# Appendix M: intermediation in open display advertising

## Introduction

1.      This appendix discusses intermediation in open display advertising. It provides background information to the analysis of the open display market developed in Chapter 5, presents the evidence supporting the claims we make in the chapter, and develops the analysis of some issues that, although useful for a full understanding of open display intermediation, have not been included in the main report. This is an updated version of Appendix H to our interim report. Compared to the interim report, the scope of the appendix has been expanded:

- We include an analysis of advertiser ad servers.

- We do not just describe how the intermediation industry works, but also develop a detailed analysis of the issues affecting competition between intermediaries, looking at lack of transparency, conflicts of interests and leveraging practices.

- We discuss how competitive dynamics can be affected by the future evolution of the industry.

2.      The appendix is divided into eight sections. In the first section, we describe how advertising intermediation works. We outline the overall structure of the industry, analyse its evolution in the course of the last ten years, present the different types of transactions that publishers use to sell their advertising inventory, describe the activities performed by the different types of intermediaries and discuss the technical advantages of vertical integration across the intermediation chain.

3.      The second section deals with competition among providers at each stage of the intermediation chain. For each type of intermediary, we discuss the main dimensions of competition and the main factors affecting the strength of competition, such as customers' homing behaviour, economies of scale and scope, and switching costs. We introduce the largest providers and briefly describe their specific characteristics. Finally, we discuss the competitive impact of vertical integration across the intermediation chain and of the integration of intermediation services with user-facing services and owned and operated sources of inventory.

4.      The third section discusses various issues related to the use of data for targeting purposes in open display. We describe the types of data used by publishers and by different types of intermediaries. We then discuss the data

advantages of intermediaries that also provide user-facing services and that, as a result, have exclusive access to the data collected through those services. Finally, we consider the impact of the sharing of browsing data from publishers to intermediaries on the value of publishers' advertising inventory.

5. The fourth section is devoted to a discussion of the lack of transparency in advertising intermediation and analyses three separate issues. The first is transparency of fees across the intermediation chain. The second is the extent of 'arbitrage' among intermediaries, that is, the possibility for an intermediary to buy impressions at one price and sell them at a higher one, without its customers being aware of the magnitude of the difference. The last issue is about the existence and extent of undisclosed rebates between intermediaries, and the impacts these have on intermediaries' incentives.

6. An analysis of conflicts of interest is developed in the fifth section. We present a general framework to assess the conditions under which conflicts of interest can be expected to be most problematic. We then apply this framework to advertising intermediation, looking first at the combinations of functions that would give rise to conflicts of interest and then discussing at which points in the intermediation chain these conflicts are likely to lead to detriment for advertisers or publishers, based on the current and likely future structures of the industry and the prevailing conditions of competition.

7. The sixth section analyses how Google has leveraged its market power from its user-facing platforms into advertising intermediation and how, being present across the entire intermediation chain, it has been extending its market power from one service into another through bundling and self-preferencing practices, potentially harming publishers and advertisers and making it difficult for other intermediaries to compete on the merits.

8. The seventh section looks at likely changes to how intermediation will work in the next two to three years, especially as a result of recent data protection regulation and the introduction of privacy enhancing technologies. We outline possible future scenarios and describe how the competition issues we have identified under the current structure of the intermediation industry are likely to continue to be present in the near future.

9. A short final section summarises our main findings and identifies the remedy implications.

## How intermediation in open display works

10. In contrast to the walled gardens of Google, Facebook and other platforms, in the open display market a wide variety of publishers, such as newspapers and

other content providers, compete against each other in real time to sell inventory to advertisers. To achieve the complicated task of selecting an ad to be served to an individual in real time, and establishing the price to be paid for doing so, advertisers and publishers rely on a range of intermediaries. This section describes how advertising intermediation works.

*Overview of the intermediation value chain*

11. Many operators of online content that attracts consumer attention monetise the services they provide, at least in part, through digital advertising. Some of their advertising space (or inventory) is sold at fixed price through direct deals with specific advertisers or media agencies. Most digital advertising, however, is now sold 'programmatically'.[1] The defining feature of programmatic buying is that the decision on whether to buy a particular impression is made in real time, making use of information about the environment (eg webpage) in which the ad will appear and often about the internet user in front of whom the ad will be placed.

12. Social media platforms have sufficient scale to run their own self-service interfaces for programmatic trading – these are often referred to as 'walled gardens'. In order to make programmatic trading possible for smaller operators of online content, which we denote with the term 'publishers', a complex industry has emerged, including a range of intermediaries between advertisers and publishers – the so called 'adtech stack'.

13. The adtech industry has developed to address the needs of two groups of firms – advertisers and publishers.

   - Advertisers – the demand side – want to reach users with their message; their aim can be increasing consumers' awareness of their brands or inducing a direct response (eg a purchase) from consumers seeing the ad; they are usually interested in reaching specific audiences.

   - Publishers – the supply side – operate websites or apps and want to monetise their services selling digital advertising inventory; they want to maximise their (long-term) revenue subject to constraints deriving from the two-sided nature of their business (eg ad quality standards, editorial line).

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[1] Following the IAB, we define programmatic trading as 'the use of automated systems and processes to buy and sell inventory'. See Internet Advertising Bureau UK, The Programmatic Handbook, page 8.

14. In order to satisfy these needs, the intermediation industry must perform the following functions:

- targeting function – targeting adverts at particular users or groups of users;

- advertiser advisory function – determining buying and bidding strategies, based on the advertiser's objective and the available information;

- publisher sales function – setting the rules for the selling process, contacting potential buyers, collecting and ranking their offers, determining who the inventory is allocated to and the price to be charged;

- verification, attribution and evaluation – verifying that advertisers received what they paid for and estimating the performance of their campaigns; and

- delivery – the basic task of serving the ad in real time.

15. To fulfil these functions, the intermediation industry has evolved into a complex chain of specialised providers. A simplified version of this intermediation chain is provided in Figure M.1 below.

**Figure M.1: Simplified scheme of the intermediation value chain**



Source: CMA.

16. On the demand side, the main participants include:

- Media agencies – large advertisers often use the services of media agencies to plan and deliver an advertising campaign. Media agencies can offer in-house trading desks, which provide the technical expertise to execute programmatic media buying.

- Advertiser ad servers – used by advertisers and media agencies to store the ads, deliver them to publishers, and keep track of this activity.

- Demand Side Platforms (DSPs) – provide a platform that allows advertisers and media agencies to buy advertising inventory from many sources. DSPs bid on impressions based on the buyer's objectives and on data about the final user.

17. On the supply side, the main participants include:

- Supply Side Platforms (SSPs) – provide the technology to automate the sale of digital inventory. They allow real-time auctions by connecting to multiple DSPs, collecting bids from them and performing the function of exchanges.[2] They can also facilitate more direct deals between publishers and advertisers.

- Publisher ad servers – manage publishers' inventory and are responsible for the decision logic underlying the final choice of which ad to serve, based on the bids received from different SSPs and the direct deals agreed between the publisher and advertisers.

18.   The advertising industry also includes further participants involved in the provision and management of data and in advertising analytics:

- Data suppliers – provide data that can be used to augment the user data already possessed by advertisers and publishers and enhance the ability of targeting advertising to specific types of audiences.

- Data Management Platforms (DMPs) – allow other participants along the value chain (advertisers, DSPs, SSPs and publishers) to manage and analyse their data, integrate it with third-party data, and use it to create audiences that can be used for targeting purposes.

- Measurement and verification providers – used by advertisers to measure the performance and impact of advertising campaigns.

19.   Table M.1 maps the various functions listed above to the intermediaries that perform them in the current industry structure.[3]

**Table M.1: Intermediation functions and providers**

| Function | Providers |
|---|---|
| Targeting function | DMPs, DSPs |
| Advertiser advisory function | Media agencies, DSPs |
| Publisher sales function | Publisher ad server, SSPs |
| Verification, attribution and evaluation | Measurement and verification providers, advertiser ad server |
| Delivery | Advertiser ad server, publisher ad server |

Source: CMA.

20.   In a typical real-time transaction, when a user opens a webpage (or uses an app), an automated process is put in motion through which:

1) Multiple SSPs receive ad requests for the advertising space available on the web page. In turn, SSPs send bid requests to multiple DSPs.

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[2] Advertising exchanges used to be separate from SSPs. The two functions, however, have largely been merged into the same operators.
[3] These intermediaries may also perform additional ancillary functions not included in the list.

2) DSPs evaluate the advertising opportunity based on the objectives of the campaigns of all their customers (advertisers and media agencies) and automatically generate bids to be sent to SSPs.

3) SSPs then rank the bids received based on price and on priority levels that may have been set by the publisher and send the winning bid to the publisher.

4) Finally, the publisher ad server compares the bids received, together with any pre-existing direct deals between the publisher and specific advertisers, and decides which ad is to be served on the webpage.

21. While this general process applies to all programmatic transactions, there are many variants to it, which differ in the ways in which SSPs are contacted and submit their bids and in the type (if any) of pre-existing agreements between the publisher and advertisers. In order to understand the different paths that ad requests and bids can follow, it is helpful to look at how the intermediation industry has evolved through the last ten years. A brief history of advertising intermediation is developed in the next section.

### The evolution of the intermediation industry

22. The advertising intermediation industry is complex. In part, this complexity is the result of the way it has developed (and continues to develop) organically to solve the technical problem of allocating advertising inventory in an efficient way, responding to the changing needs of advertisers and publishers. A review of the industry's development shows the important role played by Google, and in particular by its publisher ad server.

*The emergence of real-time bidding*

23. When digital advertising was in its infancy, publishers sold most of their inventory through direct deals with advertisers and media agencies, reflecting the way advertising was traditionally sold in the offline world. The deals typically specified the number and type of impressions to be delivered within a certain time span, and the agreed price for those impressions. However, the volume of available impressions cannot be perfectly estimated in an online context, as it depends on the number of visits to the publisher's website. Publishers, therefore, had to find a way to sell 'remnant' inventory, which had not been pre-sold through a direct deal.

24. This provided a space for ad networks, which could buy remnant inventory from various publishers and repackage it before selling it to advertisers. The agreements between ad networks and publishers were based on pre-agreed

prices for the available inventory. A publisher having a piece of inventory for which no direct deal applied would therefore contact the various ad networks and ask whether they were interested in buying the impression at the pre-agreed price. Publishers would rank ad networks in a waterfall-like sequence according to the agreed prices and would first call the ad network that agreed to the highest price; if that ad network did not buy the impression, the second one in the list would be called, and so on. This process was managed by the publisher's ad server, where direct deals were included as 'guaranteed line items' and the various ad networks appeared as separate 'remnant line items'.

25.     Over time, however, there was a realisation that, as the value of an impression is affected by the identity of the user seeing the ad, allowing advertisers to flex their bids in real time based on information about the user could increase the efficiency of advertising campaigns. New services emerged to allow advertisers to collect and make use of user information, while ad exchanges allowed real-time bidding for impressions. Ad networks evolved into today's SSPs.[4] Real-time bidding typically took the form of second-price auctions. The attractiveness of a second-price auction is that it incentivises bidders to reveal their valuation of the impression, as in principle it is optimal for bidders to bid exactly the value they assign to the impression.

*Dynamic Allocation*

26.     With the introduction of real-time bidding, the traditional way in which publisher ad servers worked became inefficient. SSPs continued to be ranked in a waterfall-like sequence within the ad server. The ad server was instructed to contact first the highest ranked SSP and offer the impression for sale. If the SSP submitted a high enough bid it would secure the impression; if the SSP did not buy the impression, the ad server would contact the SSP ranked next in the waterfall, and so on until the impression was finally sold. This type of sequential call of the SSPs became known in the industry as 'daisy chaining'.

27.     However, this waterfall setup was inefficient and led to sub-optimal yield. The reason is that the ad server did not allow publishers to rank SSP partners in the waterfall in accordance with the actual bid (expressed in cost per thousand impressions, or 'cost per mille' (CPM)) they would submit. Instead, SSPs were ranked according to their estimated bids (expressed in CPM), ie the bids the publisher expected them to submit once called by the ad server. Such estimates were typically based on the average past performance of each SSP. That means publishers could lose potential revenue, as for a given impression it might be the case that an SSP was willing to submit a high bid

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[4] Some intermediaries still maintain many features of ad networks, while allowing for real-time biding.

but was never given the chance to do so, as the impression was already sold to the SSP higher in the waterfall.

28. As a way to partially address this inefficiency, in 2007 the ad server DoubleClick for Publishers (DFP), which was acquired by Google in 2008, introduced Dynamic Allocation. Under Dynamic Allocation, DFP established a 'floor price' based on the highest price of any of the publisher's booked, static remnant line items (which a publisher 'booked' by manually configuring the estimated price of each remnant line item) and then sent a bid request to its own exchange (AdX). AdX would run its real-time auction and secure the impression if it could submit a bid above the price floor. In this way, AdX was the only SSP able to insert its real-time demand within DFP. While all other SSPs were stuck with their estimated demand, AdX was able to compete against them and secure impressions on the basis of its real-time demand. In 2014, Google introduced Enhanced Dynamic Allocation, which extended the principle of dynamic allocation to 'guaranteed line items', ie direct deals. Direct deals were no longer always prioritised over other bids, but AdX bids (and other SSPs' estimated bids) could win the impression if they were sufficiently high and if this did not cause under-delivery of the direct deal. Direct deals were no longer always prioritised over other bids, but AdX bids (and other SSPs' average CPMs) could be preferred if they were sufficiently high and if this did not cause under-delivery of the direct deal.

*The introduction of header bidding*

29. Dynamic Allocation did not completely solve the inefficiencies inherent in the 'waterfall' system; moreover, it gave AdX an advantage that other SSPs considered unfair. From 2015, therefore, a new technology began to be used by publishers to allow all SSP partners the chance to compete against each other on the basis of their real-time demand – header bidding. Under (client-side) header bidding, when a user accesses a publisher's webpage, the user browser calls simultaneously all the publisher's SSP partners that participate in header bidding before it calls the ad server (for that reason header bidding has also been referred to as pre-bidding). All the SSPs get the chance to view the impression at the same time and submit their respective bids.

30. Header bidding provided several advantages to publishers:

   - It provided a more efficient allocation process compared to the waterfall; the increased price competition among multiple SSPs in real time led to a higher price per impression (yield).

   - Each step down the waterfall took additional time. As more time passed, there was an increased likelihood that the user might have left the page

by the time the ad creative serves, causing miscounting and discrepancies, as well as a loss of revenue for that impression. This could also have a negative impact on load times for the page if the page was configured in a manner such that the ad creative load times slowed down the content on the actual page from loading. Header bidding solved these issues.

31.     These benefits led to the widespread adoption of header bidding among publishers. According to eMarketer, over 65% of the top 1,000 sites in the UK have adopted Header Bidding;[5] media agency IPG Mediabrands told us that around 80% of the Comscore UK top 100 publishers are now engaging in header bidding.

32.     Google, however, decided not to participate in header bidding. This decision, combined with the working of Dynamic Allocation, resulted in AdX maintaining an advantage over other SSPs where ads are delivered through Google's Ad Server (DFP). When an impression is available, the user's browser first calls the publisher's SSP partners, which submit their bids to the header bidding auction. The browser then contacts DFP. Within DFP, the bids of the SSP partners are matched with price priority line items. Until the recent transition to a Unified Auction (discussed below), as a result of Dynamic Allocation, DFP selected the line item with the highest price (which in that case corresponds to the highest bid from the header bidding auction) and then sent a bid request to AdX with it as its price floor. This was the so called 'last look' advantage. It is worth stressing that 'last look' was not intentionally designed to give AdX an advantage when competing against header bidding; it was simply the result of the header bidding auction taking place before the AdX auction was able to run. However, by not participating in header bidding, Google ensured that AdX's advantage was preserved.[6]

33.     While beneficial to publishers in terms of yields, header bidding also introduced some challenges.

- Header bidding can be difficult to implement and requires both advertising operations and development resources. Publishers often struggle to have the development resource required to implement it.

- The addition of extra code on the webpage, which client-side header bidding requires, can slow down the publisher's website, thereby detracting from the site's user experience.

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[5] See E-Marketer, UK Header Bidding Adoption, Aug 2018 & Nov 2018.
[6] Until the transition to Unified Auction, as we discuss below.

34.    As an alternative to client-side header bidding, some adtech companies have developed server-side header bidding, where the auction among SSPs takes place in a remote server controlled by a third party (the provider of the server-side header bidding solution) instead of the user browser. This minimises impacts on the site load speed. On the other hand, this solution generally leads to less revenue for publishers, because participating SSPs are not directly called by the browser – where they can retrieve their user IDs from their cookies – but are contacted by the provider of the solution. That results in lower cookie sync rates, which in turn means that buyers will be reluctant to submit a bid (or will submit a lower bid). In addition, visibility of data on bidding is more difficult to obtain on the server side. For these reasons, server-side header bidding has proven less popular among publishers.

*Google's Exchange Bidding*

35.    As a response to publishers' uptake of header bidding, Google introduced its own proprietary version of server-side header bidding – Exchange Bidding – allowing non-Google SSPs to integrate into its ad server auction. Exchange Bidding was originally developed in 2016 and became available to publishers in April 2018. Google's internal documents show that its desired outcome was the following:

1) Exchange Bidding being a superior product, the industry would stop investing in header bidding; publishers would embrace Exchange Bidding and stop using header bidding.

2) Access to inventory would then be a sufficient incentive for SSPs to participate in Exchange Bidding.

3) The revenue share charged to participants in Exchange Bidding,[7] added to the fees charged by the SSPs themselves, would prevent DSPs from switching from AdX to other SSPs.

4) As a result, revenue would increase for both publishers and AdX. Moreover, being part of every transaction, Google would benefit from 'data network effects'.

36.    While a major reason for the introduction of Exchange Bidding appears to have been protecting Google's revenues from the impact of header bidding, Google's internal documents also show [✂]. One example of this approach was the decision not to give AdX a 'last look' advantage over the SSPs

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[7] Exchange bidders are charged either 5% or 10% of the value of the winning bid, depending on the type of inventory.

participating in Exchange Bidding (this advantage was removed by Google during the beta period in response to customer feedback). However, some publishers are concerned that the Exchange Bidding auction is non-transparent and it cannot be verified whether AdX maintains an advantage.[8]

37.    Exchange Bidding, recently renamed as Open Bidding, has proved successful and is widely adopted by publishers. It has not led, however, to the demise of header bidding.

*The move towards first-price auctions*

38.    When real-time bidding was introduced, exchanges initially ran second-price auctions, where the highest bidder wins the auction but pays the second-highest bid. In the last few years, however, exchanges have moved towards a first-price auction model, where the winner pays the amount it bids. With Google's exchange moving to a first-price auction in 2019, the large majority of auctions are now run as first-price. There were two factors behind the transition to first-price auctions: the first is related to publishers' incentive in the context of repeated second-price auctions; the second has to do with the implications of the sequential auctions resulting from the introduction of header bidding.

39.    The fact that auctions are repeated gives publishers the ability and incentive to use floor prices to increase their short-term revenues. This strategy is typically executed when a publisher reviews their bid landscape data and compares it to their revenue reporting. If they notice that their auction closing prices (the auctions' second prices) are significantly lower than their highest bids, the publisher may raise their floor prices to increase their revenue in the short term. Over time, this behaviour eroded trust in the benefits of a second-price auction, as advertisers, anticipating the behaviour of publishers, have the incentive to bid less than their valuation for the impression. One common practice was the use of soft floors. A soft floor is a price threshold the publisher chooses for an auction – above the floor, bids are evaluated on a second-price basis and below the floor, they are evaluated on a first-price basis. When soft floors are deployed non-transparently, bidders are even less sure of the optimal bidding strategy.

40.    The introduction of header bidding created an environment where the bids submitted by SSPs participate in a final first-price auction. In this context, exchanges began running makeshift second-price auctions, where they would utilize artificial floors or static pay-to-bid ratios to increase their ability to win

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[8] Other issues related to Exchange Bidding are discussed later in the appendix.

the final auction. The auctions run by the exchanges, therefore, began looking more and more like first-price auctions.

41. Under these pressures, the move to first-price auctions ratified what was already taking place in practice and made the auction mechanisms more transparent.

*Google's Unified Auction*

42. In 2019, Google transitioned to a Unified Auction, in which the winning header bidding SSP, the DSPs bidding into Google's exchange and the SSPs participating in Open Bidding take part in a unified first-price auction within Google's publisher ad server (now integrated with its SSP and called Google Ad Manager). As part of this transition, Google has made the policy decision to remove its 'last look' advantage over header bidders. Google's exchange will no longer be informed of the winning bid from header bidding before submitting a bid and the results from header bidding will have no influence on the bids submitted by Google's DSPs (DV360 and Google Ads), other DSPs bidding into Google's exchange, or other SSPs bidding into Open Bidding.

43. The transition to Unified Auction has been accompanied by changes to how publishers are allowed to set floor prices. Specifically, publishers using Google Ad Manager are no longer allowed to set different floor prices for different buyers (eg SSPs or DSPs). Publishers' concerns with this change are discussed later in this appendix.

*Intermediation in the mobile environment*

44. The evolution of the intermediation industry has been somewhat different in the mobile environment, because of some technical specificities of mobile app advertising. On many mobile apps, user journeys are more structured or linear; as the next advertising opportunity is known beforehand, it is easier for publishers to pre-fetch ads. For example, in an app-based game, the next advertising opportunity may arise when the user completes the 'current level'. By contrast, when users browse a webpage, they may click on any one of a number of links, navigating to many different pages. Ads for all of these cannot be fetched in advance.

45. Inventory in the mobile environment is still predominantly sold through ad networks ranked in a waterfall-like sequence. Historically, networks had an advantage over ad exchanges in terms of their ability to:

- collect device and app signals that were traditionally not supported by auctions designed primarily for a web environment;

- support the caching and loading of ads within the iOS and Android ecosystems; and

- render ads in-app and support metrics such as 'viewability'.

Moreover, the latency associated with calling multiple networks sequentially may affect users less in mobile app environments, where it is more common to 'pre-fetch' ads.

46. However, as this method does not guarantee that publishers receive the highest price for every query, many publishers have shown an interest in header bidding-like solutions that allow multiple SSPs to compete in real time.

### *Transaction types*

47. This section describes the different types of programmatic transactions available to publishers and advertisers in the open display market.[9]

48. Programmatic transactions can be divided in the following categories:

- Open Auctions,[10] where any advertiser can bid for the impression;

- Private Marketplaces (PMPs), used when publishers want to limit the number of advertisers eligible to buy an impression and, typically, to sell more 'premium' inventory. PMPs include

    (i) private auctions, where multiple bidders participate in an invite-only auction; and

    (ii) preferred deals, where a single advertiser contracts with a single publisher to purchase inventory with specific deal terms for a 'first-look' advantage before the inventory is made available on an auction.

- Programmatic Guaranteed transactions, which are one-to-one deals in which the full transaction details are agreed in advance between publisher and advertiser. They reflect the traditional direct campaigns but are executed via programmatic pipes, bringing some of the benefits of programmatic advertising transactions to the process. The automated process increases the efficiency of what had previously been direct deals performed manually; moreover, unlike in insertion orders, advertisers and

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[9] It should be noted that there is still a fraction of digital advertising that is not sold programmatically, but through 'insertion orders', that is, direct agreements between a publisher and an advertiser (or media agency) specifying the number of impressions to be shown in a specified period of time, the pacing of the ads and their placement within the publisher's website, and the price.
[10] Open Auctions are just one of the types of transaction available in open display. The issues discussed in this appendix apply to all types of transaction unless we explicitly state otherwise.

publishers can layer on additional targeting for personalised advertising in real time.

49. Compared to Programmatic Guaranteed transactions, PMPs allow advertisers and publishers to use more granular targeting. Moreover, PMPs are integrated within the real-time bidding (RTB) ecosystem and integrate campaign data alongside other RTB transactions, which allows for better frequency capping and cleaner attribution. On the other hand, PMPs do not provide the parties with the ability to guarantee or reserve inventory. Programmatic Guaranteed inventory is typically sold at a higher price than PMP, which in turn is generally more expensive than Open Auction inventory.

*Advantages and disadvantages of the different transaction types*

50. Advertisers and publishers can use a combination of these transaction types, each of which has specific advantages and disadvantages.

*Open Auctions*

51. The main advantage of Open Auctions for advertisers is that they give access to hundreds of thousands of publishers, providing a much higher level of reach than other transaction types. This maximises the opportunities for effective data-driven audience targeting, as advertisers are more likely to find their best targeted consumers through the wide reach afforded by the Open Auction. This is particularly useful if the advertiser is looking to drive performance, rather than just brand awareness. Moreover, for advertisers with smaller marketing budgets, it is much easier to use Open Auctions than other transaction type, as there is no need for a direct relationship with publishers.

52. On the other hand, when using Open Auctions advertisers have less control over the placement of their ads. This may give rise to brand safety issues and make it easier for fraudulent ad inventory to be present. One intermediary told us that, in an Open Auction environment, the information that the potential buyer collects is only declaratory information from the SSP, without the possibility of checking its accuracy, veracity and authenticity.

53. From a publisher perspective, Open Auctions make it possible to access a large pool of demand and to monetise all ad impressions, including those in non-core geographies. They also allow for quick reactions to changes in traffic, taking advantage of short-term peaks and troughs in the news agenda. Moreover, selling through Open Auctions requires minimal account management.

54. On the other hand, Open Auctions make it more difficult to control the quality of the advertisements that are shown on the publisher's website. They are also associated with a higher intermediation cost than other transaction types. Moreover, it may be hard for a publisher to forecast its revenue, given the real-time pricing of inventory sold in Open Auctions.[11] Finally, one publisher submitted that in Open Auctions inventory is typically valued for the user, rather than for the environment. This means that often a publisher's premium environment is priced at a similar level to sites where users are less engaged and that therefore may be less effective for advertisers. One publisher submitted that this has led to a commoditisation of digital advertising, creating a vicious cycle of devaluing and reducing direct sales and reducing the incentive for publishers to invest in high quality, innovative media environments. We discuss the 'commoditisation' of digital advertising in later in this appendix.

*PMPs*

55. PMPs increase brand safety for advertisers, as they eliminate any potential risk of domain spoofing or fraud, which can happen in Open Auctions. However, given the more limited reach allowed by PMPs, they are best suited to brand awareness campaigns, where advertisers choose inventory that best aligns with their audience and brand. One intermediary also observed that advertisers might start buying inventory via Open Auctions and then build a network of PMPs or programmatic guaranteed deals based on the best performing inventory.

56. Publishers value PMPs because they have more control over which advertisers have access to their inventory. For sensitive publishers, especially broadcasters monetizing video inventory, PMPs offer an additional layer of compliance control when determining which campaigns will be allowed to run. Moreover, PMPs also allow a publisher to structure a bid request based on audience or contextual information that is unique to the publisher and not known to the buyer. As PMPs protect premium publishers from losing control over their data and audience, publishers may feel more comfortable sharing information with advertisers. Finally, publishers typically earn a higher revenue share for PMP transactions than they do for Open Auctions.

57. The main limitation of PMPs, from the publisher perspective, is that each PMP is typically set up individually between advertiser and publisher, which leads to operational overhead that is proportional with the number of buyers bringing demand. For this reason, PMPs (together with Programmatic

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[11] However, one publisher told us that revenue streams from Open Auctions are relative reliable and predictable.

Guaranteed transactions) generally benefit large, well-known and established publishers, whose inventory is sufficiently desirable to advertisers. Smaller publishers who do not have the same exposure and negotiation power are typically better off with the Open Auction model.

*Programmatic Guaranteed*

58.     Programmatic Guaranteed transactions give advertisers similar advantages to traditional direct deals. They allow for negotiation over prices, provide visibility over ad placements and impression viewability, and allow for better creative tailoring to website content. Guaranteed purchases are particularly useful when certain supply is scarce, such as with some high-quality publishers or publisher with niche audiences, or during peak seasonal periods (eg Christmas and Easter). Guaranteed buys are used to target specific contextual environments, rather than specific users. This means that they are more typically used for top-of-funnel campaigns.

59.     On the other hand, advertisers have limited access to user targeting. More generally, advertisers have limited control over a campaign once it has begun: they have to commit their budget to the publisher, regardless of campaign performance.

60.     In addition to the greater control over pricing and the quality of advertisements, as in PMPs, Programmatic Guaranteed transactions give publishers greater predictability of sell-through and a steady stream of future revenue. However, Programmatic Guaranteed transactions are more difficult to execute. Due to over-targeting, it is possible that a publisher could enter into a guarantee and have issues delivering on the spend. Moreover, if the buyer does not respond there are cases where a costly 'pass back' occurs where the opportunity was allocated to the guarantee, but the buyer did not respond with a bid, so the process would have to be restarted to find a fall-back partner.

*Recent trends*

61.     Most of the intermediaries who responded to our Requests for Information (RFIs) told us that PMPs and, even more, Programmatic Guaranteed transaction models are growing in use for premium inventory.

62.     Respondents, however, disagreed on whether the growth of PMPs and Programmatic Guaranteed is happening at the expense of Open Auctions. Some told us of a trend for premium publishers to reduce inventory sold through Open Auctions in favour of more private transaction forms and guaranteed deals. Open Auctions rely heavily on trust, since the publisher and

the buyer have no direct relationship. Accordingly, if publishers' or advertisers' trust in the Open Auction transaction type decreases, a trend would emerge towards PMPs or Programmatic Guaranteed. The current movement towards PMPs can be partly due to distrust of some inventory transacted on Open Auctions. Another reason could be linked to data privacy concerns in programmatic advertising.

63.    Other intermediaries, however, argued that there is not a full-blown industry trend away from Open Auctions and towards more controlled setups, and that Programmatic Guaranteed transactions are mainly replacing traditional direct deals for publishers' premium inventory. One respondent submitted that publishers and buyers tend to transact new advertising formats using PMPs or Programmatic Guaranteed, but as these advertising formats mature they increasingly use Open Auction transactions. In particular, video inventory has a strong skew towards 'private-style' fulfilment models, in part because publishers of video inventory often require an additional level of compliance control in selecting the advertisements that run in this inventory. Banner inventory, however, is not moving towards or away from any particular transaction type. This may be due to the fact that this market is starting to reach a more mature point and is thus more stable.

### Participants in the intermediation industry

64.    This section describes the roles played by the different participants in the advertising intermediation industry – media agencies and trading desks, advertiser ad servers, DSPs, SSPs, publisher ad servers, header bidding solutions, ad networks, and DMPs. For each type of participant, the section describes the main functions and how providers are remunerated.

#### Media agencies and trading desks

65.    Many advertisers rely on media agencies to plan and buy digital advertising. This allows them to take advantage of the agencies' technical expertise, scale, buying power and preferred trading arrangements with technology vendors and publishers.

66.    Advertisers brief the agency on a campaign, outlining its overall objective, the desired outcomes and, typically, the desired business KPIs. The advertiser then sets the budget for the campaign, the target audience, the campaign duration and the creative concept and formats available. Advertisers may also provide a 'black list' or 'white list' of websites. The agency will then make recommendations on where (ie on what platforms), how (ie with what optimisation methods) and to who (ie with what audience strategy) to allocate the advertiser's budget in order to best achieve its goals. The agency will also

define the channel-specific metrics that it will be using to measure the success of the given channel.

67.     For the execution of the media buying plan, agencies provide the services of 'trading desks'. These are in effect a managed service, where the agency provides the talent required to operate a third-party technology (DSPs). While advertisers could use a DSP's own managed services, there might be reasons for advertisers to prefer an agency's trade desk. WPP told us that, due to the contractual structures of most WPP client engagements, typically WPP does not operate directly conflicting clients within the same agency. In contrast, third-party DSP platforms will have a significant number of competing clients using the platform. Given the potential risk of inadvertently informing competitor strategies from their own campaign activities, a DSP managed service is often therefore deemed unsuitable by clients.

68.     Agencies enter into agreements with technology and media vendors. WPP told us that agreements with technology vendors relevant to digital advertising are typically negotiated at a global level and adopted by the network agencies at local market level, while agreements for media space with digital media vendors are negotiated at local market level. Agencies typically act as principal when entering into contracts with media owners and other third-party vendors on behalf of their clients. In some cases, however, advertisers contract directly with the publisher and the agency acts as an agent.

69.     There is, however, a growing trend in advertisers in-housing the purchase of some or all of their digital advertising space. This trend has accelerated in the last two years. The choice to in-house can be due to various reasons, including:

•       Reducing costs by eliminating agency fees and mark-ups, and having greater transparency of the value chain costs (ie third-party data, tech fees and agency fees). This desire may have been made more pressing by historical issues around transparency from agencies in relation to the passing back of rebates to clients.

•       Having better control over who is targeted and greater visibility of the value to the advertiser of the users seeing the ads. This need may be felt especially by advertisers in sectors with large amounts of fast moving, first-party data, such as travel and finance, who want to shorten the gap between data generation and data application in a controlled and secure fashion given the commercially sensitive nature of real-time transactional data.

- Having greater control over performance data. For example, American Express told us that it started purchasing Closed Display advertising directly from Google DV360 in 2018, to ensure that performance management data remained under American Express' ownership; [✂]. On the other hand, data ownership seems to be achievable for advertisers in some cases even when using agencies. For example, L'Oréal has a direct global contract with Google for its tech stack, so that L'Oréal owns the data and has full transparency regardless of which agency operates the media buying.

*How media agencies charge for their services*

70. Media agencies typically charge either a commission-based fee, based on the amount of media spent, or a fixed fee based on agreed FTE levels. In some cases, a performance-related fee can be applied, especially in the case of advertisers who have highly measurable customer conversion events within their business.

71. Fee levels range between 2% and 25% of the media spend, depending, among other things, on the complexity of the digital channels, volume of spend, strategic complexity and the number of different brands and campaigns, and the time taken to activate across the different channels.

*Advertiser ad servers*

72. Advertisers and media agencies use advertiser ad servers to manage their campaigns. In addition to hosting the creative content, the main activities performed by an advertiser ad server can be divided into targeting, reporting, and media management.

- An advertiser ad server is the 'source of truth' on all the campaigns run by an advertiser, collecting data on the domains and URLs where the ads are served, classifying a page content into categories, and providing statistics on geo-targeting. Its reporting activities can also include data to understand the performance of each campaign and the role that specific channels play in conversions. As part of this activity, it is a common task for ad servers to implement tracking on advertisers' websites and e-commerce sites in order to measure ad effectiveness.

- An advertiser ad server can allow advertisers to target their ads when establishing an ad campaign. For example, the campaign's audience can

be divided into separate groups, with different ads being shown to different segments.[12]

- An advertiser ad server can also provide media management functionalities. This can involve frequency capping (ie ensuring that users are not served the same ad multiple times) and sequential creative rotation (ie showing a set of ads to users in a specific sequence).

73. Other activities performed by an advertiser ad server are related to brand safety safeguards and evaluations, to ensure that adverts do not end up displayed next to unwanted content or context. To perform this task, the advertiser ad server uses third-party databases of website URLs mapped to content categories.

74. While advertiser ad servers were historically the main providers for measurement of ad campaigns, this has changed in recent years with the emergence of a host of companies that specifically focus on measurement. An advertiser ad server can therefore facilitate its customers' ability to work with other service providers in the execution of their advertising campaigns. For example, customers may use third-party viewability providers such as IAS or Double Verify to associate ad viewability metrics with ad delivery. Customers may also use measurement services such as Nielsen or comScore, who use samples or panels, to discern if and to what extent target audiences are being reached in their advertising campaigns.

75. Advertisers are typically charged a fee based on usage volume. The most common pricing model is based on the number of impressions served, although a click-based model can be offered, either where the advertiser has CPC as the performance goal, or for campaigns that do not involve content delivery and where only click tracking is performed (eg search campaigns).[13] The fee can vary based on the weight of the creative content and/or the ad type (eg image vs video). Additional services related to targeting or brand safety can be charged separately.

76. Ad serving fees are low compared to those charged at other stages of the intermediation chain. For example, Google's Campaign Manager generally charges less than US$[✂] per 1,000 impressions or US$[✂] per click. More information on the level of fees charged by advertiser ad servers is provided in Appendix R.

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[12] This targeting functionality is less sophisticated than the one typically offered by DSPs.
[13] An alternative, but rarely used pricing model is based on fixed monthly or yearly fees with a transaction volume cap.

*Demand Side Platforms (DSPs)*

77.  DSPs enable advertisers and media agencies[14] to buy programmatic display advertising from SSPs and media owners. Based on parameters set by advertisers, DSPs

   - make it possible to target advertising to specific audiences;

   - determine the optimal bid for each advertiser in response to each ad opportunity;

   - decide which bids to submit and into which SSPs; and

   - monitor the quality of supply.

78.  When setting up a campaign, advertisers typically provide information including their budget, their key performance indicator (KPI) target, and their targeting strategy.

   - In addition to the total budget of the campaign, advertisers can specify a pacing strategy, indicating their hourly, daily or weekly budget.

   - Advertisers can explicitly declare the value of an impression based on certain conditions, ie the maximum CPM bid, or they can let the DSP have the flexibility to determine the bids to optimise a chosen KPI, eg cost-per-click (CPC), click-through rate (CTR) or cost-per-action (CPA), where an action can be ads leading to a purchase, newsletter sign-up, phone call, download or other behaviour useful to the advertiser.

   - Advertisers can determine the user attributes they want to target and assign values to those attributes. They can specify targeting strategies by inventory source, content and device; they can also choose on which SSP they want to bid.

   - Advertisers can include brand safety requirements (eg whitelists or blacklists of websites, content they want or do not want their ads to appear next to) and quality requirements (eg in-view targets, view-through targets).

79.  One of the main roles of DSPs is to provide advertisers with the ability to target users in real time. Targeting is largely enabled by the following elements:

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[14] In the rest of this section, we use the term 'advertisers' to encompass both advertisers and media agencies.

- audiences which use advertiser's first-party data (ie a list of IDs that the advertiser wants to target or retarget) or third-party data segments (audiences created using data collected by other market participants);

- consent signals informing ad buyers when users have given their consent to be served personalized ads, which are passed on by publisher consent management platforms through the digital ad supply chain; and

- device IDs that come through auctions, which the DSP matches with the IDs in the target segment.

80. Once the DSP receives a bid request, it reviews all active campaigns, comparing their targeting settings with the features of the ad opportunity. A potential bid is generated for all the campaigns whose targeting criteria match the information in the bid request. The bid depends, among other things, on the estimated value of the ad opportunity for the advertiser, on the campaign's progress against the pacing goal and on the type of auction:

- The value of the ad opportunity is determined based on the KPI specified by the advertisers, depending on the likelihood of the action that the advertiser wants to achieve.

- The DSP may calculate an ideal spend curve so that the advertiser's budget is distributed evenly throughout the day (with more spent during the hours when there are more users online); a bid modifier is then applied to bids to control the amount of spend. In addition, the bid can also be adjusted based on the frequency (the number of times the user has seen the creative) and recency (the amount of time that has passed since the user last saw the creative) of the user.

- When the SSP runs a first-price auction, or uses soft floors,[15] many DSPs have developed machine learning algorithms to shade the bids, in order to avoid overpaying for the impression.[16]

81. The bids generated are ranked based on priority level and price. For example, Beeswax told us that it prioritises Programmatic Guaranteed and deal ID (ie PMP) bids; if there are multiple of these it takes the highest price; next it takes open bids and prioritises by price.

82. The number of bids submitted in response to a bid request can vary. While some DSPs submit only, or mostly, one bid, others typically submit more than

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[15] A soft floor works as an additional bid in a second-price auction. So, when bids are above soft floor price, the auction will clear at second price; when bids are below soft floor price, the auction will clear at first price.
[16] Not all the DSPs have this technology, and some rely on SSPs optimising the bid for them.

one bid. Submitting multiple bids for a single auction increases the chances of winning, as some bids may be discarded by the SSP for a reason other than the price. In those cases, the SSP is expected to utilize only the bid information from the highest-price, non-discarded bid for the relevant auction.[17] The number of bids sent can vary by SSP and can also depend on the general level of demand for an impression.

83.     As publishers typically work with multiple SSPs, DSPs receive multiple bid requests related to the same ad opportunity. This is a result of header bidding, as multiple SSPs simultaneously try to elicit bids for the same impression. While there is currently no way to efficiently de-duplicate such requests, some DSPs have developed systems to reduce the volume of bid requests that reach them, reducing the costs they have to sustain to listen to the bid stream and respond to bid requests.

- DSPs often implement a technique known as 'supply path optimisation'.[18] DSPs choose their preferred paths to supply and stop actively listening to open bid requests from non-preferred SSPs. There are multiple variables taken into consideration when deciding whether a supply source should be given preferred status; one of them is price, which is measured as an expected CPM. This can disincentivise suppliers from manipulating or otherwise inflating prices in cases where there are alternative access points to the same ad inventory through other more transparent or cost-effective suppliers.

- [✂].

- Xandr has developed an adaptive system to identify (and regularly reassess) superfluous inventory with minimal probability of receiving a bid and limits these requests from being processed.

84.     It is often the case, however, that the same DSP submits bids to different SSPs for the same ad opportunities. In those cases, the bids submitted may not be the same, as the DSP may receive different information from the different SSPs.

85.     Another issue that can increase the volume of bid requests faced by DSPs is the possibility of the same SSP sending multiple bid requests for the same impression. A publisher can make a single impression opportunity or larger sets of traffic eligible for multiple Deal IDs and can set a different level of

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[17] However, since auction mechanics are not fully transparent, DSPs run the risk of multiple bids acting as price support against each other (in the context of a second-price auction).
[18] Verizon Media also offers a product called Omniscope, which provides buyers with more transparency on the supply path and allows them to make decisions on their own supply path optimisation.

priority for each deal – a higher priority usually coinciding with a higher floor price. If SSPs consolidate these multiple Deal IDs into single requests, the DSP can decide in real-time which of those deals (and their respective floor prices) it wants to bid on, and as such has greater ability to optimize bid prices for its customers' campaigns. However, if SSPs send multiple requests for a single opportunity (in this case broken down by Deal ID), the DSP is forced to evaluate each request individually and independently of the others and may unknowingly bid multiple, different prices, thus driving up potential yield for the publisher when a lower bid price would have sufficed. This practice can increase a DSP's processing costs due to the increase in bid request volume and can lead to customers over-paying for impressions. One stakeholder told us that sending multiple bid requests for the same impression opportunity is a common industry practice.

86.  Finally, another function of DSPs is to monitor the quality of supply. DSPs can apply a variety of quality filters to all incoming inventory to remove traffic that may not be brand safe or fit for its customer base, or that shows signs of malware or suspicious behaviour.

*How advertisers pay for the impressions and for DSP services*

87.  As DSPs submit their bids into SSPs on a CPM basis, they typically pass this cost to advertisers on the same basis. However, some DSPs allow advertisers to pay on a different basis. For example:

- Google Ads charges some advertisers on a cost-per-click (CPC) basis or based on subsequent conversions; it runs a second-price auction among advertisers, with the winning advertiser paying the minimum necessary to win the auction.

- Criteo charges advertisers on a CPC basis. This model is possible since Criteo provides DSP services together with retargeting services, and then sells ad spaces which have been optimized and targeted using Criteo's own retargeting technology.

- Some DSPs offer other charging models in addition to CPM, such as Viewable CPM (vCPM, where advertisers pay only if the ad is completely viewed), cost per completed view on video (CPCV), or cost per action (CPA).

88.  When charging on a basis different from CPM, the DSP takes on the transaction risk. For this reason, non-CPM pricing is much more common within the 'walled gardens', where the same company controls margins on both the demand and supply side, than in advertising intermediation. While

most DSPs are not offering this service, this is not perceived by them as a significant limitation. DSPs, in fact, normally have algorithms which optimise toward certain KPIs (like clicks or actions), so that the bid price and targeting is automatically adapted to the likelihood of the user or ad placement contributing positively to the KPI.

89.   For their services, DSPs typically charge advertisers and media agencies a percentage of the media spend. This is usually subtracted from the bid before it is sent to an SSP, although some DSPs allow advertisers to add the fee on top of their campaign budget. Based on the information provided by DSPs responding to our RFI, fees can vary between approximately 5% and 20% of the media spend. Large customers are often able to negotiate lower fees, or to receive incentive-driven discounts (eg a reduced fee for any spend over a certain threshold). DSPs bidding directly into a publisher's header bidding solution, without going through an SSP, such as Facebook Audience Network (FAN), may charge higher fees. More information on the level of fees charged by DSPs is provided in Appendix R.

90.   Some DSPs adopt different pricing models. For example, Beeswax charges a flat monthly fee based on the queries per second (QPS) of traffic provided to the customer's bidder.[19] One DSP, on the other hand, adopts a non-disclosed pricing model, where the CPM fee charged to advertisers includes media costs, audience data costs, quality metrics costs, service costs and technology costs.

91.   In addition to the base fee, advertisers can be charged separately for additional services:

-   While ad targeting is typically included in the base fee, some DSPs add an additional charge when the advertiser uses the DSP's proprietary data. Third-party data acquired through DMPs is typically charged separately and some DSPs may add a mark-up.

-   Advertisers can receive a managed service, including campaign set up, strategy, reporting and campaign optimisation, for an additional percentage fee, which can vary between 5% and 15%.

-   Additional services such as viewability measurement and pre-bid fraud blocking can carry an additional charge. An additional fee can also apply if

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[19] Beeswax also charges its customers a fee for using its 'seat' on the exchanges to purchase inventory; however, larger customers can get their own seats on the exchanges and avoid this fee altogether.

advertisers want to receive log level data from impression served when they win an auction.

- When advertisers do not pay on a pure CPM basis, additional fees may be charged. For example, Xandr allows its customers to pay only if the impression was viewed, while the publisher will always get paid. In that case, Xandr charges an additional percentage for taking on the transaction risk.

*Supply Side Platforms (SSPs)*

92. SSPs allow publishers to connect with multiple sources of demand and sell their advertising inventory programmatically. SSPs initially tended to be separate from ad exchanges, marketplaces connecting buyers and sellers and hosting open real-time auctions. The two roles (SSPs and ad exchanges), however, have to a large extent merged in recent years, to the point that the two terms are often used interchangeably. SSPs typically allow publishers to sell their inventory through a variety of transaction types, including Open Auctions, private marketplaces, priority deals and programmatic guaranteed deals.

93. The main function of SSPs is to send bid requests to DSPs, receive and rank the bids, determine the winning bidder and send a bid back to the publishers. They can also provide several other services to publishers to maximise their yields, while acting at the same time to attract DSPs to their platform.

94. When ranking the bids received by DSPs, SSP take account not only of the bid price, but also of the restrictions and priority rules set by the publisher:

- Some bids may be judged to be ineligible, eg because they fail to meet the reserve price, or because the advertiser is included in the publisher's blocklist.

- Valid bids are first ranked by priority level. For example, an SSP told us that Programmatic Guaranteed bids take priority over all other transaction types, while preferred deals are prioritised over private auction and open auction bids. A publisher can also create multiple private auctions, preferred deals and programmatic guaranteed transactions for the same ad inventory, which can be given different priority levels.

- When multiple bids have the same priority, price becomes the deciding factor. If prices are the same, some SSPs determine the winner using a 'buyer score' based on historical data, including the average buyer CPM,

the average revenue achieved by such buyer, and the ability for the buyer to actually deliver an impression if selected.

95.    Once the winning bidder is determined, the value of the bid sent to the publisher depends on the type of auction run by the SSP. Most of the SSPs we received information from run first-price auctions in all, or in the majority of, cases. In such cases, the bid submitted to the publisher is the same one submitted by the winning bidder, net of the fees charged by the SSP. In some cases, however, other auction mechanisms can be used:

- Second-price auctions: the winning bidder pays the second-highest bid, typically plus 0.01 £/$/€ CPM, which is what is sent back to the publisher (net of the SSP's fees);

- Some SSPs allow for a mixture of first- and second-price, allowing DSPs to decide how they want to submit their bids;

- Fixed-price auctions, where the price is pre-agreed between publisher and advertiser and there is usually a single bidder.

96.    Some SSPs focus on particular ad formats, such as video or native display. SSPs can also develop proprietary ad formats. For example, Sharethrough told us that it offers a proprietary enhanced display format.

97.    In addition to managing the auctions, SSPs can provide further services to publishers and buyers (DSPs). Some SSPs told us that they check the quality of both the supply and the creatives. These activities can involve:

- using automated techniques to identify and block invalid (bot) traffic;

- auditing the domains on which the ads are served and verifying that the domain sending the bid request is what it claims to be; and

- scanning the advertising creatives.

98.    SSPs can provide yield management services. For example, Verizon Media SSP includes price floor optimization capabilities and has a yield management analyst team that provides on-demand consulting services, including recommending changes to price floors. SSPs can offer publishers the ability to sync their first-party data, or to integrate with third-party data providers. Some SSPs also automatically crawl publisher inventory and contextualise it according to the identified keywords, to facilitate contextual targeting.

99.    SSPs can also bear the costs and the risks of paying publishers and collecting payments from buyers (DSPs). DGM Media, however, told us that this is

increasingly no longer the case, as SSPs are seeking to put in place sequential liability clauses to cover instances where they cannot collect payments from their DSP partners.[20]

100. To attract buyers to their platform, SSPs can provide various services to DSPs, including the following:

- SSPs can decide which DSPs to call for getting bids based on what kind of ad inventory DSPs are looking for and whether they are likely to submit a bid.

- SSPs can package inventory across publishers in ways that are meaningful to buyers. For example, Rubicon Project offers 'auction packages', in which it bundles the ad inventory of different publishers which fall within a certain content category (eg sports, lifestyle) in order to make it easier for buyers to find the ad inventory they are looking for; an auction package is a form of open auction, but is curated like a PMP deal.

- SSPs can keep a matching table of their own unique cookie User IDs and DSPs' own cookie User IDs; when submitting a bid request, they send the DSPs' specific IDs.

- Some SSPs provide a bid shading functionality, reducing the amount of the bid that they pass to the downstream auction on behalf of the winning bidder.

*How SSPs charge for their services*

101. SSPs typically charge publishers based on a revenue share agreement. Based on the responses SSPs submitted to our RFI, the share retained by the SSP (also known as the 'take rate') varies substantially across the industry, ranging from 5% to 35%. Even for a single SSP, the take rate can vary depending on the ad format and on the transaction type, with Open Auctions being associated with higher take rates than private marketplaces or programmatic guaranteed transactions. Moreover, take rates are often directly negotiated between SSPs and publishers, and lower take rates can be agreed with publishers that have a high volume of ad inventory, or have unique users or content; large publishers are able to achieve significantly lower rates than smaller ones. More information on the level of fees charged by SSPs is provided in Appendix R.

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[20] DMG Media's response to our consultation on the interim report, page 8.

102. Some SSPs apply variable rates: their percentage charge is not always the same for a given type of transaction but can vary around an average agreed with the publisher. This allows, for example, an SSP to reduce its fee in cases when, should the whole fee be charged, the net bid would be below the floor price set by the publisher; or to charge a lower fee when they expect to face higher competition for an impression.

103. In addition to the revenue share, some SSPs can charge additional fees, such as:

- a DSP access fee based on the risk ranking of the DSP and to account for revenue discrepancies (which arise because SSPs and DSPs have variations in the methodology for counting impressions delivered to a user); and

- a small exchange fee charged on a CPM basis.

*Publisher ad servers*

104. The publisher ad server plays a central role in digital intermediation, as it is responsible for the decision logic that determines the choice of which advert will appear at each specific piece of inventory. This does not simply involve selecting the highest bid but requires a holistic management of real-time demand and the direct deals agreed by the publisher with advertisers and media agencies. A publisher ad server should therefore maximise a publisher's revenue by taking into account prices, agreed target volumes and audiences, and frequency caps across different types of deals.

105. A critical component to a publisher ad server is therefore the ability to forecast what inventory will be available for sale in the future. Ad decisioning is based on pacing and decisioning algorithms based on machine learning algorithms and complex data sets.

106. Other functions of the publisher ad server relate to the provision of data and insight to the publisher, to allow it to better understand the demand for its inventory. Reporting and analytics capabilities are therefore important components of an ad serving technology.

107. A publisher ad server is not formally an intermediary, as its function is that of a tool through which publishers manage their inventory. However, the complexity of the operations carried out by publisher ad servers gives them a degree of autonomy from publishers that make them more than just a piece of software. For example, as seen above, Google's ad server has been able to

impose changes to the rules publishers must follow in selling their own advertising despite many publishers complaining about it.

108.  Publisher ad servers typically charge publishers on a constant CPM basis. In some cases, the charge can become proportionally lower as the volume of ads served increases. Fee levels are typically low. Google told us that, for publishers using Ad Manager Small Business, ad serving fees are waived up to a certain impression threshold; for Ad Manager 360 (the version used by larger publishers), the ad serving fee is generally [✂]. Our analysis suggests that this is typically below [0-5]% of the value of the ads. Smart estimates that its fees correspond to 1-2% of the value of the ads served; FreeWheel's estimate is [✂]%. Publishers may also be charged a flat set-up fee, while additional fees may be charged for the provision of log level data or non-core services.

*Header bidding solutions*

109.  Header bidding technology was introduced to allow multiple SSPs to compete head-to-head in real time. There are currently two models of header bidding: client-side, where the auction is run by the user's browser using code included in the publisher's webpage; and server-side, where the auction takes place in a third-party server. The advantages and limitations of each model have been described in above.

110.  Header bidding technologies can be split into an open source technology and proprietary technologies. The open source technology is called Prebid and is the most widely used header bidding solution. The Prebid community's oversight of the code ensures neutrality and equitable bidding processes among header bidding solution providers. A proprietary solution, on the other hand, has technology and algorithms unique to the provider. While the Prebid technology is free to use, it can be difficult for publishers to implement and maintain. Some third-party providers, however, can offer a managed service based on Prebid technology, by hosting the auction on their servers and providing an easier user interface and analytics tools.

111.  Typically, publishers have direct contractual relationships with the SSPs who want to participate to header bidding. Some providers, however, offer a service that allows publishers to integrate SSPs without the need for a contractual relationship, which SSPs have only with the header bidding provider.

112.  While header bidding typically allows publishers to achieve a better return for their inventory, it has some limitations (in addition to those already discussed in the section on the evolution of the intermediation industry), including:

- some formats are not yet available in header bidding, such as audio, digital out-of-home, and many emerging video formats; and

- as seen above, in the mobile app space the majority of demand still operates according to the waterfall model, with many key players not competing in header bidding.

113. In most cases, publishers do not pay for using a header bidding solution. SSPs bidding into proprietary header bidding solutions, however, are often charged a fee, which can vary between US$0.01 per won impression and 10% of the value of the impression. As header bidding providers are usually companies that also bid into them as SSPs, such fee is not levied to them.

*Ad networks*

114. Ad networks are intermediaries that aggregate inventory supply from publishers and match it with demand from their own demand sources, therefore connecting advertisers and publishers and integrating in a single service most intermediation functions. This was the main channel through which publishers used to sell their inventory in the early years of open display advertising, but were largely replaced by more specialist providers with the development of real-time bidding. Nevertheless, ad networks have not disappeared and continue to be an important tool for smaller publishers or in specific advertising environments, such as mobile apps. Two of the major ad networks are operated by Google:

- AdSense is widely used by small publishers, which through it delegate the sales of their inventory to Google. This allows small publishers to obtain advertising revenues without the need to develop specific technical capabilities to manage the sales.

- AdMob is widely used by publishers to sell advertising on their mobile apps.

115. The distinction between ad networks and other types of sell-side intermediaries has been decreasing in recent years, with ad networks increasingly open to third-party demand sources. For example,

- AdSense inventory[21] is available to third-party DSPs, although the vast majority of ads served originate from Google's own demand platform Google Ads.

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[21] We refer to AdSense for Content, AdSense for Games and AdSense for Video.

- AdMob inventory is also available to third-party DSPs. AdMob also operates as a 'platform', allowing publishers to find buyers for their inventory from multiple ad networks. Moreover, since 2018, Open Bidding, Google's version of header bidding, has been made available on AdMob, allowing participating third-party SSPs and ad networks to bid for the inventory in a real-time auction.

116. Ad networks such as AdSense and AdMob are therefore becoming increasingly similar to publisher ad servers with an integrated SSP, although AdSense does not provide publishers with the range of services and the degree of customisation that is allowed by a publisher ad server. Ad networks are not further discussed in this appendix.

*Data management platforms (DMPs)*

117. DMPs provide services focused on importing data, managing or enhancing that data, and delivering it back out, primarily for the purposes of enhancing consumer audience targeting. Data is organised to create consumer audiences (via cookies and mobile advertising IDs (MAIDs)) that are categorized into groups based on various targeting parameters. Customers can combine these different categories across first-, second-, and third-party data into audiences so that they can run more targeted advertising campaigns. DMPs are used by all parts of the digital advertising supply chain, including advertisers, media agencies, intermediaries and publishers. DMPs also allow data owners to connect with the digital advertising industry and monetise their own data.

118. While each provider tends to offer somewhat different services, the core capabilities provided by DMPs relate to data ingestion, data management and data delivery.

119. DMPs allow customers to ingest online data captured through tags (in the customer's websites) and software development kits (SDK) (in mobile applications). Customers can also onboard offline customer relationship management (CRM) data by mapping offline identifiers with online cookie or MAID identifiers (direct identifier personal data such as name and address, which may be included in CRM data, are not stored on the DMP). Customers can also use third-party data and DMPs can facilitate their customers in purchasing it.

120. Data management can include a variety of functionality aimed at categorising and analysing the data, and at building audiences. DMPs can:

- categorise the data brought into the platform by structuring it into different segments and targeting profiles (eg create rules to classify cookies/MAIDs into categories), and build audiences by combining first- or third-party data;

- perform look-alike modelling (ie apply modelling to pre-existing audiences to uncover additional consumers that would fit the same targeting parameters); and

- offer reporting and analytics functionalities, such as multi-touch attribution analysis to determine the impact of customers' investment in data and of their media campaigns.

121. DMPs then deliver cookies and MAID to downstream adtech partners, so that they can be used, for example, for media targeting (by DSPs) or for analytics purposes by attribution providers or by the customer's own business intelligence tools. Segment data are typically delivered to third-party DSPs or SSPs in batches through server-to-server integrations. In some cases, a DMP can use real-time techniques to send the full list of segments attributed to a specific user in real time.

122. A critical component of all these services is data matching, which spans the following types:

- Cookie Syncing: a DMP would perform cookie syncs with data suppliers or partners to whom it delivers audience data (eg DSPs);

- Postal to IP to Cookie Matching: a DMP may source Post Code level data from partners, which would include a list of post codes mapped to categories. In order to associate the post code level categories to cookies, the DMP first maps the last IP address associated with a cookie to a postal code using a geo mapping library and then associates categories to a cookie based on matched post codes.

- Offline onboarding: third-party data providers may send the DMP log files that contain a partner's cookie ID and value pairs (that map to audience categories). In the presence of a cookie sync with the provider, upon receipt of a file, the DMP would match the data to its own cookie profiles. In the case of a file of MAIDs and value pairs, a direct match on the value of the MAID can be made, as MAID are unique.

123. These services can be charged through a fixed monthly fee or based on the volume of data processed.

124.    In addition to the services discussed above, DMPs may also provide a third-party data marketplace that allows customers to import data directly from third-party providers. Such data brokerage services can be charged through different charging models: usage-based CPM, revenue share, or subscription licence. Data providers are typically compensated on a revenue share model where a portion of the revenue generated from the sale of their data is paid to the data provider. Some DMPs may also deposit public audiences, built from data obtained by third-party providers, for sale on DSPs. DSPs may add a mark-up when selling these segments to their customers.

### The technical advantages of vertical integration

125.    Several operators in advertising intermediation provide more than one service along the value chain. This section briefly discusses the technical advantages of vertical integration. The implications of vertical integration for competition among providers are discussed in a separate section later in this appendix.

### Integration of advertiser ad server and DSP

126.    Vertical integration between advertiser ad server and DSP can result in a more streamlined workflow and more seamless data sharing, for example allowing data from the DSP to be used for ad serving choices, and avoiding cookie loss. However, these features can often be reproduced through API integrations to third-party DSPs.

### Integration of DSPs and SSPs

127.    Due to a set of standards and guidelines set by the IAB, supply and demand side functionalities are harmonised to a great extent. However, there are still technical differences that impact how effectively different platforms can interoperate. The main issues relate to cookie matching and to latency.

128.    Each company operating in advertising intermediation, such as DSPs and SSPs, associates a user with a cookie ID. Such cookie IDs are specific to each provider. As a result, if the DSP and SSP are operated by different providers, a process of cookie matching is required in order for the DSP to identify the relevant user information to associate to a given impression (a description of the cookie matching process is provided in Appendix G). This process is prone to failure and, according to one ad intermediation provider, can result in approximately 30% failed matching. When matching fails, the DSP cannot apply audience targeting or frequency/recency management to the impression, with the result that advertisers cannot understand the real value of the impression and the bids submitted by the DSP will therefore be lower. This inefficiency is avoided when the same provider operates both the

DSP and the SSP, as in this case the two platforms would share the same user identifier, removing the need for cookie matching.

129.   After an SSP sends bid requests, DSPs have a time limit to submit their bids. For example, Google's exchange waits [✂] milliseconds for bidders to respond and responses received after this deadline are excluded from the auction. If the same provider operates both the SSP and the DSP, it can locate them close by geographically, reducing the time needed for information to travel between the two. For example, as Google's demand-side platforms (Google Ads and DV360) [✂], they have a very low risk of timing out and missing the auction. This means that, if they choose to submit a bid, the bid would almost certainly be registered prior to the expiry of the bid application deadline.

130.   The vertical integration of SSP and DSP may also bring other operational efficiencies. For example, Xandr (which operates a DSP, an SSP and a publisher ad server) told us that there are operational efficiencies for buyers and sellers setting up PMPs using both Xandr SSP and DSP.

*Integration of SSPs and publisher ad servers*

131.   Currently, all providers of publisher ad servers also operate an SSP. Verizon Media told us that the integration of the publisher ad server with an SSP can increase operational efficiencies, help avoid impression loss caused by redirects between different platforms and enable a holistic yield management and the maximization of revenue between different sales channels.

132.   Several publishers told us they get this type of benefits from using the integrated services of Google's publisher ad server and AdX. One advertiser told us it experiences significant benefits from the lack of friction with technical integration of Google products. Another advertiser submitted that using AdX as well as Google's publisher ad server allows for better reporting and lower operational overhead than using third-party intermediaries, while DMG Media told us that the seamless connection of AdX with Google's publisher ad server makes it less error-prone than other integrations. These benefits are recognised by Google, according to which its publisher ad server and AdX work well together because they share the same technical infrastructure (meaning they can offer lower latency), and the user interface and reporting tools share the same format and design.

133.   One specific advantage mentioned by publishers of the integration between Google's ad server and Adx is the ease to set up and run programmatic guaranteed campaigns, which under other providers is a very manual and time-consuming process.

## Competition in advertising intermediation

134. Several operators in advertising intermediation submitted in their responses to our RFI that, at least historically, digital advertising has been highly competitive. For most of the existence of the online advertising market, brands and publishers have had a diversity of advertising platforms they could work with to manage their data, campaigns, and ad inventory. This diversity has spanned the ad industry, from data management platforms, to buy-side technology, sell-side technology, and measurement analytics. A new company with a compelling technology could easily access programmatic identity services and inventory suppliers, and they could build integrations quickly and easily with the rest of the industry.

135. There appears to be less consensus on whether this is still the case. Some respondents submitted that competition is still intense, and the industry is still characterised by fragmentation, new entry and innovations. Beeswax told us that, while adtech financing is less robust than it was several years ago, the landscape remains filled with start-ups and scaled companies, as well as giant tech companies. Outbrain noted that general software infrastructure costs have rapidly declined, and digital advertising technology has become increasingly commoditised. As a result of this commoditisation, there has been increasing competition with respect to both price and feature transparency.

136. Other respondents, however, see a decrease in competition accompanied by a process of consolidation. Adform told us that the increasing vertical integration along the supply chain puts the remaining competitors under massive pressure with regards to profitability margins and ability to sustain long-term business. Many non-vertically integrated solutions, such as individual SSPs or DSPs, have either been acquired or exited the market. A DSP told us that, as it becomes more difficult to compete with large vertically integrated B2C companies, independent companies are likely to be purchased, merged or go out of business. According to one intermediary, the effect of these developments is decreased innovation and an increasingly defeatist attitude in the industry from would-be investors who are unwilling to risk their funds in start-ups, leading to a declining number of new companies starting in digital advertising, a declining amount of new investment and a slowing pace of technological development.

137. This section examines how competition works in advertising intermediation, focusing on advertiser ad servers, DSPs, SSPs, publisher ad servers, and

header bidding solutions.[22] Each level of the value chain is first considered separately, looking at the dimensions of competition, discussing the overall competitive dynamics, and briefly describing the main providers and how they differentiate themselves. We also provide estimates of shares of supply based on the data we have collected. The last part of the section discusses the implications of vertical integration on competitive dynamics.

### *Competition between advertiser ad servers*

138. The analysis of competition between advertiser ad servers is organised in five parts, focusing on the following aspects:

    - the main dimensions of competition, ie the factors that advertisers and media agencies consider when choosing among advertiser ad servers;

    - the largest advertiser ad serving providers and the main features of their services;

    - the extent of single- and multi-homing and the level of switching costs;

    - the role of economies of scale; and

    - the most significant current and expected trends in the advertiser ad serving market.

### *Dimensions of competition*

139. Many smaller advertisers rely on their media agency to choose an advertiser ad server. In those cases, an agency's primary goal is to help the client understand and identify its requirements when selecting an ad server. Larger and global advertisers, on the other hand, often select a single primary ad server globally and impose that on the media agencies working with them.

140. Media agencies indicated that there are multiple factors that inform which ad server best suits the needs of a specific client or campaign, in addition to the rates charged by the ad server for using the platform. These include:

    - usability, ie how easy it is to manage trafficking and reporting functions or to set up campaigns;

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[22] We do not discuss competition between media agencies or between DMPs, as this is less relevant to the issues discussed in the report.

- interoperability, ie how well the ad server links up with other key parts of the adtech industry such as site analytics, DMP, and DSP;

- integrations, for example with ad verification partners, or API integrations for dynamic creative;

- ad serving functionality, ie whether the technology seamlessly delivers the campaigns ad serving requirements across ad formats and in different environments;

- reporting functionality, ie how rich and robust the reporting options are; and data access, ie the provision of log-level data for more advance analytics;

- service levels, including technical support;

- independence – some advertisers specify that ad servers should be independent from the rest of the adtech industry.

141. Google noted that the core functionality of advertiser ad serving has become increasingly commoditised. As a result, compatibility, stability and reliability have become more important features for advertisers than customisability.

142. In addition to the factors listed above, Adform told us that scale and global presence are important competitive dimensions. Advertisers want to make sure that the ad server will stay in the business in the long term (2 to 5 years at least) and that it has sufficient capacity in terms of support. Small players can gain client trust and offer niche solutions for individual campaigns or creative types, but it is difficult for them to offer a full-scale service.

143. Finally, in relation to independence, Adform noted that, while media ownership can create a bias towards making virtual barriers for third-party integrations or can make delivery measurement less reliable, providers that offer exclusive media access can achieve a superior competitive position.

*Main providers*

144. The main provider of advertiser ad serving in the UK is Google, through its Campaign Manager service. Other competitors include Adform, Sizmek (acquired by Amazon in May 2019), and Flashtalking. One media agency submitted that there are no viable alternatives to these four providers; other media agencies also mentioned Innovid, Weborama, AdRiver and Gemius, although the last three were indicated as local or regional solutions with localised capabilities and technical support.

145. Competitors told us that Google has gradually been winning market share. Our analysis, presented in Appendix C, indicates that Google accounts for approximately [80-90]% of the ads served to UK users. Dentsu Aegis submitted that the growth of Google was due in part to the advantages of a seamless data flow between ad server, site analytics, DSP, dynamic creative, and search bidding, which allows advertisers to better target their audiences. Similarly, Flashtalking observed that Google's responses to data protection regulations may incentivise advertisers to switch or remain within the Google's ad stack, as sharing data between multiple intermediaries has become more difficult; for example, Google's removal of log-level data fundamentally changed the ability for some competing adtech products to function with parts of the Google stack.

146. Google told us that Campaign Manager is valued because it is technically sophisticated and provides advertisers with granular controls and features that allow them to optimise their return on investment, such as frequency capping and media management. Advertisers also value Campaign Manager's integration with both third-party and other Google technologies. On the other hand, compared to its smaller and nimbler rivals, Campaign Manager lags behind the market in emerging formats such as connected TV and audio. Google's approach to user privacy means that Campaign Manager also has limited capabilities in novel areas such as cross-device tracking, location-based measurement and targeting, and offline sales targeting. Generally speaking, Campaign Manager is not a 'first mover', as it tends to build new features only where a standard has emerged across multiple publishers.

147. Among the other providers:

- Adform told us that it sets itself apart from competitors through a market-leading reporting and measurement offering, a very extensive creative optimization suite allowing for fast creative version production and efficient personalization, and the customisation of its products to meet the specific requirements of clients.

- Flashtalking differentiates itself through bespoke features and its service layer, providing a managed service or self-service tools. Not operating any DSP, it is independent from the rest of the ad stack.

- Sizmek told us its strengths are its focus on customer service, its interoperability and willingness to partner with customers' other service providers to facilitate ad delivery and measurement. [✂].

*Single and multi-homing, switching costs*

148. The number of providers that customers use and the size of switching costs are important determinants of competition intensity in a market. In the case of advertiser ad servers, the evidence we received is unclear and our current knowledge does not allow us to reach firm conclusions.

149. Google submitted that advertisers are increasingly multi-homing on ad servers, either so they can flexibly use the system best designed for individual campaign types, or to combine integrations and feature sets. Google also sees advertisers 'double-tag' the same ad from multiple ad servers, allowing them, for example, to procure measurement services from one provider and creative decision-making services from another. Ad serving fees are relatively low, which means that the main barrier to multi-homing is an individual advertiser's tolerance for operational complexity, rather than cost.

150. Advertisers' behaviour, however, differs across the various services that advertiser ad servers provide. While it is not uncommon to use different providers for creative management, advertisers tend to use a single ad server for measuring purposes. A single 'primary' ad server is typically required. However, major ad servers can be less innovative and more standardized, and the need for additional products can arise. In such cases, advertisers use a 'secondary' ad server to execute difficult creative management functions. Content from the secondary ad server is typically 'wrapped' in the primary ad server, allowing both to coexist.

151. We have received different views on the size of switching costs. On the one hand, Amazon told us that, in its experience, there are limited switching costs or other barriers to switching between advertiser ad servers. Similarly, Google submitted that it is relatively easy to switch advertiser ad servers. It explained that the practical costs of switching mostly comprise the effort the advertiser (or its agency) needs to go through to retag its property for conversion tracking and to recreate its campaign structure and hierarchy in the new system. However, Google added, switching is less common than multi-homing; advertisers will generally add a second ad server to their setup long before they switch and will then shift budget over time towards the technology they prefer.

152. On the other hand, one adtech company submitted that switching costs can be significant, for the following reasons:

- Media agency or in-house media teams responsible for uploading and managing ads, sending tags to publishers or DSPs and generating reports have to be trained for the new ad server system.

- It is very common for advertisers to use independent reporting and analytics, workflow automation, creative storage and platforms that have to push content into the ad server, pull reporting data out or do other automated tasks using APIs. As it is impossible to have all the necessary integrations for each new advertiser in advance, onboarding a new major advertiser might require new integrations with third-party companies or new API configurations.

- Ad server analytics scripts have to be put on the advertiser website; in case of complex sites like e-commerce websites or sites containing cart or order form, integration can be complex.

153. Similarly, one media agency told us that the initial set-up of an ad server can be labour intensive, with an investment in time required from both the advertiser and the agency. The process of deploying ad serving tags across an advertiser's site can also be disruptive, especially for advertisers with complex ad serving and reporting needs. Another media agency estimated the average cost of switching at around £[✖] and considered this to be a significant amount.

154. We received contrasting information on how long it takes for an advertiser to switch. According to one provider, migrating a large global advertiser could take one or more years to fully complete. On the other hand, another provider gave us examples of large advertisers who migrated to a new provider in two or three weeks.

*Economies of scale*

155. The presence of strong economies of scale in a market can make it more difficult for smaller competitors to challenge a leading provider. In the case of advertiser ad serving, as discussed below, a global footprint appears to be important to attract customers, but there are no strong cost economies of scale.

156. Adform told us that the most significant investment to build an advertiser ad server is to initially program the solution. Adform estimates that to create a competitive service would require an investment of at least US$100 million. Other significant investments would be required in datacentres and in business and partnership management (especially for API integrations with third-party providers).

157. Adform submitted that a significant part of the costs and investments associated with building and maintaining the solution grows with the activity level. Infrastructure costs grow almost linearly with size, but also on the

development side there is a significant additional cost factor because of the massive volumes of data transactions, storage and processing; this means that different approaches and technology platforms are needed when growing from a single country or a single datacentre to multiple ones.

158. Google, while submitting that the cost of ad serving is generally lower, similarly told us that there are no obvious cost economies of scale in advertiser ad serving. Google told us that the rise of cloud-based computing has vastly reduced the cost of serving and measuring ads on a global basis. This means that having a sophisticated technical infrastructure is no longer necessary to service the largest advertiser clients. Moreover, ad server providers generally do not combine data from different customers, meaning that data scale has little direct impact on their ability to compete.

159. On the other hand, Adform and Flashtalking submitted that international advertisers often require a global ad server footprint, meaning ad server vendors have to maintain an expensive tech and service infrastructure across the world. Moreover, Flashtalking and Google told us that third-party adtech providers often prioritise working with the 'top' advertiser ad servers, which means that larger providers sometimes have more third-party integrations. Google, however, submitted that this is of limited benefit.

*Current and expected trends*

160. Flashtalking told us that there has been a sharp decrease in ad serving fees, spearheaded by Google, which has become increasingly a self-service tool. While some competitors tried unsuccessfully to compete head to head with Google, others have tried to differentiate themselves, focusing on customer support and services that Google does not offer.

161. Google expects that the fastest-growing providers over the next three years will be those offering value-added services – such as advanced measurement, brand safety and verification – and focusing on emerging formats and devices. [✕].

162. On the other hand, Adform expects increased market concentration, with Google increasing its already very high share of supply, as a result of its unique access to Google's user-facing platforms. For the same reason, Adform does not expect new entry into the market. According to Flashtalking, new entry has also become increasingly difficult because of regulatory compliance costs (including compliance to GDPR). The cost, Flashtalking added, is not only financial: to remain complaint often requires senior developers and tech experts that would otherwise be focused on product development.

163. Finally, one provider told us that the future deprecation of third-party cookies in Chrome might have a major impact on third-party ad serving, if Google can somehow utilise its vast login user base as an exclusive alternative to cookies, not available to competitors.

*Conclusions*

164. Google's high market share is indicative of it having market power in the advertising ad server market. The recent financial difficulties of a large provider such as Sizmek also suggest that competition has become more difficult. Data protection regulation and the deprecation of third-party cookies on Chrome may have the effect of further entrenching Goole's position.

## Competition between DSPs

165. The analysis of competition between DSPs is organised in five parts, focusing on the following aspects:

- the main dimensions of competition, ie the factors that advertisers and media agencies consider when choosing among DSPs;

- the largest DSP providers and the main features of their services;

- the process adopted by agencies and advertisers to select DSPs and the pros and cons of single-homing;

- the role of economies of scale and scope;

- the most significant current and expected trends in the DSP market.

*Dimensions of competition*

166. In addition to the fee level, the features that advertisers and media agencies are more interested in when choosing among DSPs are access to data, access to inventory, and technological capabilities.

167. The importance of data has been indicated by several of the advertisers and media agencies that responded to our RFI. DSPs can both provide access to their own proprietary data and allow advertisers to use first- and third-party data through integrations with DMPs. Both features are valued by advertisers, although their relative importance depends on the type of campaign.

- Publicis told us that access to specific, exclusive data sets is one reason why a decision may be taken to use a platform, but only if that data can be proven to deliver a chosen outcome. Unique data is also one of main

strategic differentiators that Omnicom look for when helping clients choose a DSP.

- We have received contrasting views on the relevance of DMP integration as a competitive differentiator. On the one hand, Publicis told us that, in today's market, there are few DSPs that do not synchronise with all the major DMPs and most third-party data providers can be accessed through most DSPs. On the other hand, one large advertiser told us that access to third-party data is an important consideration for DSP selection; after GDPR Google had no appetite to use data they do not own, while DSPs such as AppNexus allow for greater use of third-party integration.

168. Access to inventory is another factor mentioned by many advertisers and media agencies as affecting their choice of DSP. Access to inventory includes two different elements: integrating with SSPs; and offering access to unique inventory.

- Integration with SSPs and audience reach have been mentioned by several advertisers and media agencies as a factor that influences their choice. On the other hand, Xandr told us that, outside of the supply controlled by companies that also provide advertising technology solutions, DSP access to supply is commoditised.

- Access to unique inventory has been indicated by Omnicom as one of the strategic differentiators on its choice of DSP or when helping a client choose their DSP. Unique supply has also been indicated as a relevant consideration by Publicis, although this would be the case only in certain circumstances.

169. Technological capacities and the availability of specific features are another group of considerations advertisers and media agencies make when choosing a DSP. The aspects looked at can vary across advertisers and include:

- targeting capabilities;

- brand safety controls;

- specific features such as bid-shading and pre-bid viewability settings;

- the ability to perform Programmatic Guaranteed transactions;

- reporting and analytics capabilities; and

- performance transparency and integration with ad verification partners.

170. Some respondents also mentioned that the provision by the same company of other services in addition to a DSP may be an advantage. For example, Boots' choice of DSP can be influenced by the use of wider solutions provided by the same company (eg cloud computing services). Dentsu Aegis told us that working with 'same stack' technology can both increase operational efficiency and technical functionality due to their likelihood of working more effectively as systems together, often integrating more seamlessly.

171. On the other hand, Publicis told us that one of the factors that can affect their choice is DSPs' independence from supply, noting however that while this would be preferred it is not always possible. This preference is linked to the need for transparency of supply path and auction dynamics, to ensure that there are no conflicts of interest in a DSP's bidding decision. The potential for conflicts of interest has been mentioned by some respondents as a relevant consideration in their choice of DSP.

172. Finally, the usability of the platform can also be taken into account.

*Main providers*

173. There are likely to be dozens of companies providing DSP services in the UK, although most of them would have small operations. The largest provider is Google. As shown in Appendix C, in terms of the value of inventory bought, Google's DSP DV360 has a [30-40]% share, roughly equal to the combined share of all the third-party DSPs we received data from ([40-50]%); Google operates as a DSP also through Google Ads, which has an [10-20]% share.

174. The review of the main providers in this section is based on the DSPs most often mentioned by advertisers and media agencies in their RFI responses, and on the DSPs most often listed as main competitors by those providers who responded to the RFI. As, unlike other DSPs, Google Ads is mostly used to buy display ads by small advertisers, it was not mentioned as a competitor by other DSPs nor as a provider by media agencies and large advertisers. It is therefore not discussed in this section. The role of Google Ads in open display is discussed later in the appendix.

*Who the main DSP providers are*

175. Three providers have been mentioned as main competitors by every single DSP responding to the RFI; they are Google, The Trade Desk, and Amazon. Other providers mentioned several times are Adobe, Xandr and MediaMath. All these DSPs have also been mentioned by at least once by an advertiser or media agency in their RFI responses, with Google's DSP DV360 being mentioned by all respondents.

176.　Facebook should also be seen as a competitive constraint, as it has been mentioned as a main competitor by most respondents to the RFI. It is worth noting, however, that no advertiser or media agency mentioned Facebook as a DSP. This may reflect the fact that Facebook Audience Network (FAN), which allows advertisers on the Facebook platform to extend their campaigns to third-party publishers, is not strictly speaking a DSP. FAN does not submit bids into an SSP, but has direct relationships with publishers, submitting bids directly into their ad server or their header bidding solution. Advertisers may see FAN as just an extension to their advertising on Facebook's owned and operated inventory, while Facebook is seen as a major competitor by both DSPs and SSPs (as we observe below).

177.　Finally, Criteo must also be included as one of the main DSP providers although, as discussed below, it has a different business model from most DSPs. While not mentioned by advertiser and media agencies, nor by most of the DSPs responding to our RFI, it was indicated as a major competitor in [✂] internal documents.

*Advantages and disadvantages of the main DSP providers*

178.　Based on responses from advertisers and media agencies, there are two groups of reasons for using a particular DSP: the first has to do with the advantages derived from access to exclusive inventory, use of exclusive data, and integration with other services offered by the same provider; the second group of reasons is linked to technical sophistication, customisation and level of support of the DSP services themselves. The major strengths of different DSP providers seem to generally belong to either one or the other of these groups.

179.　The strengths of Google's DV360 mostly derive from its scale and links to Google's inventory, data, and other services in adtech. The advantages mentioned by advertisers and media agencies include DV360's access to a vast inventory across the internet, its seamless integration with the rest of Google's ad stack, exclusive access to YouTube inventory, use of Google's proprietary data and affinity audiences. Several respondents also favour DV360 for its usability and capabilities, while the lack of transparency on its bidding algorithm or audiences, difficult integration with non-Google technologies and lack of flexibility in product development are the limitations most often mentioned.

180.　Similarly to Google, Amazon is valued for its access to unique inventory and to Amazon's customer data, while it is sometimes considered to be technically inferior to other DSPs and to lack integrations with third-party technologies and the wider industry. [✂]. As Amazon's inventory and data is of particular

interest to advertisers in the retail sector, Amazon's DSP is likely to be an attractive solution for these types of advertisers, but less so for those operating in other industries.

181. Although we have received no views from advertisers and media agencies, it is likely that Facebook Audience Network (FAN) may be also particularly valued for its data. FAN appears to be a stronger competitor for mobile advertising than for desktop: approximately [✕]% of the ad inventory filled through FAN is on mobile apps, with most of the remainder on mobile websites.

182. Adobe Advertising Cloud DSP's main strengths appear to be its integration with Adobe Analytics and the support of all types of video inventory. Adobe told us that its DSPs' integration with Adobe Analytics provides its customers with a better understanding of the performance and effectiveness of their campaigns. On the other hand, Adobe seems to be weaker in terms of reporting and usability, based on views of advertisers and agencies.

183. While Xandr is, like Google, vertically integrated along the intermediation value chain (it also offers an SSP and a publisher ad server), advertisers and media agencies responding to our request for information value it especially for the sophistication and customisation of its DSP technology. Respondents mentioned, in particular, the implementation of custom solutions and bidding algorithms, the possibility of paying for impressions based on custom viewability thresholds, and the ability to connect with a broad array of third-party technologies. Respondents also noted Xandr's low platform fees. On the other hand, some other functionalities may not be as advanced as DV360.

184. Unlike all the providers discussed so far, The Trade Desk only operates a DSP and is not involved either in other parts of advertising intermediation or in user-facing services. This is considered by advertisers and media agencies responding to our RFI as both an advantage and a potential limitation. On the one hand, respondents appreciate the fact that The Trade Desk's DSP is not biased towards external vendors and can be integrated with many different third-party products. On the other hand, a large agency told us that only having the DSP element puts The Trade Desk at a disadvantage to others within the industry. As it is common to see discrepancies between solutions offered from different companies, advertisers who invest their marketing budget within solutions offered from the same company can be in an advantageous position when it comes to reporting and accountability of media investment. The Trade Desk is also valued for it bidding technology, the level of support, service customisation and flexibility in product development.

185.  Finally, Criteo, as a re-targeting specialist, has specific features and capabilities, and a business model which differs in part from that of most DSPs. Criteo reaches publishers' inventory via direct relationships with publishers or via ad exchange technology. Through direct relationships, Criteo can connect directly to the publisher's ad server when publishers use header bidding or can be given the opportunity to buy impressions before they are made available to other potential buyers. Unlike most DSPs, Criteo charges advertisers only when users engage with an ad (usually by clicking on it). [✖].

*Single and multi-homing*

186.  Customers' homing behaviour is an important determinant of competition intensity in a market. In the case of DSPs, multi-homing is common, although a single DSP tend to be used for a given campaign. There are, however, a number of large advertisers single-homing on DV360.

187.  Publicis submitted that the choice of DSP can vary from client to client and campaign to campaign depending on the specific needs and requirements. There are typically three stages of review:

- Stage 1 – The agency network reviews all technology partners, putting them through a stringent technical and legal verification process to ensure the platforms are suitable for use by individual agencies.

- Stage 2 – The specific client account teams review if there is a need (based on client objectives and parameters) to work with a chosen DSP partner of choice. It is at this stage that some of the factors discussed above come into play.

- Stage 3 – On a specific brief-by-brief basis, the agency's planners review which DSP will best deliver the campaign. This process may require the agency to switch to specialist DSPs (for example for audio or video) or work with DSPs to access specific targeting or inventory.

188.  Dentsu Aegis explained to us that, in the majority of cases, a single DSP is used for a campaign, although the agency would typically review on a campaign by campaign basis whether this was the most effective way to activate the campaign. An exception to this rule would be where using a secondary DSP allows access to unique data points or inventory. An advertiser also told us that it might use multiple DSPs for a campaign, and ultimately move its budget to the DSP that is performing the best.

189. While using multiple DSPs can help ensure competition between players, most respondents told us that the advantages of using a single DSP typically outweigh those of using multiple DSPs. These include:

- the ability to manage frequency across the entire campaign, something that is not possible when using multiple DSP's due to the lack of a common ID between different technologies;

- more effective audience management due to the presence of a consistent ID solution allowing for better retargeting and audience suppression;

- more efficient reporting as a result of using a single interface to pull data from; and

- reduced cannibalisation where two different DSPs compete for the same impression in the auction, thereby inflating the price.

190. GDPR has also put an increased requirement on advertisers to vet the media partners they work with, to ensure understanding of the source data and associated consents. This has further limited the appetite of advertisers to support multiple DSPs.

191. On the other hand, IPG Mediabrands told us that, given the analytics capability of its own adtech platform tools, it is able to optimise entire campaigns across multiple DSPs.

192. Of the 17 advertisers that provided us with information about the DSPs they use, six use a single (main) DSP across all their campaigns. In all such cases, the chosen DSP is Google's DV360. Four other advertisers told us they use two DSPs. In these cases, different DSPs can be used for different types of inventory, and in all cases one of the two DSPs is Google's. The other seven advertisers use multiple DSPs, although in at least two cases DV360 account for the majority of advertising expenditure.

193. The advertisers using only or primarily DV360 as DSP indicated multiple reasons for doing so:

- its access to inventory, and in particular unique access to YouTube inventory;

- the possibility of cross-channel optimisation across search, display and YouTube advertising; and

- holistic data integration with Google Analytics and the ability to de-duplicate data from across the Google stack, allowing a more accurate picture of effectiveness.

194. The competitive advantage that Google derives from exclusive access to YouTube has also been mentioned by several intermediaries.

*Economies of scale and scope*

195. The presence of strong economies of scale in a market can make it more difficult for smaller competitors to challenge a large provider. In the case of DSPs, as discussed below, there are clear scale efficiencies, although this does not appear to have made entry impossible. As reported in Appendix C, differences in scale between DSPs do not seem to affect their performance.

196. Building and operating a competitive DSP is a costly enterprise. One intermediary estimates that, in today's market, the investment required to build and maintain a competitive DSP would be in the range of hundreds of millions of dollars.

197. Xandr told us that, to be competitive, a DSP must operate at a global scale. We note that some of the advertisers who responded to our RFI told us that they had global agreements with their DSPs. Due to the inherent latency requirements of the business this means that a DSP needs to operate in multiple data centres across the world.

198. Some of the costs sustained by DSPs scale with the buying volume (and so with revenue) and can therefore be considered 'variable'. These include costs in reporting, data storage, bandwidth and account management/support. On the other hand, auction traffic is a relatively fixed cost and scale with the types of formats (video, banner, native, mobile) a DSP deals with and with its geographical coverage. Given that the volume of auction requests (measured in queries per second, or QPS) is so large, competing globally requires a minimum scale to become profitable. Beeswax estimates there are 5-10 million QPS globally outside of China, which could cost US$5 million or more a month for a DSP to listen to. This means that to achieve a 50% gross margin you would need a minimum scale of US$10 million in monthly fees to the DSP or spend in the range of US$100 million or more. While there are some techniques to reduce QPS, such as supply path optimisation, DSPs with a diverse and global customer base need to maintain a high absolute QSP capacity.

199. There are also other reasons why scale is beneficial to DSPs:

- DSPs must sustain significant research and development costs, in particular in artificial intelligence and data science capabilities.

- Scale allows DSPs to get better prices from data partners and other vendors. A DSP told us that technology evolves so rapidly that operating a DSP amounts to constantly rebuilding a DSP; any major asset – technology, data sources, relationships, best practices – that is five years old is probably no longer commercially relevant and due for an overhaul. Research and development costs are broadly not scalable.

200. Being present in other parts of the intermediation value chain in addition to DSP services can also generate cost economies. The investments made into the DSP may also benefit other parts of the business. Moreover, Adform told us that if a company has other assets which complements the DSP, such as the data owned by Amazon or the DMP owned by Salesforce, then it would be possible to run a profitable DSP unit at a slightly lower scale than in the case off a standalone business.

*Current and expected trends*

201. Xandr told us that, as of 2019, there are over 150 companies offering a DSP across the globe; however, there has been a significant consolidation in revenue to a smaller number of companies due to many factors, including:

- advertisers using fewer platforms as the technology matures;

- mergers and acquisitions, and a slowdown in venture capital funds invested in new companies;

- advantages provided by access to proprietary data and owned and operated media; and

- the implications of privacy regulation.

202. Some providers of DSP services told us that they expect this consolidation trend to continue, impacting in particular specialist DSPs and those that do not have unique access to supply, data or identity solutions. One of the factors behind consolidation is the increasing commoditisation of the technology. This, according to Adform, is also linked to the expectation that the most relevant and prominent inventory pools will be sold under strictly controlled conditions (Private Deals, Programmatic Guaranteed) whereas smaller publishers will be left to open auction with (then) presumably lower average prices (as the inventory perceived as 'premium' is in this scenario 'locked' in the private marketplaces attracting the advertisers with significant budgets). In such set-ups the role of intelligent optimisation of inventory

selection using algorithms gets marginalised as – especially in a Programmatic Guaranteed setting – the whole campaign is already pre-defined.

203. Increased commoditisation is expected to lead to growing pressure on prices. In this environment, The Trade Desk expects that only well-funded new entrants and those with particular advantages, such as direct user access, will have a meaningful chance of success. Unique access to inventory may therefore become an even more important advantage, while Adform expects that technology fees will continue to be put under pressure.

204. Other trends that providers of DSP services expect are an increased focus on users' identity, the convergence of digital and TV advertising, and increasing attention to measurement and transparency.

- The evolving nature of consumer privacy and data protection legislation is having a significant impact on the way that technology platforms process signals around consumer identity. With the decline of the cookie, identity has become a key issue. Xandr expects that technology platforms will more than ever be expected to solve for user identity across screens.

- The changing nature of TV consumption amongst consumers in the UK and globally will see an increasing amount of that inventory treated as, and traded in the same way as, digital video. Xandr expects that the technology platforms that will win in the next years will be the ones that, among other things, can offer marketers a unified platform to manage campaigns across TV and digital. Many DSPs are competing to position themselves as leaders in the emerging Connected TV space. Since the large tech companies like Google and Amazon offer devices and services for operating the interface and distribution by which consumers will access TV programming, they also control portions of the monetization stack for this area.

- DataXu expects there will be innovation in measuring business outcomes well beyond transactional measures like views and clicks towards return on marketing spend and incremental value. Transparency around pricing and take rates is also of paramount importance to buyers.

*Conclusions*

205. Google is by far the largest provider of DSP services. Its position is strengthened by its exclusive access to inventory (YouTube) and its integration within Google's wider ecosystem. These advantages might become even more significant in the future, given the increasing

commoditisation of DSP services. Nevertheless, so far this has not prevented the growth of alternative providers, although none has achieved a scale comparable with Google.

## Competition between SSPs

206. The analysis of competition between SSPs is organised in six parts, focusing on the following aspects:

- the main dimensions of competition, ie the factors considered by publishers on the one hand and by DSPs, media agencies and advertisers on the other hand when choosing among SSPs;

- the bargaining power of publishers vis-à-vis SSPs;

- the largest SSP providers and how their services are differentiated;

- the main features of competition among SSPs: the increasing commoditisation of their services, the role of network effects, and the multi-homing behaviour of SSPs' customers;

- the role of economies of scale and scope; and

- the most significant current and expected trends in the SSP market.

### Dimensions of competition

#### Supply side

207. In addition to the fee level, when deciding whether to work with an SSP publishers typically consider whether it gives access to incremental demand, the quality of such demand, the SSP's technical capabilities, its integration with the publishers' other systems and the rest of the tech stack, and possibly the level of transparency.

208. Working with a new SSP makes sense for publishers if it gives access to new demand and unique revenue streams. Sky, for example, considers the strength of the SSP's relationships with agencies, advertisers and DSPs. DMG Media explained that, after launch, it analyses how much money the SSP bids above the next best available price to determine the incremental value of their bid, which is more important than understanding their overall revenue. There might then be cases where a specific buyer pushes a large amount of spend through a specific SSP or pursue demand that only flows through a particular SSP.

209. The quality of the advertising coming through the SSP is also a relevant factor. Sky, for example, looks at whether the SSP has brand safety technology implemented into the system in order to enable the publisher to block advertisers and advertisements that it does not want to appear on its inventory.

210. Publishers also look at the sophistication of an SSP's technology. This can include various aspects, such as the speed of the code, the reporting capabilities and whether the SSP gives access to bid data, the level of latency, and the ability to set up deals and programmatic guaranteed transactions.

211. Compatibility with the rest of the tech stack is another of the main factors publishers consider when deciding whether to work with an SSP. This can include compatibility with the publisher's header bidding solution, robust DSP connections, and ability to integrate with the publisher's DMP. A related factor is the ease of SSP integration and the level of technical support. In relation to header bidding integration, DMG Media added that, for the most part, smaller SSPs will need to prove their worth via server-side integrations, ie Open Bidding or TAM, before DMG Media dedicates the resource to integrate them client-side.

212. Transparency, and specifically fee transparency, has also been mentioned as an important criterion by some publishers. DMG Media, however, told us that the lack of transparency within the industry means that, more often than not, a publisher simply has to trust the SSPs.

*Demand side*

213. On the buyer side, the choice of SSP may be made by the DSP, the media agency or the advertisers directly.

214. Some advertisers and media agencies told us that they typically allow DSP bidding algorithms to determine from which SSPs impressions are bought. DSPs can base their choice on the scale of supply, the quality of supply, and the effectiveness of data matching services (like cookie syncing). Efficiency is another important consideration: DSPs look at metrics like bid rate (meaning how often are they interested in competing for an impression) and win rate (how often do they win the right to serve their client's ad to the impression).

215. Agencies can influence the choice of SSP in various ways, based on factors such as brand safety, fraud levels, auction and fee transparency, or historical performance. For example, WPP told us that it applies a filter on each DSP account which limits which partners it works with; the reason is to work more

closely with a limited number of SSPs towards a joint code of conduct around transparency, brand safety and supply management. Similarly, Publicis may purposefully exclude certain SSPs from a campaign, because they utilise a specific format which is not deemed relevant or appropriate, they may historically have had high observed rates of ad fraud or brand safety infractions, or they have a lack of transparency (low ads.txt certified inventory). However, there are several uncontrollable factors which may limit the choice an agency can make, such as inventory exclusivity, data access, cookie syncing, latency and other technical issues, and GDPR requirements.

216.   Some advertisers may decide to only use a small selection of SSPs. For example, L'Oréal uses a small selection of exchanges available on DV360 based on brand safety, inventory and data access. Advertisers can also adopt different approaches. For example, a large advertiser told us it bids on all SSPs at the start of a campaign, rather than selecting particular SSPs. As the campaign progresses, it typically observes that the majority of its spend is concentrated with approximately five SSPs, which indicates that these are the SSPs with access to the key inventory that the advertiser requires for that particular campaign. Therefore, at that stage the advertiser focuses bidding on those SSPs.

*Bargaining power*

217.   When dealing with SSPs, large publishers try to negotiate contract terms including payment terms, revenue share across different transaction types, limitation of liability, clawbacks (sequential liability clauses), as well as processes for addressing claims of issues such as bot traffic; they may also try to negotiate minimum revenue guarantee amounts. Publishers' levers are the volume of ad impressions and users they have. Smaller publishers, however, may not have much leverage and may not be able to bear the costs involved in these negotiations. Moreover, even for large publishers, their bargaining power varies significantly when dealing with different SSPs.

218.   Typically, publishers are unable to negotiate the terms of their relationship with Google and Facebook. In general, publishers told us that there is no meaningful scope for negotiation with Google or Facebook, in terms of both the price and non-price aspects of the contract. In some cases, however, large publishers have been able to negotiate preferential rates with Google's AdX or the waiving of certain minimum spend commitments and set-up fees, although these may not impact on significant elements of the relationship. On the other hand, one publisher told us that the contractual terms offered by Google are not unreasonable and are simpler and less one sided than those generally contained in the first drafts of contracts sent by other intermediaries.

219. There is more scope for negotiations when publishers deal with other SSPs. For example, News UK told us that it is generally able to negotiate reasonable commercial terms when dealing with the other SSPs it uses. Similarly, another publisher told us that it is able to negotiate favourable terms with the majority of individual suppliers it works with.

220. One way of negotiating more favourable terms may be to enter into an exclusive arrangement with the intermediary. For example, one party told us it has an exclusive relationship with one intermediary (exclusivity for content recommendations) and receives guaranteed minimum revenue from those intermediaries.

*Main providers*

221. Dozens of different companies currently provide SSP services. Most of them, however, have very small operations in the UK. As shown in Appendix C, Google has the largest share of total inventory value sold – [50-60]% if we include all publisher-facing intermediaries, [50-60]% if we exclude those SSPs that serve their ads, therefore operating as ad networks. There are, however, other large providers although, as discussed below, some of them specialise on particular types of inventory.

222. Considering those SSPs that have been mentioned by at least two of the publishers that responded to our RFI, or that the SSPs in their responses to us indicated as their main competitors, it appears that the main SSPs can be divided into three groups:

- generalist SSPs, some of which also offer other services along the intermediation value chain;

- specialist SSPs, focusing on specific types of inventory; and

- a third group that could be defined as 'content discovery platforms'.

*Generalist SSPs*

223. Large publishers typically work with multiple generalist SSPs. Some of them are used because they give access to demand sources that could not be reached otherwise, others because they provide more flexible technology or better support.

224. Among the SSPs that give access to unique demand, Google's AdX was indicated by most publishers who responded to our RFI as a 'must-have', and in some cases as the only must-have SSP, as it is main channel for accessing Google Ads demand. Another SSP with unique demand is Xandr: as the

Xandr SSP is the most efficient path of supply for the Xandr DSP, there is a higher likelihood of a Xandr DSP buyer purchasing through the Xandr SSP than through another source.

225. Some publishers also include Amazon and Facebook among generalist SSPs, although strictly speaking they do not provide SSP services. Nevertheless, Facebook Audience Network bids directly into the publishers' ad server or header bidding solution, without going through an SSP; Amazon Advertising bids into SSPs as a DSP but can also integrate directly into Amazon Publisher Services' header bidding solution. Amazon has been indicated by one publisher as a 'must-have'.

226. Other SSPs have been indicated by some publishers as providing better technology or support. For example, News UK described Rubicon Project as having a very efficient technology, enabling it to provide a competitive offering in the SSP market. Index Exchange was described by publishers as focusing on providing sell-side support and having unique match rates. OpenX also has unique match rates, while PubMatic focuses on mobile and app monetisation.

227. Google, Index Exchange, OpenX, PubMatic, Rubicon Project and Xandr are also the SSPs that have been listed as among the main competitors by the largest number of SSPs responding to our RFI. While generalist SSPs tend to be listed as competitors by other generalist SSPs, Google is considered a competitor also by specialist SSPs (discussed below).

228. Some of the large generalist SSPs have recently encountered difficulties. [✂].

*Specialist SSPs*

229. Some SSPs specialise in particular ad formats. There seem to be two main niches for specialist SSPs: native display and video, particularly outstream video advertising.

230. SSPs specialising in native advertising include TripleLift, Sharethrough and AdYouLike. TripleLift describes itself as the world's largest native programmatic ad exchange, enabling publishers to capture unique demand for native advertisement that is unavailable on other SSPs; it also offers custom native ad formats. Sharethrough also differentiates itself by the formats it offers, which include native display, a proprietary enhanced display format, and outstream video. SSPs specialising in outstream video advertising include Teads, Unruly and SpotX. Teads is the inventor of outstream video advertising.

231. Specialist SSPs typically compete most closely with other specialist SSPs; TripleLift told us that general SSPs are less direct competitors. The exceptions are Google and Facebook, which have been indicated as strong competitors by some specialist SSPs.

*Content discovery platforms*

232. This third group includes companies which adopt a business model quite different from that of typical SSPs. One of the largest operators in this category is Taboola. Taboola has formed partnerships with publishers, advertisers, advertising agencies, digital advertising service providers, and mobile phone carriers and manufacturers to serve and recommend advertisements and editorial content to audiences around the world. It recommends sponsored content, articles, videos, slideshows, and other content on the publishers' properties (typically below a header such as 'Content You May Like', 'Recommended for You', or 'Around the Web'), based upon each visitor's particular interests. Publishers provide Taboola with advertising inventory on their websites, ie Taboola does not submit bids in competition with other SSPs, but is given exclusivity over some space on the webpage. Taboola is given the right to sell that inventory through programmatic channels. Another large provider following a similar business model is Outbrain. Taboola and Outbrain announced their merger in October 2019.

233. Advertisers can buy the inventory offered by these platforms either directly or through third-party platforms such as DSPs. Unlike traditional SSPs, most of the inventory is sold to advertisers and paid to publishers on a CPC basis. However, both Taboola and Outbrain also offer inventory on CPM basis.

234. Taboola and Outbrain told us that their main competitors include a group of similar platforms or specialist players in native advertisement and, for Taboola, SSPs focusing on outstream video, such as Teads and Unruly. Among non-specialist SSPs, Google and Facebook were indicated as the major threats. In particular, Outbrain told us that:

- Google is a direct competitor in all areas in which Outbrain is active. In addition, Google competes for on-page real estate with Outbrain's publishers with their 'matched content' product.

- Facebook is directly pitching to replace Outbrain's native advertisements.

235. As for the other large generalist SSPs, Taboola told us that, while they are competitors, they are also possible partners as they bid for Taboola's supply.

*Overall competitive dynamics: commoditisation, network effects, multi-homing*

236.    Several SSPs responding to our RFI told us that SSP services have been commoditised since the introduction of header bidding, especially with respect to access to inventory. Before header biding, publishers had to decide which SSPs to connect with, how to prioritise them in the 'waterfall', how much inventory to release at what point in time, and what price to offer the inventory at. Publishers' yield management resulted in differentiation among DSPs. Under header bidding, on the other hand, all major SSPs have more or less access to the same inventory. While header bidding has been critical for allowing new SSPs to enter the market, it has made SSPs a commodity, making price and service the only real differentiators and compressing SSPs margins. The exceptions to this commoditisation of supply are those SSPs which have 'walled-off' certain owned and operated inventory, to which they provide exclusive access.

237.    We have received contrasting submissions, however, on whether commoditisation extends to the whole of SSPs' technology. On the one hand, one SSP told us that SSP is a pretty commoditised business with little innovation, apart from the ongoing incremental innovation due to changes to regulations and standards in adtech. On the other hand, Rubicon Project submitted that constant innovation is required for SSPs to keep ahead or just stay afloat.

238.    SSPs need to attract both sellers (publishers) and buyers (DSPs, and ultimately advertisers) to their platform. They operate in a two-sided market and some respondents indicated the presence of indirect network effects.

-   On the one hand, advertisers are more willing to work with platforms that have higher access to supply, in order to achieve their goals at scale. Adform told us that it is much easier to attract DSPs in markets where it has a strong sell-side offering and that it has experience of DSPs rejecting connection without a guarantee of certain trading levels.

-   On the other hand, companies which are able to work with many advertisers (or DSPs) can provide publishers with greater demand, and access to demand is one of the main factors publishers look at when deciding which SSPs to work with, as we discussed above.

239.    The strength of network effects, however, may be limited by the fact that both DSPs and publishers tend to work with multiple SSPs.

-   For example, on the publisher side, Independent Digital News & Media (IDNML) told us that, as each technology partner differs slightly in its

approach, it makes sense to have a roster of partners; IDNML currently uses six SSPs. Similarly, Reach told us that different SSPs are stronger in serving demand for different formats; to get the best return on one's inventory, it is useful to work with several SSPs. There are, however, costs to multi-homing. While, in theory, there is no restriction on a publisher's ability to use multiple SSPs, there is operational overhead associated with adding additional SSPs (integration, relationship management, quality control, reporting and billing), and therefore it may not be optimal to add additional SSPs once a publisher has met 100% of the demand for its inventory.

- DSPs also typically use multiple SSPs; however, there is currently a trend to reduce the number of SSPs to work with. An SSP told us that, as demand partners start deactivating inventory sources, scale is of major importance to remain in the top ten inventory sources on the market.

240. While scale is therefore important for SSPs, there is no clear critical mass. Small SSPs can survive at relatively low volumes, but they need to specialise on a particular niche of the market. The critical mass for an SSP can depend on the maturity of the ad format it deals with, with publishers more likely to work with smaller SSPs for ad formats that are new to programmatic advertising. The minimum scale is higher for SSPs that service the general market.

*Economies of scale and scope*

241. SSP providers responding to our RFI provided a wide range of estimates for the level of investment required to build a successful SSP. Despite these differences, it appears that setting up an SSP is less costly than creating a DSP, as an SSP does not require the same infrastructure and level of integration as a DSP. Moreover, the availability of Amazon Web Services and similar technologies have significantly reduced the scale of investments.

242. Generally speaking, an SSP needs to be sufficiently large to justify the large DSPs integrating. The scale of an SSP matters for DSPs also because cookie syncing success is determined by the SSP's scale, ie its exposure to other impressions from the same user. An SSP therefore needs enough server capacity to handle the demand, enough bandwidth to handle the transfer of bid requests to DSPs and the responses, and enough data processing to be able to aggregate the tera- to peta-bytes of data that enter the platform daily. SSPs typically make use of hosting services, which constitute the main cost of running the business. These costs are proportional to the load sent to the platform, ie the volume of auctions. On the other hand, engineering and data science investments do not scale with the level of activity, although the

number of publishers marginally impacts the cost of R&D, mainly for custom adaptations. In general, some cost reductions at scale can be achieved.

243. For SSPs servicing the general market, a party estimated that at least US$100 million of annualised revenue is needed in order to be marginally profitable on a year in, year out basis (and stated that this estimate assumes a very favourable cost structure that likely requires a significant investment in offshore technology resources). In order to generate US$100 million of annualised revenue, an SSP must generate more than US$500 million of ad spend. To attain that volume, an SSP would have to service multiple format types (eg desktop, mobile, video) across hundreds or even thousands of publishers and likely across several geographic markets.

244. Finally, being vertically integrated along the intermediation value chain can lead to cost efficiencies. Xandr, which in addition to an SSP operates a DSP and an ad server, told us that, as all these services share the same technical platform infrastructure, some technical investments can benefit all or most. It is also possible for certain innovations and R&D investment to take a holistic view of Xandr's product offerings and, in a single project, build features for multiple offerings.

*Current and expected trends*

245. Some of the SSPs who responded to our RFI told us they expect to see market consolidation over the next few years, with both DSPs and publishers reducing the number of SSPs they work with in order to optimise their supply paths. This trend is already visible: Xandr told us that publishers have already started to consolidate their ad stack, while buyers have also started to collaborate with publishers to agree on 'preferred' SSPs, to ensure their media buying is routed through cost efficient, fraud-free, scaled SSPs. A publisher also told us it expects the SSP market to consolidate, with six to ten players who may specialise in different areas (eg mobile, apps, video, or PMP / Programmatic Guaranteed transactions).

246. One SSP anticipates that the SSP market will break into two distinct 'forks': there will be some competitors that focus on being very low-cost pipes and others that focus on creating more net new value through better intelligence and matching.

247. TripleLift submitted that it also expects increasing vertical consolidation along the value chain, with more SSPs integrating with the demand side. This will make it difficult for independent SSPs to compete. An internal document from one of the SSPs goes further by arguing that the SSP category itself is under great pressure and is unlikely to survive in its current form, as price pressure

from DSPs and disintermediation threats, with DSPs going direct to larger publishers, mean that no independent SSP is currently in a sustainable place.

248. Disintermediation may be favoured by a wider adoption of server-side header bidding by publishers. With client-side header bidding, there are two main reasons why the intermediation of SSPs is needed:

- Client-side wrappers cannot technically support more than ten active connections at a time. For this reason, SSPs act as intermediaries that occupy a single connection to the client-side wrapper and are then integrated with a larger number of DSP demand sources on the server side.

- Client-side wrappers require the use of specialized client-side technology (ie JavaScript) that most DSPs are not experienced in developing and maintaining. DSPs, rather, are accustomed to integrating with supply over server-to-server connections that use the OpenRTB protocol.

249. Server-side header bidding removes these obstacles. Technically, a server-side header bidding wrapper is quite similar to an exchange: it is a server-side real-time marketplace that integrates with demand over server-to-server connections that use OpenRTB. This means that for a DSP to integrate with a server-to-server wrapper is essentially the same process as integrating with an ordinary exchange. DSPs can therefore integrate directly into the header bidding wrapper and circumvent the SSPs and other intermediaries to create a more efficient supply path.

*Conclusions*

250. Competition between SSPs, especially generalist ones, is intense: header bidding has led to a commoditisation of their services, has increased multi-homing among publishers and DSPs, and has made competition between SSPs more direct. In this context, Google's SSP AdX has a special position as a 'must have' for most publishers. This status, however, depends on AdX's access to Google Ads demand rather than on intrinsic features of AdX's service. We discuss the implications of the link between AdX and Google's demand later in the appendix.

**Competition between publisher ad servers**

251. The analysis of competition between providers of publisher ad servers is organised in three parts, focusing on the following aspects:

- the largest providers and the main features of their services;

- the high degree of market concentration and the possible underlying reasons; and

- the costs that publishers have to bear when switching between ad servers.

*Main providers*

252. Google Ad Manager is by far the most used publisher ad server in the UK, accounting around [more than 90]% of the ads served in the UK (see Appendix C).[23] All the publishers who responded to our request for information were using it as their ad server. The other ad server providers mentioned were Xandr, Smart and FreeWheel.

253. When explaining the reasons for using Google Ad Manager, publishers told us that it is a global market leader offering multi-functional capabilities of serving all ad formats across all platforms, and far superior to other ad servers. Google Ad Manager is considered to have best-in-market features, reporting, integration of demand and tools to provide buyers with easy access to the publisher's inventory, and a very robust decision logic, at least before recent changes to unified pricing. One publisher told us that Google Ad Manager is the only ad server tool available to publishers of its scale. Another advantage of using Google Ad Manager is that, being the leading ad server in market, more people know how to use it and it is therefore easier to recruit people who can work with it.

254. Xandr believes that its publisher ad server has superior forecasting. [✕] it does not have access to Google's demand.

255. While Xandr was mentioned by several publishers responding to our RFI, only one explicitly said that it considered it an alternative to Google. Another publisher told us that, while it used to see Xandr (then called AppNexus) as a potential alternative, it no longer does after its recent acquisition by AT&T. The publisher expects Xandr to focus on video and demand-side activities instead of trying to compete as a publisher ad server, and to prioritise the sale of AT&T inventory. On the other hand, Axel Springer, a large German publisher who recently switched to Xandr as its main ad server, told us that it has not noted any change of approach since the acquisition by AT&T and that Xandr appears now to have greater resources to invest.

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[23] We are excluding ads served by ad networks and considering only those providers that have been mentioned to us as possible alternatives to Google Ad Manager.

256. Smart told us that its publisher ad server is more flexible and transparent than Google's, although the additional flexibility comes with additional complexity. Smart provides an alternative to Google's Open Bidding that includes managed header bidding (client side) and server-side bidding (integration with other SSPs). However, it does not have access to Google AdX demand. One of the publishers responding to the RFI told us that Smart was, in its opinion, too small to serve a publisher of its size.

257. Finally, FreeWheel is a specialist provider that offers ad serving services to premium publishers (typically TV broadcasters/networks). FreeWheel was specifically built for broadcast quality video advertising and designed to replicate the complex broadcast rules for television advertising. It differentiates itself through its ability to serve ads across a broad array of online video platforms and internet-connected devices such as Android and iOS mobiles, smart TVs, and broadcaster set-top-boxes (STBs) in a consistent and uniform manner.

*Market concentration*

258. As seen above, the market for publisher ad serving is very concentrated. The number of providers has decreased recently with OpenX, Open Ad Stream, and Verizon Media deciding to stop providing a publisher ad server product. OpenX decided to close the ad server business in 2018 and completed the process in 2019. It told us that the decision was due to a series of reasons [that meant it had difficulty competing].

259. While the ability to source supply through header bidding can explain why the provision of a publisher ad server may have become less important for companies whose main business is an SSP, other issues more directly affected competition in the provision of publisher ad server products.

260. An ad server provider told us that, following the acquisition of DoubleClick and its ad server in 2008, Google reduced the price charged to publishers by a factor of ten. Such pricing pressure made the provision of publisher ad server difficult to sustain as a standalone business. This was the main reason why Smart felt the need to expand into the provision of SSP services. Google's low pricing and aggressive marketing strategies led to a substantial growth in its share of supply in ad serving, making it difficult for other providers to maintain a significant scale.

261. Without sufficient scale, the costs involved in setting up and maintaining a publisher ad server may be too high. Xandr told us that many of the investments required to run an ad server, such as integrations with other SSPs, forecasting capabilities, ad decisioning logic, targeting, frequency

capping and buying tools, and reporting, do not depend on the number of publishers using the service. Without scale, the cost of running an ad server is therefore high. This presents a barrier to entry for many potential competitors and limits the number of those that can maintain an ad serving business. On the other hand, an important component of the cost of running a publisher ad server is due to hosting costs, which are proportional to the load sent to the platform, ie the volume of auctions. Scale can provide other advantages in addition to cost efficiencies. FreeWheel told us that scale can provide an ad server with more data and insights into video advertising, which can benefit its decisioning and reporting capabilities, since data can be used to improve the delivery of ads and insights from data can be used to improve the technology.[24]

262.    For these reasons, and given the high switching costs for publishers (discussed below), Xandr does not anticipate many new entrants to the ad serving space, while Smart expects to see market concentration increase further.

*Switching costs*

263.    Publishers typically single-home on one ad server. It is possible, however, to have a secondary ad server. This appears to be the solution adopted by some publishers whose primary ad server is not Google Ad Manager in order to have access to Google's demand.[25]

264.    Responders to our RFI generally told us that switching ad server is a complex and lengthy process which involves significant risks of revenue loss. The switching process is technically complex because of how deeply integrated an ad server is into a publisher's systems. News UK identified 11 main areas of work, covering an estimated four-month period, that would need to be undertaken to switch ad server:[26]

- re-tagging the publisher's websites and apps;

- migrating orders, line items and creatives;

- configuring the existing Order Management Systems;

- linking the Order Management System to the new ad server;

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[24] On the other hand, scale can be a disadvantage if it results in the ad server not being sufficiently responsive to customers' needs.
[25] For a discussion of the limits on access to Google's demand from third-party ad servers, see the section on links between Google's DSPs, SSP and publisher ad server, below.
[26] News UK noted that potential implications of the migration in other areas would also need to be considered.

- creating the product catalogue (eg creating a common set of ad products/segments and configuring them to the new ad server);

- programmatic migration (the header bidding wrapper would need to be re-engineered for new ad server configuration; orders would need to be created for all SSP demand sources in the new ad server; all PMP deals would need to be recreated in all SSPs with the new ad server configurations);

- data migration (eg rebuilding APIs to the DMP to the ad server; retag viewability and verification vendors to the new ad server);

- consent management (building consent management strings from the new ad server to the publisher's consent management platform);

- reporting (integrating the new ad server with the publisher's financial reporting dashboards and migrating the new ad server to the publisher's yield management tools for programmatic ad serving optimisations and reporting);

- testing; and

- training (staff would require training in connection with the migration).

265. The estimated time required for the switching to take place varied significantly between publishers, from 3-6 months to 18 months (including scoping, preparation and implementation). Xandr told us that, given the costs and risks associated with switching ad server, publishers tend to go through a tough evaluation process that can take up to two years to complete.

266. In addition to the direct costs of switching, there are operational risks and the possibility of demand losses resulting from the transition. A publisher would incur a significant opportunity cost due to the time that would need to be devoted to the transition. In addition, the time and effort that the publisher would need to invest into familiarising itself with the new ad server and learning strategies to optimise revenues on the new system would hamper its ability to innovate to maximise its revenues. A publisher could also face losses from potential campaign downtime if it were unable to guarantee the smooth running of a campaign during a switch.

267. In addition, a publisher submitted a specific concern around the availability of data after the transition. Ad servers do not support the transfer of data between them. Switching would therefore mean that the publisher would lose the ability to report effectively on historical data, and the new ad server would not have the historical data needed for forecasting and other functionality until

it had been in place for at least a few months. While it might be possible to access reportable data from the old ad server after the transition, mapping these with the new data is a large and costly operational overhead. The loss of historical data means that inventory forecasting is impossible and so manual workarounds that are highly labour intensive would need to be created and managed, which could be inaccurate, resulting in either over- or underselling, both of which are bad from a buyer and revenue perspective. Going forward, there would be a loss of comparable data for month-on-month and year-on-year analysis, so measuring performance becomes difficult.

268. Considering the various costs and risks, News UK estimated that migrating to a new ad server would incur significant costs for external consultation and project management, in addition to internal resourcing costs. News UK also anticipates revenue losses from migrating its campaigns, potentially arising from human errors, delivery issues, and/or technical issues. Overall, it estimated the revenue loss would amount to several hundred thousand dollars.

*Conclusions*

269. Google is the leading provider of publisher ad serving services in the UK. Its market power is strengthened by high switching costs. Recent years have seen a reduction in the number of providers and this trend is unlikely to reverse in the foreseeable future. We discuss later in the appendix how business choices by Google's SSP have resulted in a further increase in the market power of its publisher ad server.

### Competition between header bidding solutions

270. The analysis of competition between providers of header bidding solutions is organised in three parts, focusing on the following aspects:

- the providers and the main features of their services;

- why providers along the intermediation value chain have an incentive to also provide header bidding solutions, and why publishers multi-home; and

- the most significant expected trends in the market.

*Main providers*

271. The main providers of proprietary header bidding services are Google, Amazon and Index Exchange.

272. The most widely adopted solution is Google's Open Bidding. One of its main advantages is the close integration with the rest of Google's ad stack, in particular Google's publisher ad server. Because Open Bidding is connected to Google's ad server, less JavaScript about the user needs to be loaded on the publisher's webpage, which reduces data consumption and speeds up page loading and ad serving times. Another advantage is that it is quick and easy to implement and it allows publishers to have a single bill to Google, which manages payments to all participating SSPs.[27]

273. On the other hand, disadvantages of Open Bidding mentioned by some of the publishers responding to our RFI include the fees charged to bidders (5% of the winning bid, which increases to 10% for app and video inventory), a perceived lack of transparency, and the relatively limited number of participating SSP partners. On this last issue, Google told us that the onboarding process for SSPs onto Open Bidding is resource intensive as it requires substantial technical support from Google and support from the Google accounts team. Google is open to working with new SSPs but, due to heavy interest from SSPs and limited onboarding resources, it has had to prioritise requests from SSPs based on publisher interest. There are also SSPs, [✂], which have made the choice not to participate in Open Bidding [✂].

274. Amazon offers two header bidding solutions – Transparent Ad Marketplace (TAM) and Unified Ad marketplace (UAM). TAM is a server-side header bidding solution that enables publishers to receive bids for ad impressions from Amazon advertisers and third-party bidders. In TAM, publishers need a contractual relationship with third-party bidders to cover terms such as payments. UAM works for publishers in the same way as TAM, except that publishers do not need to have a contractual relationship with third-party bidders.

275. Index Exchange offers a collection of web-based, client-side advertising technology solutions called Index Exchange Library, including a highly customisable header bidding solution.

276. Other providers offer services built on Prebid's open source technology.

- Xandr offers an integration layer between server-side Prebid and Xandr's publisher ad server offering called Prebid Server Premium. Prebid Server Premium has the ability to host and manage the Prebid server from within

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[27] This is considered a disadvantage by some SSPs, concerned by their inability to have a direct relationship with publishers, which limits their ability to negotiate preferred deals and to build up strategic partnerships with publishers directly.

the Xandr web interface. The product includes analytics and integration with the Xandr publisher ad server.

- In May 2019, Rubicon Project introduced a private beta version of a header bidding service called Demand Manager. With this service, Rubicon Project (i) hosts the publisher's Prebid header bidding wrapper on Rubicon Project's system; (ii) provides the publisher with a suite of tools, such as Prebid Analytics, and a configuration user interface; and (iii) operates the header bidding auction on behalf of the publisher.

277. Finally, smaller header bidding consultants also operate in the market. While they lack the scale of investment of larger operators and are likely to have lower technical capabilities, they can develop products, innovate and ramp up more quickly than a larger company, because they are solely focused on providing the header bidding solution. They also tend not to have an SSP and therefore do not participate in the header bidding auction, which is perceived by publishers as giving them a degree of independence.

*How SSPs and publishers use header bidding*

278. The main providers of header bidding solutions are companies also active at other levels of the intermediation value chain, especially as SSPs. We have been told of two reasons why these companies may find it beneficial to develop a header bidding solution.

- Companies that operate a header bidding solution have a large degree of control over how that solution makes decisions. This includes establishing the priority of SSPs, eg which SSP is called first; setting the time-out duration and potentially preventing some header bidder partners from participating in the auction; and knowing where the publishers set their floor price for a given ad impression. These companies also have full visibility of how each SSP performs (bid prices, speed, relative strength in specific ad categories, etc). As a result, SSPs which manage header bidding solutions have better information about the auction's performance and can use this as a competitive advantage against the other participants in the header bidding solution they manage.

- Another reason for setting up a header bidding solution is to reduce dependence on SSPs, and in particular on Google. [✂].

279. As multiple header bidding solutions exist, there are benefits for publishers in using more than one. The advantages of multiple header solutions are in the diversity in demand and the tools which each supply: some may supply better analytics and ways in which to display inventory, while others may have

unique demand to their own platform. Moreover, publishers may want to test smaller SSPs via server-side integrations (such as those provided by Google or Amazon), before dedicating the resource to integrate them client-side. The ease of integration through Open Bidding and the fact that many publishers may only want to work with an SSP through it are the main reasons for SSPs to participate.

280. On the other hand, a publisher would not be likely to integrate multiple Prebid header bidding solutions, as this could result in increased page loading time and ad serving latency. As such, publishers may choose Prebid header bidding solution providers that have larger scale (eg access to more or unique demand) or that also operate other components of the advertising supply chain.

*Expected trends*

281. Xandr told us that header bidding solutions are being developed to support new formats and channels like native, video, accelerated mobile pages, mobile app, and so on.

282. Some of the respondents to our RFI also expect server-side solutions to replace client-side header bidding. Xandr anticipates that client-side only solutions will struggle to be viable, since server-side header bidding offers more capabilities than the client-side model, including customisation. An intermediary told us it expects server-side header bidding to develop also as a result of pressures to disintermediate SSPs, given that server-side header bidding makes it easier for DSP to connect directly with publishers, as discussed above.

283. Header bidding solutions may also increasingly offer ad server-like functionalities, competing against the ad server as the primary publisher technology solution. [✂].

**The competitive impact of vertical integration and bundling**

284. The advertising intermediation industry has been consolidating in recent years. Part of this process has taken place through vertical integration. As one intermediary told us, the largest companies are either acquiring smaller companies along the supply chain or, where they can afford to take the time, building extensions of their own platform stack into new parts of the supply chain. The effect is an industry of increasingly closed ecosystems that are dominating growth and spend. Competition between intermediaries is affected not only by the integration of intermediation services along the value chain (eg DSP and SSP), but also by the provision by the same suppliers of both

intermediation and user-facing services, and exclusive access to owned and operated sources of inventory.

*Integration along the intermediation value chain*

285. Integrating multiple intermediation services gives companies greater flexibility in their pricing for each product or in how the products are bundled together, potentially cross-subsidising across the layers of the value chain. For example, vertical integration can allow a DSP to provide bundled pricing across a range of DSP and non-DSP services that can in turn allow the DSP element to be effectively subsidised.

286. The integration of advertiser ad serving and DSP services can bring a competitive advantage. Some advertisers, for example, told us that the integration of DV360 with the other Google Marketing Platform products, including Campaign Manager, makes it possible to create audience segments and move that information around the various ad platforms to give a better holistic approach to targeting users, resulting in large advantages from a targeting and measurement perspective, and makes setting up and reporting on campaigns a lot easier.

287. The technical advantages of vertical integration between DSPs and SSPs, discussed above, can also be a source of competitive advantage. Xandr submitted that, in cases where a DSP has an SSP in the family, it is likely that this SSP will represent the most efficient path to supply and therefore be the preferred one. In this way, any SSP that has a DSP in the family has a competitive advantage as it should expect to see the lion's share of spend from that DSP. The perception that being integrated across the supply chain increases buying efficiency for advertisers and revenue opportunities for publishers can provide a compelling argument for premium publishers to prefer to utilize these tools and services.

288. The technical advantages of the integration of AdX with Google's publisher ad server (discussed above) can also provide AdX a competitive advantage over rival SSPs. The fact that setting up programmatic guaranteed transactions using a non-Google SSP is more technically difficult and time-consuming gives AdX an advantage. One publisher told us that this is why it tends to favour Google systems for more premium advertising sells, while another submitted that this is often a barrier for setting up programmatic guaranteed deals via any SSP other than Google's.

289. Nevertheless, the significance of the competitive advantage of integration along the intermediation value chain is unclear. Despite the technical advantages of DSP/SSP integration, one of the most successful DSPs in

recent years has been The Trade Desk, which does not offer any non-DSP service.

*Bundling of intermediation services and owned-and-operated inventory*

290. The integration of intermediation services with user-facing services (providing a proprietary source of data or inventory) may prove to have a more significant impact on competition in advertising intermediation, at least in the long run. The rest of this section will deal with the role of unique inventory, while the role of proprietary data will be discussed in a subsequent section.

291. The managing of demand for owned and operated inventory provides an obvious entry point into intermediation. Having large scale inventory under exclusive control (as in the case of Google, Facebook or Amazon) gives a company the resources and ability to invest in technology to fully control the logic under which the inventory is traded and, based on this, to extend into intermediation outside its own inventory by offering the technology at low price to smaller publishers. Most importantly, unique inventory can be used to increase the attractiveness of a company's intermediation services. We have seen in above how exclusive access to inventory constitutes one of the main strengths of some DSPs. The same argument can extend to further stages of the intermediation value chain in the case of vertically integrated providers. [✂].

292. [✂]. The argument proceeds as follows:

   • [✂] demand for the unique inventory allows the company to become an important source of demand for third-party inventory, as buyers would find it advantageous to use the same platform to buy both types of inventory. [✂].

   • Such advantage on the demand side can translate into an advantage on the supply side, [✂].This advantage can be strengthened by a closer integration between the demand and supply sides. [✂].

## Targeting data in open display

293. Data, and in particular user data, play a crucial role in the open display market. The ability to target advertising to specific audiences allows platforms and publishers to maximise the value of inventory for advertisers. This section discusses the role of targeting data in open display and is structured into three parts:

- the first part gives an overview of the use of targeting data by different participants in the industry (publishers, SSPs and DSPs);

- the second part discusses the advantages in terms of access to user data enjoyed by those intermediaries who also offer consumer-facing products; and

- the last part analyses the risk of 'commoditisation' of publishers' inventory as a result of the widespread sharing of users' browsing data with intermediaries in the context of real-time bidding.

***The use of targeting data by publishers, SSPs and DSPs***

294. Targeting in open display advertising is made possible through the use by intermediaries of the following pieces of information:

- user segments/profiles;

- location data;

- contextual data; and

- user identifiers.

295. Personalised advertising relies on the creation of user segments, based on demographic and behavioural data (see Appendix F). For some advertisers, user segments are the primary mechanism for targeting and produce most of the value of the DSP. User segments are often also central to direct deals between publishers and advertisers. Publishers can get users' behaviour data by looking at their behaviour on the website, from which interest can be inferred. They can also use the ads a user has been shown or clicked on to infer their interests or value to an advertiser. Demographic data can be obtained from user declared data (when creating an account, or through on-site surveys), inferred from users' behaviour if the behaviour matches patterns of known users in the demographic, or licensed from third-party providers. DSPs can receive user segments from advertisers themselves (or their DMP) for their own use or can acquire the data from third-party data providers. Intermediaries who also operate user-facing services have their unique sources of data, as we discuss below.

296. Location data is used for geographical targeting. The source of this data is the IP address of the user or their latitude/longitude when the location of their mobile device is captured. It is obtained by publishers from Google Ad Manager as part of the ad serving product, or from other providers. Location

data (ie the user IP addressed) is sent to SSPs and included in the bid requests.

297. Contextual data is data about the web page where the ad will appear. It is used for contextual targeting or for anti-targeting, ie to avoid the ad appearing on pages whose content is considered unsuitable. Publishers typically use third-party specialists, such as Grapeshot or Admantx, for contextual data, or use the meta-tags behind the content. Some contextual information is included in the bid request, but DSPs can also use the same specialist providers.

298. Finally, being able to identify a user and recognise each time they are encountered is crucial for DSPs and publishers; this is the role of user identifiers. Without this information it becomes impossible to match a user to segment data, to implement frequency caps (ensuring that the same user does not see the same ad too often), or to attribute conversion outcomes to a campaign. User identifiers are included in bid requests as cookies, but the availability for DSPs is typically subject to a successful cookie-matching process.[28]

*The use of data by publishers*

299. Publishers use first-party, third-party and contextual data to build bespoke segments and profiles of readers which they can use for targeted advertising campaigns or audience insights. This is typically the case for PMPs or other programmatic deals with specific advertisers. We have been told, however, that, as buyers have a great depth of data, they are no longer placing the same level of reliance on the publisher's data. Publishers can also decide to voluntarily provide interest data in order to allow the SSP to better understand the inventory.

300. Publishers first-party data typically consists of data obtained from users when they sign in or subscribe to the publisher services and of browsing data from users' interaction with the publisher website or app. Typically, publishers permit intermediaries such as DSPs to use cookies on their websites or apps to track user interactions for use in targeting or for the purposes of ad reporting. Publishers also broadcast user browsing data to multiple intermediaries in ad requests.

301. The cost for publishers of sourcing and managing targeting data can vary significantly. Some publishers responding to our RFI indicated amounts

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[28] For more details on the flow of data in open display, see Appendix F.

corresponding to around (or more than) 3% of their digital advertising revenues; other publishers are spending significantly less.

*The use of data by SSPs*

302.	Access to user data is not crucial for SSPs. However, the availability of user data can be useful to SSPs, by making it possible to optimise advertising performance efficiently. In particular, if an SSP can identify whether the characteristics of an ad request are desirable, it can effectively allocate resources. For example, being able to determine whether an ad request is bot traffic (and should be filtered), or is desirable to a buyer, is critical to overall business health and marketplace efficiency. Each ad request and bid request costs money for an SSP to process. To the extent that an SSP can accurately predict the value of an impression, it can more efficiently allocate resources to gain economic leverage. The more data that is available to improve these types of algorithms, the more accurate (and, consequently, efficient) an SSP can become.

303.	SSPs can also use targeting data in a similar way as publishers when they package 'deal IDs' on behalf of the publishers. Content discovery platforms, which often directly connect advertisers with publishers, can also make greater use of targeting data than typical SSPs.

304.	The user information included in bid request that SSPs send to DSPs often follows OpenRTB specifications released by the IAB Tech Lab (some SSPs may use different specifications). In addition to information about the publisher's website or app and ad placement, a bid request typically includes information about the user's browser and device, location data, and the user ID (taken from browser cookies or MAID identifiers).

*The use of data by DSPs*

305.	Data is crucial for the operation of DSPs and their ability to optimise bids reflecting advertisers' campaign objectives and targeting requirements. For this purpose, DSPs augment the information contained in bid requests with data provided by advertisers and data sourced from third-party providers. This allows DSPs to offer multiple targeting options, which can include:

- contextual targeting, based on contextual information on the webpages and apps, including specific keywords appearing in the page;

- targeting based on time of day or day of week or month, location, browser language, type of device or internet connection;

- demographic targeting, based on known or inferred characteristics such as age, gender, or education;

- interest-based targeting based on users' inferred interests or intent (ie what users are actively researching and planning);

- retargeting of the advertiser's existing customers or of users who have already interacted with the advertiser (eg have visited its website);

- targeting of 'lookalike audiences', ie users with characteristics similar to the advertiser's existing customers or to users who have interacted with the advertiser.

306.  More details on targeting can be found in Appendix F.

### The advantages of operating user-facing services

307.  Unlike companies active exclusively in advertising intermediation, those who also operate user-facing services have the ability to directly collect user data and make the targeting possibilities allowed by such data available to the users of their intermediation services.

308.  For example, Verizon Media DSP uses data from its owned and operated websites and apps and Amazon DSP uses pseudonymised information about users' interactions with Amazon services. Google, as a provider of a wide array of consumer services, can collect and combine a large amount and variety of user data. Subject to users' consent to ads personalisation, Google can collect data not only through users' interactions with customer-facing products, but also from their interactions with Google's products integrated into third-party sites and apps, and, with the exclusion of services for which Google is a 'data processor' or otherwise restricted from merging data for ads (eg Google Analytics), can combine all this data across services into individual profiles. The data collected by Google is described in Appendix F. Facebook also collects a large amount of information from the users of its social platform (see Appendix F).

309.  Operating market-leading consumer products give intermediaries an advantage in relation to the pieces of information used for targeting by advertising intermediaries:

- In relation to user identifiers, the availability of log-in data allows companies like Google and Facebook to generate deterministic device graphs that identify the computers and mobile devices associated with a single user. This increases performance of their DSP services. While other intermediaries (DSPs and DMPs) can create device graphs allowing

them to link the cookies stored on multiple devices used by the same person, these graphs are made probabilistically, ie based on modelling, and are typically less reliable than those based on user log-ins.

- The data collected through user-facing services allows the creation of richer user segments. For example, search data from Google and data on searches for products or services in the Amazon Store can be used to create segments of users that are looking to buy specific products.

- Google has access to detailed location data from Android mobile devices (see Appendix F).

- Google also excels at contextual targeting. Intermediaries, however, did not mention this as a significant advantage over using third-party providers of contextual data.

310. As seen in the section on competition between DSPs, access to data is an important consideration for advertisers and media agencies in their choice of DSP. WPP told us that, all things being equal, a greater availability of user-level data by a DSP might be expected to increase the ability to achieve the campaign's KPIs and, as a result, to generate increased spend with the DSP. Similarly, Publicis submitted that, inherently, platforms with stronger data capabilities will generate more cost-effective results and are more likely to be included in a media plan. Nevertheless, so far the lack of access to data sets as rich as those assembled by Google or Facebook has not made it impossible for DSPs to succeed and grow, as the case of The Trade Desk shows. The evolving privacy regulation and stricter rules on the use of third-party cookies, however, might increase the advantage of user-facing companies, as discussed in a later section and in Appendix G.

### *Sharing of user browsing data and the 'commoditisation' of inventory*

311. There is a possibility that access by DSPs to browsing data from publisher sites may undermine the value of that data to the publishers themselves. DSPs generally obtain permission from publishers to place tracking cookies on their websites, so that they can observe user browsing behaviour to help them better target ads to users. In addition, publishers generally broadcast some user browsing data to multiple intermediaries in ad requests.

312. User browsing data is generally pooled by DSPs with other data about the same user sourced from advertisers, other publishers and third-party data providers to generate a rich user profile for use in personalised ad targeting. These profiles are used by DSPs for targeting ads to a user across multiple publisher websites and apps. Therefore, a publisher's browsing data is being

used by DSPs for the targeting of ads on sites other than the original publisher website. This 'data leakage' may mean that a publisher's unique audience may be 'commoditised' and used to target ads on cheaper sites and apps, which might undermine the value of advertising inventory on a publisher's own website.

313. Following the receipt of responses to our interim report, we asked publishers specifically about the issue of commoditisation and all of them indicated that it was an issue that they were concerned about. As DMG Media stated, 'it is still of concern that our loyal and highly scaled audience, built through significant effort and investment, may be utilized to help power ad campaigns across low quality arbitrage websites'.

314. Publishers also acknowledged a possible trade-off between any loss in value from the widespread sharing of their user browsing data and the potential for value to be added to their advertising inventory through the matching of this data with other data. The matching of publisher browsing data allows the generation of richer user profiles than might be possible with only the publisher browsing data. This potentially encourages more and higher bids for the publisher advertising inventory. As DMG Media explained,

> From an operational standpoint we do not actively limit buyer's identification of users across our site, with the exception of course of non-consented users and always subject to the applicable data protection rules. We believe limiting tracking and user identification would hurt open market revenue. We actually support buyers in performing their user syncs through feeding into the likes of DigiTrust and ID5.

## Lack of transparency in advertising intermediation

315. Many stakeholders we spoke to, both on the advertiser and on publisher sides of the market, commented on the lack of transparency in the digital advertising sector. The lack of transparency is exacerbated in the open display market, where publishers and advertisers rely on intermediaries to manage the process of real-time bidding and ad serving but cannot observe directly what the intermediaries are doing or, in some cases, how much they are being charged at different points in the supply chain.

316. Google submitted that opacity sometimes is a function of fragmentation and observed that the Cairncross report[29] noted that lack of transparency can

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[29] The Cairncross Review: A Sustainable Future for Journalism, 12 February 2019, page 58.

arise from the presence of a 'multitude of players', many of whom 'are not easily visible to those buying or selling the ad space on publishers' sites'.[30] According to Google, vertical integration can sometimes resolve some of the concerns around a lack of transparency and complexity: it eliminates the multiple margins from having many actors in the intermediation chain, and there may be more transparency when a single player delivers all services along the adtech stack.[31] Similarly, one SSP told us that the internal transparency of the larger vertically integrated businesses confers to them a competitive advantage; other businesses, on the other hand, face a fragmented industry, which can have the result of limiting transparency.

317.  One symptom of this lack of transparency is the significant degree of uncertainty around the average ratio between the amount that publishers receive for their inventory and the amount that advertisers pay, as discussed in Appendix R.

318.  Lack of transparency and asymmetric information can lead to inefficient outcomes – for example, advertisers may be reluctant to purchase advertising if they are unsure whether it will ultimately be viewed by a consumer. However, in some cases we would expect market participants to have a shared interest in trying to overcome the problem – for example, by investing in technology to improve ad verification. Therefore, we have focused on assessing whether there might be situations where the interests of different market participants are not well aligned. We currently consider that the main concerns relate to the transparency of fees paid to different intermediaries, the opportunity for 'arbitrage' and the existence of undisclosed rebates. Transparency of bids, and in particular limits to the bid data that Google provided to publishers, is discussed later in the appendix.

### Transparency of fees

319.  Market participants typically do not have visibility of the fees charged along the entire intermediation chain and many are concerned that this limits their ability to make optimal choices on how to buy or to sell inventory, reducing competition among intermediaries.

320.  On the other hand, concerns have been expressed that excessive focus on fee transparency could be counterproductive. Verizon Media submitted that, if fee transparency were to become a regulatory requirement, the focus would likely shift to the specific percentages of underlying fees rather than on net revenue and overall benefit to the publisher. In this scenario, Verizon Media

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[30] The Cairncross Review: A Sustainable Future for Journalism, 12 February 2019, page 58.
[31] Google's response to our consultation on the Statement of Scope, page 23.

added, providers with market power would be able to undercut competitors and such intervention may end up entrenching market status rather than stimulating competition. While Verizon Media sees a need for greater transparency, it submitted that the industry should build on existing practices which focus on disclosures between contracting parties in order to inform buying decisions. This would also respect data protection rules and commercial confidentiality.

321. Similarly, DataXu submitted that a requirement to regularly publish data on average fee or take rates would cause a quick race to the bottom, ensuring that only the largest adtech companies survive, as they would use this information to aggressively price against the rest of the industry.

*Transparency for advertisers*

322. Most DSPs operate a 'disclosed' relationship with their customers, which mirrors the model advocated by the advertiser's trade bodies. According to The Trade Desk, the major advantage of a disclosed contractual relationship is that all fees are clearly outlined, and clients can choose which features they wish to buy. One potential disadvantage is the perception that every choice comes at a cost, and advertisers may misjudge or misunderstand the cost/benefit of activating additional features. In some cases, however, an undisclosed model can be used. In this model, which was historically a favourite of major agency holding company trading desks, the actual winning prices of media purchased are not disclosed and only a final price is provided, which includes margin and fees; the focus is therefore only on results (clicks, conversions, etc.). With a non-disclosed contractual relationship, the major disadvantage is the potential for hidden fees or other non-transparent costs (eg extra margin on owned and operated inventory, or as a result of arbitraging inventory); it is also difficult to assess the presence of conflicts of interest linked to the recommendations (eg favouring proprietary technology) and there is no right for the client to audit the provider. On the other hand, the simplicity of the undisclosed model may be an advantage*.*

323. Under a disclosed model, advertisers can have transparency on the fees for the DSP part of the chain (eg DSP tech fees, agency fees and data costs), but not on the entire chain. For example, The Trade Desk gives advertisers or media agencies the right to access transaction and fee data and provides customers with self-service reporting tools in respect of campaign activity, including transaction and fee data. However, one DSP told us that some customers have reported that it can be difficult to compare fees across multiple DSP platforms, because each platform has a different set of a-la-carte fees. Moreover, the fact that a DSP operates a disclosed model does

not necessarily mean that advertisers have access to all the information. One DSP told us that, while all its clients are on a disclosed relationship, there are cases where a media agency client may not share this transparency with the end advertiser client.

324. Advertisers responding to our RFI typically told us that their media agencies provide transparency over costs and commissions and that they have good visibility of the terms of the contractual agreements with intermediaries, up to the DSP level. On the other hand, media agencies and advertisers have little visibility of what happens on the supply side, in particular of the fees levied by SSPs.

325. The lack of transparency on the buy side over SSP fees affects buyers' decisions and can have implications on competition between SSPs. Given that publishers decide which ad should be served based on bids net of SSP fees, visibility of these fees could make it easier for buyers to select the cheapest path to secure specific inventory and for DSPs to decide where to bid. Lack of transparency may therefore result in reduced competition between SSPs in attracting buyers. It is therefore not surprising that lack of transparency over SSP fees have been indicated as an issue by several of the advertisers and DSPs who responded to our RFI.

326. SSP fees are agreed in contracts between the SSP and the publisher. To reveal them to buyers (ie DSP), the SSP needs permission from the publisher. While this can be a cumbersome process, a media agency told us that there is now a general drive towards greater transparency, with some SSPs now already sharing details of commission rates and others intending to do so in the near future. For example:

- Xandr told us it has spent the last few years accelerating its Trust & Transparency initiative, by which Xandr has been updating its seller contracts to enable it to share the costs charged to publishers with marketers and agencies purchasing ad inventory through Xandr's SSP. So far Xandr has obtained permission to confidentially share this information from publishers corresponding to approximately 60% of inventory in the UK.

- Similarly, Index Exchange discloses take rates to buyers on the exchange when it has permission to do so. It has permission in its contracts with publishers to disclose approximately 35% of its publisher partner's take rates. Index Exchange is working towards receiving permission to share more take rates including outside the scope of contractual negotiations with a goal of reaching 100% publisher take rate disclosure.

- [✂].

- Another initiative to increase fee transparency is MediaMath's SOURCE project. [✂].

327. There could, however, be resistance from some publishers to disclosing SSPs' take rates. PubMatic told us that, while some publishers have granted permission to share take rates with buyers, many others believe that they would ultimately be harmed by this requirement.

*Transparency for publishers*

328. Publishers have little visibility of fees charged by intermediaries, except for the commissions contractually agreed with SSPs. Publishers do not observe the fees DSPs (and other providers along the intermediation chain) charge to advertiser buying their inventory.

329. It may be difficult for publishers even to know which advertisers are bidding for their inventory. DMG Media submitted that most exchanges provide aggregated buyer data which can be used to gather insight on what buyers are bidding on the inventory. Reach told us that some SSPs provide auction level/log level data, but this is rare. Another publisher told us it is actively trying to work better with SSPs for access to bid-level data so it can understand the health of its auctions and what the opportunities are for optimisation; however, at times it has been difficult to get hold of this data.

330. The Guardian Media Group submitted that one of the primary reasons for the lack of transparency is the limited ability for publishers to audit the value chain. It told us that it was only through conversations with advertisers that the disparity between the advertisers' perception of spend and the amount reaching the publisher was discovered.

331. This lack of transparency is likely to have implications on competition between intermediaries. One source of competitive pressure for intermediaries such as DSPs is the possibility of publishers signing direct deals with advertisers. This is, however, a resource intensive activity. Publishers would be in a better position to engage with advertisers if they knew which advertisers appear to be interested in their inventory and if they had a reasonable understanding of how much these advertisers are charged by intermediaries. For example, The Guardian Media Group told us that it uses the results from its investigation into the supply chain to have open and frank conversations with advertisers about the lack of transparency and advocate for more direct commercial relationships. The lack of transparency about the identity of the bidders and

intermediaries' fees may therefore limit publishers' ability to negotiate directly with advertisers, limiting the competitive pressure faced by DSPs.

### *Lack of auditability and arbitrage opportunities*

332. The lack of visibility for advertisers and publishers of what happens along the entire intermediation chain has the additional implication of making it impossible for them to audit the contracts they have with the intermediaries acting as their agents. For example, how can a publisher verify that an SSP is charging the level of fees agreed in their contract if it has no alternative but to trust the SSP for information about the bids it received from DSPs? Full auditability of the contract would require the possibility for a publisher, or for an auditor operating on its behalf, to match auction-level data across the chain, and verify that the amount reported by the SSP as received from a DSP corresponds to the amount that the same DSP reports as paid to the SSP. This is currently not possible.

333. As discussed in a recent report on programmatic supply chain transparency carried out by PwC on behalf of ISBA,[32] what makes it almost impossible to track a transaction across the intermediation chain is, on the one hand, lack of clarity over who needs to give permission for the sharing of auction data and, on the other hand, lack of uniformity on how data is stored by different providers.

334. Such lack of transparency, in the context of an intermediation process characterised by the presence of sequential auctions, may give rise to rent-seeking behaviour and arbitrage opportunities, ie the possibility for an intermediary (SSP or DSP) to buy impressions at one price and sell them at a higher one, without its customers being aware of the magnitude of the difference.

335. Some evidence of this being an issue in the current intermediation industry is provided by the ISBA study on programmatic supply chain transparency.[33] The study mapped 31 million impressions bought by 15 advertisers on 12 publishers' websites across the entire intermediation chain, to understand what proportions of publishers' spend the various intermediation stages accounted for. The study was unable to attribute 15% of advertisers' spend (corresponding to approximately 30% of the difference between advertisers' spend and publishers' revenues for matched the impressions). This 'unknown delta' could in part reflect limitations in the study's methodology and data

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[32] ISBA's Programmatic Supply Chain Transparency Study, published in May 2020.
[33] ISBA's Programmatic Supply Chain Transparency Study, published in May 2020.

(limitations in data sets, necessitating occasional estimations, DSP or SSP fees that are not visible in the study data, foreign exchange translations),[34] but its size suggests the existence of significant discrepancies between the bids that DSPs record as submitted into SSPs and the bids that SSPs record as received by DSPs. This can indicate that arbitrage, by either DSPs or SSPs, might account for a significant fraction of the cost of intermediation.[35]

336. In this section, we discuss the evidence we have received on arbitrage by SSPs and DSPs. The forms of arbitrage discussed below vary and have different potential implications. In particular, while some forms of arbitrage would result in discrepancies like the one observed by the ISBA study, the term 'arbitrage' is also used to describe a specific business model adopted by some DSPs, which is not inherently harmful and would not lead to such discrepancies.

*Arbitrage by SSPs*

337. Some stakeholders have expressed the concern that some SSPs, after running an auction among DSPs, may charge the winning DSP the amount of its bid but submit a lower bid to the next stage, keeping the difference for themselves. While some SSPs have publicly announced that they are no longer adopting these practices, stakeholders believe that other SSPs may still do it.

338. Beeswax told us that hidden fees have been pervasive in the industry until recently, and many exchanges used to charge 'buy-side fees' which were not disclosed to the inventory seller and for which the buyer had no ability to negotiate or opt out. Beeswax claimed that some exchanges continue to take buy-side fees where a DSP's bids are being reduced by 10-15%, with the amount not being disclosed to either the buyer or the seller. To the extent these fees are waived or lowered for larger buyers this would put other DSPs at a disadvantage.

339. However, transparency has improved over the past three years as certain exchanges have removed their buy side fees. For example, Rubicon Project told us it eliminated buy-side fees in November 2017 in response to competitive pressure and as part of its strategy to operate more transparently. Beeswax believes that the prevalence of hidden fees has reduced in the intermediation industry for two reasons. First, advertisers have demanded transparency from their partners. Second, with the advent of header bidding,

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[34] ISBA's Programmatic Supply Chain Transparency Study, published in May 2020, Executive summary, slide 8.
[35] We note that the study was not intended to be representative of the entire open display advertising spend in the UK.

fees taken by an SSP hurt the ability of its bid to compete in the first-price auction taking place in the ad server. As a result, SSPs have come under pressure to reduce their buy-side fees and to become more transparent with both buyers and sellers.

340. The prevalence of buy-side fees, however, may differ between website and mobile app advertising. Beeswax told us that, to its knowledge, most of the mobile SSPs still take buy-side fees, while most desktop SSPs no longer do that. According to Beeswax, this is due to the fact that the mobile SSPs are all reliant on SDKs that are deeply integrated into the apps. As a result, their relationships with apps are 'stickier' and it is a much higher burden on the publisher to switch out monetization partners. In addition, SSPs do not typically compete with each other in an efficient marketplace but are still ranked by publishers in a waterfall-like system. Because of this, SSPs have more ability to take fees without repercussions, such as having their priority decreased. In contrast, in website advertising there is widespread adoption of header bidding, so that an SSP that takes too large a share would both lose auctions against other SSPs that take a smaller margin and open themselves up to scrutiny from other members of the supply chain who may be able to realise that they are taking additional fees.

341. As seen above, the prevalence of buy-side fees among SSPs depends not only on the degree of transparency in the intermediation chain but, more fundamentally, on the strength of competition between SSPs. Weak competition between SSPs in app advertising reduces the revenues for publishers; buy-side fees are just one way in which SSPs can take advantage of weak competition to increase their revenues to the detriment of publishers. The development of header bidding solutions for mobile app environments (which, as discussed above, some market participants expect) may lead to a reduction in buy-side fees, similarly to what appears to have happened for website advertising.

*Arbitrage by DSPs*

342. As seen earlier in the appendix, most DSPs currently charge advertisers a fixed percentage of their media spend. It would be possible in theory for DSPs to engage in similar arbitrage practices as those described above in relation to SSPs, ie take an additional cut from a bid, in addition to the fees agreed with the advertiser, before submitting it into the SSP. However, none of the stakeholders we contacted in the course of our study suggested that this kind of practice was taking place in the industry.

343. What is typically referred to as 'arbitrage' in the case of DSPs is a different practice, which characterises the business model currently adopted by Google

Ads. Google Ads does not charge an explicit fee. It runs an internal second-price auction among its advertiser customers; while the winning bidder is charged by Google Ads an amount corresponding to the minimum amount they would have needed to bid in order to win the auction (often the second highest bid received by Google Ads), the amount that Google Ads bids into SSPs may be different, as Google Ads optimises the bid to achieve a high probability of winning the impression without overpaying for it.

344. This form of arbitrage was originally the typical way in which DSPs made profits. In a conference paper from 2014, Stavrogiannis et al. observed that DSPs 'typically implement local auctions among their interested advertisers, making a profit by arbitraging between advertisers' received payments and corresponding payments to the exchange'.[36] Indeed, academic research was conducted to determine an optimal arbitraging mechanism, in the context of competition between DSPs to attract advertiser customers.[37]

345. In theory, if DSPs face competition for customers, competitive pressure would keep arbitrage at a reasonable level. An excessive difference between what advertisers pay to a DSP and what the DSP bids into SSPs would lower advertisers' returns on investments and lead them to switch to an alternative DSP. On the other hand, arbitrage may be less salient than an explicit fee. If it is costly for advertisers to search for alternative DSPs, they might be less incentivised in doing so when it is less evident to them how much they are being charged by their current provider.

*Estimates of Google Ads revenues*

346. While some large publishers have expressed concerns about the level of arbitrage in Google Ads, it is not possible for them to assess its magnitude. Google estimated that, over the 12 months to October 2019, Google Ads (DSP) margin (ie the difference between payments received by Google Ads from advertisers and the amounts paid to AdX and third-party SSPs, divided by the payments from advertisers)[38] was [10-20]%.

347. Given the concerned expressed by publishers and other stakeholders, we have undertaken an analysis of Google's transaction-level data to reach an independent estimate of the difference between what Google Ads receives from advertisers and what it pays to SSPs. The details of our analysis are

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[36] Stavrogiannis, L.C., E. H. Gerding, and M. Polukarov, Auction Mechanisms for Demand-Side Intermediaries in Online Advertising Exchanges. In A. Lomuscio, P. Scerri, A. Bazzan, and M. Huhns (eds.), Proceedings of the 13th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2014), May 5-9, 2014, Paris, France.
[37] Ibid.
[38] This was the take rate obtained by Google Ads. It does not include fees charged by AdX or by third-party SSPs to which Google Ads submitted bids.

provided in Appendix R. Our results indicate that Google Ads' average take rate is approximately 12%. When Google Ads is used in conjunction with AdX, Google's total take rate is approximately 30% of the advertisers' payments. As discussed in Appendix C, the margin achieved by Google Ads is broadly in line with the size of the fees charged by other DSPs.

*Conclusions*

348.   Based on the evidence we have analysed, Google Ads does not appear to retain a higher percentage of advertisers' spend than other DSPs.

349.   On the other hand, there is some evidence that other forms of arbitrage might have a sizeable impact on the overall cost of advertising intermediation, as suggested by the results of the ISBA study. It is difficult to estimate the dimension of this phenomenon, as tracking impressions along the intermediation chain is extremely difficult. The ISBA report highlights the challenges encountered in accessing impression-level data, despite having permissions from both advertisers and publishers. In addition, differences between intermediaries in how data is recorded and stored made it difficult to match datasets from different providers.[39]

350.   The lack of transparency in the intermediation chain and the difficulty for advertisers and publishers to audit transactions is a problem in itself, as it makes it extremely costly and time consuming (if not impossible) to verify that intermediaries are acting in accordance to their contractual obligations and are not charging 'hidden' fees. This lack of scrutiny reduces the incentive for intermediaries to behave in the best interest of their customers, especially in contexts where they face limited competitive pressure.

**Undisclosed rebates**

351.   Concerns have been expressed with the use of rebates or discounts given by intermediaries to media agencies or by SSPs to DSPs, which may not be disclosed to advertisers. The use of undisclosed rebates may give rise to a misalignment of interests between intermediaries and their customers. We note that it is in general uncertain whether competition alone can eliminate undisclosed rebates. On the one hand, customers clearly prefer their intermediaries not to take undisclosed rebates, which are likely to have a negative impact on their return on investments. On the other hand,

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[39] ISBA's Programmatic Supply Chain Transparency Study, Executive summary, slide 7.

competition may focus on more visible aspects such as the explicit fees, putting pressure on intermediaries to find alternative ways to make a profit.

352. This section discusses the evidence we have received on the existence of undisclosed rebates and the issues they may give rise to.

*Rebates to media agencies*

353. Based on information received from industry stakeholders, rebates from DSPs to media agencies appear to be relatively common. Of the DSPs we have received information from, four told us they sometimes offer rebates to media agencies or large advertisers, one submitted that it does not offer rebates to any customers, while another mentioned contractual discounts but not rebates.

354. Rebates to media agencies appear to be less common among SSPs, although there are cases in which they are paid. One SSP submitted that some agencies require a percentage of media spend to be paid back to them and they generally select their partners based on whether or not they are willing to do this; the terms requested are between 5-10% of the value of the ads. Holding companies that are based in Europe tend to prefer this arrangement more than US-based ones. Of the other SSPs we contacted, five told us they do not offer any form of rebates, one had explored entering into trading agreements with agencies in the UK, but had not yet done so, and three submitted offering discounts or rebates based on media spend volume.

355. On the other hand, of the five media agencies responding to our RFI, only one told us it had received rebates from intermediaries in 2019, and only from a single DSP. This, in conjunction with the evidence from intermediaries discussed above, may suggest that rebates from intermediaries to media agencies have been declining.

356. Media agencies told us they pass the rebates (received mainly from media owners rather than from intermediaries) back to their clients, although with some qualifications.

- WPP told us that rebates are passed back to clients, typically on an annual basis, in accordance with the terms of the client contracts. The agency may also negotiate additional benefits (value pots) from media owners. Value pots do not form part of the rebates payable by the agency to clients; instead, clients receive these benefits through the agency's fulfilment of its contractual commitments (as value pots are taken into account when the agency submit its price offer to prospective clients).

- [✂].

- Dentsu Aegis told us that rebates may be passed-on to clients depending on the terms agreed.

- [✂].

- [✂].

357. Some intermediaries also take proactive steps to make sure that the rebates they pay to agencies are disclosed to advertisers. For example, Verizon Media asks agencies to give an undertaking that the agency will disclose any such rebates to their advertiser clients where they are required to do so.

358. None of the advertisers that responded to our RFI expressed a concern with their agencies taking rebates. One advertiser told us that rebates received by its media agency linked to its spend volume are passed back and that it verifies this through an independent financial audit conducted by the advertiser's compliance auditing partner.

359. From the information we have received, it appears that rebates that media agencies receive from intermediaries, where they exist, are typically disclosed and are therefore unlikely to cause significant inefficiencies in how their clients' budget is allocated. Advertisers have tools to verify the behaviour of their media agencies with respect to rebates.

*Rebates to DSPs*

360. All the DSPs that responded to our information request told us that they had not received any rebates from SSPs in 2019. On the other hand, one SSP submitted that some DSPs require a percentage of media value to be paid back to them and they would generally select their partners based on whether or not they are willing to pay rebates. For example, rebates used to be demanded by Turn and Sizmek, both of which have since been acquired. Of other the SSPs responding to our RFI, seven told us they do not offer rebates to DSPs, while only one submitted that it offers rebates based on spend volume.

361. Based on the information we have received, although rebates paid by SSPs to DSPs are not unheard of, they appear to be an uncommon and possibly a declining phenomenon.

# Conflicts of interest in advertising intermediation

362.    Intermediaries typically act as agents for either an advertiser or a publisher, making decisions and taking actions on its behalf. In this context, conflicts of interest describe situations where the intermediary can potentially gain by taking actions that adversely affect the advertiser or publisher on whose behalf it is acting.

363.    This section analyses conflicts of interest in advertising intermediation, especially those arising when vertically integrated intermediaries are active at multiple levels of the intermediation chain. The section is organised as follows:

- We first briefly discuss the economics of conflicts of interest in advertising intermediation, highlighting the factors that can mitigate their impact.

- We then discuss how the functions performed by intermediaries, and the combination of functions within vertically integrated firms, can give rise to conflicts of interest.

- We finally analyse the roles that mitigating factors have played in advertising intermediation given the way the various activities are currently performed, and how they can be expected to apply to the evolving industry structure in the next few years.

### *The economics of conflicts of interest[40]*

364.    While conflicts of interest are widespread in principal-agent relationships, the mere existence of a conflict of interest does not necessarily mean that, in equilibrium, the principal would be harmed. There are, in fact, various mechanisms that can mitigate conflicts of interest.

365.    In theory, when the principal has full information about the actions taken by the agent, when that information is fully verifiable, and when contracting is costless, the agent has no incentive to take actions that adversely affect the principal. These extreme conditions, however, are rarely satisfied in real transactions, especially in advertising intermediation, where the services being sold are complex, information asymmetries are significant, and both advertisers and publishers often have limited ability to verify the information they receive.

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[40] The analysis developed in the following paragraphs is largely based on Mehran and Stulz's (2007) analysis of conflicts of interest in financial institutions. See: Mehran, Hamid, and René M. Stulz (2007). The economics of conflicts of interest in financial institutions. *Journal of Financial Economics*, 85, 267–296.

366. Nevertheless, even when conflicts of interests cannot be fully avoided, principals can respond to them, as long as they form rational expectations on the behaviour of the agent. If the principal is aware of the presence of conflicts of interest, it will adjust the price it is willing to pay the agent for its service to cover the costs associated with conflicts of interest. As a result, the agent would bear the cost of the conflicts of interest and would therefore have an ex-ante incentive to commit to actions that reduce the impact of conflicts of interest on the principal, as long as it is cost-effective to do so.

367. Moreover, forms of vertical integration that give rise to conflicts of interest may also generate efficiencies. For example, we have seen in a previous section that the integration of DSPs and SSPs can result in technical efficiencies. In the presence of competition between different providers, at least part of these efficiencies would be expected to be passed to customers, in the form of better service or lower prices.

368. There is the possibility, however, that principals may systematically underestimate the adverse impact of conflicts of interest. In this case, they can end up being worse off. In the context of advertising intermediation, while large customers may be expected to be sophisticated enough to understand the implications of conflicts of interest, small advertisers and publishers may not have a full understanding.

369. Competition can also help mitigate conflicts of interest. Many advertising intermediaries are not vertically integrated and some explicitly present the absence of conflicts of interest as a selling point. Competition from non-vertically integrated providers can further incentivise the vertically integrated ones to limit the impact of conflicts of interest on their customers. The impact of competitive pressure, however, would depend on several factors, including the degree of substitutability between the services offered by different providers, customers' ability to compare the quality of service from alternative providers, and the magnitude of switching costs.

370. Finally, even in situations where the principal is not worse off, conflicts of interests can still result in inefficient market equilibria. Consider a hypothetical scenario in which all DSPs were linked to specific sources of inventory and did not have a credible way of committing not to act on their conflicts of interest. Assume that all advertisers rationally expected DSPs to favour their own inventory, and therefore adjusted the price they were willing to pay for their services. In this scenario, advertisers would not necessarily be worse off, but the outcome would be inefficient, as ad spend would not be allocated to the publishers providing the best return on investment.

371. In summary, the extent to which conflicts of interest may harm customers will depend on:

- the degree of information asymmetry between intermediary and customers;

- customers' sophistication, the ease with which customers can compare different providers, and switching costs;

- the extent to which the intermediary is subject to strong competition, in particular from non-conflicted competitors; and

- any efficiencies that compensate for conflicts of interest.

### *Intermediation functions and conflicts of interest*

372. Advertising intermediaries can be conflicted if their incentives are not aligned with those of their customers. The types of intermediaries that are potentially most subject to conflicts of interests are those performing the advertiser advisory function.[41]

- Media agencies can be conflicted if their revenues depend more on their clients' total advertising spend than on the effectiveness of their advertising campaigns. As seen in earlier in the appendix, media agencies typically charge either a commission-based fee, based on the amount of media spent, or a fixed fee based on agreed FTE levels.

- Conflicts of interest can arise within DSPs since, as seen earlier in the appendix, they are typically remunerated with a percentage of their clients' media spend, which may not incentivise them to find the most cost-effective path to inventory.

373. There are then conflicts of interest arising from the combination, within a single provider, of multiple intermediation functions. At a high level, we can observe the following:[42]

- The integration in a single firm of publisher sales and advertiser advisory functions gives rise to conflicts of interest, as the firm could benefit from setting its algorithms on the buy-side to favour its own intermediation

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[41] The advertising advisory function is defined earlier in the appendix, where we provide an overview of the intermediation value chain.
[42] In theory, conflicts of interest could also arise where an intermediary is also an advertiser. However, as even the largest firms offering intermediation services constitute a small fraction of the overall advertising spend, such conflicts of interest are unlikely to have a significant impact.

services on the sell-side (or vice versa), even if this were not optimal for its customers.

- Similarly, conflicts of interest can arise if a firm performing an advertiser advisory function is also a publisher, as such a firm could benefit from favouring its own inventory.

- The integration in a single firm of the advertiser advisory function and of verification, attribution and evaluation activities can also generate conflicts of interest, as such firm could, for example, benefit from biasing its estimates of the effectiveness of campaigns in favour of its own advisory services.

- A similar conflict can arise if a firm performing verification, attribution and evaluation activities is also a publisher, as such firm could benefit from providing biased estimates of ad effectiveness to favour its own inventory.

374. All the functions mentioned above involve complex activities, where customers have a limited ability to fully evaluate the quality of the service they receive and where the providers have significant informational advantages. We can therefore conclude that in all these cases conflicts of interest cannot be fully avoided.

375. While analysing the issue of conflicts of interest in terms of functions is useful, there are limits to how far the analysis can be developed without delving into the details of how the intermediation industry is structured. As discussed above, the implications of these conflicts of interest depend on the strength of competitive pressure on providers, on customers' ability to compare different providers and on the cost of switching between them. These are not intrinsic features of the activities themselves but depend on the contingent structure of the industry.

376. Moreover, the publisher sales function is currently performed by a multiplicity of intermediaries, acting both simultaneously and sequentially. While this is not a necessary feature of advertising intermediation (we can envisage alternative industry structures where this function is centralised in a single type of intermediary), it has implications on the significance of the conflicts of interests emerging from the integration of publisher sales and advertiser advisory functions, as not all intermediaries have an equally 'central' role in the publisher sales function. In the current open display market, the publisher ad server has a particularly important role.

377. In the following paragraphs, therefore, we assess the significance of the conflicts of interest identified above in the current structure of the

intermediation industry and the competitive pressure to which intermediaries are subject. We also consider how concerns about conflicts of interest might change in the next two to three years, as the industry evolves.

### *The significance of conflicts in the current industry structure and in the near future*

*Conflicts of interest within the advertiser advisory function*

378. The issue of conflicts of interest between media agencies and their clients is wider than the agencies' role in digital advertising and it is something advertisers have long been aware of.[43] Some conflicts may be less problematic in digital advertising than in other forms of advertising, especially in the case of advertisers who have highly measurable customer conversion events within their business, as it is easier to apply a performance-related fee, increasing the alignment between the interests of the principal and of the agent.

379. In the case of DSPs, conflicts of interests are likely to be mitigated if there is sufficient competition between providers, customers are sophisticated and able to compare DSP services and switching costs are low. We consider the extent to which these conditions apply below, when discussing the potentially more problematic conflicts that can emerge when providers of DSP services are also involved in the publisher sales function.

*Conflicts of interest from the combination of publisher sales and advertiser advisory functions*

380. In analysing the conflicts of interest arising from the combination of publisher sales and advertiser advisory functions, we consider in turn two types of behaviour:

- Biasing the services provided to publishers to favour the vertically integrated advertiser advisory services; and

- Biasing the advertiser advisory services to favour the vertically integrated publisher sales activities.

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[43] See, for example, Media agencies and their numerous conflicts of interest: a recipe for disaster.

*Biasing the services to publishers*

381. The way in which the publisher sales function is performed in advertising intermediation has changed in the course of the evolution of the industry and is currently characterised by significant complexity, with multiple auctions being run both simultaneously and sequentially. Providers at different points along this chain are subject to different levels of competitive pressure and/or different degrees of discretion, with the result that the potential for and seriousness of conflicts of interest can vary significantly. However, there are points in the adtech chain where competitive pressure may not be sufficient to mitigate the conflicts of interest. Typically, these points correspond to firms that have the 'final say' on how inventory is allocated.

- *The publisher sales function in the current industry structure*

382. In the current industry structure, there are two 'nodes' where competitive pressure may not be sufficient to mitigate conflicts of interest: the header bidding solutions and the publisher ad server.

383. In the case of header bidding solutions, while there are several header bidding providers and, as discussed earlier in the appendix, multi-homing is not uncommon, it is costly for publishers to use many of them, especially if they are all based on Prebid technology. Moreover, in the case of 'server side' header bidding, publishers have limited visibility about the auction and self-preferencing is possible. DSPs may therefore have limited alternatives to a header bidding provider favouring its own vertically integrated buy-side intermediary.

384. Competitive pressure is even weaker in the case of the publisher ad server:

- DSPs cannot reach the publisher bypassing the ad server (although a header bidding solution could be a partial alternative, especially if the ad server has no visibility of where header bidding demand originates);

- Publishers have limited visibility over how the ad server operates, while the integration of the ad server with the publisher's own systems results in significant switching costs.

385. As a result, the integration within a single provider of an advertiser advisory function (eg DSP services) and of a publisher ad server (and possibly a header bidding solution) could create conflicts of interest. Such a provider could favour its own advertiser advisory services with limited risk of publishers switching to alternative providers and limited countermeasures available to competing intermediaries. These concerns are more serious if the integrated

provider has significant market power in the provision of at least one of the functions it integrates, as this would increase publishers' costs of switching provider. For example, some publishers told us that the main cost of switching to a non-Google ad server is the risk of losing access to Google's DSPs (particularly Google Ads), which they consider a very important source of demand.

386. On the other hand, the vertical integration between an SSP and a DSP appears less problematic from the perspective of conflicts of interest, as competition between SSPs should significantly reduce their incentive to discriminate against competing DSPs:

- With the widespread adoption of header bidding, many publishers multi-home with several SSPs, which compete against each other for each single impression. Multiple SSPs have therefore access to the same inventory, giving DSPs many alternative routes to reach the same publisher.

- By looking at their own win rates, DSPs can compare the outcome they get through different SSPs and re-direct their bids towards those SSPs where they are more likely to win. Switching between SSPs is relatively easy.

387. As a result, as long as header bidders are not discriminated against by the publisher ad server,[44] an SSP giving a substantial advantage to its own DSP would be likely to see the chances of winning the impression significantly reduced, as DSPs that are discriminated against would migrate to competing SSPs.

- *The publisher sales function in the future*

388. Appendix G and the section on future scenarios in adverting intermediation below discuss the privacy-enhancing technologies that are currently being developed in the industry and are likely to be introduced in the next couple of years. A possible outcome of some of these technologies would be a move towards ad selection decisions and auctions being run on the user's browser. This would be a fundamental change in how intermediation works and would result in browsers being increasingly responsible for the publisher sales function. In this scenario, competitive pressure on the intermediary would be extremely limited:

- DSPs would have no control over which browser a user adopts.

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[44] Google's actions that could potentially discriminate against header bidders are discussed later in the appendix.

- While publishers could in theory decide not to work with a browser or degrade the user experience for non-preferred browsers, such actions could be very costly in terms of loss of traffic.

389. In this future scenario, the integration within a single provider of a browser and of the advertiser advisory function (eg DSP activities) would be problematic, as the browser could favour its own advertiser advisory services without risking repercussions from either publishers or advertisers.

390. Another possible outcome of privacy-enhancing technologies could be the increased importance of publishers' first-party data. This could create a new role for those intermediaries, like SSPs, that have a direct relationship with publishers. SSPs could therefore turn themselves into intermediaries whose role is to standardise and possibly aggregate publishers' first-party data. In this case, and especially if each publisher used a single SSP for this service, SSPs could once again have a central role in sales activities. Some industry commentators think that the increased importance of publishers' first-party data would lead to greater incentives for DSPs to integrate with SSPs. This, while beneficial for the vertically integrated DSPs, could be problematic from a conflict of interest perspective.

*Biasing the advertiser advisory services*

391. An intermediary operating in an advertiser advisory function should ideally be agnostic about where to submit a bid and should try to find the most cost-effective path to inventory that allows it to achieve the advertiser's objectives. However, if the same provider is also active in the publisher sales function, it can benefit from favouring the routes to inventory it controls, or the publishers with which it has agreed a higher revenue share, potentially to the detriment of advertisers.[45]

392. Dentsu Aegis told us that some DSPs offer more transparency than others on how their platforms make bidding decisions. The growth in custom algorithm technology has also given buyers more control over how these buying platforms make decisions. Ultimately, though, the granular detail of how decisions are made are only truly understood by the platforms themselves.

393. Many customers of DSPs – media agencies and large advertisers – are large and sophisticated. They are aware of the conflicts of interest that arise when DSPs are vertically integrated with other intermediaries along the chain, which

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[45] Note that, in this case, vertical integration can harm advertisers only if it leads to a change in the allocation of advertising between publishers. If the vertically integrated sell-side intermediary were simply to charge higher fees but lead to the same allocation as without self-preference, the same outcome could be achieved without vertical integration simply by increasing the DSP fees.

have been mentioned by some respondents to our RFIs as a relevant consideration in their choice of DSP. Moreover, although advertisers cannot observe the algorithms used by a DSP, they can observe the outcome of a campaign run through the DSP, assess its performance against several KPIs, and compare the performance of different DSPs. For example, IPG Mediabrands told us that it conducts regular testing and partner evaluation to understand the strengths of the DSPs it uses and validate their actual capabilities, using head to head testing and A/B methodology. By using a quantitative evaluation framework, IPG Mediabrands argues that it can remove any incumbency advantages and differentiate between platforms' performance and capabilities.

394. However, the case of small advertisers that do not use a media agency is likely to be different. They may not be sophisticated enough to appreciate the potential for conflicts of interest arising from vertical integration. Moreover, they are likely to lack the technical capabilities to undertake rigorous evaluations of DSPs' performance.

395. Looking at customers' ability to switch, we observe that there are several large DSPs competing for advertisers and providing comparable services, and that switching costs are low. However, some DSPs might have access to unique sources of data which are particularly useful for some advertisers or some campaigns.[46] In this case, switching to a different DSP may involve significant opportunity costs. Switching may be particularly costly for small advertisers, many of which single-home on one DSP for all their campaigns – often Google Ads, which allows advertisers to purchase both search and display inventory. Switching to a different DSP would remove the advantages of using a one-stop-shop solution.

396. Finally, when considering the implications of vertical integration between publisher sales and advertiser advisory functions, it must be recognised that the impact of conflicts of interest could be compensated by operational efficiencies. For example, as seen earlier in the appendix, the integration of DSP and SSP allows for better data sharing between publisher and advertisers and generates operational efficiencies for buyers and sellers setting up PMPs. In the presence of competitive pressure on the providers of these services, at least part of these benefits can be expected to be passed through to customers. The presence of efficiencies can therefore reduce our concern with conflicts of interest, especially if other mitigating factors are present.

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[46] This may be the case not only for Google, but for others as well (eg Amazon).

*Conflicts of interests when the advertiser advisory function is performed by a publisher*

397. Conflicts of interest are present when an intermediary operating in an advertiser advisory function is also a publisher (or a platform), as it could gain by favouring the purchase of its own inventory, even if this were not optimal for its customers. The possible mitigating factors would be the same as discussed above in relation to the integration of advertiser advisory function and publisher sales function. However, it is unclear whether the integration of publishing and of advertiser advisory function gives rise to significant technical efficiencies, although such a publisher could be able to offer advertising formats or data that are not supported by the standards adopted by independent DSPs.

398. The only publisher playing a major role in the advertiser advisory function is Google (the presence of other publishers, such as Amazon, Facebook or Verizon in advertising intermediation is much smaller). Further, in walled-garden environments platforms also play a role in optimising advertisers' bidding strategies. Issues of transparency and information asymmetry in the sales of advertising in walled-garden platforms are discussed in Appendix O.

*Conflicts of interest from the combination of an advertiser advisory function and of verification, attribution and evaluation activities*

399. An intermediary providing both advertiser advisory services and verification, attribution and evaluation services may find itself in the position of 'marking its own homework'. This is, for example, the case when a single provider operates both an advertiser ad server and a DSP. One piece of data advertisers ad server estimate is the conversion rates achieved by the advertiser's campaigns. An integrated provider could benefit from inflating this metric when evaluating campaigns run through its own DSP. Following the recent introduction of data protection legislation (including GDPR) and the restrictions imposed by some providers to data access, it has become increasingly difficult for advertisers to verify how performance metrics are estimated, therefore increasing the opportunity for biasing performance indicators.

400. As noted earlier in the appendix, some advertisers are aware of this conflict of interest and place a positive value on the independence of ad servers. On the other hand, some advertisers prefer vertically integrated providers because of the technical efficiencies they allow for.

*Conflicts of interests when verification, attribution and evaluation activities are performed by a publisher*

401.    The provision of verification, attribution and evaluation services by publishers themselves gives rise to similar conflicts of interest, as publishers would be in a position to 'mark their own homework'. While such combination does not currently arise for publishers selling inventory through intermediaries, this concern has been raised in relation to some walled-garden platforms, such as Facebook and YouTube.

402.    This issue is analysed in greater detail in Appendix O. Looking at the behaviour of the largest platforms, the evidence points toward Google and Facebook making it difficult for advertisers to carry out their own independent evaluation of Google and Facebook owned and operated inventory and forcing them to rely on the analytical tools offered by those platforms:

- Both Google and Facebook restrict the ability of advertisers and media agencies to carry out independent verification of advertising on their owned and operated inventory, especially in relation to viewability measurement. That is, advertisers have to rely on data collected and collated by Facebook and Google for verification purposes. Google has explicitly invoked the introduction of GDPR as a reason for changing the way it worked with third-party verification providers.

- Platforms such as Google and Facebook have an advantage in terms of being able to carry out attribution accurately in respect of their own 'walled garden' platforms. Responses to our interim report indicated that it is becoming more difficult to carry out independent attribution.

- On the other hand, Google and Facebook offer advertisers and media agencies very sophisticated tools to measure advertising effectiveness, based on randomised control trials, although only the largest advertisers are likely to be able to use these tools.

## Leveraging Google's market power in advertising intermediation

403.    The concerns about conflicts of interest are greater where firms have market power at certain points in the intermediation chain, because publishers or advertisers will have less ability to switch away from intermediaries with market power, even if they have concerns about potential conflicts of interest. Moreover, vertical integration can enable players with market power at one point in the chain to leverage it into other points, making it harder for independent players at each stage to compete. One large advertiser submitted that the combination of the vertical integration of large tech

platforms through the value chain and their market power gives those firms the ability to restrict competition in the provision of intermediation services by favouring their own services and/or pursuing tying and bundling practices; lack of transparency makes it difficult to assess to what extent this is happening in practice.

404. In particular, concerns have been raised that Google, which is present along the entire intermediation chain, may be able to leverage various sources of market power and exploit its position on both sides of the market. This section analyses Google's behaviour in the open display market and is structured as follows:

- We first summarise Google's sources of market power which are relevant to the open display market and discuss how Google has used its market power in inventory and data to advantage its own DSP services (Google Ads and DV360).

- We then discuss several Google's practices about which stakeholders have expressed concern, outlining the evidence we have received on whether these practices are taking place and on their potential effects. These practices are:

  (i) channelling the demand from Google's DSPs through Google's SSP (AdX) and limiting the integration of AdX with rival publisher ad servers; and

  (ii) Setting rules on Google's publisher ad server that favour AdX and Google's demand sources.

***Google's sources of market power and how they are leveraged in advertising intermediation***

405. In order to understand Google's practices in advertising intermediation, it is important to recognise its market power in the provision of other services. In particular, our analysis takes as a starting point Google's market power in search, its major role as provider of owned-and-operated display inventory, and its access to a large amount of user data.

- In Chapter 5 of the report we conclude that Google has substantial market power in search advertising. In display advertising, while Google's owned and operated inventory is currently smaller than that controlled by Facebook, the value of advertising on its YouTube platform corresponds approximately to [15-30]% of the value of open display advertising in the

UK; in video advertising, the value on YouTube is [80-110]% of that of the entire open display market (see Appendix C).

- Google also has exclusive access to a large amount of user data that can be used for targeted advertising and for measuring advertising outcomes, collected through its consumer-facing services and its tags in third-party websites. Moreover, the availability of log-in data allows Google to identify all the computers and mobile devices associated with a user, associating all the data about the user to a single user ID (see Appendix F).

406. In the following paragraphs we discuss how Google leveraged these sources of market power in advertising intermediation and, in particular, in the DSP market.

*Leveraging data*

407. As discussed in Appendix F, Google has access to very rich user data through its user-facing services. This data allows Google to create detailed audiences, which are made available for targeting in open display only through Google's own DSP services (DV360 and Google Ads).

408. Access to a large amount of unique data gives Google DSPs an advantage over many of its competitors. Publicis told us that access to specific, exclusive data sets is one of the reasons why a decision may be taken to use a platform; unique data is also one of main strategic differentiators that Omnicom looks for when helping clients choose a DSP. The use of Google's proprietary data and affinity audiences was mentioned by advertisers and media agencies as one of the main strengths of DV360, together with access to inventory and integration with the rest of Google's ad stack.

409. Google submitted that it is not the only platform with access to user data; for example, Facebook and Amazon have extensive user data that can be used for targeting purposes. However, we note that Facebook has a much smaller presence in open display through Facebook Audience Network (FAN), limited for the vast majority to mobile apps. FAN is typically offered to advertisers in addition to Facebook's owned and operated properties and not on a standalone basis. Conversely, Google's DV360 is one of the largest DSPs and offers access to a very wide range of third-party inventory. Amazon's presence in open display is also much smaller than Google's. As Amazon's data is of particular interest to advertisers in the retail sector, Amazon's DSP is likely to be an attractive solution for these types of advertisers, but less so for those operating in other industries. On the other hand, Google's data is likely to be valuable to advertisers operating in a wide range of industries.

*Leveraging YouTube inventory*

410. YouTube is, after Facebook, the second largest platform in terms of display advertising sold in the UK, and it is particularly important for video inventory (see Appendix C). Advertisers can buy YouTube inventory programmatically only through Google's DSPs. This affects advertisers' choice of DSP for non-Google inventory as well, because a single DSP is typically used for a given campaign. As discussed earlier in the appendix, using a single DSP gives advertisers the ability to manage frequency across the entire campaign, making sure that the same ad is not served too frequently to the same user. Therefore, if an advertiser wants to include YouTube in a campaign, it has a strong incentive to use Google's DSP for the entire campaign.

411. Several DSPs submitted that exclusive access to YouTube provides a very significant advantage to Google's DSPs and creates a barrier to the growth of competitors. One intermediary explained that access to YouTube is important because all major brands and agencies spend a significant amount of the media budgets there and thus have to use DV360 to access it. This gives DV360 a large advantage on third-party inventory as well because it is the only DSP able to measure and frequency cap ad impressions across all media buys including YouTube. This in turn leads to significant pricing pressure upon independent DSPs as they seek advantage in other ways. Another DSP submitted that access to unique or otherwise inaccessible walled-garden inventory is even more important than scale for a DSP; DSPs that have exclusive relationships with supply sources, or restrict access to supply sources for other DSPs, have a far greater advantage.

412. A similar point was made by Mr Brian O'Kelley, former CEO of AppNexus (now Xandr) in a testimony to the US Senate on 21 May 2019.[47] Mr O'Kelley claimed that Google's decision to no longer allow third-party advertising technology on YouTube was a response to the threat posed by AppNexus. According to Mr O'Kelley, this was a 'devastating move for AppNexus and other independent ad technology companies', as 'YouTube was (and is) the largest ad-supported video publisher'. He added that 'over the next few months, Google's ad technology team went to each of [AppNexus's] clients and told them that, regardless of how much they liked working with AppNexus, they would have to also use Google's ad technology products to continue buying YouTube.' Mr O'Kelley linked this to the slow-down of AppNexus growth, which resulted in the dismissal of 100 employees (out of a total of over 600) in 2016.

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[47] See O'Kelley testimony to the US Senate.

413.   Every respondent to our information request used DV360, although in many cases they also used other DSPs, depending on the campaign. All those advertisers who had decided to use a single DSP across all their campaigns chose DV360. Based on advertisers' submissions, exclusive access to YouTube inventory was one of the main reasons for choosing DV360, in addition to the use of Google's proprietary data and affinity audiences, its integration with the rest of Google's ad stack and its access to a large advertising inventory across the internet.

414.   Responding to these concerns, Google told us that restricting third-party access to YouTube inventory is the best way to maintain the privacy of user information and prevent it from being leaked. Third-party DSPs with access to YouTube inventory could build profiles of users based on their viewing history, which would be a data protection risk. Restrictions are also a way to ensure that the ads appearing on YouTube are of a consistently high quality, as widespread third-party ad serving could increase latency and make it harder for Google to scan for 'bad' ads.[48] Ensuring ad quality and protecting users from data leakage are listed as part of the rationale for discontinuing third-party DSPs' access to YouTube inventory in a Google document discussing that decision.[49]

415.   It is true that third-party DSPs with access to YouTube inventory could build profiles of users based on their viewing history. This is indeed what currently happens for all publishers that rely on intermediaries to sell their own inventory (see Appendix G). However, Google's Privacy Sandbox (discussed in the section on future scenarios in advertising intermediation, below) includes proposed solutions for enabling targeted advertising without user profiling. Similar solutions could be adopted for YouTube as well, therefore overcoming the privacy concerns expressed by Google.

416.   Latency was not mentioned as a reason for restricting third-party access to YouTube inventory in the internal documents Google provided us. It also appears to us that Google could set timeouts for third-party bids compatible with its acceptable level of latency.

417.   Finally, in relation to Google's claim that widespread third-party ad serving could make it harder for Google to scan for 'bad' ads, several DSPs noted that Google would still have sufficient tools to do so.

   •   Adform told us that, given that YouTube's ads are mostly video ads, which today are served without any JavaScript, Flash and similar codes that

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[48] Google's response to our consultation on the interim report, paragraph 37.
[49] Document dated January 2015, submitted in response to our RFI dated 19 October 2019.

makes malware possible, scanning for bad ads is purely a question of checking whether the video ad content itself is appropriate.

- Beeswax submitted that, currently, all ads that are run on AdX are pre-reviewed by the Google team. Adform added that, with ads traded through real-time bidding, the URL for the ad is always received as part of the auction and can be scanned (when it has not been scanned before). YouTube could decide not to allow the bid for an ad to win before the ad has been scanned. Such process would still be necessary even if Google's DSP is used to by the inventory, as a Google DSP customer can upload an inappropriate ad.

- Other premium publishers tend to support a combination of automated (API driven) and manual creative checks. YouTube could institute its own system, either automated or manual, to conduct the same types of reviews.

418. Google submitted that having access to unique inventory is not a prerogative of Google DSPs. Amazon and, especially, Facebook have a large advertising inventory on their consumer-facing platforms that they make available through their DSP services. However, as discussed above, Facebook has a relatively small presence in open display, limited mainly to mobile apps. Conversely, Google's DV360 is the largest DSP in the UK and offers access to a very wide range of third-party inventory, in addition to Google's own inventory. As for Amazon, its inventory is of particular interest to advertisers in the retail sector, but much less for those operating in other industries. On the other hand, YouTube inventory is likely to be valued by advertisers operating in a wide range of industries.

419. Google also submitted that, although YouTube inventory has not been available on AdX, and therefore not accessible to non-Google DSPs, since 2016, even before that third-party DSPs accounted for less than [✕]% of spend on YouTube. YouTube mobile inventory was never available to third-party DSPs, nor was TrueView inventory.[50] We note, however, that the fact that YouTube inventory was only available on a restricted basis even before 2016 does not remove the potential concerns about the impact on current market conditions of the tying of YouTube inventory to Google's DSP.

420. Google further observed that, despite its alleged advantage from access to YouTube inventory, some other DSPs have been able to attract advertisers by investing in their technology and providing a more customised service and

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[50] TrueView allows users to skip an ad after five seconds, and the advertiser behind a TrueView ad is only charged if the user watches the full ad or 30 seconds, whichever is shorter.

easier integration of advertisers' own data. However, as discussed in Appendix C, non-Google DSPs are significantly smaller than Google and, as seen above, some have told us that one of the main barriers they face is the ability of Google to tie its inventory into its DSP services.

421.    Finally, Google submitted that it takes investment to maintain the various sales channels and ad formats on YouTube and make them work optimally for advertisers and users alike. By removing YouTube inventory from AdX, Google was able to focus its resources on innovating and maintaining formats which offer better value and a higher quality user experience. Google introduced the programmatic buying of TrueView inventory through DV360 in response to advertiser demand to access TrueView through programmatic channels. Launching this in a manner that protected user privacy was a resource intensive and technically complex endeavour, taking almost three years to accomplish.

422.    Explaining why integration with third-party DSPs would be complex and expensive in the case of YouTube inventory, Google told us that YouTube auction dynamics (for all ad formats) are complicated: they do not only consider advertiser bid, but also optimise for campaign goals and consider user experience factors such as types of ads recently viewed and likelihood to watch a video to the end. It would be challenging to integrate real-time bidding in this context. No existing Google buying channels (including Google Ads, DV360 or direct reservations) allow for real-time bidding. Supporting this functionality would involve significant complexity. The costs of a third-party DSP integration are likely to be substantial and require significant engineering resources. For example, many dedicated product manager resources and engineers would likely be required to develop a broader integration even for one DSP.

*Leveraging Google's large advertiser base*

423.    Google may also be able to leverage its market power in search inventory into display advertising. Google Ads is the main route through which advertisers, especially smaller ones, buy Google's search inventory. The importance of search inventory for advertisers makes Google Ads an extremely popular buying platform, with a very large advertiser base. Advertisers using Google Ads for their search campaigns can easily extend the scope of their campaigns to display advertising. Indeed, Google Ads includes both Search and Display Network by default when an advertiser sets up a campaign on Google Ads (see Appendix N). Moreover, Google Ads makes it easy for small advertisers to build a display ad, offering a free tool for creating it and even

providing pre-made images that can be added to text ads.[51] By providing a one-stop shop solution for those advertisers who genuinely want to make use of both search and display advertising, and by nudging other small advertisers into using display ads through default settings,[52] Google has managed to leverage part of its search advertiser base to increase its importance as a source of demand in open display.

424.    As one of the main routes to open display for small advertisers, Google Ads constitutes an important source of demand for publishers.

*Conclusions*

425.    Both access to data and exclusive access to inventory can provide a DSP with an advantage over its competitors. The evidence discussed above indicates that Google has an advantage over its main DSP competitors in terms of both data availability and access to inventory. Based on submissions received from DSP providers, it appears that lack of access to YouTube inventory has the greatest impact on DSPs' ability to compete with Google, while the difference in access to data may currently be less important.[53] The two factors combined are likely to result in a significant advantage for Google's DSPs.

**Links between Google's DSPs, SSP and publisher ad server**

426.    Stakeholders expressed the concern that Google has made it difficult to access its advertiser demand (especially from Google Ads) through alternative publisher ad servers, thereby increasing its market power in ad serving and making it difficult for other providers to compete on the merits. These practices are a manifestation of the conflicts of interest arising from Google's presence in both the advertiser advisory function and the publisher sales function. Stakeholders' concerns can be divided into two parts:

- Google allegedly engages in self-preferencing behaviours between its DSPs and its SSP (AdX), thereby extending its market power from the DSP market to the SSP market;

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[51] See Google Display Network, 'Build your ads'.
[52] As noted in Appendix N, the Display Network is pre-selected as a default in the Google Ads interface, although around [80-90]% of customers uncheck this option.
[53] However, as discussed in the section on future scenarios in advertising intermediation, the future evolution of the industry may make it more difficult for DSP providers that do not also provide user-facing services to get access to data.

- Google allegedly makes it difficult to access AdX from non-Google publisher ad servers, therefore increasing its market power at the ad server level.

427. In the following paragraphs we consider these two components in turn.

*Self-preferencing between Google's DSPs and SSP*

428. A concern expressed by some stakeholders is that Google could potentially be favouring its own SSP when its DSPs decide where to submit its bids. As publishers typically work with multiple SSPs, DSPs receive multiple bid requests related to the same ad opportunity. While there is currently no way to efficiently de-duplicate such requests, some DSPs have developed systems to reduce the volume of bid requests that reach them, reducing the costs they have to sustain to listen to the bid stream and respond to bid requests. It is therefore possible that a company operating a DSP may favour its own vertically integrated SSP when deciding where to bid.

429. A Google's document from March 2017 suggests that Google may have a policy of favouring its own SSP:

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However, Google submitted that this was a sell-side document and its creators were not responsible for Google's buy-side strategy.

430. In relation to Google Ads, demand for third-party display inventory is overwhelmingly channelled through Google's own exchange, AdX. For example, between September 2018 and August 2019, the aggregate value of the impressions won by Google Ads through AdX was [several] times that of impressions won through other third-party exchanges. We note, however, that there are efficiency reasons why a DSP would tend to buy impressions from its vertically integrated SSP more often than from other SSPs. When the DSP and the SSP are operated by the same firm, they use the same user identifier, eliminating the loss of data due to failed cookie matching; in addition, the low level of latency in the communications between the DSP and SSP means that the bid submitted by the DSP will always reach the SSP before the auction closes, unlike with third-party SSPs.

431. Google told us that DV360 submits a bid for each bid request with a suitable impression according to the parameters set by the advertiser. One SSP provider, however, told us that DV360 is by far the slowest DSP to send a bid response. The top 10 DSPs this SSP works with typically bid in 20-30ms, whereas DV360 can take [much longer] to bid. As a result, the SSP can time

out in Open Bidding due to Google's delays in bidding into its auction. This may suggest that DV360 does in some way disadvantage third-party SSPs when submitting bids.

432. In conclusion, the evidence we have received suggests the existence of a degree of self-preferencing between Google's DSPs and SSP, although it is difficult to establish how significant its impact is. It is clearly the case that a lot of the demand from Google's DSPs, and particularly from Google Ads, is channelled through AdX. For this reason, and given the importance, discussed above, of Google Ads and DV360 as a source of demand, publishers place a high premium on being able to access AdX demand. In the following paragraphs we analyse how Google has leveraged the importance of AdX to the advantage of its own publisher ad server.

*Limits to access to AdX through third-party publisher ad servers*

433. AdX does receive requests from, and submit bids to, other ad servers. Google submitted that, during the week ending 19 October 2019, about [10-20]% of global AdX queries (and approximately [10-20]% of AdX queries with users located in the UK) came from publishers using AdX Direct, which is a common implementation of AdX for publishers who combine AdX with third-party ad servers.

434. However, when a non-Google publisher ad server is used, AdX demand cannot be easily placed in real-time competition with that from other SSPs. Unless an SSP is vertically integrated with the publisher ad server, the only way for it to compete with other SSPs with real-time bids is through a header bidding solution (or, if a publisher uses Google Ad Manager, through Google's Open Bidding). AdX, however, does not participate in header bidding. As a result, if the publisher uses a non-Google ad server, AdX would compete with an 'expected' bid in a waterfall-like fashion,[54] rather than with an actual bid. This system is inefficient for the publisher.

435. While other publisher ad servers may provide a technical solution to integrate AdX demand, this is not as efficient as header bidding and presents several limitations. An ad server provider told us that the only way publishers using its ad server can benefit from Google Ads demand is to first run an auction of all non-Google demand and, then, to dynamically call an ad unit in Google Ad Manager, setting a floor price equal to or higher than the price returned from the auction for all non-Google demand. Google will then run its own auction.

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[54] A discussion of the 'waterfall' and its limitations is included in the section on the evolution of the intermediation industry.

436.  This process is highly inefficient. The main issue is around latency, as the publisher has to wait for two separate auctions to complete in sequence. Latency degrades the customer experience of the publishers' users, and risks loss of revenue if the impression is lost due to the delay in serving an ad. The process also increases costs, because the publisher has to pay ad serving fees to both the main ad server provider and Google. This system also potentially gives Google a 'last look' advantage, as Google would know the winning price of the non-Google demand before it runs its auction. Finally, this is a technically complex set-up that requires significant effort by both the publisher and the ad server provider to implement and maintain.

*Google's arguments and our assessment*

437.  Google told us that its decision not to participate in header bidding had nothing to do with seeking to force publishers to use Ad Manager. Instead, AdX does not participate in header bidding for reasons that include latency, lack of transparency, user trust and privacy concerns.

- *Latency*

438.  In header bidding, the user's browser sends multiple bid requests in real-time to the participating SSPs during the initial page load. This can affect page performance. Google submitted that the typical timeout for a header bidding auction is one to two seconds, which is several times longer than it would take for AdX to run its auction and return an ad. This latency harms user experience and, in turn, impacts publisher revenue. If an ad takes longer to load, the user may have moved from the web page in the time required for the ad to load.

439.  It is true that header bidding, especially user-side header bidding, adds latency to a webpage. However, many publishers currently consider that the higher revenues they achieve through header bidding compensate for the increase in latency. There might be, as Google has argued, a 'tragedy of the commons': if increased latency on some publishers' websites leads to increased adoption of ad blocking technologies by users, then the entire industry would suffer. Nevertheless, this is not a good reason for an SSP not to participate in header bidding, given that, as long as header bidding is adopted by a publisher, the participation of an additional SSP would not increase latency. While Google as a publisher ad server can provide an alternative to header bidding, such as Open Bidding, that reduces latency, this is not a reason for Google as an SSP not to participate in header bidding if publishers still want to use that solution.

- *Lack of transparency*

440. Google told us that header bidding is not transparent because, although the publisher accepts the impression at a certain price, the header bidder may not actually pay the sum indicated in its offer. Unlike Ad Manager, which counts and reports impressions, sends bills, and collects payments for publishers, when publishers use header bidding they are on their own. There may also be discrepancies in what each participant considers to be a billable event. In addition, because header bidders often provide aggregate reporting, the publisher may not be able to discern whether it has been paid for each impression.

441. We consider that lack of transparency in header bidding is a concern for the publishers, not for Google. If, despite the limitations described above, publishers still think that header bidding allows them to better monetise their inventory, it is not for Google to argue that this is a bad choice and decide not to participate. Moreover, as a header bidder Google would be in a position, if it so wished, to provide better reporting than competing SSPs, using this as competitive differentiator. Finally, while Google as a publisher ad server may decide to provide an alternative to header bidding, such as Open Bidding, which does not suffer from the issues described above, this is not a reason why Google as an SSP should decide not to participate in header bidding, if publishers still want to use it.

- *User trust and privacy concerns*

442. Google submitted that many buyers are sensitive about the use and disclosure of their bid data. If AdX participated in header bidding, Google would share data with both the header bidding tag (that is, the supplier of the header bidding solution) and the publisher. This data may include the bid, the identity of the advertiser and certain ad information informed by the user data that the buyer processes. Google would not be able to guarantee to buyers that data collected by the header bidding tag would be adequately protected, since the data flow would be primarily controlled by the third-party header bidding service integrated with the publisher website. The third-party header bidding service may share user data with other participants in the auction (ie SSPs) and with analytics providers, particularly where the auction is carried out on the client side. Data can also leak to other third-party services integrated with the publisher's website due to the fact that, where a publisher has implemented header bidding, entities who place JavaScript on the publisher's website may be able to inspect the ad. Google has implemented a high standard of privacy safeguards to ensure that, insofar as it is within Google's control, impressions that are sold via AdX and Open Bidding are

sold in compliance with applicable data protection laws (most notably with respect to processing and user transparency). Google has its own high privacy standards but cannot make the same guarantees where data are controlled by third-party services.

443. None of the DSPs or media agencies that responded to our request for information were particularly concerned by the risk of disclosure of their bid data in header bidding. While one DSP recognised that this data could be used, theoretically, to place a user in a higher-value segment by inferring that the advertiser has information about this user that implies a higher value, none considered this as a high risk or an especially dangerous form of data leakage. One media agency told us that it can stipulate controls and restrictions on what is done with any data generated in the buying of digital inventory through a given SSP on a publisher's website. We also note that Google, when acting as a DSP, disclosures bid data in header bidding, as both DV360 and Google Ads buy into SSPs that have their own header bidding technology.[55]

444. Some SSPs participating in header bidding recognised that, for client-side header bidding, it is technically possible to 'intercept' bid information post-auction on a per bid basis. However, for this interception to be done on a comprehensive and systematic basis, it would require the publisher's technical support and approval to integrate the necessary code on the page. This would also slow down website loading, degrading user experience. For this reason, such data is generally only used by third-party analytics companies employed directly by and with the consent of the publisher, which can use this information to determine how best to monetize its impressions. One SSP added that such sharing of bidding information, far from being a concern, is important in enabling the market to function correctly and in reducing the existing imbalance between the buy and sell sides.

*Implications of the link between Google DSPs' demand and Google's publisher ad server*

445. Irrespective of Google's rationale for not participating in header bidding, the effect of linking demand from Google's DSPs to AdX and AdX to Google's publisher ad server is to increase the barriers publishers face in switching from Google to a different ad server, reducing competition in publisher ad

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[55] Google submitted that, in its role as a DSP, it operates on behalf of advertisers; if advertisers are willing to take the risk of data leakage inherent in participation in header bidding, Google does not restrict this possibility. Contractual measures in DV360's contracts with SSPs also mitigate data leakage risk for advertisers. On the other hand, when operating as an SSP, Google cannot assume that advertisers are comfortable with that risk and has therefore chosen to adopt a more cautious approach.

serving. This is confirmed by submissions we received from publishers and other stakeholders:

- The main concern some publishers expressed around switching to a non-Google ad server was not related to the costs and risks discussed in the section on competition between publisher ad servers, above, but to the risk of not being able to access demand from AdX, and therefore from Google DSPs, in an efficient manner.

- As seen in the section on competition between publisher ad servers, some of the main competitors to Google in the provision of publisher ad serving services indicated the lack of access to Google's demand as a weakness.

- Smart submitted that the difficulty of accessing AdX from non-Google ad servers killed competition on ad serving. As seen above, the number of providers has decreased recently with OpenX, Open Ad Stream, and Verizon Media deciding to stop providing a publisher ad server product.

446.    In addition, linking Google Ads demand with the publisher ad server may provide Google with a greater incentive to foreclose rival providers along the intermediation chain.

- First, the link between its DSPs (where Google's margins are higher) and ad serving makes it possible for Google to credibly commit to price aggressively on the ad serving market. In other words, Google may have an incentive to effectively cross-subsidise its publisher ad server from its other intermediation businesses. This could lead to the exit of competitors or deprive them of economies of scale, therefore softening their ability to compete.[56] In this regard, a stakeholder submitted to us that Google had implemented a very aggressive sales strategy for its publisher ad server, charging very low prices for ad serving and, in some cases, offering guaranteed media spend to publishers signing up to Google Ad Manager.

- Second, the link between Google DSPs and ad serving can give Google an incentive to degrade the quality of rival providers, by favouring its own intermediation services. Higher-quality ad intermediation rivals increase the cost of the foreclosure strategy discussed above, because they reduce the cost to publishers of giving up using the Google adtech stack in favour of a rival. Therefore, if a foreclosure strategy is optimal, Google

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[56] Although Google's conduct cannot be defined as 'tying', the economic implications may be similar. For the role of tying in softening rivals' ability to compete, see Whinston, M., 1990, Tying, Foreclosure and Exclusion, *The American Economic Review*, 80, 4, 837-859.

has an incentive to take steps which reduce the quality of rivals. In the following paragraphs, we explain how Google may have historically favoured, and may still be favouring, its own SSP, making it more attractive to DSPs and, therefore, more valuable to publishers.

### *Self-preferencing between Google's publisher ad server and AdX*

447.    Google is the leading provider of publisher ad serving services in the UK and its market power is strengthened by high switching costs, as we saw in the section on competition between publisher ad servers. Moreover, the analysis above has shown how barriers to switching are further increased by Google's practices linking demand from Google's DSPs to AdX and AdX to Google's publisher ad server. Several publishers and intermediaries have expressed concerns that Google may be able to use its position as the largest publisher ad server to favour its own demand from AdX and its DSPs. In this section, we first look at the advantage that AdX historically had over other SSPs (the so called 'last look'), before analysing whether current practices and recent changes to how Google ad server works may still favour AdX over its rivals. The changes and practices discussed below are:

- the introduction of Open Bidding and its features;

- the introduction of Unified Pricing rules;

- the provision of 'minimum bid to win' information;

- the alleged preferential use of bidding data by Google's intermediaries;

- recent changes to Data Transfer files; and

- other practices.

### *Last look*

448.    As seen in the section on the evolution of the intermediation value chain, as a result of the way Dynamic Allocation worked, AdX had a 'last look' advantage over header bidders, ie bid requests received by AdX included as a price floor the highest bid from the header bidding auction. Therefore, in some cases, an AdX buyer could win the impression by submitting a bid only slightly higher than the highest bid from header bidding. It was also possible for AdX to adjust its revenue share to meet the highest net bid from header bidding.

449.    In 2019, Google made several changes to the way its publisher ad server works, introducing a unified first-price auction in which the winning header bidding SSP, the DSPs bidding into AdX, and the SSPs participating in Open

Bidding all take part. As part of this transition, Google took the policy decision to remove AdX's ability to observe the bids submitted by header bidding SSPs before running its own auction.

450.    While the decision to remove AdX's 'last look' advantage should lead to a fairer competition between different SSPs, some publishers told us that the bidding information they receive from Google Ad Manager does not allow them to effectively verify that the auction is conducted fairly. Google still has the incentive to favour its own services and some other changes introduced with the move to a unified auction may still give AdX an advantage, as we discuss below.

*Open Bidding*

451.    Open Bidding, formerly known as Exchange Bidding, is Google's proprietary version of server-side header bidding. Originally developed in 2016, it became available to publishers in April 2018. As seen when discussing the competition between header bidding solutions, the ease of integration through Open Bidding and the fact that many publishers may only want to work with an SSP through it (rather than through alternative header bidding solutions) are the main reasons for SSPs to participate.

452.    Open Bidders are charged a fee when they win an impression (5% or 10% of the value of the winning bid, depending on the type of inventory), which places them at a disadvantage compared to AdX.

*Stakeholders' concerns*

453.    SSPs have expressed concerns about their ability to compete fairly with Google through Open Bidding. One concern is that first-party demand is not allowed on Open Bidding; as a result, an SSP that also operates a DSP would need to eliminate all bids from its own DSP before submitting the final bid back to Open Bidding. This could remove the opportunity for vertically integrated providers, other than Google, to take advantage of the technical efficiencies deriving from the integration of DSP and SSP.

454.    Some SSPs are also concerned about a lack of transparency in Open Bidding's auction dynamics. One SSP provider told us that, when bidding through Open Bidding, it lacks as much visibility into data and performance as it would have if it were directly integrated, and it is beholden to strategic and/or policy changes from Google that it has no control over. Another provider submitted that, through Open Bidding, Google essentially 'masks' the direct information from the publishers (as would be transmitted if ordinary

header bidding had taken place) and gains full control over what it offers to whom and at which transparency level.

455.  Finally, some SSPs submitted that Open Bidding has shorter timeouts than generally provided by other types of integrations in programmatic advertising, reducing SSPs' ability to submit a bid and compete with AdX.[57] Open Bidding's average timeouts in the UK are 162ms for desktop and mobile web ads, and 300ms for most video ads and for in-app ads. One SSP provider told us that other server-side header bidding solutions are typically in the 300ms-500ms range. According to this provider, the 162ms window is incredibly tight: it is often not enough time for a single demand partner to respond, let alone for an SSP to aggregate bids from many different demand partners, run an auction and then communicate that auction's winning bid to Google. The 300ms windows are still short but more within the typical range for open RTB auctions. Another intermediary told us that it considers at least 200ms to be a reasonable timeout. One SSP provider, on the other hand, submitted that it is able to compete at this timeout threshold as it has peering in place with Google.

*Google's response to the concerns*

456.  In relation to the exclusion of first-party demand from Open Bidding, Google explained that Open Bidding is designed to integrate with SSPs, not with DSPs. Unlike DSPs, SSPs offer ad quality protections and other important services for publishers that Open Bidding does not provide itself (which is, in part, why it charges a lower fee than AdX). The restriction on first-party demand is in place to ensure that Open Bidders are bona fide SSPs. Vertically integrated DSP/SSPs can bid into AdX. While vertical integration allows better cookie matching, bidding through AdX does not reduce a DSP's cookie matching capabilities, as a cookie matching service is offered to DSPs by Ad Manager.

457.  Google also submitted that Open Bidders receive the same information as AdX provides to third-party DSPs. If some of the information included in a publisher's ad request is not passed on by Google in the bid request, this is only due to publishers' settings or to privacy and data minimisation reasons (for example, IP addresses are truncated). The same data minimisation concerns may not apply to data passed to Google's own DSPs.

458.  Finally, Google told us that it tries to ensure that timeout thresholds are reasonable, balancing the needs of Open Bidders with the need to avoid

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[57] Not all SSPs shared this view. One SSP told us that the Open Bidding timeout is typical of any server-side integration.

excessive latency. After feedback from SSPs, Google extended the timeout for most video ads from 162ms to 300ms. A timeout of 300ms is also adopted for in-app ads as these are less affected by latency. Generally, Google works with the industry to encourage greater efficiency and achieve lower latency level.

*Our assessment*

459. As seen in the section on the evolution of the intermediation industry, a major reason for the introduction of Open Bidding was protecting Google's revenues from the impact of header bidding, while providing a service that publishers could benefit from. The product was designed in a way to avoid creating an alternative route directly competing with AdX and to disadvantage third-party SSPs:

- The 5% or 10% fee, while being a remuneration for a service that Google is providing, places Open Bidders at a disadvantage compared to AdX.

- The exclusion of first-party demand avoids the risk that DSPs could bypass AdX. In addition, the cookie matching service offered by Ad Manager in unlikely to fully compensate for the technical disadvantages this rule imposes on vertically integrated rival DSPs.

- Short timeouts on Open Bidding might further encourage DSPs to rely on AdX, although the evidence we have received is mixed.

460. Therefore, our assessment of the evidence is that the way in which Open Bidding has been implemented has had the effect of disadvantaging other SSPs.

461. We note that the introduction of Open Bidding has not, however, resulted in the disappearance of other header bidding solutions, which continue to be used by publishers. Open Bidding can therefore have two opposite effects of third-party SSPs' ability to compete for inventory:

- Being easier to use than other header bidding solutions, Open Bidding might have allowed more publishers to move away from the 'waterfall' system; third-party SSPs would benefit, despite still being at a disadvantage compared to AdX.

- On the other hand, to the extent that publishers using Open Bidding to deal with non-Google SSPs would have used header bidding instead, Open Bidding makes third-party SSPs worse off.

*Unified Pricing*

462.     In conjunction with the transition to Unified Auction, Google introduced
        changes to the way publishers are allowed to set floor prices. Specifically,
        publishers using Google Ad Manager are no longer allowed to set different
        floor prices for different buyers (eg SSPs or DSPs). The new rules to setting
        floor prices are referred to as Unified Pricing. The evidence discussed in the
        following paragraphs indicates that one of the main motivations for this
        change was to increase AdX competitiveness and Google demand's win rate.
        Several publishers have been critical of Google's decision, which they
        consider harms their interests. The introduction of unified pricing rules,
        therefore, can be seen as an example of Google's conflicts of interest and of
        its ability to leverage its market power in publisher ad serving to introduce
        changes that could harm publishers while being beneficial to Google's own
        intermediation services.

        *Google's rationale*

463.     We reviewed Google's documents related to its decision to introduce Unified
        Pricing. The documents show that this was an integral part of the design of
        the Unified Auction and was motivated by the fact that publishers tended to
        set higher floor prices for AdX compared to other SSPs. Introducing a uniform
        reserve price would therefore improve AdX competitiveness by giving it an
        'equal footing' with third-party SSPs. [✂].

464.     Google argued that the creation of a level playing field improves advertiser
        trust in the auction process, which would result in higher spend, benefiting
        publishers. Google added that, in the context of a unified first-price auction,
        per-buyer floors are less relevant. Floor prices in the unified first-price auction
        serve a different purpose than they previously did in a second-price auction.
        In a second-price auction, besides filtering out low bids, a floor price can set
        the transaction price for an impression, since the winning buyer needs to pay
        the higher of the second-highest bid and the floor. Setting higher floors for an
        individual buyer could allow a publisher to increase the transaction price on a
        particular impression for that buyer. With the migration to a unified first-price
        auction, where the winning buyer pays what they bid in every auction, the
        floor price does not play the same role in setting the price that the publisher is
        paid.

465.     Finally, Google observed that under unified pricing rules publishers can still
        set different floors for different advertisers (eg to prevent certain advertisers
        participating in the auction). One reason for doing so would be to prevent
        channel conflict, that is, having an impression available through the indirect

channel at a lower price than that at which the publisher sells that inventory through direct channels.

466.    Google submitted that it had a contingency plan [✂] if there was evidence that changes to the buyer price floor rules had damaged publishers' business or the ads industry as a whole – for example, due to the discovery of a core business use case for individual buyer price floors that Google had been unaware of. [✂], it has not seen any evidence that these changes have damaged publishers' revenue earning opportunities, and so has not resorted to the added complexity of this contingency.

*Potential harm to publishers*

467.    Some publishers, however, told us that unified pricing eliminates an important functionality of Google Ad Manager, which they consider to be a key optimisation tool.[58]

468.    To understand why publishers may want to set different floor prices for different demand sources, it is important to consider how DSPs operate. By evaluating the demand from all their advertiser customers but submitting only one (or few) bid(s), DSPs lead to a sort of 'coordination' between advertisers, as advertisers using the same DSP are in effect not competing against each other even if they are interested in the same impression.[59] A DSP submitting a bid to an SSP (where it will compete against other DSPs in a first-price auction) will optimally shade the valuation implied by its advertiser customers' strategies. Therefore, the bid will depend on the competition the DSP expects to face at the SSP level, rather than on the competition between the advertisers using the DSP.

469.    This coordinated outcome reduces revenues for publishers compared to a counterfactual in which DSPs submit a bid for each of their advertiser customers interested in a given impression. The impact is likely to be higher the largest the proportion of total demand controlled by a single DSP, as there would be weaker competition at SSP level.

470.    Publishers' rational response to coordination between DSPs' advertiser customers is to set higher floor prices. Moreover, there can be cases in which

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[58] Not all the publishers we have talked with think that Google's introduction of unified pricing harms their interest. One publisher told us that it was not using buyer-specific floor prices even before the introduction of unified pricing, as it did not consider it a useful strategy to increase advertising revenues.
[59] See Allouah, A. and O. Besbes, Auctions in the Online Display Advertising Chain: A Case for Independent Campaign Management (June 5, 2017). Columbia Business School Research Paper No. 17-60.

it is optimal for a publisher to apply different floor prices for different DSPs. Consider the following two illustrative scenarios.

- Scenario 1 – From the perspective of the publisher, all advertisers are ex ante identical and their valuations for an item of inventory are independently drawn from the same random distribution. One DSP, however, is known to represent a larger number of advertisers than its competitors. Such DSP will therefore tend to 'value' the same inventory more than the others, as the highest valuation among its advertiser customers will tend to be higher. In other words, if we think of DSPs as running an internal auction among their customers, such auction is known by the publisher to be 'thicker' for one DSP.

- Scenario 2 – From the perspective of the publisher, advertisers' valuations of an item of inventory are randomly drawn, but the distribution depends on information, such as user data, provided by the DSP – everything else equal, better data results in higher valuations. One DSP is known by the publisher to provide advertisers with better user data (either because it has more data on users or because it is less likely to suffer from cookie matching failures[60]). In this case, its advertiser customers will tend to value inventory more than the customers of competing DSPs.

471. In the scenarios above, one DSP has an advantage over its competitors: its valuations for the same inventory will tend to be higher, although not always so. If faced with the same floor price as all other DSPs, this DSP will have an incentive to shade its valuations more aggressively, as it expects weaker competition at the SSP level. It may be beneficial to the publisher, therefore, to apply a higher floor price to such DSP. Several large publishers consider Google Ads to have this type of advantage. As a result, many publishers systematically applied higher floor prices to Google Ads than to other DSPs.[61]

472. Publishers have indicated further reasons why buyer-specific floor prices could be useful:

- The Guardian Media Group submitted that the process of auctioning inventory through the open marketplace is not simply a binary objective of delivering the highest CPM at all times. It is vital that a publisher is able to control the nature of advertising on its site, the context in which it sits, and that it is able to use auction tools that reward relationships with longstanding partners. Similarly, another publisher noted that unified

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[60] For example, as a result of vertical integration with an SSP.
[61] Until 2019, AdX used to run second-price auctions. While DSP strategies are different in a second-price environment (eg there is no bid shading), the use of differentiated floor prices could be a response to the same perceived advantages discussed above.

pricing means that a publisher can no longer set up a preferential deal with an SSP partner for superior access to inventory.

- News UK told us that a publisher may want to set higher floors for lower-quality demand partners. More specifically, the Guardian Media Group told us that, within Google Ads, some buyers are segmented as unclassified, meaning that they do not form part of a listed advertiser type. The Guardian Media Group has previously requested the full list of advertisers within this segment but has not been provided with access to this information due to the size of the list. The Guardian Media Group noted that buyers within this unclassified segment of advertisers within Google Ads have previously delivered adverts on its site in breach of its ad policy rules. In the Guardian Media Group's experience, there is a higher propensity for unclassified advertisers within Google Ads to breach the Guardian's advertising policies, than there is in relation to unclassified advertisers within other demand sources. After the introduction of unified pricing, it is not possible to block unclassified advertisers from the Google Ads demand source, without that same rule having to be applied to unclassified advertisers across all bid streams.

473. While, based on the discussion above, it appears that the introduction of Unified Pricing was potentially harmful to publishers' direct interests, Google has argued that it was beneficial for the industry as a whole. When publishers use header bidding solutions, a single ad impression will be auctioned through multiple SSPs at the same time. It is difficult for DSPs to determine whether they are bidding for the same impression on different SSPs; this means that advertisers bidding for an impression may be unknowingly bid against themselves. In this context, discriminatory price floors could be used by publishers to take advantage of advertiser self-competition to drive up bids. For example, a publisher could impose a higher price floor for the same impression in SSP A than in SSP B, knowing that the same DSP bids on both, to try to get the higher bid from that DSP on SSP A. If this fails, the publisher will likely still get the lower price from that DSP on SSP B. This behaviour could undermine advertisers' trust in the auctions and cause advertisers either to participate less or bid lower than they otherwise would.[62]

474. While this can be a reason for restricting publishers' ability to set different floor prices for different SSPs, in our view it does not justify the wider restriction imposed by Google, under which publishers cannot use different floor prices

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[62] Google submission to ACCC prepared by Bitton and Lewis (2020).

for different DSPs. We consider this second restriction to be potentially more detrimental to publishers' interests, for the reasons discussed above.

475.　There are therefore valid arguments to argue that the introduction of unified pricing could harm publishers. So far, however, we have seen limited evidence of actual harm to publishers' revenues.

- Google performed some tests to assess the impact of the unified auction (which included the new unified pricing rules) on publishers' revenues. Its analysis indicated that the introduction of unified auction has had a marginally positive impact on publishers' revenue earning opportunities.

- In a recent survey by business intelligence firm Advertiser Perceptions, only 4% of publishers indicated a negative business impact from the recent unified pricing rules; 30% of publishers said they saw positive business impact and just over half of publishers observed no change at all.[63]

- We collected data from a small number of publishers on the daily total revenues and number of impressions covering two years to December 2019, aggregate and broken down by various demand sources.[64] This data did not indicate that there was any clear impact on overall publisher revenue after the full roll-out of unified pricing. Whilst one publishers' data did show that the roll out of unified pricing had led to AdX winning a higher proportion of its advertising inventory – albeit with no discernible impact on its overall digital advertising revenues – this was not the case for the other publishers we collected data from.[65]

*Publishers' reactions*

476.　Google's documents show that [✂].

477.　[✂] some publishers began experimenting with running header bidding demands using 'House' line items, which are not covered by unified pricing rules. This allowed publishers to set different floor prices for Google and non-Google demand, but had the disadvantage that non-Google demand could not compete with Google demand via dynamic allocation, as 'House' line items

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[63] Advertiser Perceptions polled 150 digital ad sales and operations professionals at sites with more than 3 million monthly visitors. Google Ad Manager Policy Changes Don't Hurt Publishers, According To Advertiser Perceptions, published on AdExchanger on 5 May 2020.
[64] AdX/Google Ads; AdX/other Google DSP; AdX/ third-party DSP; and non-Google.
[65] As we note in Appendix C, AdX share of impressions served by Ad Manager shows a distinct upturn in the proportion of ads sourced from Google AdX in the period September to December 2019, both when compared to the previous 12 months and to the corresponding months in 2017 and 2018. However, it is difficult to draw any conclusions of a causal effect by looking solely at a simple time series such as that presented in the appendix.

are only served when no other demand is available. It is a priori unclear whether this would have led to higher revenue for publishers. Google, however, closed this loophole through a policy update on 5 February 2020, requiring that a 'House' line item be only used to represent demand where the publisher owns the product or service being advertised[66] – which is the original function of 'House' type line items.

478. The fact that Google Ad Manager was able to introduce these changes without losing publisher customers is indicative of Google's market power in publisher ad serving and of its ability to leverage it across the adtech chain.

*Our assessment*

479. Our analysis indicates that one of the main motivations for the introduction of Unified Pricing was to increase AdX competitiveness and Google demand's win rate. Moreover, while we have seen limited evidence that this change has harmed publishers in the short term, it seems clear that restricting their ability to set differential floor prices is not in their interest. Unified Pricing is therefore a clear example of Google leveraging its market power in publisher ad serving to benefit its own buy-side intermediation services, to the detriment of publishers.

*Introduction of 'minimum bid to win' information*

480. A recent change introduced by Google Ad Manager is a new piece of information sent to AdX and to Open Bidders after an auction is completed – the 'minimum bid to win'. These bidders receive information on the minimum bid that would have allowed them to win an auction (typically, if a bidder has lost the auction, the 'minimum bid to win' would be the winning bid; if a bidder has won the auction, the 'minimum bid to win' would be the second highest bid). While this information cannot be used to bid on the same auction, as it is provided ex-post, it is useful for training bidding algorithms for future auctions.

481. Google told us that this piece of information benefits buyers by allowing them to improve the competitiveness of their bid; in turn, the increased demand-side transparency and bid accuracy benefits publishers by improving auction competition, which drives publisher revenues. In the context of a first price auction, where truthful bidding is not optimal for buyers, information on the 'minimum bid to win' makes the market more efficient. As a result, advertisers

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[66] DMG Media's response to our consultation on the interim report, page 7.

can be expected to spend a larger fraction of their advertising budget in the open display market.[67]

482. However, as the information is provided to AdX and to SSPs bidding through Open Bidding, but not to header bidders, it can provide an incentive for non-Google SSPs to use Open Bidding rather than header bidding. As discussed above, when using Open Bidding, however, SSPs are charged an additional fee, placing them at a disadvantage compared to AdX. The introduction of the 'minimum bid to win' field could therefore penalise header bidders and, as a result, re-establish the advantage that AdX historically had before the introduction of header bidding. Moreover, as a standard for passing 'minimum bid to win' information to DSPs does not exist, SSPs have to create a protocol for doing so. Google told us that it is unaware of any SSPs other than AdX currently passing the full 'minimum bid to win' information to DSPs. While this does not necessarily imply that third-party SSPs are not making use of this information, it appears that AdX is currently the only SSP able to take full advantage of it.

483. SSPs have expressed different views on how significant the advantage provided by 'minimum bid to win' information is. On the one hand, one SSP told us that, in the absence of this information, the buyer can infer its optimal bid price based on historical win rates; 'minimum bid to win' is, therefore, of limited value. On the other hand, one SSP submitted that information on the minimum bid to win can make AdX (and potentially Open Bidding) a more efficient path to inventory for DSPs, which would therefore have an incentive to favour this path through supply path optimisation techniques.[68]

484. As for the fact that header bidders do not receive this information, Google pointed out that Google Ad Manager does not know the identity of header bidders, so that it is not possible for it to send them the 'minimum bid to win'. However, as publishers receive data from all the bids submitted to its auctions, they can create a full bid landscape that shows the range and number of bids received across dimensions such as ad unit and buyer. Publishers can choose to share this information with any buyer, including header bidders.

485. One publisher told us that it could, technically, share the bid-level data, similarly to 'minimum bid to win', with its buyers. However, since the information would not be given in real time, it would be much more difficult for buyers to act on it. Moreover, buyers would need to have that information at

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[67] [✂].
[68] For a discussion of supply path optimisation, see the description of DSPs in the section on participants in the intermediation industry.

scale, which would require them to set up this data sharing relationship with thousands of publishers, which is not feasible from a time and resources perspective. Another publisher observed that developing similar mechanisms would require significant resources, which only some publishers could afford.

486. Based on the information discussed above, it appears to us that Google's decision to provide 'minimum bid to win' information was based on a genuine intention of making the auction more efficient and did not reflect an exclusionary intent. Nevertheless, it has resulted in an advantage to AdX (and potentially Open Bidding) compared to third-party SSPs and header bidding solutions, although less significant than the one it had before the transition to a unified auction.

*Alleged preferential use of bidding data*

487. Some stakeholders told us that, thanks to Google's double role as publisher ad server and SSP, Google's SSP AdX can benefit from privileged access to bidding data even after the elimination of 'last look'.

- One SSP provider submitted that a publisher ad server has information about all the directly sold campaigns that are not available to any other platform; it also has the clearing price of every single historical impression. This unique data advantage allows it to better predict the winning price for any future auction, which provides it a substantial economic benefit to both buy and sell ads. Similarly, another SSP provider told us that it believes AdX receive certain competitive advantages, such as the ability to see all performance data of other participating demand sources. As a result, AdX can use this intelligence to better handle its own demand distribution and potentially know the 'price to beat'.

- Some large publishers have expressed similar views. Reach told us that if an intermediary both runs and participates in an auction, it has the advantage of observing the auction data, including bidding patterns and bid density, and can therefore make more informed buying decisions. Similarly, another publisher submitted that Google has the benefit of seeing all ads in the auction and can use that to its advantage to help itself win.

- In a recent paper,[69] Damien Geradin and Dimitrios Katsifis suggest that Google may be able to use current and historical data to inform the

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[69] Damien Geradin and Dimitrios Katsifis, 2019, An EU competition law analysis of online display advertising in the programmatic age, *European Competition Journal*, 15:1, 55-96.

bidding decisions of AdX, giving it an informational advantage over its rivals, and that in light of the commercial significance of bidding data, it appears problematic for a dominant undertaking to be both an auctioneer and a bidder with access to its rivals' bidding data.

488. We note that Google's bids are not generated by AdX (an SSP), but by Google Ads or DV360 (which operate as DSPs). In order for the bidding data received by Google Ad Manager in its role as publisher ad server to affect bids, the data should be made available to either Google Ads or DV360. Google, however, told us that the Ad Manager Service Terms prohibit Google from sharing any information that publishers enter into the Google Ad Manager interface with Google Ads or DV360 for the purpose of informing bids, unless the same general data are also shared with third parties. [✂]. Moreover, Google submitted that DV360 and Google Ads do not use bidding data received from other DSPs bidding into AdX or from Open Bidders, with the exception of the 'minimum bid to win' field discussed above.

489. There is, however, one way in which AdX could in principle affect the bid. AdX applies a variable rate: the percentage charge is not always the same for a given type of transaction but can vary around an average agreed with the publisher. AdX can therefore affect the net bid submitted to the publisher ad server by flexing the level of the fee. Historical bidding data could therefore be used to estimate the strength of the demand faced by AdX in a given auction and determine the fee level that maximises AdX's probability of winning the impression while charging on average the fee agreed with the publisher. This mechanism is called 'revenue share optimisation'. Google told us that, until the introduction of Unified Auction, historical data on bids submitted by Open Bidders and by DSPs bidding into AdX was used as an input to determine the optimal revenue share. However, revenue share optimisation was briefly paused in conjunction with the move to the Unified Auction, to ensure that it was consistent with the principle of equal treatment of bidders under the Unified Auction. Google has suggested that any future implementations of Revenue share optimization in the Unified Auction will have to comply with this principle.

490. In conclusion, it appears that it is technically possible for Google to use bidding data collected as publisher ad server to inform its bidding strategies, and that Google has an incentive to do so (at least in the short term). Google has adopted a policy not to take advantage of this possibility, at least since the move to Unified Auction. Nevertheless, it would be possible for Google to reverse such a policy decision in the future; moreover, the current lack of transparency over auction mechanisms makes it difficult to verify that Google is abiding its own rules.

*Changes to Data Transfer files*

491.    Another change recently made by Google Ad Manager relates to the bidding
        data publishers receive. Publishers receive two sets of files:

- Bid Data Transfer files, which include Google's bidding data.
  Publishers currently receive a file with records of every ad request
  received by Google Ad Manager (from AdX and from other exchanges
  that participate in Open Bidding). This file includes the bidding data of
  DSPs on AdX and of Open Bidding partners, including the name of the
  bidder, the bid price, and whether the bid was rejected or won. This file
  does not include impression-level information, eg the price at which the
  impression was sold, nor do they include the bids of header bidding
  partners. However, for impressions won by AdX or Open Bidders, the
  (rounded) price at which the impression was sold can be determined.

- Impression Data Transfer file, which includes information on an
  impression-by-impression basis, eg the price at which an impression
  was sold, and to which buyer, as well as the bids of header bidding
  partners.

492.    As Google Ad Manager does not provide publishers with a single file that
        combines data from both products, ie bidding data from AdX (eg how much
        each buyer bids) with impression-level data from the ad server (eg the price at
        which the impression was sold), publishers used to reconcile the separate
        Data Transfer files in order to gain a holistic view of their inventory and adjust
        their ad yield optimization strategy accordingly. To link the separate Data
        transfer files, publishers used two corresponding fields in the Data Transfer
        files: the key (also known as the KeyPart field) and the timestamp.

493.    From September 2019, the KeyPart field in the Bid Data Transfer file was re-
        encoded to not match other Data Transfer files. Moreover, the timestamp for
        each bid response, which was previously expressed in microseconds, was
        truncated to the hour, making it impossible to associate particular bids with
        individual impressions using a timestamp.

*Publishers' concerns*

494.    Some publishers submitted that this change may have significant implications
        on rival SSPs' ability to compete with Google. Publishers typically measure
        the value of their SSPs based on the incremental revenue driven by each
        provider. Doing so requires the ability to compare the winning bids received
        from an SSP with the second-highest bids received for the same impressions:
        the higher the difference, the higher the value of that SSP for the advertiser.

However, following the recent changes in the bidding data that Google Ad Manager provides to publishers, it will no longer be possible for them to compare the performance of non-Google SSPs versus AdX, ie comparing the winning bid from a non-Google SSP with the bid received from AdX. As a result, SSPs will find it increasingly difficult to demonstrate how they add value for publishers, while publishers will have less incentive to sustain the costs of integrating non-Google SSPs through header bidding.

495. Moreover, a large publisher submitted that the changes in the Bid Data Transfer files restrict publishers from measuring the value of their own first-party data and audiences. Publishers routinely pass first-party data related to the impression to the ad server in the form of 'key values'. By linking these key values with the prices of the bids submitted for each impression, they are able to appropriately measure the value of their own first-party data and audiences. By restricting publishers from being able to link such data to the Bid Data Transfer file, Google interferes with publishers' ability to measure the incremental value of their own first-party data. This removes publishers' incentive to invest in and grow their own data segments.

496. The change may also result in reduced transparency of auction mechanisms for publishers. A large publisher told us that the use of precise timestamps is absolutely vital to the ability of publishers to cross-match auction data from the buy side and sell side in order to understand whether advertising intermediaries are complying with the revenue share model set out in contracts.

*Google's rationale for the changes*

497. Google told us that the data files that include AdX non-winning bids were only made available in August 2017 as an 'alpha' feature. A Google document shows that this feature was introduced in response to publishers' demand and to bring AdX on a par with other SSPs that were already providing access to raw bid data. Buyers were given the option to opt out of sharing their bid data with publishers and many decided to do so.

498. The possibility to opt out was removed with the transition to unified auction. Google, however, needed to balance the transparency sought by publishers with its confidentiality obligations to buyers. [✂].

499. The restrictions imposed on the new Bid Data Transfer file format were also prompted by user privacy considerations. If bids could be tied back to individual users, a publisher could glean additional data on the user in certain cases. For example, a user may be targeted by ads for a particular category, such as toddler products. Many ad campaigns apply 'frequency caps', which

can limit the number of times a user sees an ad across certain channels. For example, advertisers can set a single-digit frequency cap (across all websites), in which case an ad may be served only once on a single publisher's website (over a given period of time). If an advertiser advertising toddler products bids for ad space on a publisher's page and wins, publishers would be able to see that this user has been shown this ad once, which could be a coincidence. However, should the Bid Data Transfer file be joinable with user IDs, publishers would be able to identify each time the advertiser of toddler products bid to show an ad to this specific user, including lost bids. This would provide publishers with significantly more data on the ads targeted to this user and allow them to form a much deeper picture of the user and their interests.

500. The changes to the Bid Data Transfer file were aimed at avoiding breaching Google's contractual obligations with buyers and protecting users' privacy. In order to do so, Google has:

- excluded user data from the Bid Data Transfer file, including the KeyPart field (which can be linked to user data);

- ensured that the Bid Data Transfer File cannot be joined with other report files, as these could reveal the identity of the user together with the identity of the buyer; and

- taken measures to break probabilistic connections between the Bid Data Transfer File and other report files, for example by rounding up the timestamp.

501. Google submitted that Bid Data Transfer has always been a test feature and has never been made generally available to publishers. Google considers its approach to be reasonable given the competing concerns that it needs to balance. We reviewed a Google document confirming that Google's engineers believed these changes constituted [✄] given the constraint Google was subject to.

*Google's response to publishers' concerns*

502. In relation to the issues raised by publishers, Google submitted that publishers have a better way to compare SSP performance than using the data transfer files. The best way to do so is to run a randomized, controlled ("A/B") experiment. This is superior to comparing bids because it controls for all confounding factors (eg page latency, impression discrepancies, or user experience impacts). Publishers wishing to compare SSP performance may do A/B testing at the time they are thinking of adding a new SSP or removing

one. Rather than making the change on 100% of their traffic, they could make the change on a random subset of users or ad requests. Google Ad Manager's 'custom criteria' feature supports publisher experimentation, by making it easy for publishers to compare slices of traffic and obtain accurate experimental results.

503.  News UK agreed that A/B testing is a very important tool but submitted that it is complementary to the analysis that could be done using the Data Transfer files. In particular, results of A/B testing relate to a specific point in time; as market conditions change, transparency of Bid Data is important to be able to analyse trends and have a fuller view of SSP performance.

504.  As for publishers' ability to measure the value of their own first-party data and audiences, Google submitted that the value of an impression is represented by the winning bid, rather than the losing bids. Winning bids are included in the Impression Data Transfer file, which also includes the key values. In relation to the Bid Data Transfer file, which includes the losing bids, Google has engaged with publishers to identify dimensions of the data that could be provided while complying with Google's contractual obligations and privacy principles. Moreover, if a publisher wants to know the losing bids related to a specific audience segment, Google Ad Manager allows it to access this data, as long as it cannot be linked to specific users. A publisher can define a pricing rule, corresponding for example to a specific audience segment, or any other segment of interest, and observe the distribution of winning and losing bids for the matching ad requests using the 'Bid Insights' card.

*Our assessment*

505.  It appears from the documents we have reviewed that the recent changes introduced by Google to the Data Transfer files were not motivated by a desire to penalised third-party SSPs but were the result of the necessity to balance the needs of publishers with the interests of advertisers. Google's engineers believed that these changes were the least restrictive that could be applied. The changes, however, may have reduced publishers' ability to compare SSP performance and, therefore, may have made it more difficult for non-Google SSPs to demonstrate the value they provide.

*Other practices*

506.  Some stakeholders mentioned other instances of Google's publisher ad server giving an advantage to AdX.

507.  One SSP provider submitted that Google's technology is not fully compatible with Prebid due to technical limitations. One consequence of this is that a bid

from a Prebid header bidding wrapper into Google Ad Manager does not correspond to the actual price a buyer is willing to pay but is rounded down. These technology constraints make Prebid demand less competitive. Interoperability issues like these are expected to become more costly as the Prebid community develops solutions for Programmatic Guaranteed.

508. One publisher submitted that, while generally Google Ad Manager charges a fee per ad impression served, if the impression is won by AdX no fee is charged. While Google submitted that its adtech platform fees do not depend on whether inventory is sold via Google or non-Google intermediaries, [Google has agreed different arrangements with certain publishers]. Google's ad serving fee charged per impression is in any case low (generally less than [0-5] cents per 1,000 impressions), so that the advantage given to AdX by waiving the fee is minimal.

509. Overall, these are probably minor issues and have a limited impact on competition. However, they are indicative of the conflicts of interest Google is subject to when operating as a publisher ad server.

## Future scenarios in advertising intermediation

510. The analysis developed in the previous sections is mostly based on how digital advertising intermediation currently works. However, the intermediation industry has been evolving in recent years and its structure is likely to change significantly in the next two to three years. For example, some stakeholders expect an increased commoditisation of intermediation services and increased market concentration; DSPs might also increasingly try to establish direct relationship with large publishers, leading to a simpler intermediation chain. However, the most significant changes are likely to result from stakeholders' efforts to make advertising intermediation more privacy-friendly, in response to GDPR and to increased public interest in how personal data is shared and used in the digital advertising industry. Of primary importance will be policy decisions made by Google, given the central role it plays in the intermediation industry.

511. While it is difficult to predict the future evolution of digital advertising, it is important to consider whether the competition issues that currently affect the industry, and that we have identified above, can be expected to continue to be present under plausible future scenarios. In this section, we first try to envisage different possible ways in which advertising intermediation could change in the next two to three years, and then assess whether such evolution would solve any of the current competition issues without need for external intervention.

***Privacy regulation and the future of advertising intermediation***

512.  GDPR sets out some important principles that have to be adhered to in the
collection and processing of personal data. These principles have had and will
continue to have profound implications on how personal data can be used in
adtech and, more generally, in targeted advertising.[70] It is, however, unclear
what exactly is required for adtech to operate in compliance with GDPR,
leaving significant margins for market participants to make their own
judgements about what compliance means.

513.  The evolution of the digital advertising industry, therefore, depends on how
market participants will interpret the requirements imposed by GDPR and on
what types of enforcement actions the ICO, and other data protection
authorities like the DPC, decide to prioritise. These decisions are likely to
have implications beyond data protection.

- First, large companies such as Google or Facebook, whose decisions
impact the entire industry, have an incentive to interpret data protection
requirements in a way that may benefit their own businesses and put
competitors at a disadvantage. When Data Protection Authorities (DPAs)
encourage privacy enhancing measures via advocacy rather than
enforcement, firms are more likely to be receptive to this advocacy where
it is congruent with their own interests, and less receptive where it cuts
against them.

- Secondly, the enforcement of GDPR, and in particular any decisions on
which aspects of GDPR to prioritise in enforcement action, might have
unintended consequences on competition in advertising intermediation.
Verizon Media submitted that legislators did not place a duty on DPAs to
apply GDPR rules in a way that balances economic and individual
interests and promotes innovation and competition in digital markets; as a
consequence, a DPA could arrive at a decision with significant market
impacts.

- Finally, the intermediation industry might be impacted by the actions of
private litigators – actual individual consumers, or more likely consumer
organisations or privacy protecting civil society organisations. Such actors
have no duty, and possibly no interest, in seeking to achieve a balance
between, on the one hand, individual privacy today and, on the other

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[70] As the UK has left the European Union, it is possible that data protection regulations will be amended. In our
analysis, we have abstracted from this possibility and assumed that changes will not alter the main principles of
the current legislation.

hand, the economic interests of consumers and the protection of privacy via a diverse and competitive industry.

514. In the following paragraphs, we consider different aspects of privacy regulation – the legal basis for the collection and processing of personal data, the external and internal dimensions of data protection, the treatment of special category data and the cost of compliance – and analyse how they could impact digital advertising intermediation, taking into account the expected behaviour of market participants (and of Google in particular).[71]

*Consent*

515. Under GDPR, there are six legal bases for processing personal data – consent, contract, legal obligation, vital interests, public task and legitimate interests. GDPR does not prioritise one legal basis over another and it is for the data controller to make a determination, based on the principle of accountability, and to demonstrate a valid lawful basis for any processing of personal data it undertakes. In adtech, while not all intermediaries have adopted 'consent' as the legal basis on which to collect and process personal data, there is increasing pressure for them to operate under a consent-only basis. The ICO's *Updated report into adtech and real time bidding*, published in June 2019, states that, in the ICO's view, 'the only lawful basis for "business as usual" RTB processing of personal data is consent'.[72] The report also expresses the ICO's concern that it is not possible for consumers to provide valid consent to their personal data to be shared with an unknowable (from the perspective of the consumer) and large number of parties, with unknowable controls and security measures.

516. We have been told that obtaining consent can be particularly challenging for intermediaries without direct relationships with the users. The main reasons are the following:

- Publishers have many third parties integrated on their sites; having a system in place that requires each party to separately obtain consent, or provide detailed information for each partner, would hamper their websites' usability.

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[71] As it is difficult to anticipate what issues will be raised by private litigators, their expected impact is not further discussed in this appendix.
[72] ICO's Updated report into adtech and real time bidding, page 18.

- B2B companies lack brand recognition from ordinary users. It is therefore more difficult for them to gain users' trust, even if they adopt privacy-friendly practices.

- Companies without direct relationships with users have limited possibilities to offer them incentives for obtaining consent.

517. Publishers may therefore have an incentive to rely on intermediaries that, because of their ownership of user-facing platforms, can more easily obtain consent for themselves. These are mainly the large platforms like Google, Facebook and Amazon. The result can be a further consolidation of advertising intermediation to the benefit of large platforms.

518. It is possible that the advantages of user-facing companies might be reduced if DPA enforcement, and subsequent case law, mandates the collection of much more granular consent than is currently sought in the market. Currently, the consent that large platforms are given by users during sign-up covers all the purposes for which personal data is processed, including both the provision of user-facing services and personalised advertising. If valid consent was given separately for different types of use, it might become less easy to obtain for the purpose of providing personalised advertising. Nevertheless, the direct relationship with users would continue to make it easier for these providers to obtain consent than for B2B companies.

*Sharing data with third parties*

519. Article 5(1)f of GDPR requires that personal data shall be 'processed in a manner that ensures appropriate security of the personal data, including protection against unauthorised or unlawful processing and against accidental loss, destruction or damage, using appropriate technical or organisational measures'. Ensuring the 'security' of personal data can be challenging in adtech, particularly in the case of real-time bidding, where large amounts of personal data are made accessible to dozens of companies through the data included in bid requests and the ability to match cookies between companies.

520. Measures have already been taken by some of the largest market participants to limit the flow of information between adtech companies and further measures have been announced. The implementation of more stringent measures can be expected as the interests of large companies, such as Google, with direct access to a large amount of personal data are aligned with this aspect of data protection: restricting the flow of data may increase these companies' advantage over competing intermediaries. Some intermediaries told us that the grey nature of privacy regulations creates opportunities for the large companies (eg Google and Facebook) to define what compliance

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means and further isolate smaller competitors, by restricting interoperability and the flow of data.

521. Currently, third-party cookies are the most widespread technology for tracking users for the purpose of personalised advertising and are the main channel through which personal data is shared with intermediaries (see Appendix G). Limiting the use of third-party cookies is therefore seen by some as an important component of privacy protection on the internet. Apple's Intelligent Tracking Prevention feature was released in September 2017 to limit the ability of adtech companies to use third-party cookies on Apple's Safari browser; a similar decision was taken by Mozilla for its Firefox browser through its Enhanced Tracking Protection feature.

522. In January 2020, Google announced the intention to phase out support for third-party cookies in Chrome within two-years, subject to the development of privacy-preserving and open-standard mechanisms, like its proposed Privacy Sandbox, that would address the needs of users, publishers, and advertisers and render third-party cookies obsolete.[73] As Google's browser Chrome is widely adopted by users in the UK (according to StatCounter, it had a market share of approximately 50% in October 2019),[74] the consequences of Google's choices on how to replace third-party cookies could be very significant for advertising intermediation.

523. Google's Privacy Sandbox is still just a proposal and it is unclear which of the proposed solutions will be adopted and what they will look like. The two proposals that could have the largest impact on advertising intermediation are Federated Learning of Cohorts (FLoC) and TURTLEDOVE (for a more detailed description of the Privacy Sandbox, see Appendix G).

- FLoC is a proposal that would allow ad targeting based on users' interests without requiring the use of cookies. In the FLoC approach, the browser incorporates a decentralised machine learning model. The model is responsible for grouping together 'flocks' of users who exhibit similar browser behaviour. The browser would then allow advertising intermediaries to know which flocks a user belongs to without disclosing any other information about the user. Flock membership could then be used for interest-based targeting.[75]

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[73] Building a more private web: A path towards making third party cookies obsolete, published on 14 January 2020.
[74] StatCounter, https://gs.statcounter.com/browser-market-share/desktop-mobile-tablet/united-kingdom/. For a discussion of the methodology used by StatCounter, see Appendix C.
[75] See https://github.com/michaelkleber/turtledove.

- TURTLEDOVE would allow retargeting in a cookie-free environment. Under this proposal, when a user visits an advertiser's page, the advertiser can include it in an 'interest group'. Advertisers would provide this information to the browser, which would elicit bids from the adtech intermediaries the advertisers work with. Such bid requests would specify the interest group the user belongs to but would not contain any other information about the user or the webpage they are visiting.[76] These bid requests would be separate from 'contextual requests', which can contain information about the webpage and first-party data provided by the publisher. The final auction (or at least the intermediate auction between the 'interest group' bids) would be held by the browser on the user's device.[77]

524. While there is still significant uncertainty on whether and how these solutions will be implemented, we can try to assess what impact such changes could have on competition in advertising intermediation.

525. A solution like TURTLEDOVE would give browsers a key role in advertising auctions, at least in the case of retargeting and possibly in all intermediated display advertising. The browser would be responsible for selecting the intermediaries to which bid requests are sent and for executing the auction, functions that are currently undertaken by the publisher ad server. In the absence of common standards on how auctions are run, an intermediary, like Google, that also operates one of the most widely used browsers would have the ability to favour its own intermediation services (for browser shares of supply in the UK, see Appendix E).[78]

526. A solution such as FLoC can potentially give an advantage to those intermediaries that, like Google, have direct access to user data from their own user-facing services, similar to the advantage they currently have (discussed earlier in the appendix). Importantly, flocks are identifiers of group membership; they contain no information *per se* – they are only useful for targeting purposes if the bidder can associate flock membership to information about the browsing and conversion behaviour of users belonging to that flock. By being able to observe large quantities of users' behaviour data around the web, large intermediaries would be better positioned to understand how users within each flock tend to behave and be therefore

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[76] Such bid requests could be sent periodically and not at the time when the user visits a publisher site where the ad could be shown. Bids would be cached for later use.

[77] See https://github.com/michaelkleber/turtledove.

[78] Criteo has published a competing proposal called SPARROW, which maintains the same privacy-enhancing objectives as TURTLEDOVE, but several key roles would be performed by a completely independent 'Gatekeeper' (that cannot have any other role in adtech) instead of the browser. For more details about SPARROW. More information on SPARROW can be found here.

better able to target advertising to the 'right' flocks.[79] On the other hand, third-party data that intermediaries source through data brokers is likely to become more scarce, as it will be more difficult to associate the data with a flock.[80]

527.  One intermediary told us that a browser ID may emerge as a replacement for the cookie ID. Browsers would then control how this ID is shared among the industry, incentivizing further market consolidation around browser-based walled gardens. More generally, Verizon Media submitted that any change to browsers' neutral posture presents an existential threat to both competition in the digital advertising market and to the ability of digital content and services providers (particularly those without logged-in users) to generate revenues to fund their content production.[81]

528.  Some stakeholders, including Google, have argued that the blocking of third-party cookies, in the absence of alternative solutions that enable personalised advertising, would encourage the use by adtech companies of 'fingerprinting' techniques.[82] Fingerprinting is a broad term meant to describe various statistical techniques for attempting to identify a given user or device in the absence of IDs passed by that device. For example, the combination of the user-agent string[83] and the user's IP address can be used to make a relatively unique identity. This argument, however, has been contested. It has been noted that bowsers are developing anti-fingerprinting solutions and there is no evidence that the use of fingerprinting increased after Apple and Mozilla blocked third-party cookies on their own browsers.[84] In a cookie-free environment, where browsers would control access to users' identities, it is reasonable to expect all browsers to have an incentive to restrict fingerprinting.

529.  In the absence of third-party cookies, it can also be expected that advertisers and intermediaries may make greater use of publishers' first-party data and may develop more sophisticated contextual targeting techniques. This could somewhat reduce the advantage of intermediaries with direct relationships with users. To an extent, this is already happening. Some intermediaries expect a rise in contextual targeting or are actively increasing their capabilities for contextual targeting. Some publishers told us that they are making greater use of first-party data, or are investing to build up their first-party data through subscriptions and better user-level tracking. Other publishers are looking to

[79] See Bennett Cyphers, Don't Play in Google's Privacy Sandbox, 30 August 2019.
[80] See Seb Joseph, WTF is Google's Privacy Sandbox?, 17 January 2020.
[81] Verizon Media added that such change would also interfere with consumer preferences which are recorded via cookies and therefore with the ability of ad intermediaries to comply with GDPR.
[82] Building a more private web, published on 22 August 2019.
[83] A user agent is software, such as a web browser, that acts on behalf of a user. When operating in a network, a user agent typically identifies itself by submitting an identification string.
[84] Jonathan Mayer and Arvind Narayanan, Deconstructing Google's excuses on tracking protection.

refocus on contextual targeting, or testing technologies that allow users to select the type of advertising they receive. However, one large publisher told us that a move back to more contextual-based advertising would only be achievable if publishers can limit 'data leakage' and other companies monetising their audience and data. Google and Facebook, in particular, capture huge amounts of data on publishers' users and content and can monetise this better than publishers are able to.

530. It should be noted, however, that some intermediaries may still be able to capture user data without using third-party cookies by leveraging their relationship with publishers. Publishers can adopt an intermediary's cookie setting code (eg a pixel or tag) into their own code, so that the browser classifies cookies from that intermediary as a first-party cookies (see Appendix G for an explanation of how this is done). This already happens to an extent[85] and might become more common if third-party cookies are no longer allowed. On the one hand, large intermediaries might be able to use their market power and the strength of their relationship with publishers to compel publishers to share user data with them; on the other hand, publishers might see this as an opportunity to monetise their own data.

531. Finally, it is worth nothing that Google's current proposals in the Privacy Sandbox all deal with third-party cookies and how they are handled by browsers. However, such measures would be less applicable in a mobile environment, which is by far the fastest-growing area in digital advertising. This is especially true in relation to advertising in mobile apps, where publishers have access to stable ad IDs (see Appendix G). Therefore, the current proposals would leave an increasing fraction of digital advertising spend largely unaffected.

532. In conclusion, measures to limit the sharing of personal data between intermediaries are likely to be implemented in the next two to three years, although the nature and extent of these measures is still unclear. The measures are likely to increase the advantage of those intermediaries that also offer user-facing services and may result in a more central role for browsers in digital advertising. Publishers' first-party data may become more valuable, but their ability to monetise it may still be limited.

*Sharing data within walled gardens*

533. Article 5(1)b of GDPR requires that personal data shall be 'collected for specified, explicit and legitimate purposes and not further processed in a

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[85] See CNAME Cloaking, the dangerous disguise of third-party trackers and Data Collection CNAMEs and Cross-Domain Tracking.

manner that is incompatible with those purposes'. It follows that, as stated in the 'Guidelines on consent' from European data protection authorities, if 'consent' is used as the legal basis for data processing, '[w]hen data processing is done in pursuit of several purposes, the solution to comply with the conditions for valid consent lies in granularity, i.e. the separation of these purposes and obtaining consent for each purpose'.[86]

534.     A strict application of the 'purpose limitation' principle could make it more difficult for companies, such as Google, to utilise the data they collect through their user-facing services when offering advertising intermediation services, unless they obtain separate and specific consent for such use. This would at limit the advantage currently enjoyed by intermediaries that also operate user-facing services.

535.     However, unlike in relation to sharing data with third parties, in terms of purpose limitation the incentives of the largest market participants are not aligned with data protection, as it is in their interest to fully exploit the value of their data by using it for multiple purposes. In the absence of external enforcement actions, it is therefore unlikely that the intermediation industry would evolve in the direction of a more limited sharing of data between the user-facing businesses and the intermediation businesses of integrated companies. The evidence suggests that large companies' chosen approach to data protection tend to favour vertical integration along the adtech stack and the creation of closed-model ecosystems. For example, Google told us that it only sends imprecise location data to third parties to reflect the principles of data minimisation and proportionality required by GDPR, whereas the same concerns do not arise for disclosures to DV360 as no third-party data sharing occurs.

*The cost of compliance*

536.     One further issue raised by some intermediaries is that the cost of compliance with privacy regulation can act as a barrier to entry. Any company seeking to enter into the market and compete with the larger established companies will face the same accountability costs and overheads but may not have the resources or institutional maturity to be able to do so effectively, which may make it more difficult to compete.

537.     Moreover, an intermediary submitted to us that large companies like Google and Facebook can take a different approach to compliance with data protection regulations. A smaller intermediary has no choice but to comply

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[86] Guidelines on consent under Regulation 2016/679, Article 29 Working Party, 10 April 2018, page 10.

with data protection regulations because all its partners demand it; it cannot afford to be a target of regulators or run the risk of partners ceasing to do business with it. On the other hand, Facebook and Google can take more risk as they can afford to fight regulators if and when they are made the subject of enforcement action.

538.   As an example of how GDPR could potentially disincentivise competition from smaller firms, an intermediary told us that fear of how the ICO might challenge its GDPR status has adversely impacted its investments in new products.

*Possible scenarios*

539.   It is difficult to predict how advertising intermediation will evolve. However, the analysis developed above suggests some likely trends:

- The changes that can potentially have the largest impact on competition among intermediaries will result from providers' interpretation of what privacy protection requires, rather than from direct enforcement of data protection regulations. Decisions made by the largest market participants, Google above all, will have the greatest impact on the industry.

- The use of third-party cookies is going to be severely curtailed. This might further entrench the advantages of those intermediaries with direct relationships with users and is likely to turn browsers into a central component of the advertising industry, as they could be in control of users' identities and possibly of advertising auctions.

- The use by integrated providers for advertisement targeting purposes of user data collected through user-facing services is unlikely to be significantly reduced, with the possible exception of special category data.

540.   We therefore envisage two possible scenarios for the evolution of the structure of the intermediation industry in the next two to three years:

- A scenario where display advertising is bought and sold without the use of third-party cookies (through solutions such as FLoC), but where the way auctions are run does not substantially change, ie the publisher ad server continues to play the main role in deciding how impressions are allocated.

- A scenario where, not only third-party cookies are no longer used, but where browsers execute at least some of the auctions.

541.   In the rest of the section we discuss whether the issues we have identified in advertising intermediation – lack of transparency, conflicts of interest, and

Google's ability to leverage its market power – would still be present in these two future scenarios.

542. First, we consider that the transparency issues discussed above would remain very similar in both scenarios.

- There is no reason to believe that fee transparency would be less of an issue than it currently is. In the second of our scenarios, where auctions are run by the browser limiting information sharing between advertisers and publishes, transparency may even decrease, as publishers would have less visibility of which adverts appear on their websites.

- In both scenarios, DSPs would have the same arbitrage opportunities as is currently the case.

543. Second, our considerations on conflicts of interest would remain valid. In the second scenario, the role of browsers in the performance of 'sales functions' may increase the severity of conflicts of interests when the same provider also has an 'advertiser advisory function', given publishers' and advertisers' lack of control over the choice of browser.[87]

544. Finally, as discussed above, the elimination of third-party cookies would potentially increase the advantage of those intermediaries which have access to a large amount of first-party data. Google, therefore, would still be able to leverage its market power in data similarly to how we discussed earlier in the appendix. Its ability to leverage the market power that derives from its search and display (YouTube) inventory would also be unchanged. Moreover, in the first of our scenarios, Google's ability and incentive to link its different intermediation services and to engage in self-preferences between its publisher ad server and SSP would be the same.

545. In both scenarios, browsers are going to have a greater role in digital advertising than is currently the case, as they would control access to users' identities. This would be even more the case in the second scenario, where they are in charge of the final auction. Google operates one of the most used browsers (Chrome). It also leads the development of Chromium, the open-source project that underpins other commonly used browsers such as Microsoft Edge. This dominance over browser technology would therefore constitute another source of market power that could potentially be leveraged in advertising intermediation. This would particularly be the case in the second scenario, where Google would again be in a position of both running the

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[87] The potential for conflicts of interest would decrease if a solution such as SPARROW (described above) was introduced, as auctions would be run by an independent 'gatekeeper'.

auction (through Chrome) and participating in it (through its demand side platforms). Google would therefore have a similar ability and incentive to self-prefer its own demand as is currently the case, with the difference that the source of market power to be leveraged would not be its publisher ad server, but its browser.

## Conclusions

546. The concerns we have identified in intermediation in open display can be grouped in two broad categories:

- concerns on the lack of transparency; and

- concerns about Google's ability to leverage its strong position in its wider ecosystem into the open display market, and its conflicts of interest within the adtech stack.

### *Lack of transparency in adtech*

547. We agree with the view expressed by many stakeholders that open display intermediation can be opaque in its working and that market participants do not have access to all the information they would need to make informed choices on how best to buy or sell advertising inventory. The main transparency issues can be summarised as follows:

- Supply chain traceability/auditability – advertisers and publishers are typically unable to easily observe all the intermediaries that are involved in the buying and selling of inventory, and many are unable to access transaction-level data which they could use to effectively audit their supply chains.

- Fee transparency – there is limited visibility of fees across the supply chain.

- Access to bidding data – publishers' access to data about the auctions run to sell their own inventory is limited.

548. These issues have implications for competition among intermediaries and market outcomes:

- Advertisers have limited ability to audit and manage their supply chains. For example, lack of transparency on the fees charged along the adtech chain makes it difficult for buyers to select the cheapest path to secure specific inventory and for DSPs to decide where to bid. This, in turn, affects competition between SSPs.

- Lack of transparency also limits publishers' ability to engage directly with the advertisers interested in their inventory. This reduces competitive pressure on intermediaries.

- Transparency concerns also reduce market participants' confidence in the supply chain, leading to higher transaction costs and inefficient outcomes.

549. We have proposed a set of possible interventions to address these concerns. In the case of platforms with strategic market status, the concerns can be addressed by introducing transparency requirements in the context of the proposed code of conduct, as discussed in Appendix U. However, some transparency measures may need to be applied more widely to the entire ad tech industry. We discuss industry-wide transparency interventions in Appendix Z.

### *Issues arising from Google's position in open display*

550. The second set of concerns relate to the role played by Google in advertising intermediation. We can distinguish two main areas of concern:

- The first area relates to the way Google has leveraged its strong position in search advertising and its wider ecosystem into the open display market. Google has been able to use its strong position in search and the importance of its own-and-operated display inventory to build its position as a DSP, by leveraging its wider data and large base of advertisers, and by tying its YouTube inventory to its DSP services. These practices underpin Google's market power in the DSP market and have made it more difficult for rival DSPs to compete.

- The second area relates to Google's conflicts of interest within the ad tech stack and its ability and incentive to exploit its position on both sides of the intermediation chain to self-preference its own activities, thereby reinforcing its market power. On the one hand, our analysis in this appendix has shown how Google has been able to increase its market power at the publisher ad server level by making it difficult to access Google DSPs' demand through non-Google ad servers. On the other hand, Google has used its position as the largest publisher ad server to favour its own demand from AdX and its DSPs, for example by penalising third-party SSPs in Open Bidding and by introducing unified pricing rules.

551. These leveraging and self-preferencing issues can be addressed through a package of interventions:

- The leveraging of data from Google's wider ecosystem into open display can be remedied through interventions that either mandate access to Google's data to a wider range of firms, or reduce Google's ability to share the data between different parts of its ecosystem. These possible interventions are discussed in Appendix Z.

- The leveraging of YouTube's inventory to increase Google's market power as a DSP can be addressed by mandating access to YouTube inventory to rival DSPs. We discuss this intervention in Appendix ZA.

- Google's self-preferencing behaviour within adtech can be tackled in two ways. The first option is to rely on principles included in our proposed code of conduct. Appendix U discusses the relevant principles. If monitoring compliance with the code of conduct is too difficult or costly, separation interventions can be adopted to eliminate Google's ability and, in the case of structural separation, incentive to engage in self-preferencing practices that harm competition in adtech. The case for these interventions is assessed in Appendix ZA.