e-retailer in the keyword (eg '*shoes Amazon'* or '*Barnes & Noble books discount').*

[99] It should be noted that the same results hold even when the authors run the analysis only on searches that did not include the retailer's name, reducing concerns about the circularity of the argument.

[100] 1.3%/60 = 0.02%. This assumes that every keyword generates the same number of visits, and that only one keyword is affected and all others remain as they were. This would not be the case if there keywords were closely related and affected by similar changes.

[101] The authors quantify how well-known an online retailer is likely to be by using the rank of a given firm (eg Nikon) on Alexa.com, an analytics company which publishes 'popularity rankings' of major websites using traffic metrics such as unique visitors and page views.

known established players. This is in line with the results discussed above which suggest that reputation and consumers' perceptions of specific online retailers do indeed seem to be a substitute to rankings in generating clicks.

4.85 Similar results are found in an earlier paper by *Smith and Brynjolfsson (2003)*. The authors use data on around 40,000 search sessions from a price comparison website for books[102] over a period of four months in 1999.

4.86 The authors find that, holding constant the price of the offer and other non-price characteristics (eg delivery times, the offer's rank among search results), the likelihood of an offer being selected by the consumer from the list of search results increased markedly if the offer came from one of the three big established online retailers for books (Amazon, Barnes & Noble, and Borders). The effect was particularly strong for consumers who sorted search results by delivery times, suggesting that consumers who value non-price attributes may reward well-known retailers with increased loyalty.

4.87 Surprisingly, the authors also find that this effect was stronger among more frequent customers, undermining the hypothesis that consumers may learn to 'shop around' more as they become more comfortable and experienced with online shopping: on the contrary, it seems that more experienced shoppers may develop stronger preferences for specific online retailers, possibly because over time they come to trust a certain brand with which they had a positive shopping experience.

4.88 These results suggest that certain consumers may come over time to trust and develop a positive impression of certain established players. This reputation may then influence their choices of which supplier to buy from during future purchases.[103] Also, it is worth noting that these results are derived from click data on a price comparison website, which one might speculate are being used mainly by price-sensitive consumers who could place less emphasis on issues such as reputation and reliability.

4.89 The results above are confirmed by survey data collected by *Sen, King and Shaw (2006)* who surveyed 273 university students to analyse their online search strategies. They found that respondents who thought their favourite seller's price was among the high end of the spectrum of possible prices were less likely to use search tools like search engines or price comparison websites. While we do not know how consumers identified their favourite

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[102] EvenBetter.com.

[103] Notice that these effects are compatible with alternative explanations. For instance, if one of the big three retailers offered rewards for frequent or returning customers, consumers may choose to purchase from one of these suppliers not because they have a good reputation or because their brand influences consumers to buy, but merely because of the rewards they might get as a frequent / repeated customer.

seller (it could be because of the retailer's reputation, brand image or because of observable factors such as quality of service), it is nevertheless interesting to note that consumers who thought their favourite seller was relatively expensive reported searching less, therefore possibly preventing them from discovering cheaper options that might be suitable for them.

4.90 The results described above imply that consumers' own perceptions of a retailer's reputation and image are likely to be an important factor in explaining consumers' choice of supplier when purchasing online. However, in and of themselves they do not tell us why and how such perceptions might emerge.

4.91 *Brynjolfsson, Dick and Smith* (2009) offer some insights on what might drive consumers to form perceptions of a specific online retailer by examining the role played by non-price factors (such as delivery terms, returns policy, product availability) in determining how consumers choose which offers to consider when faced with a list of search results.

4.92 The authors rely on a dataset of 10,627 consumer searches at a price comparison website for books over a 12-month period and analyse the click patterns observed on this platform. The authors find that, upon searching for a specific book title, 50% of the consumers do not click on the offer with the lowest price,[104] suggesting the role of non-price factors in determining which retailer to shop from is important. For instance, they find that consumers were less likely to click on offers by suppliers with longer delivery times. They also find that consumers were more likely to click on offers by suppliers with a larger product availability. However, even after taking these factors into account, consumers still displayed a preference for heavily branded retailers (Amazon, Barnes & Noble, Borders), suggesting that brand loyalty is not only driven by delivery times and product availability.

4.93 Overall the evidence presented in the previous paragraphs suggests that the consumers' observed online purchasing decisions cannot be explained solely on the basis of factors we can readily observe such as price, delivery times, returns policies and product availability. Consumers also seem to be rather strongly influenced by their perceptions of specific online retailers. These perceptions may arise for a variety of reasons (good feedback received by friends or family, experience from previous purchases, effects of the branding strategy adopted by the retailer) but they play an important role in shaping

[104] The price displayed in the price comparison website was inclusive of shipping and handling costs.

consumers' decisions and may over time generate a degree of consumer loyalty towards established players with a strong reputation in the market.

Finding 7: Online reviews are an important factor in consumers' search and purchase process, but they may be biased

4.94 Another aspect worth mentioning in relation to consumer behaviour when searching online is that consumers, when deciding on an online purchase, seem keen to use reviews and feedback ratings left by other users who have previously purchased the product or service being considered.

4.95 Online consumer reviews are today a common feature of many popular online shopping services: they are a prominent feature in marketplaces (eg Amazon, eBay), online travel agents (eg Expedia, Booking.com), specialised retailers (eg BarnesandNoble.com) and even search engines (for example, Google often returns a list of user reviews for every local search result, cf section 3.3).

4.96 Estimates of the percentage of online shoppers reading such reviews when making an online purchase vary, but overall different studies seem to indicate that a high proportion of online shoppers make use of this tool:

(a) Reevoo,[105] in a 2012 survey of 1,000 UK consumers, estimated that 88% of consumers 'sometimes' or 'always' consult consumer reviews when making a purchase, even though only 48% reported being influenced by them. The usage of consumer reviews seemed especially widespread in the travel, automotive and financial sectors.

(b) A consumer survey commissioned by the CMA in 2015 in the context of its call for information on online reviews and endorsements[106] suggested that 54% of UK adults read online reviews, especially for one-off purchases and more expensive goods or services.

(c) A 2013 research study of 1,000 consumers conducted by Moz[107] reported that 54.7% of consumers consider online reviews 'fairly, very or absolutely' important when making purchases related to appliances, cars and smartphones.

(d) BrightLocal,[108] in a survey of 1,062 US consumers, estimated in 2016 that 91% of consumers read online reviews 'occasionally' or 'regularly' when

[105] See the results of the survey.
[106] See the full CMA report.
[107] See the results of the survey.
[108] BrightLocal (2016), *Local Consumer Review Survey*.

shopping online (an increase of twenty percentage points since 2010), Furthermore, 64% of consumers reported reading between two and six reviews before they could trust a business, with 32% reporting reading more than six reviews.

4.97 The figures above rely on surveys of online consumers, and it is quite possible that consumers willing to participate in surveys online may be more 'active' and willing to interact extensively with content they find online compared to the average online consumer.[109] Nevertheless, while potentially overstating the figure compared to the overall online population, these results still suggest that a significant proportion of consumers rely on online reviews to assist them in their shopping decisions. However, these figures by themselves do not prove that the presence of online reviews can influence purchases: they simply suggest that consumers consider them important.

4.98 Several academic studies have tried to estimate the impact that consumer reviews have on sales:

(a) *Hu Liu and Zhang (2008)* analyse data from Amazon.com on consumer reviews of books, DVDs and videos, and find that changes in online reviews were indeed related to changes in sales (an additional review providing a better-than-average score tended to increase sales and vice-versa). The impact of consumer reviews was larger for products with fewer reviews (as the number of reviews increased, the impact of an additional review on sales decreased) and tended to decrease over time (sales of older products were less affected by online reviews than more recently launched products).

(b) *Chevalier and Mayzlin (2006)* also find that average review ratings have an impact on sales by analysing data on 2,387 books sold on both Amazon.com and BarnesandNoble.com. The authors acknowledge that it may be difficult to estimate the impact of reviews on sales (for instance, if reviews are positive sales may be increasing not because of the reviews per se, but because of the inherent quality of the book). To control for unobservable factors that may influence sales of a book, such as quality, the authors approach the problem from a different angle: when a positive review on a given book is posted on one of the websites, do the sales of that book increase relative to the sales of the same book on the other

[109] Note that, if consumers willing to participate in online surveys are a very small fraction of the total, these surveys could have a very low response rate. This may imply that the results cannot be generalised to the larger population, especially if consumers answering the survey differ systematically from the average online consumer in the extent to which they use online reviews.

website? [110] They find that this is the case, and also that negative reviews reduced sales by more than positive reviews increased sales, possibly because negative reviews are much rarer at the two sites, so they might have a larger impact on consumers' decision-making.

(c) In other contexts, the actual rating of the reviews did not seem to influence the sales of a specific good. This is the case for instance of movie tickets. *Duan, Gu and Whinston (2008)* find that box office sales were not significantly affected by the rating of a movie on popular movie review sites. However, the authors find that films with more reviews had higher box office sales, independently of the fact that movies doing well at box office are also likely to have more reviews posted about them.[111] The authors interpret this finding as suggesting that 'word of mouth' buzz counts more than the actual ratings to generate sales in the movie industry.

4.99 Overall the evidence presented above seems to indicate that consumers do use online reviews and that reviews seem indeed to influence consumer purchases as it can be seen by their effect on sales. However, the way consumers actually use reviews may vary according to the type of good under consideration: for a good such as a movie, it might be that consumers are not only looking for 'good' movies but 'popular' movies, since movies can be a popular item for discussion with friends and social circles. Instead, for books and DVDs more positive reviews may be associated with more sales since they may increase consumers' confidence in the high quality of the product.

4.100 So far we have seen that feedback ratings and online reviews can be very useful for consumers during their online purchases.[112] However, it is important to recognise that their existence and reliability depend on the fact that other consumers are willing to invest time to write such reviews, and that the information presented in the reviews is accurate and truthful. In fact, online

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[110] The authors' technique to estimate the impact of an additional review on difference between the sales at the two websites rather than on the absolute sales at a specific site is an example of an econometric technique called 'difference-in-differences'. This technique presents some advantages compared to a standard regression, because it can eliminate concerns that some unobserved factor is driving the results captured by the standard regression estimates. More technical details on the difference-in-differences technique can be found in these Imbens/Wooldridge lecture notes (2007).

[111] The authors acknowledge the potential issue of 'reverse causality', ie a high number of reviews could be the effect, rather than the cause, of many people going to watch a specific movie. However they take into account this potential reverse causality issue by estimating a simultaneous equations model where the impact of the number of reviews on box office sales and the reverse impact of box office sales on the number of online reviews are separately modelled.

[112] Online reviews and feedback ratings have been mentioned frequently as one important aspect behind the successful development of e-commerce, as they offer a solution to the problems of trust involved with buying products and services online. More information on this point can be found in section 5.1.4.

reviews may present consumers with a biased evaluation of the product or seller under consideration due to several different underlying reasons:

(a) Consumers who post reviews on products must have bought the product in the first place: as consumers usually buy items they expect to fit their preferences, consumers who post reviews may be more likely to find the product satisfactory than the average consumer considering that product for purchase.

(b) Conversely, consumers may be more inclined to leave reviews when they are not satisfied with the product than when they are.

(c) When reviews are written about a specific seller, buyers may be wary of leaving negative reviews if the seller is able to retaliate in some way (for instance, by leaving a negative review for the buyer where this is possible).

(d) Some online companies may have an incentive to create fake reviews to artificially manipulate their own or their competitors' reputation.

4.101 A thorough discussion of these points is outside the scope of this review, but there is some evidence[113] supporting all of the hypotheses above, suggesting that competition authorities should not simply assume that buyers have access to complete and unbiased information online. The CMA published in 2015 a report which investigates these issues in detail. The report[114] presents the CMA's findings following a call for information in the online reviews and endorsements sector.

[113] Interested readers may refer to *Nosko and Tadelis (2015), Bolton et al (2013) and Mayzlin et al (2014)* for more information on this topic.
[114] The full report.

5. Online firm behaviour

5.1 In the preceding section we have summarised the available evidence on how consumers behave when they search online. This has led to a set of seven core findings:

(a) Consumer search online shows complex patterns but may be less extensive than traditionally assumed.

(b) Consumers may often use multiple channels during a single search.

(c) Consumers mostly focus on the results displayed on top of the search results page, and even more so on mobile.

(d) Consumers vary significantly in how they search online.

(e) Consumer search is sensitive to website characteristics.

(f) Consumers can sometimes have significant brand loyalty online.

(g) Online reviews are an important factor in consumers' search and purchase process.

5.2 This section looks at how firms behave on the Internet given how consumers search as described in the seven key points above.

5.3 The possibility for consumers to use the Internet to search for different suppliers and compare them extensively across multiple dimensions provides both opportunities and challenges for firms deciding to operate online.

5.4 From the perspective of a firm, on the one hand since consumers can easily search on the Web, it may be easier for them to find out about you and you might be able to acquire customers you previously couldn't access. On the other hand, for consumers it is just as easy to find out about your competitors and their offers.

5.5 This section will explore this trade-off by documenting how:

(a) companies choose to compete against their online competitors when faced with consumers who can compare with relative ease price and non-price attributes[115] through online search tools;

[115] Non-price attributes may be quality of the good or level of service.

(b) companies try to make themselves more visible in the search tools adopted by consumers.

How do companies compete given consumer search behaviour?

5.6 From an economic perspective, the fundamental motives driving firm behaviour are the same for online firms and more traditional offline firms. We would expect firms to choose their strategies in order to maximise profits. Hence, when thinking about attracting new customers through reduced prices, firms have to balance the additional profits brought by these new customers against the lower profits made on existing customers who are now paying a lower price.[116] How do firms cope with this trade-off when the consumer search process is an important element of the market, as it is on the Internet?

5.7 Economic theory offers some predictions on how we might expect markets to behave when consumers can search easily for options.

5.8 The economic literature on search assumes that consumers do not know the prices and/or the quality offered by the firms in the market. To find out, consumers must carry out a search process. This search is costly for the consumer (the literature calls these costs 'search costs') who must then compare the benefits from searching extensively (they may find a firm with a really low price) to the costs of doing so (they may spend a lot of time shopping around). The key goal of the literature is to characterise the consequences of this search activity on firm behaviour and ultimately market outcomes.[117]

5.9 One basic finding of this literature is that, when consumers have search costs, firms enjoy some degree of market power over their customers. What this means is that firms might be able to charge prices that are higher than they would be able to if consumers were fully informed and did not have to search. This is because, when faced with a price increase, consumers may be reluctant to look for other options given that they must incur a cost to do so.

5.10 Searching for firms providing products or services has become a lot easier with the Internet. Economic theory suggests that when the cost of carrying out a search is decreased, consumers will look for more options, putting pressure on firms to decrease their prices. Thus one might expect the Internet to be characterised by strong price competition between firms selling similar products. Also, as search costs are decreased, the most basic theoretical

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[116] This assumes firms are not able to charge different prices for the same good to different consumers, a practice usually referred to as 'price discrimination' in economics.
[117] See *Baye, Morgan and Scholten (2006)* for a comprehensive overview of the economic literature on search.

predictions imply that we should observe not only lower prices, but also prices that are much closer to each other as consumers can easily switch to another firm in the event a supplier decides to charge higher prices.[118]

5.11 In the following sections, we will explore how firms on the Internet may cope with this pressure to bring down prices and what strategies they have adopted to compete in an environment where searching for alternative options has become very easy for consumers.

Finding 8: Surprising price variation

5.12 In contrast to the predictions of economic theory, uniform and flat prices are typically not what we observe in Internet markets. Since the early days of the online shopping era, economists and marketing academics have analysed online prices and have consistently found that these do not seem to converge to a single price.

5.13 This result has been documented in a variety of settings. We frequently observe different prices for the same item, even when the good being sold on the Internet is essentially the same independently of who you purchase it from (for instance, books or CDs) and even when the sale happens through a price comparison website, where consumers can compare suppliers ranked by price on a single page.

5.14 Table 1 reports average dispersion metrics for prices of different goods reported by the literature:

[118] Notice that the search literature is extensive and not all models foresee that prices will converge as search costs are decreased. For example, see *MacMinn (1980)* or *Anderson and Renault (1999)*.

Table 1: Summary of the literature documenting price dispersion in online markets

Author(s)	Year	Industry	Online setting	Price dispersion observed	Other significant findings
Baye, Morgan and Scholten	2001	Consumer Electronics	Price Comparison Website	• Average range between min and max price for the same item is 40% • Coefficient of Variation: 10%	
Baye, Morgan and Scholten	2002	Consumer Electronics	Price Comparison Website	• Coefficient of variation: 12.6% • Average range in prices: $75.99	• Even after controlling for observable factors such as advertisements, shipping costs and product availability 28% of the price variation is unexplained
Brynjolfsson and Smith	2000	CDs and Books	Internet Retailers specialised in CDs and Books	• Standard deviation in posted prices for books: 33% • Standard deviation in posted prices for CDs: 25%	
Clay et al	2003	Books	Internet Retailers for books	• Standard deviation in posted prices for New York Times bestsellers: 27.7%	
Brynjolfsson and Smith	2000	Books	Price Comparison Website	• For a given book, the lowest priced offer is on average 33% lower than the mean price offer	• Majority of customers do not select the cheapest offer, and on average they select an offer that is 20% more expensive than the lowest available price • 27% of consumers select offers that are dominated in price and shipping times
Brynjolfsson, Dick and Smith	2009	Books	Price Comparison Website	• Consumers can potentially benefit an average of $6.55 by scrolling to the lower screens	• 50% of visitors do not click on the lowest priced offer
Clemons, Hann and Hitt	2002	Airline tickets	Online Travel Agent	• Price Dispersion of 28% between highest priced and lowest priced Online Travel Agent	
Latcovich and Smith	2000	Books	Internet Retailers and Books	• Find persistent price dispersion amongst online retailers. Smaller retailers for books consistently price 5% lower than Amazon for non-bestseller titles.	
Pan, Ratchford and Shankar	2001	Media and Electronics	105 websites of Internet retailers	• Large price dispersion for identical items. Average difference between lowest and highest price in books and CDs are 49% and 51% respectively.	
Gorodnichenko and Talavera	2017	115,000 goods over a period of five years, mostly in the electronics category	Price Comparison Website	• Price dispersion at the price comparison website under study is found to be large even across a very broad sample of goods and when tracked for a long period of time (average standard deviation of log prices is 0.13-0.16). Price dispersion is also found to be persistent: high levels of price dispersion in one period are typically followed by high levels of price dispersion in the following period.	

5.15 These results are at odds with the main theoretical predictions suggesting this price dispersion should not be sustainable in the context of homogeneous goods and in the absence of search costs.

5.16 However, these findings can be explained if at least one of the following is true:

(a) Online firms and retailers manage to distinguish their product or service from the competitors' in the eyes of consumers, a process economists call *product differentiation*. When product differentiation is present consumer decisions may not be based solely on price.

(b) Consumers may sometimes make less-than-optimal decisions and purchase from a supplier that is not providing them with the best possible deal. This might be because consumers may show certain types of biases when making decisions (what economists refer to as 'behavioural biases') or because consumers do not have full information about the products or services they are buying (situations which economists call 'imperfect information' situations).

Finding 9: Retailers are successfully differentiating themselves

5.17 When consumers search online to buy goods, they are not only searching for the good itself. They also value the overall online shopping experience, consisting of factors such as ease of navigation, breadth of product selection, shipping, security of payment method, possibility of returning the item, and others.

5.18 An early case study on the role of differentiation in the online book industry by *Clay et al (2003)* is summarised in Box 4 below.

5.19 Other authors have tried to explore how firms achieve differentiation in the eyes of consumers:

(a) *Brynjolfsson, Hu and Simester (2011)* find that firms operating online may specialise in the supply of niche products. They analyse data from a clothing retailer operating both online and offline, and find that sales on the Internet were less concentrated on popular products: the worst-selling 80% of items accounted for 20% of sales offline, but 27% online.[119] This

[119] Notice that this is unlikely to be driven by unobservable differences in consumers purchasing online versus consumers purchasing offline, as the same results apply also when the analysis is done only on the subsample of customers who purchased at least once via both channels.

suggests that the Internet as a sales channel may be more favourable towards sellers willing to sell niche products.

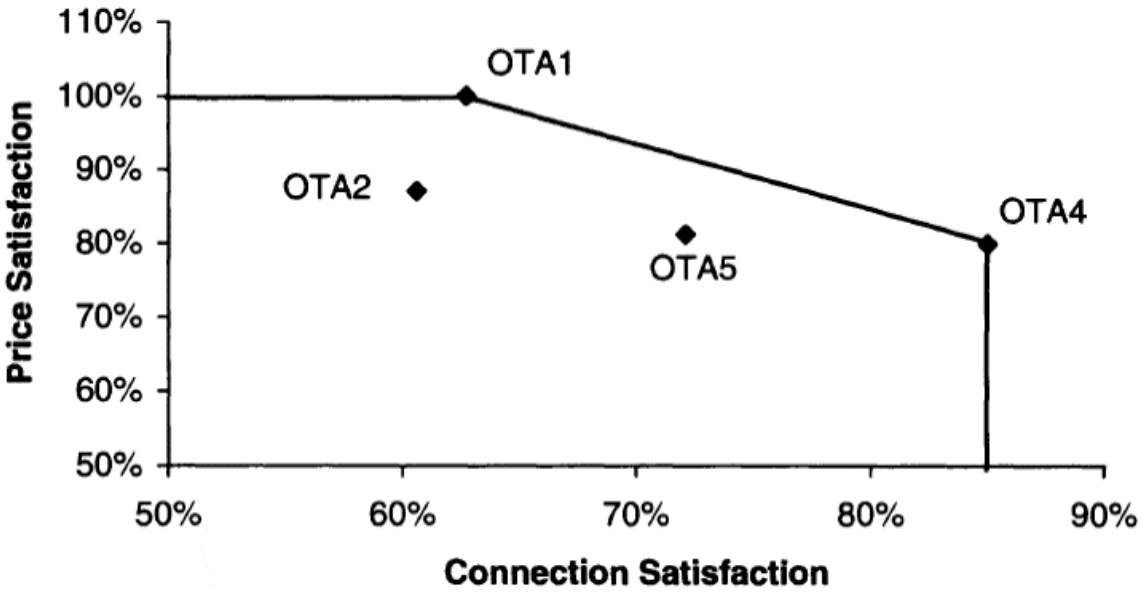
(b) *Clemons, Hann and Hitt (2002)* find evidence that different online travel agents returned different ticket recommendations for the same ticket enquiries, specialising in different combinations of ticket price and ticket quality.[120] When authors inputted the same travel request in two different online travel agents (the request were identical with respect to the preferences expressed for price, dates and other factors such as waiting times during transfers, total flight time, etc.), some online travel agents returned flights that very closely matched the preferences specified by the user in terms of price, whereas other agents returned results that more closely matched the preferences expressed by the user on non-price factors (eg waiting times during transfers). Figure 17 below displays how different online travel agents differed in the percentage of their search results that matched the user's specified preferences in terms of price and connection times.

(c) *Pan et al (2001)* find that some Internet retailers for CDs, DVDs, computers, software and electronics successfully differentiated their service through features such as superior shipping reliability, handling services and website usability. These retailers were able to sustain higher prices for these items than other generic Internet retailers.

(d) A 2015 report[121] by internet performance management firm Dyn finds that site characteristics can also be an important dimension of differentiation amongst online retailers. In an international survey of online consumers, a website's appearance and loading speed had a strong impact on customer's willingness to use the site. 65% of customers reported being unwilling to shop at a website if the site took more than 3 seconds to load, with roughly half expecting it to load instantly.

[120] The authors defined ticket quality as the deviation of the returned ticket results from the price, connection, timeliness and flight duration preferences specified by the consumer at the beginning of the search.
[121] See the full report.

Figure 17: Differentiation between Online Travel Agents (OTAs)



Source: Clemons, Hann and Hitt (2002), pg. 12.

Box 4 – Differentiation in online book retailers (clay et al.)

In their study of the online book industry, *Clay et al (2003)* document that the retailers in the industry were clearly seeking to find a unique selling point to customers. In particular, they find that book retailers could be classified broadly into six categories:

1. The 'Big 3' players (Amazon, Barnes & Noble, Borders) which offered a very large selection and low prices on New York Times (NYT) bestsellers;
2. Other full-selection stores offering low prices on NYT bestsellers;
3. Full-selection stores offering average prices on NYT bestsellers;
4. Full-selection stores charging close to full price for almost all books;
5. Stores with limited selection and very low prices;
6. Speciality bookstores.

Firms in category 2) were adopting a strategy of 'being slightly cheaper than Amazon' to appear on top of it in price comparison websites' results. Only in 20% of the cases were their prices lower than Amazon's by more than $0.1.

Firms in category 3) were more expensive than Amazon on average but were cheaper on selected categories, or were part of larger online stores carrying goods other than simply books.

Category 4) was essentially composed of firms who appeared to use the Internet mainly as a customer service channel, planning to sell the majority of their books through traditional bricks-and-mortar stores.

Category 5) was composed of retailers who sold remaindered books (typically old titles that are no longer selling many copies, and whose unsold copies are sold at greatly reduced prices).

Category 6) mainly included retailers who specialised in niche products, such as textbooks, computer books and Christian books.

5.20 Several surveys of online shoppers have sought to understand which factors are important for consumers when deciding to shop online.

5.21 A summary of these results is presented in Box 5:

Box 5 – What do consumers value when shopping online?

Several reports, surveys and studies have tried to analyse the relative importance of different factors for consumers when shopping online. Below we offer a summary of the analyses contained in the following reports (it is worth noting that some of these are very focused on retail and their findings may not generalise well to instances where consumers purchase services online):

- comScore's Online Shopping Customer Experience Study (2012).
- PwC's Multichannel Survey (2012).
- PwC's Total Retail Survey (2016).
- UPS's 'The Pulse of the Online Shopper' (2015).
- Granify's report on 'Top buyer objections by category'.

Overall, and consistent with the findings presented above, consumers' responses seem to point to a variety of factors that are considered important when shopping online, even though the ranking of these factors varies across different reports:

- Fast delivery times: comScore reports that 43% of consumers expect delivery within 2-3 days to be available, with a full 30% expecting overnight delivery to be available (comScore). In a survey of 7,005 online consumers conducted by PwC, 48% of consumers reported the availability of fast and reliable delivery as an important factor in choosing their favourite online retailer;

- Returns policy: 63% of consumers reported looking at the retailer's return policy before making a purchase (comScore), and in a survey of 5,118 heavy online shoppers conducted by UPS, 66% of respondents identified this factor as important when searching for products online. The return policy was ranked as the single most important factor driving online sales in the Apparel, Jewellery and Home Building Supplies categories in a study conducted by Granify analysing buyers' responses to 1.2 million messages and stimuli placed on retailers' websites;

- The availability of detailed product information: 73% of respondents to the UPS survey of heavy online shoppers identified this factor as important when searching for products online. Granify reported that this might be the second most important factor, behind price, for online shoppers in the health and fitness category;

- Reputation and trust: 'reputation' was listed as the second most important factor when searching and selecting products online by heavy shoppers surveyed by UPS, and 'trust' was ranked the third-most important factor when thinking about their favourite retailer by consumers surveyed by PwC in its Total Retail survey of 23,000 shoppers in 25 countries.

5.22 We might also find evidence that differentiation is an important feature of online competition by considering the origin of visits to online companies' websites. SimilarWeb (2016) reports that on average 36% of the traffic for an online business is 'Direct' traffic, ie traffic coming from users who typed the web address of the website into the address bar of their browser. This suggests that 36% of consumers most likely[122] already know the shopping website they plan to visit. This percentage is significant in all product categories, ranging from 27% for the Home and Garden category to 47% for the Coupon[123] category.

5.23 Whereas this result might suggest that firms' attempts at differentiation could reward them with customers visiting their website 'by default', it could also be consistent with the hypothesis that over time consumers engage in less search once they find a 'good enough' option and thus go 'by default' to a specific website.

[122] It is hard to interpret figures for direct traffic. On the one hand, direct traffic may underestimate the number of consumers who know the website already, as consumers may simply search the name of the website they know already on a search engine instead of typing its URL directly in the address bar. On the other hand, some experiments (see the Search Engine Land website for an example) suggest that popular tracking software may misclassify some visits from search engines as direct traffic, and that thus visits from direct traffic may be overestimated.
[123] This includes websites such as Groupon selling coupons for several services such as sport activities, holiday packages, etc.

Finding 10: Firms may try to exploit behavioural traits of consumers

5.24 Usually we would expect consumers to consider all aspects of a deal, for example price and quality, and choose the one that best suits their preferences. However, sometimes consumers may adopt suboptimal decision-making rules when choosing products: for instance, they may make their decisions entirely based on the price of the product and fail to take into account other costs like shipping charges or payment costs. Economists refer to these suboptimal decision rules as 'behavioural biases'.

5.25 If firms know the behavioural biases of their consumers, they may try to exploit them to their advantage to increase their profits. For instance, if consumers systematically overlook add-on costs, firms may increase these add-on costs without witnessing a decrease in the number of customers, thereby increasing their profits. [124]

5.26 Overall the literature on behavioural biases in online markets is quite limited, and therefore general definitive conclusions cannot be made. However, the available evidence has documented a few cases in which firms may try to use tactics to exploit some of the biases consumers show when searching and purchasing products online.

5.27 For instance, *Ellison and Ellison (2009)* study firms' pricing strategies on a price comparison website ranking sellers of spare computer parts by price. They find that firms, in response to the intense price competition, adopted strategies aimed at deliberately confusing consumers. First, they attracted customers by setting low prices on low-quality products (in this case, hard disks with limited storage space) to generate a higher rank on the price comparison engine. Once consumers clicked on the link in the price comparison website and were redirected to the landing page on the retailer's website, they were offered the option to 'upgrade' to superior products (in this case, hard disks with more storage) at much higher prices. Importantly, sales of these more expensive products were positively related to the firm's price ranking on low-quality products, suggesting that this tactic was successful in making customers purchase higher-priced products. More details on this paper are available in Box 6.

[124] The Office of Fair Trading published in 2010 a report titled *Advertising of Prices* on how firms might take these behavioural biases into account when advertising prices and in 2011 a report on consumer behavioural biases in Competition. The Financial Conduct Authority also published in 2013 an occasional paper on how insights from behavioural economics may apply to the FCA's work.

Box 6 – Loss-leading strategies for the sale of computer parts online (Ellison and Ellison)

Ellison and Ellison (2009) document an interesting case in which firms online adopted strategies aimed at promoting the sales of more expensive higher-quality products to consumers by attracting them through lower prices on other lower-quality products. The authors study a market in which small and largely undifferentiated providers of computer parts (eg memory modules) sold their products through a price-comparison website (Pricewatch.com). The authors focus on sales of memory modules which could be of high, medium or low quality according to the storage space provided. Pricewatch is a classic price comparison website on which consumers search for products and are returned a list of sellers sorted in ascending order by price. Thus, sellers who want to be ranked in the first positions for given products have to set prices that are lower than their competitors'.

Through an examination of the retailers' websites, the authors find that when consumers searched for a low-quality product on Pricewatch and were then redirected to a retailer's website, they were often shown a webpage advertising 'upgrades', add-ons and more expensive (but higher-quality) options for purchase. The authors then ask whether these retailers were successfully managing to sell these higher-quality products to consumers who had initially searched for lower-quality ones.

The authors gather a year of hourly data from Pricewatch on the sellers and prices of four low-quality items (memory modules with limited storage) as well as data from two of the retailers on the sales and costs for their entire product line (including the higher-quality upgrades advertised in the landing pages). Analysing this data they find that the sales of higher-quality goods were positively related to the rank of the firm in Pricewatch's low-quality list: ie a site sold more medium- and high-quality memory modules when it occupied a higher position on Pricewatch's low-quality list. They estimated the magnitude of the effect to be quite sizeable: moving from first to seventh on the Pricewatch list for low-quality memory reduced a website's sales of medium-quality memory by 66%.

Also, through the cost data made available to them by two website retailers, they discovered that the margins made by websites on low-quality products were slightly negative, whereas medium- and high-quality products showed margins of 16% and 27% respectively.

Therefore the retailers were adopting a 'loss-leader' strategy when competing on the price comparison website: they set low prices for low-quality products in order to appear among the top positions on Pricewatch to attract consumers, and then through appropriately designed webpages managed to sell to these consumers higher-quality (and higher-margin) products.

5.28 *Jin and Kato (2006)* conducted an experiment on eBay by purchasing ungraded baseball cards[125] from different sellers and having the cards rated by experts to test for counterfeits. They found that sellers who widely advertised their product as genuine and stressed the quality of the item being sold were more likely to sell counterfeit items, but were able to command a 33-50% price premium over the average price paid across all sellers.[126] Card quality was also found to be unrelated to the seller's reputation score on eBay, suggesting that for highly specialised goods sellers may be able to exploit buyers' inability to correctly infer quality levels before purchase.

5.29 *Hossain and Morgan (2006)* also conducted 80 auctions on eBay acting as sellers of CDs and Xbox games to test whether consumers were sensitive to how shipping charges were presented. They find that, for the same good and total price, auctions with a low initial price and a high shipping charge usually generated more revenue than auctions with a high initial price and low shipping charges. This suggests sellers may exploit buyers' tendency to rely on the initial price[127] rather than the total price when evaluating different offers to increase their revenues.

Finding 11: Quality provision on the Internet

5.30 Some concerns may arise on the quality of goods sold over the Internet. Buying goods online may make it hard for consumers to assess the quality of the product they are buying. For instance, an online shopper looking for shoes online may find it hard to assess the material, fit, and durability of the item. This appears to be especially relevant for physical goods, whereas for some services (eg insurance) the Internet may not have decreased the ability of consumers to assess quality before the purchase.

5.31 In these situations where one side (in this case, online firms) has access to much more information about the good than the other side (in this case, online shoppers), a potential problem may arise: given that quality is hard to assess online, producers of high-quality products may not find it worthwhile to sell online because consumers would not be able to distinguish them from low-quality producers. Eventually, this mechanism would only leave low-quality

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[125] Baseball cards are purchased for collection by several enthusiasts. A grading system exists to assign cards different quality scores on the basis of symmetry, corner wear and other physical characteristics. When the cards being sold do not display information on such quality scores, they are referred to as ungraded baseball cards.
[126] Note that if consumers could distinguish genuine from counterfeit baseball cards this result could no longer hold in the long run: consumers would learn that sellers who stressed the quality of the items were more likely to sell counterfeit items, and would stop buying from them. Therefore, this result could be explained either by the fact that consumers are not able to distinguish genuine from counterfeit cards, or that consumers purchase baseball cards just once.
[127] Notice that this study only suggests this is possible, not that sellers online are systematically attracting consumers through low prices for their products to then charge them high shipping fees.

producers selling on the Internet in a 'race to the bottom'. Such a mechanism is called adverse selection by economists.

5.32 Despite these theoretical concerns over quality provision on the Internet, relatively few papers have investigated issues of quality in relation to online purchases. The literature on this subject is quite limited, and the existing evidence does not seem to point to a systematic consumer harm arising from poor quality of products being bought online. Rather, it suggests that whether the online space contains mainly low-quality sellers may well depend on the characteristics of the market under consideration:

(a) When 'quality' is quantifiable and measurable through a specific set of attributes, there will usually be an incentive for online high-quality firms to publicise and advertise these features through the creation of online content or through some mechanism such as product reviews and feedback ratings.

(b) However, when the quality of the good can only be measured after its consumption, it is more likely that there may be instances where the Internet may facilitate the provision of mostly lower-quality goods, even though the evidence is too scant to claim that consumer harm emerges under these conditions.

Quality provision when it can be assessed before purchase

5.33 A case falling into the first category was studied by *Lynch and Ariely (2000)*. The authors study how consumers searched and bought wines online through a lab experiment, where subjects were asked to purchase wine from one of two available online outlets that had only partially overlapping inventories (ie some wines could be found in both stores but some wines could only be found in one of the two stores). They find that increasing the transparency of the product information available to consumers on 'unique' wines (ie available only in one store) indeed increased the price consumers were willing to pay for these wines, suggesting that it could be profitable for a retailer of specialised goods to enhance the transparency of quality information provided over the Internet.

5.34 In other cases, online firms have developed several different systems to overcome the potential quality information problem on the Internet, such as feedback ratings for online sellers (now a prominent feature of big marketplaces such as eBay and Amazon), product review systems and advantageous returns policies allowing consumers to return their items at little or no cost.

5.35 Some papers have investigated the role played by seller ratings in communicating the quality of a seller to consumers: a seller with higher ratings could be perceived as higher quality and might be able to command a higher price for its goods. There seems to be empirical evidence for this result (eg in *Melnik et al (2003)* and *Dewan and Hsu (2004)*), but the effect seems relatively small (in one case, a 10% increase in rating increased the sale price by 0.44%, in the other a 100% increase in the rating only increased the sale price by 0.54%).

Quality provision when it cannot be assessed before purchase

5.36 A case falling into the second category is documented in *Bakos et al (2005)*. The authors studied the differences in quality provision between online and offline providers of financial brokerage services.[128] Quality in this context was based on the concept of 'quality of trade execution': for a given order (eg 'sell 50 stocks of company X') brokers could decide the trading venue on which to fulfil the order (eg on the New York Stock Exchange or on other smaller trading venues known as Electronic Communications Network). Given that different trading venues may quote slightly different prices for the same stock, the consumer could have a better or worse deal according to which exchange was selected by the broker to carry out the transaction.

5.37 The authors find that online-only brokers performed worse than offline brokers in terms of quality of trade execution, and impute this to the fact that consumers could not observe this specific aspect online until after the trade had been executed. However, the authors also find that the lower management fees charged by online brokers more than compensated this lower quality of trade execution, resulting in the total cost of placing a trade order being $21-52 cheaper with online brokers.

5.38 This mixed evidence once again suggests that the Internet does not *per se* lend itself to the systematic provision of low-quality goods, and that consumer harm arising from this is likely to be limited and in any case shaped by the specific circumstances of the market.

[128] Financial brokers act as intermediaries between the retail investor and the capital markets. For instance, they place buy/sell orders on behalf of their client on stock exchanges.

How do companies seek to attract new customers through search engines?

5.39 As seen in section 3, companies can employ two strategies to use search engines as a customer acquisition channel:

(a) **Search Engine Optimisation (SEO):** They can design their webpages in ways that would make them appear high on a search engine's organic search results.

(b) **Paid search:** They can bid to appear as paid search results on search engines when consumers search for certain keywords.

5.40 In the following paragraphs we give an overview of how these two techniques are used by companies operating online to acquire new customers and generate sales.

How firms use Search Engine Optimisation

5.41 Search Engine Optimisation (SEO) seeks to optimise the website in order to make it 'more relevant' to specific keywords in the eyes of search engines, with the ultimate goal of appearing in a high position when consumers look for certain keywords online.

5.42 SEO professionals employ a variety of tactics to achieve this goal. This should come as no surprise, given that as seen previously, search engines employ many different criteria to rank webpages according to relevance.

5.43 A survey[129] of 1,530 online companies conducted by MarketingSherpa showed that the four most employed tactics by SEO firms were:

(a) **Keyword research**, in which companies seek to find out which keywords consumers use most often, and to embed these keywords in their own websites in order to attract more traffic;

(b) **HTML[130] Tags**, through which companies seek to include useful information in their webpage code which is crawled by search engines. For instance, frequently optimised attributes are the title and the meta description tags, which appear in the search engine's results;

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[129] MarketingSherpa – 2012 Search Marketing Report, SEO Edition (2012).
[130] HTML is the standard language for creating webpages. Webpages created with HTML have an underlying code that is scanned and analysed by search engines when assigning a rank to a specific webpage.

Figure 18: Different components of an organic search result

(c) **URL[131] Structure:** search engines reward with higher positions relevant, informative URLs supported by a categorical structure. So companies seek to optimise their website and URL structure accordingly;

(d) **Internal Linking**: this refers to the creation of user-friendly and informative hyperlinks connecting different pages of the firm's website, allowing search engines to navigate the site more easily.

5.44 Companies also engage in other tactics beyond these four: they may link or try to obtain links on other popular websites redirecting to their own, or they may work on creating and optimising 'landing pages', ie pages tailored to a specific keyword that seek to be relevant to users looking for that keyword.

5.45 However, companies in the survey considered 'creating relevant web content' the most effective SEO strategy. 'Creating content' refers to the practice of creating engaging, original, relevant and structured website pages that increase the odds of getting a higher score from search engines' algorithms. This is quite a laborious and time-consuming activity and is thus not surprising that this strategy has also been rated as the most difficult to implement by respondents to the MarketingSherpa survey.

5.46 Independently of the strategy they wish to pursue, it seems that most companies are getting among the top 6 rankings for the keywords they target: 59% of respondents reported being listed sixth or above for their targeted key terms, with a full 28% reporting being listed in ranks 1-3, even though this is more common for large companies (with 37% achieving ranks 1-3) than for small ones (with 26% achieving ranks 1-3).[132] We note that, as discussed in section 4.3, links displayed in ranks 1-3 attract a disproportionate percentage of the total clicks on a page: it should thus be worth much more to an online firm being ranked in the very top positions rather than being ranked in positions 4-6.

[131] URLs, or Uniform Resource Locators, are simply the web addresses that can be typed into the address bar of browsers to uniquely identify a webpage. For instance, www.gov.uk is a URL.
[132] In the report, large companies are defined as companies having more than 1,000 employees, whereas small companies are defined as companies having fewer than 100 employees.

5.47 Many companies choose to perform SEO in-house. According to MarketingSherpa,[133] 65% of companies choose to carry out SEO without resorting to external agencies. Econsultancy[134] reports a comparable figure of 51%.

5.48 These activities generate a large portion of website traffic for many online firms. According to SimilarWeb,[135] who analysed traffic data from a global set of users spanning 200 countries, in 2016 SEO was the largest contributor to visits to e-commerce websites, accounting on average for 37% of visits. This percentage varied from roughly 27% for general merchandise stores (eg Amazon, Argos) to 50% for Home and Garden websites.[136]

5.49 According to MarketingSherpa,[137] the median conversion rate of visits coming from SEO is around 4%: to put it another way, if 1000 consumers visit the website following a search result, only 40 will end up buying something. Furthermore, 41% of respondents had conversion rates not larger than 2%.

How firms use paid search

5.50 Paid search allows companies to place advertisements on top of the search engines' results for specific keywords, in order to attract consumers looking for specific products towards their offers.

5.51 Companies bid not only for which keyword to place the ads on: they also bid for the position of the ad, the matching pattern of the ad (eg if the ad is going to be displayed only following an exact match or also following a 'broad' match) and other characteristics.

5.52 Typically firms pay for these ads through a pay-per-click model, according to which they pay a fee to the search engine for every click they receive from a given ad.

5.53 MarketingSherpa, in a survey[138] similar to the one carried out for SEO, found that the following are the most often used paid search techniques employed by online companies:

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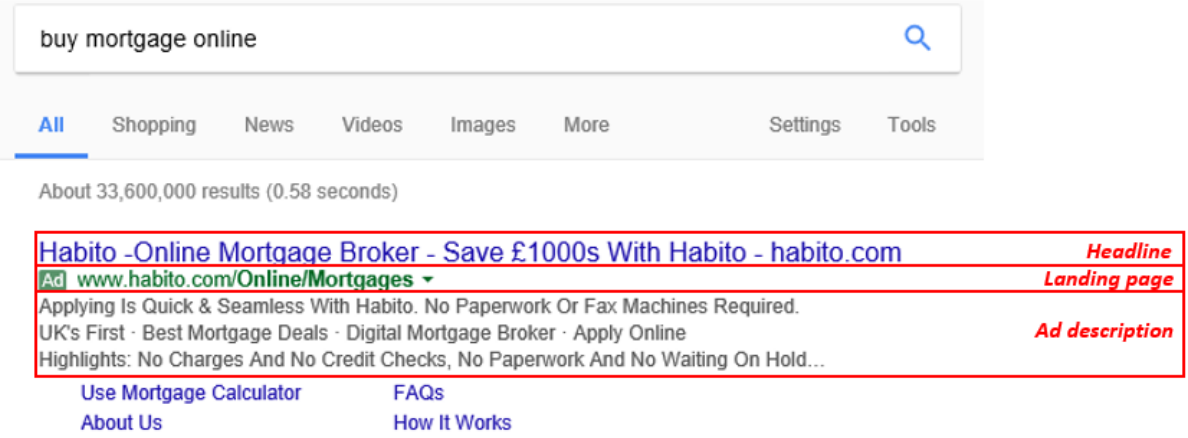
[133] MarketingSherpa – 2012 Search Marketing Report, SEO Edition (2012).
[134] Econsultancy – State of Search Marketing Report (2010).
[135] SimilarWeb – Global Search Marketing Report (2016).
[136] It is worth pointing out that the share of traffic originating from SEO and Paid Search may overestimate the percentage of consumers who learn about a specific brand or retailer through search engines. This is because some consumers may learn about a brand or a retailer through other means (eg offline advertising) and then simply use a search engine to locate and be redirected to their website.
[137] MarketingSherpa – 2012 Search Marketing Report, SEO Edition (2012).
[138] MarketingSherpa – 2012 Search Marketing Report, PPC Edition (2012).

(a) Creating targeted groups of keywords, text ads and landing pages (the combination of which is known as an 'ad group').

(b) Creating strong, engaging messages for the main text of their ads (what is known in the industry as 'ad copy').[139]

Figure 19: Different components of a paid search result:



(c) Manual bidding[140] for clicks.

(d) Testing different versions of ad copies to determine empirically which ones are more effective (which is known as 'split testing' or 'A/B testing').[141]

5.54 Companies also employ other techniques to try to maximise the visits or the sales they derive from such ads. Among such techniques, we find for instance automated bidding,[142] ad scheduling,[143] rotating ads[144] and negative keywords.[145]

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[139] Ad copies are typically only 2 or 3 lines long, which is why it is crucial for companies to make these very powerful.
[140] In Paid Search, companies can use two bidding strategies: manual bidding (in which the advertiser manually manages the bidding parameters - eg how much to bid for a given keyword) and automated or automatic bidding (in which the bidding parameters are controlled and adjusted by an algorithm provided by a third-party tool such as Marin, Google or Kenshoo to achieve a goal specified by the advertiser).
[141] A split test or an A/B test is essentially a randomised trial in which different visitors are randomly shown different versions of the ad, which allows the company to compare the effectiveness of different types of advertisements.
[142] Automated bidding involves a bidding process where bids are automatically set by a third-party tool through an algorithm to achieve pre-specified goals.
[143] This involves changing the settings of the ad to make it appear, for instance, only on certain days of the week or certain periods of the year.
[144] Marketers may set rules to show more often ads that have performed better in the past, or set rules to rotate different ads at regular intervals.
[145] When bidding on keywords a firm can specify negative keywords as well. The firm's advert will *not* appear as a paid search result when those negative keywords are included in the search terms. For instance, a company trying to preserve a high-end image might choose not to be displayed among the paid search results for search terms containing the word 'cheap'.

5.55 Most search engines offer the possibility of displaying paid advertisements, but Google is clearly the market leader in Western markets. According to a survey run by Econsultancy, [146] 97% of respondents reported using Google AdWords. Yahoo! and Bing were used by a smaller set of respondents (50% and 44% respectively). The percentage of respondents using Bing and Yahoo! actually declined with respect to previous surveys (86% of respondents in 2008 and 68% in 2009 reported using Yahoo!, and in 2009 54% of respondents reported using Microsoft Live (MSN) Search, the predecessor to Bing).

5.56 Just like SEO, paid search is mostly carried out in-house by online companies. According to MarketingSherpa,[147] 62% of the companies who reported using SEO also reported not using any external agency to do paid search.

5.57 Paid search is usually the biggest contributor to the online marketing budget of online firms: MarketingSherpa[148] reports that typically paid search accounts for 25% of the overall online marketing budget.[149] These budgets can be quite large for larger companies: 8% of respondents reported bidding on more than 20,000 keywords, and 42% of large organisations[150] reported spending more than $500,000 annually on paid search, with 24% spending more than $1,000,000.

5.58 However it seems that, unlike SEO, paid search may not account for a large fraction of the visits received by certain online companies. SimilarWeb[151] reports that on average, only around 5% of the total visits from search come from paid links (the rest being generated by organic links). This varies slightly by sector, with Classifieds being the lowest at 1.65% and Sports being the highest at 7.85%. We note these figures are much lower than other estimates (cf the footnote to paragraph 79): this might be due to the fact that SimilarWeb uses data from 3.8 billion visits to the largest online shopping vertical websites. If these large websites have better brand recognition, they might derive a higher share of their traffic from organic (unpaid) sources than the average online business.

5.59 At the same time, it is important to recognise that the percentage of visits coming from paid search can be higher for other types of businesses. For

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[146] Econsultancy – State of Search Engine Marketing Report (2010).
[147] MarketingSherpa – 2012 Search Marketing Report, PPC Edition (2012).
[148] MarketingSherpa – 2012 Search Marketing Report, PPC Edition (2012).
[149] Other large contributors to online marketing budgets are website improvements (25%), SEO (21%) and Email Marketing (18%).
[150] The definition of 'large organisation' used in the report is a company with more than 1,000 full-time employees.
[151] SimilarWeb – Global Search Marketing Report (2016).

instance, respondents to the MarketingSherpa survey reported that on average 25% of their visits came from paid search, a much higher figure than the one reported by SimilarWeb. This is possibly because the MarketingSherpa sample was more skewed towards smaller companies (75% of their respondents had less than 100 employees, with 37% reporting having less than 25 employees) which may rely more on paid search than larger retailers.

5.60 MarketingSherpa[152] also reports that click-through rates for paid search results are usually low, displaying a median of just 2% with 41% of businesses reporting a click-through rate of less than 1%. With these low click-through rates, it is perhaps not surprising that one of the biggest challenges in paid search identified by 56% of respondents to the survey is to increase its measurable return on investment.[153] However, conversion rates on visits from paid search seem similar to the ones observed on visits from SEO, with the median conversion rate on paid search being just under four percent.

[152] MarketingSherpa – 2012 Search Marketing Report, PPC Edition (2012).
[153] On this point, it is worth remembering that naïve estimates of the return on investment in Paid Search may underestimate its spill-over effects, as discussed in section 4.2.

6. Implications for the CMA

6.1 This section will discuss the findings presented in the previous section with a focus on what implications they might have for the work of the CMA in promoting competition and protect consumers.

6.2 One important caveat to keep in mind is that online markets are very varied in nature, covering a wide range of sectors. This section therefore does not try to derive general implications across the broad spectrum of Internet markets, but rather suggests some competition policy considerations when dealing with online markets characterised by a widespread use of search tools. Whether these considerations apply to any specific case at hand will of course depend on the specific characteristics of the market being analysed.

6.3 Overall we have identified five broad themes relevant to competition authorities for which the findings of this literature review may be relevant:

(a) Barriers to entry.

(b) Consumer enforcement to prevent exploitation of consumer biases.

(c) Assessment of closeness of competition.

(d) Practices aimed at limiting online search.

(e) Possible price discrimination due to difference in search activity between consumers.

Barriers to entry and online search

6.4 The CMA often takes into account in its analyses how easy it is for new businesses to enter a specific market. If entry into a market is easy, we might expect that new competitors in the market will enter if the incumbents in the market make large profits. This threat of potential competition may reduce concerns over whether consumers are getting a good deal in the market, as it may act as a restraint on the pricing practices of incumbents.[154]

6.5 As discussed in section 3 consumers are increasingly using the Internet to discover and search for products and suppliers. It is therefore becoming more and more important for firms to be able to reach out to a potential pool of

[154] An explanation of how the CMA assesses barriers to entry in its competition enforcement work can be found in the CMA's published guidelines. See the CMA's Merger Assessment Guidelines and official guidelines on market investigations: *Market investigations guidelines: CC3* and *Market studies and investigations - guidance on the CMA's approach: CMA3*. See also the guidelines on how to assess market power.

customers on the Internet. This is illustrated by the fact that the majority of online businesses seem to engage in paid search and SEO activities to some degree, as described in section 5.2.

6.6 It is sometimes claimed that it should be very easy to enter a market as an online-only retailer, as the costs of setting up a website and sourcing products for sale are relatively low. However, the findings in this review point to a few factors that might make it more difficult in some circumstances for a new entrant to increase its visibility among online search results:

(a) As described in section 4.3.1 and 4.3.2, consumers mostly focus their attention on the highest-ranking search results, especially on the top 3 or 4 results. Therefore a new entrant may find it necessary to be ranked in the very top positions to get the level of website traffic needed to expand its operations successfully.[155]

(b) The evidence described in section 4.3.3 suggests that consumers shopping on mobile devices focus even more on the top links. This tendency may mean that, as more and more online shopping is conducted on smartphone and other mobile devices, new entrants may find it even harder in certain sectors to increase their visibility among a potential customer base.

(c) The rise of smartphone usage among the UK population has brought with it an increase in the use of mobile apps, which account for around 80-85% of the time spent by consumers on their mobile phone. While apps are very convenient for consumers who can access their favourite retailers with a tap on the screen, they have the potential to further entrench some incumbents' strong position in e-commerce markets, even though very little formal research has been conducted in this area. It is thus important for the CMA to consider the role played by apps when assessing the degree of competition in a given online market.

(d) Finally, as discussed in section 4.1, consumers online seem to consider fewer brands than we might expect them to when shopping online. Thus, simply assuming that entry into the market is easy and frictionless because any consumer can find relevant offers through Internet search may be unwarranted, and deeper analysis may be required. The relative small number of brands considered by consumers in their decision process appears to be due in part to the fact that, as suggested by section

[155] From a competition policy perspective it is not just important that firms can enter a market, but that they should be able to expand as well in order to act as a meaningful competitive restraint on the practices of larger firms in the market.

4.6, over time consumers may develop brand preferences online. While consumers should develop a preference for brands that closely match their preferences, there is some evidence that these may reduce the amount of search conducted by consumers for subsequent purchases and hence their likelihood to discover new suppliers.

6.7 Whereas these facts may suggest that the way consumers search and browse through the Internet may make entry and expansion in Internet markets less easy than traditionally assumed,[156] there are other factors working in the opposite direction to be considered:

(a) As discussed in section 4.2, the paths that consumers take towards their final online purchase are quite complex and can take place over several days. This is important because it means that consumers do not follow a direct pattern when searching, giving rise to strong spill-over effects between different online channels. For instance, while a new entrant may find it hard to develop the SEO capabilities needed to rank its website among the top results for specific keywords, findings in section 4.2 suggest that in certain cases investing in paid search may generate significant additional 'spill-over' visits to the retailer's website, as consumers learn about the supplier by seeing their ad in search results and remember it for subsequent purchases.

(b) As discussed in section 3, searchers are using a variety of tools to look for businesses online. Being listed on a large marketplace (such as Amazon or eBay) or on a widely used price comparison website may represent alternative opportunities for new entrants to increase their visibility and to build a customer base.

(c) As discussed in section 4.4, it seems that whereas the majority of consumers compare relatively few offers, there is a significant minority of consumers who appear to be searching and comparing offers extensively on the Internet. While this is not guaranteed, it could be that as firms compete for these 'active' consumers, the benefits are passed on to the rest of consumers who search less.[157] Also, it is important to recognise that the extent of consumer search depends on the type of market being

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[156] A similar point is made in *Swann (2001)*, who argues that barriers to entry in online commerce may not be as low as traditionally assumed, because of consumer's tendency to focus on the top links as well as potentially significant marketing costs to attract visitors may confirm a first-mover advantage to early players in the market.
[157] A necessary condition for this to happen is that incumbent firms should not be able to charge different prices to the 'active' and 'inactive' portions of their customer base, or that they choose not to do so (if, for instance, implementing a price discrimination strategy is costly for the firm). However, the OFT has recognised in its 2013 report on personalised pricing that, thanks to their superior tracking and analytics capabilities, online firms may be able to charge different prices for the same product to different consumers. See the OFT's report on personalised pricing.

studied: it might very well be that extensive search may be the norm in some sectors (eg those with more expensive, infrequently purchased products or for which there are specialised search tools available), so making general conclusions on the basis of average results is not recommended.

There is the potential for firm exploitation of consumer biases in relation to online search

6.8 It has been widely documented in the economics and marketing literature that consumers do not always act completely rationally when making purchasing decisions in the offline world: therefore it should not be surprising that consumers may engage in similarly 'irrational' behaviour even when searching for products and services online.

6.9 One of the most well-documented examples of a consumer bias when searching online is 'position bias': it seems that consumers are often drawn to click on the top links among a list of search results simply by virtue of their position, independently of their relevance to the consumer's search query. This may have a number of implications from a competition authority's perspective:

(a) If consumers are really attracted to top positions independently of the intrinsic relevance of a link to their search query, some firms may try to get to the top of search results for certain keywords without necessarily increasing their relevance for those keywords. In the search industry these tactics, which might involve for instance stuffing 'hidden' keywords in webpages, are called 'black hat' SEO tactics. However, all the major search engines are active in fighting this type of behaviour and can impose penalties (such as being removed from the list of results for a certain period of time) on firms adopting them.

(b) Moreover, as having a high rank in search engine result may be very important to online companies, suppliers may have an incentive to manipulate their rankings through ways which tend to reduce competition. The CMA has previously investigated a suspected breach of Chapter I of the Competition Act 1998, in relation restrictions on the bidding behaviour of energy price comparison websites in paid search. While the case was closed on administrative grounds, and therefore no conclusion can be made as to whether any party involved in the investigation infringed competition law, the CMA took the view that 'in some circumstances

agreements restricting bidding behaviour in paid online search advertising may have harmful effects on competition'.[158,159]

(c) The evidence presented in section 4.3.2 suggests that, whereas rank position may affect the number of clicks received by firms, it may have a smaller or no effect at all on the probability that a consumer will purchase from a given link. This may mean that in certain situations attempts at artificially increasing one's ranking at the expense of competitors to generate more sales may be self-defeating, as consumers may find out after clicking that the website is not relevant to their query and keep on searching for alternatives that more closely match their needs.

6.10 In addition to position bias, consumers may have other types of biases that online companies may try to exploit. While empirical research on consumers' behavioural biases online has been limited, section 5.1.3 discussed documented examples of how online companies may successfully use partitioned pricing,[160] loss-leading strategies and misleading advertising to exploit these biases.

6.11 This might mean that as consumers are able to search and compare offers easily online, some firms may have incentives to try to reduce the amount of search conducted by consumers by complicating their offers in order to make comparisons harder and ultimately reduce price competition.[161]

6.12 Consumer enforcement should therefore be an important element in relation to online markets to provide consumers with transparent information on which to make their choices.

6.13 However, as documented in section 5.1.2, consumers seem to value the availability of transparent and detailed product information online. This may generate incentives for online platforms hosting sellers (eg marketplaces or search engines) to make sure that consumers have access to such information, as documented in section 5.1.4, and may take action independently by developing systems such as reputation scores and online

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[158] See the CMA's full case closure statement.
[159] The CMA's report on its market study on Digital Comparison Tools discusses this type of agreements in detail.
[160] 'Partitioned pricing' is a term used to refer to situations in which the final price is made up of several components which are shown separately to the consumer (eg purchases on online websites often involve paying a price for the good being bought and some shipping charges which are sometimes displayed separately from the price of the good itself). The OFT has conducted some research on partitioned pricing, including a covering report, a behavioural experiment and a literature review.
[161] In economics this phenomenon is sometimes referred to as 'strategic obfuscation' or 'confusopoly'. For an extensive treatment of the matter from the standpoint of theoretical economics, please refer to *Grubb (2015)* and *Spiegler (2016)*.

review systems, possibly making intervention by consumer protection authorities unnecessary.

Assessment of closeness of competition

6.14 The CMA is often required to assess how closely companies might be competing to determine the extent of competition in the relevant market. These considerations are especially important when assessing the likelihood that a merger will result in a substantial lessening of competition in the market under analysis.

6.15 Throughout this review, we have encountered several methodologies and data sources that may have useful applications for competition cases involving online players, where it is necessary to assess how closely they are competing with each other. Data about online behaviour offers a window into how consumers behave when searching online and the opportunity to study their actual behaviour. This may provide insights about the nature of competition in a specific market by allowing the CMA to gain a better understanding of the nature and extent of the consumer search process across competitors and search intermediaries.

6.16 Specifically, we have encountered three types of data could prove to be of relevance to the CMA:

(a) **Online panel data**: this type of data is obtained by tracking the behaviour of a representative panel of randomly selected consumers, who agree to have a software application installed on their devices that tracks all of their online activity.[162]

(b) **Web server data:** these are data referring to the traffic on an individual firm's website. Most online firms will have access to detailed statistics about consumers' search and purchasing activities on their own websites, which is usually accessed through commercial analytics software.[163]

(c) **Keywords and search terms targeted by companies:** these refer to the keywords that companies target for their SEO or paid search activities, which may hold insights on which audiences and market segments they are trying to capture.

6.17 These data sources may be used to explore in detail:

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[162] Some well-known online panel data companies include Alexa, comScore, GfK and TNS.
[163] Some well-known examples of commercial analytics software are Google Analytics and Adobe Omniture.

(a) The consumer online journey from the beginning of the search to the final purchase.

(b) Consumers' searching and switching behaviour between online competitors.

(c) The influence of search intermediaries (eg search engines, price comparison websites) on the nature and extent of the search process.

(d) Consumers' search behaviour within online marketplaces such as Amazon or eBay.

6.18 These new online data sources may be best thought of as a useful complement to other more traditional means of assessing how closely two companies are competing with each other in cases where online sales account for a high share of the firms' total revenues. This data may also be relevant in cases where the product is most often bought offline, but the online channel accounts for a significant part of the consumer search process.

Online panel data

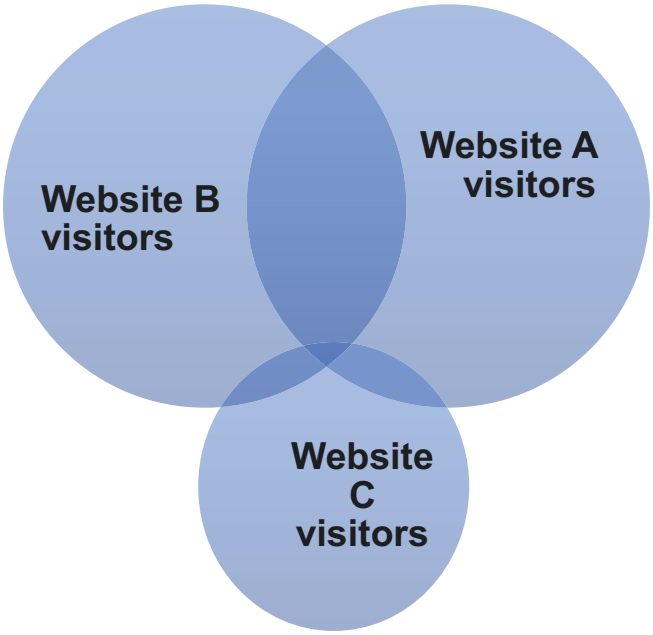
6.19 Online panel data may be valuable to the CMA because they make it possible to track the online behaviour of a large sample of users across multiple websites and over time. The most sophisticated panels also distinguish between desktop and mobile usage, and may also include the tracking of apps. The individual search histories are compiled into standardised reports, which show key information such as visiting patterns across a group of related websites and consumers' search patterns. This data can yield interesting insights on consumer behaviour from a competition perspective:

(a) It is possible to calculate the fraction of visitors of a given website who also visit a competitor's website. This could be helpful in merger cases when it is necessary for the CMA to assess how closely companies are competing with each other: if there is evidence that consumers often look at both websites, it might be indicative of the fact that consumers consider those as alternative suppliers for specific products (or, it could as well suggest that the suppliers sell complementary products).

For instance, it would be possible to generate data similar to Figure 20 below: in this example it is quite clear that a large proportion of visitors of websites A and B visit both websites, whereas a much smaller proportion of visitors of website C visit either A or B. In this situation, the CMA may form an initial hypothesis that firm A and B are more likely to constrain

each other competitively, whereas C may not significantly constrain either A or B.

Figure 20: Example of visitors overlap between competing websites



(b) It would be possible to look at how many websites or brands consumers look over a period of time, eg one month. This information could be useful for instance in market studies and market investigations in understanding how likely consumers might be to switch between competing suppliers in specific markets.

6.20 However, this potential approach comes with several caveats. For instance, if two websites are often visited in succession by a large pool of consumers, this might not necessarily imply that the two websites are close competitors. In fact, it could be that consumers go to website A to buy product X and then move on to website B, which also offers X, but buy Y instead. This could very well be the case if consumers consider products X and Y as complementary. In this case the two websites might very well not be close competitors on product X and the initial interpretation could be misleading. These limitations may be mitigated through the use of a variety of approaches, including the synthesis of online data with insights gained from more traditional means such as industry reports, internal company information and market research.

Web server data

6.21 Web server data can also provide information that might be relevant in cases involving online competition:

(a) This data offers the possibility of analysing an individual website's sources of visits (eg it would be possible to know what share of a retailer's visits come from search engines relative to, say, social media).

(b) Web server data also provide the possibility of analysing user behaviour within a specific domain, which could be especially useful in cases where companies compete on a platform or a marketplace rather than on their own websites and there is thus a need to look at how consumers behave on that specific platform.

Keywords and search terms

6.22 Lastly, as this review has documented in section 5.2, online companies often adopt active strategies such as SEO and paid search to be shown among search results for keywords relevant to their business. Therefore, these keywords may be a useful indicator in certain cases of whether firms compete closely with each other: we might expect firms who compete closely with each other to overlap substantially in the keywords they target for SEO or paid search activities, especially when these keywords are relatively specific rather than generic (for example, 'mountain bikes' instead of simply 'bicycle').

6.23 These keywords may provide useful information to the CMA in specific cases, but it is important to recognise that, as described in section 3 and section 4.2, consumers can choose from a vast array of search tools. Therefore, the weight that should be placed on this evidence should be proportionate to the share of traffic accounted for by search activities for the companies under consideration.

6.24 As documented in section 5.2 and 4.2, whereas for the average online company search provides a substantial share of visits, this proportion may differ significantly across sectors and even across retailers in a specific sector. Thus in certain cases keywords might not be very indicative of the extent of competition in a specific market. To make an overall assessment and give the proper weight to evidence based on keywords it is therefore necessary to also have a more complete picture of what are the most important sources of visits for the companies and markets under consideration.

Practices aimed at limiting online search

6.25 The evidence summarised in this review still points to the fact that the possibility for consumers to search online seems to be, on balance, of great benefit to consumers. It remains the easiest way for consumers to find out

quickly about alternative options for the products or services they want and to compare prices and key product features with relative ease.

6.26 However, in certain circumstances, firms may have an incentive to try to curb online search or to make online search more difficult for consumers. This review has highlighted in section 5.1.3 and 5.1.4 a few documented cases where firms might have tried to do so by complicating their offers and making them harder to compare, or by not disclosing certain aspects of the quality of their services to consumers.

6.27 However, other possibilities beyond these may exist for online companies to try to reduce the effectiveness of consumers' search online in finding the best deals:

(a) Some manufacturers may prevent retailers from selling their goods online through the use of online sales bans. Often this will be done to protect the brand image or reputational goodwill of a company. However, there may be circumstances under which these bans have the potential to weaken competition.

(b) Specific agreements in relation to online search also have the potential to restrict consumers' ability to search effectively on the Internet and thus to weaken competition in a given market. For instance, companies may at least in principle enter into agreements to avoid bidding on each other's targeted keywords in search engine results,[164] or may employ negative keywords[165] (cf section 5.2.2) to avoid appearing on search results when consumers search for specific keywords (eg Firm A might choose not to appear on search results when consumers' search query contains 'Firm B', in return for Firm B to do the same when consumers' search query contains 'Firm A').

(c) In theory it could be possible for firms to agree to segment their online presence across different online search tools (for instance, Firm A and Firm B may agree that Firm A only will be listed on certain price comparison websites whereas Firm B only will be listed on others). The inherent complexity of consumers' search patterns and strong asymmetries in channels' ability to provide significant amounts of traffic to the firms' websites may make this possibility unlikely in most cases, but it cannot be ruled out that it might apply to specific markets.

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[164] This may be referred to as non-brand bidding agreements, see the CMA's update paper on Digital Comparison Tools for further details.
[165] This may be referred to as negative matching agreements, see the CMA's update paper on Digital Comparison Tools for further details.

6.28 Therefore the CMA should be alert to possible agreements or practices aiming to restrain consumers' ability to search online effectively, which could restrict competition in certain markets to the detriment of consumers.

Possible price discrimination due to difference in search activity between consumers

6.29 This review has highlighted in sections 4.1 and 4.4 that consumers' propensity to search seems to differ significantly across individuals, with the majority of consumers apparently searching relatively little (compared to what we might expect them to in a setting where search is virtually costless) and a minority of consumers searching very extensively.

6.30 When consumers differ in their search propensity (and therefore likely differ in their price elasticity and willingness to pay), it may be profitable for firms to charge different prices for the same product, setting a higher price for consumers who search little (and are thus less price sensitive) and a lower price for consumers who search extensively (and are thus more price sensitive). This practice is often referred to as 'price discrimination' in economics.

6.31 This strategy requires that firms have the ability to identify or gauge the price sensitivity of a given customer. The Office of Fair Trading (OFT) report on personalised pricing[166] had already acknowledged that this might be easier for online companies than for offline companies, thanks to the advanced tracking and analytical capabilities enjoyed by many online players, and concluded that price discrimination may be more prevalent online than offline.

6.32 Whereas the OFT report highlighted the enhanced ability of firms to price discriminate, this review adds another reason why we might expect price discrimination to take place in certain online markets: that search efforts seem unevenly distributed across consumers, giving to firms not only the ability but the incentive to engage in price discrimination.

6.33 It should be stressed that price discrimination does not necessarily result in consumer harm. In most realistic settings the impact of price discrimination on consumers is a priori ambiguous, as some groups of consumers may benefit from lower prices and other groups might pay higher prices. Therefore a case-by-case analysis of the effects of price discrimination on consumers' welfare should still be recommended even in online settings.

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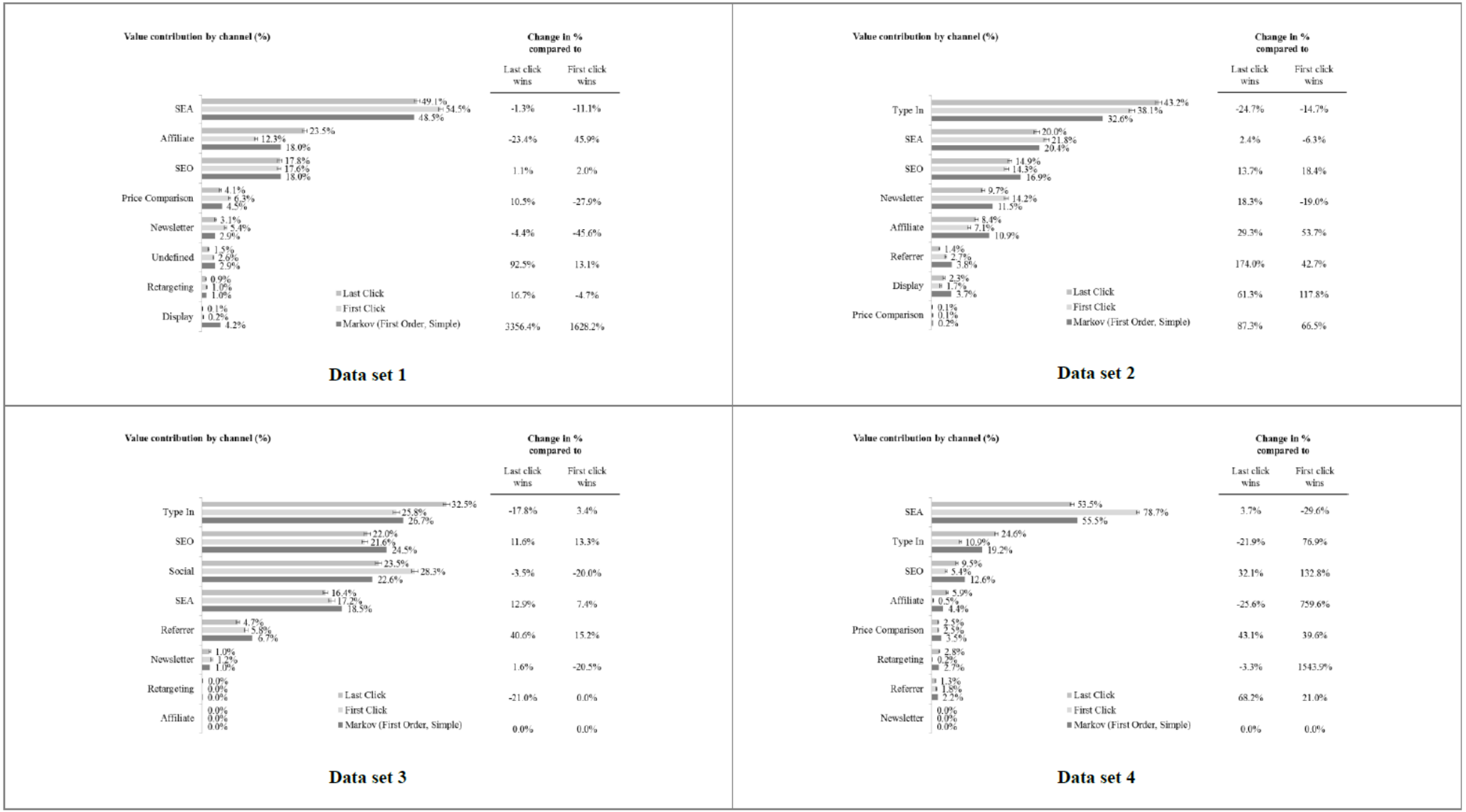
[166] See the OFT's report on personalised pricing.

Annex 1: Estimated value contributions by channel for four different online retailers



Source: Anderl et al (2016), pg. 51.

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