Dynamic Competition in Online Platforms

Evidence from five case study markets

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Executive Summary

There are concerns at an EU level over the role of online platforms, which are understood by the European Commission as software-based facilities offering multi-sided markets where providers and users of content, goods and services can meet. In response to the EU-level interest in this issue, the Department for Business, Innovation and Skills[1] conducted internal research addressing the market issues around platforms and come to a number of hypotheses about how dynamic competition affects online platforms. This research considers a range of quantitative and qualitative evidence around those hypotheses in five case study sectors: search engines, short-term accommodation, music, car insurance price comparison websites and social networks.

We find evidence that network effects, which might otherwise act as a barrier to entry, encourage dynamic competition:

- Entry is common and tends to materially affect the market – in most of the markets studied there has been frequent entry with new platforms which materially affect the market share of incumbent platforms, e.g. Spotify and other streaming services in the music sector, TripAdvisor and Airbnb and other Sharing Economy services in the accommodation sector; comparethemarket.com and GoCompare in the car insurance price comparison sector; and first Facebook, then Twitter, Instagram and Pinterest, among others, in the social network sector.

- Effective entry does not appear to be less likely in more concentrated digital markets – while the social network sector appears to be the most concentrated of those for which we have data, it also saw the recent and innovative entry, for example.

- Concentration tends to increase over time in each sector, but competition from other sectors often intensifies – some sectors become more concentrated as more successful networks grow, e.g. search engines, but there is competition on both sides of the market from other types of platform (in that case, particularly social networks).

We find that dynamic competition can produce positive competitive outcomes, despite a lack of obvious competition:

- Online platform market shares tend to be fragile, limiting the extraction of material rents – most platforms offer their services to users for free and it seems even platforms with a large market share would lose most of their users if they introduced even a modest user fee. Multi-homing means advertisers and others offering services through the platforms can generally move too if platforms are not competitive.

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[1] Subsequently amalgamated in to the Department for Business, Energy and Industrial Strategy (BEIS). For simplicity the acronym BEIS will be used during the report to represent both the current and former Departments.

- Innovation seems to persist among online platforms, even in concentrated sectors (particularly the social network sector) – platforms enter by innovating and offering new services. The less concentrated price comparison website sector seems to be the only sector in which that is not the principal means by which new platforms enter.

- Traditional competition concerns regarding conduct can still be relevant – while a lack of obvious competition does not mean that dynamic competitive disciplines are not present, it equally does not prove that there is healthy market competition either. CMA findings that some contractual arrangements in the price comparison sector impaired competition would be an example where traditional competition concerns could still be relevant.

We find that the effects of market practices can vary based on market characteristics:

- Bundling and ties to other products and services – the effect of this practice is likely to vary based on the cost of switching to another service (which might depend on the potential for multi-homing) and the extent to which any additional steps need to be taken before using the bundled or tied service (e.g. committing to pay for a streaming music service).

- Contractual commitments about the service offered through other channels – clauses that require providers not to undercut a certain platform could impair competition, but in cases where they make possible a comparison service which would not otherwise be credible, they might also promote competition.

- Distorting algorithmic results – these might enable entry for new platforms and impede competition less in cases where users can turn to other platforms for results that are not distorted, or there are other ways for platforms or providers to reach the same customers.

- Reactions to switching – where multi-homing is impossible an incumbent's reaction to switching could impair entry, but encouraging retention might simply be customer service or a mundane attempt to maintain a network in a market where multi-homing is common.

- Horizontal takeovers – horizontal takeovers could allow an incumbent to defend their market share but, if innovative entry is still possible, it will not allow them to capture rents and might even increase the amount of innovation that takes place (though quality-adjusted prices would be higher in that scenario).

- Vertical integration – vertical integration might represent in many markets a means by which firms can overcome the challenge of attaining critical mass and thereby promote competition, while the overall impact on competition probably depends on the extent to which a platform which promotes a substandard offering from providers within the same group hurts the competitive position of the platform.

We find that regulatory interventions can affect innovation:

- Requirements for platforms – many requirements for platforms include substantial fixed costs, e.g. requirements for social networks to moderate content have an expensive technical component in addition to the variable costs of moderation, which could create a barrier to entry as smaller platforms are not viable.

- Requirements for providers – any requirements for providers which are particularly onerous, particularly for those who might constitute additional capacity online platforms could mobilise (e.g. requirements for hotels which create prohibitive costs for those sharing their own home) will impair innovation, by creating a barrier to the competition online platforms seek to facilitate.

- Barriers to multi-homing – dynamic competition is much more feasible where the costs of multi-homing is low. Regulatory interventions that raise the cost of multi-homing can therefore impair dynamic competition considerably.

An existing literature addressing specific firms and their valuations raises concerns over successful digital platforms becoming subject to new price regulation as a factor which might affect the business case for investment and innovation. However at this stage at this stage such concerns do not appear to be deterring innovation.

Introduction

There are concerns at an EU level over the role of online platforms, which are understood by the European Commission as software-based facilities offering multi-sided markets where providers and users of content, goods and services can meet. In response to the EU-level interest in this issue, BIS has conducted internal research addressing the market issues around platforms and come to a number of hypotheses about how dynamic competition affects online platforms. This research considers a range of quantitative and qualitative evidence around those hypotheses in five case study sectors.

Policy context

There are concerns at an EU level over the role of online platforms. While there is no settled definition of what constitutes an online platform, the Commission described them as "software-based facilities offering two- or even multi-sided markets where providers and users of content, goods and services can meet."[2] The Commission gives a number of examples of types of platforms: communications (messaging) and social media platforms; operating systems and app stores; audiovisual and music platforms; e-commerce platforms; content platforms; search engines; payment systems; and Sharing Economy platforms. Online platforms help consumers find information online and information find consumers, despite the otherwise daunting size of the Internet (more than a trillion web pages and growing, for example). Again the question of whether all of these types should be considered as online platforms, or otherwise similar in their economic function, is not settled.

The Commission describes how the value of these platforms to consumers rises with their size (a network effect). Its resulting concern is essentially that platforms will have large market shares; those market shares will be protected by network effects; and platforms will, as a result, have market power that they can use to extract rents from market participants. The Commission describes a number of ways this might happen:

- Leverage in vertical integration: e.g. a platform might discriminate in listings between its own services and those of third party services.

- High fees and non-transparent pricing, they describe a fee model for online platforms generally based on a listing and referral fee (which the Commission believes is generally 5 to 20 per cent of the final selling price).

- Restrictions on pricing. Companies might be forbidden from selling more cheaply elsewhere.

This concern is consistent with some language used within the sector itself. Venture capitalists who invest in such firms describe network effects as "moats", which create

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[2] European Commission (2015) *A Digital Single Market Strategy for Europe – Analysis and Evidence*, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015SC0100&from=EN

barriers to consumers abandoning an online platform if one can be established, or competition from new entrants driving down the returns on an initial investment in establishing such a network. This has been suggested as one reason for the high market values attached to new and promising online platforms.

The Commission notes, however, that given "the dynamics of the markets created and served by platforms, and the relatively short time that they have been in existence, more work is needed to gather comprehensive and reliable evidence on how different types of platform work and their effects on their customers and the economy as a whole." This report is part of that work.

Research questions

In response to the EU-level interest in this issue, BEIS conducted internal research addressing the market issues around platforms. On the basis of that research, BEIS formulated a set of hypotheses:

- Competition in these industries may be less obvious, but just as effective in terms of delivering positive consumer outcomes. In particular the use of innovation to enter and re-define the boundaries of markets, competition for the market, and stronger competition on one side of the market than on the other (in multi sided markets) may all be able to produce positive competitive outcomes. Furthermore it may be hard to define the boundaries of a market or of a sector if current and future competitive constraints on firms may come from sectors that have traditionally been thought of as not part of the same market.

- Whilst network effects and tipping points may make market entry more difficult, they may also make the reward for a successful market entry greater, and encourage competition for the market. More generally, the large rewards on offer may encourage innovation and investment. Moves to lessen the impact of tipping points may reduce this incentive. BEIS would be interested to see how the combination of risk and reward associated with entry compares with other industries.

- The same practices employed by different firms may lead to very different competitive outcomes due to subtle differences in market characteristics.

- Regulatory interventions may stifle innovation in one of two ways. Firstly, there is a risk of reducing the ability to innovate by increasing the direct cost of innovation or by mandating certain standards. Secondly, there is a risk of reducing the incentive to innovate by expropriating investments made in novel products, and allowing free riding.

In this report, we aim to extend that analysis by testing these hypotheses against the evidence in a set of case study sectors. In the process, we also consider further findings that might also be relevant to the formulation of regulatory policy for online platforms.

We have developed a set of research questions from those hypotheses:

- To what extent is dynamic competition encouraged by network effects, which might otherwise constitute a barrier to entry? Those network effects and the positive feedbacks they create might mean:

  - New entrants who attain critical mass are then able to gain further market share quickly.
  - Incumbents who lose market share might then lose further market share quickly.

- To what extent does dynamic competition produce positive competitive outcomes, even despite a lack of obvious competition? That dynamic competition might mean firms contesting the market:

  - Are not able to extract rents from consumers, even in markets with substantial network effects, without risking the loss of those network effects.
  - Innovate in order to create a distinctive service and thereby contest the market or redefine its boundaries.
  - Compete for one side of the market, restraining behaviour on either side of multi-sided markets.

- To what extent do the effects of market practices vary based on market characteristics? Potential differences could include:

  - The degree to which demand-side substitution is possible, if the costs of switching to other platforms, or multi-homing, are limited.
  - The degree to which supply-side substitution is possible from related sectors (e.g. online platforms in one sector might expand into another).

- To what extent might regulatory interventions affect innovation, based on the kind of market features described above? This might include:

  - Regulatory interventions might raise the cost of innovating itself, or limit its potential scope by defining certain standards.
  - Regulatory interventions might prevent platforms who invest in innovation receiving the returns on such an investment, and thereby encourage free riding.

We note that our task here is not to consider the overall impact of online platforms on competition — even on dynamic competition. That task would, for example, require consideration of the ways in which online platforms facilitate or enhance competition and market entry in related markets. For example:

- Price comparison sites can facilitate new entry into the car insurance market by offering a lower cost way to reach consumers than television or other advertising.

- Short-term accommodation platforms and particularly their ratings and reviews systems could enable consumers to choose somewhere to stay (at a given price) based on qualities like customer service which are within reach of small establishments, rather than others like location or facilities which are too capital-intensive.

- Streaming services might reduce the lumpiness of music purchases, allowing consumers to spread their music consumption across a greater range of artists, reducing the winner takes all component in the market.

- Social networks might enhance the efficacy of marketing strategies based on word of mouth across a wide range of sectors, creating a less capital-intensive route to market than conventional advertising.

- Search engines can reduce search costs, reducing the cost for consumers to compare more options across all kinds of consumption choices.

Our approach

We have taken a four part approach to improving the evidence base around the extent and importance of dynamic competition in online platforms:

- Qualitative analysis of the case study sectors.

- Quantitative analysis of the case study sectors.

- Interviews with market participants.

- Small-scale general survey of the UK population.

Qualitative analysis of the case study sectors

We have used a combination of online sources to assemble a short history of each of the markets concerned. This allows us to explore the extent to which new entrants have in practice been able to displace prior incumbents. This is also the approach which allows us to look at the case study sectors over the longest time period and therefore get the broadest scope in our analysis.

Quantitative analysis of the case study sectors

It is necessarily difficult to measure market share for digital platforms because: a) the correct market definition is itself unclear;[3] b) web, mobile and other traffic are rarely integrated in a single reliable measure of traffic; c) traffic, while a reasonable approximation of a network's scale, may be less meaningful if, for example, one platform allows users to complete a transactions more quickly and easily (e.g. a search engine that requires less searching to find appropriate results). Other metrics besides traffic are often reported on an even less comparable basis across platforms (or only for an even more limited set of sites of time periods).

We obtained two sources of data on the evolution of the market over time.

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[3] One aspect of this difficulty which could easily be overlooked is the challenge of identifying supply-side substitutes when the core technologies of a website or mobile app and a brand are so widespread.

SimilarWeb provided data on web traffic over the previous three years. Their data is based on a range of services including the Alexa Web Information Service. We obtained data on the websites in four of their existing categories – Arts and Entertainment/Music and Audio; Internet and Telecom/Social Network; and Travel/Accommodation and Hotels – and a custom category for price comparison websites based on a shortlist we provided, which was then expanded with a mixture of recommendations from the SimilarWeb team and an algorithmic search for sites with similar profiles.

Google Trends provided information on search trends from 2004. This data returns an index for the number of searches for a topic or simple search term of interest as a fraction of the maximum over the period searched, for the topic searched. Up to five platforms can be compared in a query. The maximum in any series is 100. This is not a measure of traffic in itself, but it should give a reasonable sense of the degree of interest in a given platform and therefore its ability to attract an audience.

These two sources are used to track progress over time and the extent of dynamic competition within the case study sectors. While web traffic or online profile are not a good proxy for success in all markets (and global traffic data, while likely to be more reliable, may miss uneven geographical distributions), they should be a reasonable guide to patterns in dynamic competition among online platforms. Among those platforms the ability to attract traffic or search interest is a good guide to the scale of the network. The main exceptions, where we might want to be cautious, are those platforms in which mobile use is particularly important. This might lead to platforms succeeding in a way not captured in the data available.

Interviews with market participants

In order to deepen our understanding of the case study sectors and the market functions of online platforms generally, we interviewed market participants. These interviews were off-the-record and for background only. The intention was not to generate a large sample of interviews, covering a broad set of interested businesses, but instead to explore elements of our thinking developed from consultation with earlier research and the new data collected.

Small-scale survey of the UK population

A common test used for market definition competition policy is an SSNIP test: the smallest market within which a hypothetical monopolist could impose a Small Significant Non-transitory Increase in Price. The normal standard is a 5 per cent increase in price for at least 12 months.

This kind of test would be of dubious utility for online platforms where: a) the platform often does not charge their users, with revenue coming from advertisers; and/or b) they are often two-sided markets, in which the cost for each side of the market mostly consists of the charge levied by the other side of the market, the platform's share in the overall cost may itself be small.

It would be possible to use an SSNIP test with respect to those parts of the transaction in which there is a charge, e.g. advertisers, but it cannot help us to ascertain the extent that network effects mean users cannot switch. We therefore implement a somewhat similar

test based on whether or not a user would be willing to pay £5 a month to use the service.[4] This is intended to probe whether users feel they could find alternatives to using a given service. To the extent network effects meant there were no alternatives, or prevented users moving to alternatives, we might expect that most users would prefer to pay the fee.

The sample was 100 members of the general SurveyMonkey UK panel on 11 March 2016. The question was:

> What would you do if a £5 a month fee were required to use each of the following services? You can assume that there is no additional charge or other change to charging for any existing alternatives.

The platforms included were the Google search engine, Facebook, Twitter, YouTube, Booking.com and Airbnb. The platforms included were chosen on the basis that: a) they are reasonably well-known and therefore respondents are less likely to mistake them for some other service; b) they do not provide a platform for services that charge a monthly fee themselves (e.g. price comparison websites and car insurance), which might lead to confusion between a monthly charge levied by participants in the network and a charge to use the network itself.

The small size of the sample in this survey means that the results should not be seen as definitive. It was used to confirm our own intuitions, developed from the other quantitative evidence and the interviews.

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[4] We note by way of context that a typical subscription for an online newspaper service is of the order of £10-20 a month.

Background on the Case Studies

In choosing case studies, we attempted to cover a wide range of characteristics in terms of the types of market participants and the kind of transactions concerned.

We chose the following case studies:

- Search engines.

- Short-term accommodation, including Sharing Economy platforms, online travel agents and other platforms where accommodation is offered for short trips.

- Music, including online music stores and streaming services.

- Price comparison websites, particularly those offering car insurance.

- Social networks.

In the rest of this chapter, we will set out for each sector: the product offered; the nature of the transaction (including the frequency of transactions and whether there is any regulatory or practical requirement for people to use the platforms); the share of online platforms in the overall sector concerned; and the source of platform revenue.

Search engines

What is the product?

The search engine holds an index of websites and individual pages. The user is able to search that index by entering a search term (normally one or more words). The search engine uses an algorithm to ascertain the most relevant websites or individual pages, which are then returned to the user in order of relevance (alongside some paid results given additional prominence).

What is the process for a transaction?

Choose a search engine	• Navigate to a search engine and then enter a search term. • Enter text other than a URL in a desktop or mobile browser. • Use the search function on a portal (e.g. Yahoo).
Submit a query	• Enter a search term. • Enter part of a search term and then let the search engine complete the request (autocomplete).
Receive the results	• Unpaid results reflecting the search engine's algorithm for relevance alone. • Paid results giving particular prominence to those paying (normally per click) for advertising.

Figure 1: Transaction process, search engines

Transactions take place continuously and there is therefore not likely to be any lag in competition. There is no requirement for those using the Internet to use a search engine, though almost all Internet users are likely to use them to some extent, but the choice of search engine may be determined by the default in the user's chosen browser or portal (though these defaults can often be changed by the user).

Online platform share in the wider sector

By its nature, online search is an entirely digital activity, though people may find out about relevant information in any number of other ways, e.g. libraries or through word of mouth.

Revenue

No mainstream search engine appears to have charged for the service and the normal commercial model is to sell adverts on a per click basis. The attraction of such adverts to advertisers (relative to other potential places to advertise such as newspapers or television stations) is that they can be targeted (towards those searching for specific terms) and that they are paid on a per click basis (reducing the risk of paying for adverts in which customers are not interested).

Short-term accommodation

What is the product?

Somewhere to stay (whether a hotel, bed and breakfast or the use of a private home) while on a leisure or business trip. The online platform helps travellers find somewhere to stay and it helps the person or company offering accommodation find customers.

What is the process for a transaction?

Choose an online platform	• Word of mouth recommendation. • Another online platform (e.g. a social network). • Offline advertising. • Email subscription.
Choose an online platform	• What kind of property does the user prefer? • Does the customer trust peer-to-peer solutions, e.g. Airbnb? • Do they want to check multiple platforms, or platforms and direct sales channels?
Search for accommodation	• What kind of property? • What location? • What total cost?
Book	• Payment through the platform, in which case the platform normally takes a share. • Payment at a hotel, in which case the hotel will normally have paid in advance to be included.

Figure 2: Transaction process, accommodation

Transactions take place each time someone books accommodation. This is not necessarily frequent enough that they could try all of the material players in the market, but users are not tied to one platform for any period beyond a booking. There is therefore not likely to be any delay in competition, though there may be a delay in users discovering problems with a given platform.

There is no requirement for people to book short-term accommodation and certainly no requirement for those using short-term accommodation to use an online platform (indeed, most hotel bookings are not made through online platforms, but directly through the hotel website or offline). Some providers though, particularly those offering property on a small scale (e.g. a holiday home for parts of the year), may find that it is not economical to participate in the market without the marketing, payment processing and other services provided by an online platform. The market might therefore be practically curtailed, with a threshold to entry, without online platforms.

Online platform share in the wider sector

Within hotels, online platforms account for a substantial share of the total market, but direct sales are also important and appear to account for most bookings. Phocuswright reports that:[5]

> Despite the dominance of the supplier-direct channel (69% of online bookings in 2015 [Online Travel Agencies account for the remainder]), online intermediaries are growing fast in the U.K. market. OTAs will steadily attract a larger percentage of online bookings, according to Phocuswright's U.K. Online Travel Overview Eleventh Edition.
>
> "While supplier-direct bookings have always held a strong edge in the U.K., online travel agencies are gaining ground, and quickly," says Phocuswright research analyst, Luke Bujarski. "Both Expedia and Priceline continue to grab a larger share of the online pie, and a range of local and niche OTAs have also performed well in 2015."

Revenue

These platforms are generally financed by a charge at booking which is simply added to the price (with varying degrees of transparency. This reflects a continuation of the commissions common in the travel agency before the advent of online travel. In other cases, there might be a charge for inclusion (e.g. Travelzoo). Airbnb charges a host service fee for completing a transaction, which purports to cover the cost of processing payments and is 3 per cent of the reservation before fees and taxes,[6] and a guest service fee which represents Airbnb's own share of the transaction. The guest service fee varies between 6 per cent and 12 per cent depending on the size of the transaction (larger transactions are charged lower percentage fees).[7]

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[5] http://www.phocuswright.com/Travel-Research/Research-Updates/2015/Online-Travel-Agencies-Remain-Critical-Partners-to-U-K-Hotels
[6] https://www.airbnb.co.uk/help/article/63/what-are-host-service-fees
[7] https://www.airbnb.co.uk/help/article/104/what-are-guest-service-fees

Music

What is the product?

Users gain the permanent ability to listen to a song, or a right to listen to it one or more times. In the latter case, the music is often offered as part of a bundle in a regular subscription. Those making and selling music gain a new distribution channel (and one that might be better-placed to compete with illicit alternatives).

What is the process for a transaction?

In this case, the process for a transaction varies substantially. We can distinguish three cases:

- An online store, e.g. Apple iTunes or the MP3 files sold by Amazon.

- A subscription service, e.g. Pandora, Apple Music, Spotify Premium or the Prime Music service included with Amazon Prime.

- A service supported by advertising, e.g. YouTube or the free versions of Pandora and Spotify.

Choose an online store	• Might be determined by your choice of device (e.g. an Apple iPhone user using iTunes). • Or, might determine your choice of device (e.g. purchasing an Apple iPhone in order to access a collection of music in iTunes).
Find music	• Music can be purchased by track or by album. • Music can be searched for or might be found in the search results for other enquiries (e.g. offered as an alternate format to buy music alongside a CD in the Amazon store). • A free sample is normally available, a portion of each track.
Purchase	• Pay a one-time fee for the track or album. • The music will then be delivered immediately and often automatically added to a library available across multiple devices (meaning the user can download it again to a new device without a fresh purchase). • Controls to prevent sharing of the track (DRM) may or may not be applied.

Figure 3: Transaction process, online music store

Choose a streaming service
- Might be bundled with a wider service (e.g. Amazon Prime Music).
- There may be either a permanently (Spotify Free) or temporarily (Apple Music) trial period.
- Pay a regular subscription fee.

Find music
- Music can be recommended by email, social network or within the streaming service.
- Music can be found by searching, through peer-to-peer curated playlists or radio-equivalents, or through (algorithmic in whole or in part) recommendations on the part of the platform (e.g. Spotify's Discover Weekly).

Stream music
- Music can be streamed immediately so long as the user has an active Internet connection, selected tracks might also be selected to be available offline.
- The user is able to play the music at that moment but gains no permanent right or ability to play the track.

Figure 4: Transaction process, music subscription service

Choose an advertising supported service
- This might depend on the link shared by friends (e.g. someone might email a YouTube link).

Find music
- Music can be recommended by email, social network or within the streaming service.
- Music can be found by searching.
- Other curation is generally more limited than in streaming services, but might be accomplished by other means (e.g. collections of links on websites).

Stream music
- Music can be streamed immediately so long as the user has an active Internet connection, but offline access is rarely offered (it is one of the services that distinguishes Spotify Premium from Spotify Free, for example).
- The user is able to play the music at that moment but gains no permanent right or ability to play the track.
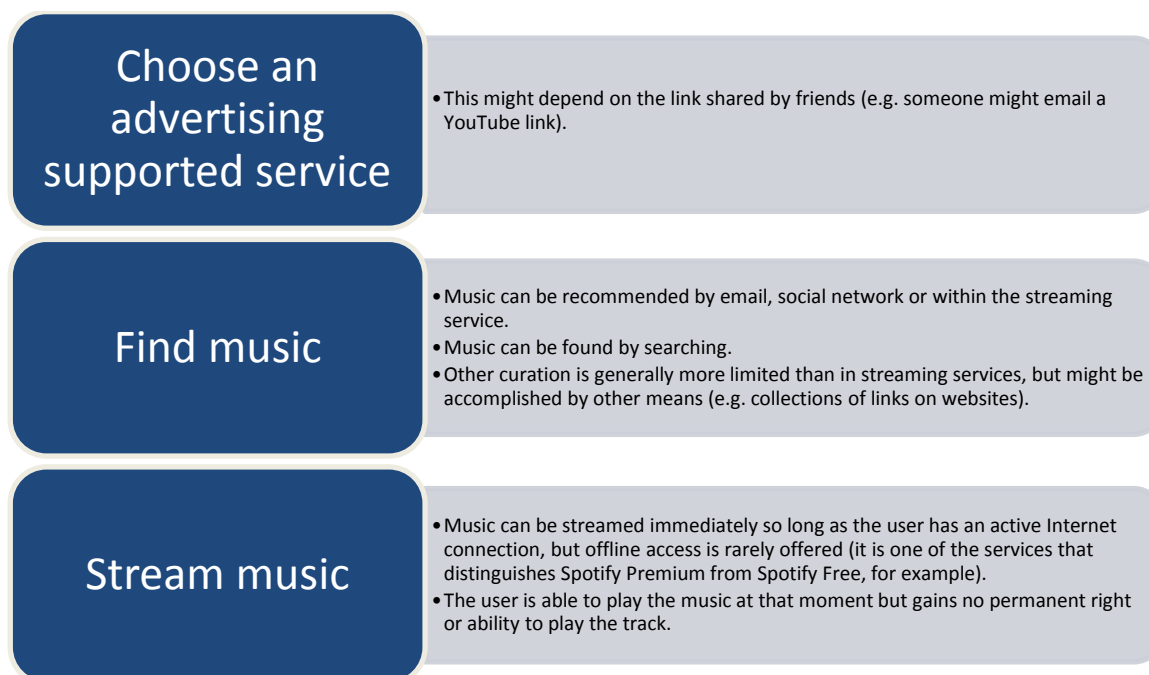
Figure 5: Transaction process, ad-supported music

Transactions take place each time a user decides they wish to listen to a song (in the case of an ad-supported service); each time a user decides they wish to purchase a song (in the case of an online music store); or each time they consider whether or not to subscribe (this could be considered as a monthly process, or a continuous one with users able to quit one service at any time and subscribe to a new one if they feel dissatisfied).

There is no requirement for users to consume music online and ad-supported options mean that there is no requirement to use paid services. These paid services may offer a more pleasant (ad-free, more functional offline) and better-curated experience.

Online platform share in the wider sector

Within the recorded music industry, digital formats have been growing steadily in their importance, from around 20 per cent of revenues in 2009 to around 50 per cent in 2013.[8] Within that digital market, online sales have been the most important, though subscription and ad-supported services are growing (to around 10 per cent in 2013).

It should be noted, however, that recorded music itself only constitutes part of the wider music industry, alongside live events, which industry analysis suggests create a greater contribution to UK gross value added[9] (though naturally recorded music distribution will affect the market for live events). Live events might also be found and booked through online platforms, but we will consider that a separate class from the recorded music distribution channels we are considering here.

Revenue

There is a mix of revenues in this sector with adverts supporting (often loss-making) basic services, e.g. Spotify Free, and payments from users for individual tracks or subscriptions to streaming services. In the case of the streaming services, the function of adverts may be as much to make the free service less pleasant, creating a rationale for users to upgrade, as to provide a source of revenue in itself (only around 10 per cent of Spotify's revenue relates to advertising).[10]

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[8]   https://www.bpi.co.uk/assets/files/Industry%20Income_2014.pdf
[9]   http://www.ukmusic.org/assets/general/Measuring_Music_2015.pdf
[10] http://www.digitaltrends.com/music/what-does-spotifys-380-percent-mobile-ad-growth-mean-for-company/

Car insurance price comparison websites

What is the product?

Users gain the ability to find offers of car insurance, protecting them against the risk of loss in road accidents or theft or fire damage to their vehicle, and can be confident they have secured a reasonable price. Car insurance firms gain the ability to attract additional business.

What is the process for a transaction?

Choose a price comparison website	• Users might instead opt to check prices directly with some or all insurers. • Price comparison websites market extensively through other media (e.g. television adverts).
Request quotes	• At least the first time a site is used, this will often involve entering a number of details about the user, their car and their home. • Users might also request features of the policy, e.g. comprehensive versus third party, fire and theft.
Receive quotes	• These will normally be sorted by price initially, with the lowest-priced first. • Users will be able to filter or sort by various features, such as the offer of a courtesy car in the event of an accident.
Buy car insurance	• The platform might redirect the user to the website of the insurance firm itself to complete the transaction, with the source of the referral tracked. • The platform would then receive a commission.

Figure 6: Transaction process, car insurance price comparison websites

Transactions will normally take place annually. This means there might be some limit on the number of transactions over which a platform can compete for a given consumer.

Users are required by law to hold car insurance (to cover harms to third parties). However they are not required to buy it through online platforms and many still purchase insurance directly. Equally, firms are not forced to participate in price comparison websites. Many large players (e.g. Direct Line) do not. However there are often varying degrees of restriction on their behaviour if they do take part in the form of "most-favoured-nation" (MFN) [11] clauses.

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[11] This is a reference to similar arrangements being used as a principle in WTO trade policy, any favour to one trading partner has to be accorded to others. Insurers might not be allowed to offer lower prices through their own direct sales channels (this would be a type of "narrow" MFN) or anywhere (this would be a "broad" MFN). These clauses have been the subject of investigation by competition authorities on the grounds they might prevent price competition between price comparison websites, discussed later.

Online platform share in the wider sector

More than 40 per cent of all car insurance was reported in 2013 to be bought online using price comparison websites.[12]

Revenue

Price comparison websites are paid a commission for sales referred to insurers. This fee reflected the existing arrangements for fees to be paid to brokers before the advent of such sites.

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[12] Warwick-Ching, Lucy (2013) Price comparison websites called into question, *Financial Times*, 25 November 2013

Social networks

What is the product?

Users are able to communicate with each other by posting information, comments, images, videos and other material. In some cases, the focus is on communicating with existing personal or business contacts. In other cases, the focus is on communicating with a broader audience. Advertisers are able to reach those using the network with the information posted allowing a degree of targeting that may be difficult to achieve in other media.

What is the process for a transaction?

There is less of a fixed order of transactions in social networks. Someone might not post content themselves, but respond to content posted by others. They might do neither but observe the interactions of others and click on adverts.

Choose a social network
- Most people will discover social networks as their existing contacts invite them to take part (viral marketing) by email or through other social networks.
- Social networks do advertise to some extent as well.

Post content
- Early social networks focused on sharing text information.
- Most platforms are now increasingly focused on the sharing of pictures and video.

Respond to content posted by others
- Users can post comments or express their views with other tools such as the Facebook "like" button.
- They can propagate a post they like to other users, subject to privacy controls, with functions such as the Facebook "Share" or the Twitter "retweet".

Click on adverts
- In theory, adverts are highly targeted to reflect information collected about the user.
- In practice, it is not clear how many adverts on social networks depend on a degree of targeting that could not be accomplished elsewhere online.

Figure 7: Transaction process, social networks

Transactions will take place continually with successful social networks often aiming to encourage interaction throughout the day.

There is no requirement to take part in social networks. However, to the extent they are used for social functions, e.g. to arrange events, someone might miss out if they do not use them and do not find out by some other means.

Online platform share in the wider sector

Social networks are an online phenomenon, like search engines, and provide some of the same services (both types of platform can be used to find a wide range of content online). They aim to provide a framework for social relationships that may also find expression offline, however. Friends and family or a group with common interests might meet in a pub and show each other pictures instead of sharing them on Facebook. It would not be meaningful to assess a social network share in that wider market, though.

In terms of the advertising market, social networks accounted for nearly 14 per cent of digital advertising spending in Western Europe in 2015.[13] Digital advertising, in turn, accounts for around half of total advertising spending.[14]

Revenue

Social networks are financed by advertising. They are able to use the information posted by users to ensure a high degree of targeting and amplify social recommendations (for example, by promoting certain posts).

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[13]   http://www.emarketer.com/Article/Social-Network-Ad-Spending-Hit-2368-Billion-Worldwide-2015/1012357

[14]

http://www.digitalstrategyconsulting.com/intelligence/2015/09/global_ad_spend_trends_for_2016_programmatic_starts_to_dominate_ad_buying.php

To What Extent is Dynamic Competition Encouraged by Network Effects, Which Might Otherwise Constitute a Barrier to Entry?

Network effects are the result of a good or service becoming more attractive as it is owned or used by more consumers or providers. In this chapter we explore the extent to which network effects appear to be functioning as a source of market power for incumbent platforms or, on the other hand, create a specific vulnerability for incumbents, whereby network effects reversing mean elasticity of demand for use of the platform might be amplified.

Network effects are the result of a good or service becoming more attractive as it is owned or used by more consumers. They can also be known as demand-side economies of scale (as opposed to conventional supply-side economies of scale).

Network effects exist in a wide range of industries. The canonical example is a phone network. The first phone is useless. Its owner has no one to call. Phones become steadily more useful as the person you want to call at any point is more likely to have their own phone. At some point, so many people have phones that it becomes expected that you will have one, an indispensable part of a normal social life, and a phone becomes a necessity.

Online platforms tend to exhibit network effects for one or more of three reasons, each of which are showcased in different case studies here:

- They create a new means for people to engage with their peers. This is the case with social networks, where the ability to share news, opinions, pictures and videos with your friends and family is the attraction. If those you wish to communicate with do not use the social network, it is not valuable as a means of communication (though the platform itself may provide other useful services).

- They connect customers and those selling goods and services. The platform is more valuable to the sellers if there are plenty of customers and therefore they can sell their goods quickly and at a reasonable price. The platform is more valuable to the customers if there are plenty of sellers and therefore they can find a good range of goods at a reasonable price. This is known as a heterogeneous network and a Sharing Economy service like Airbnb would be an example (though some users may be both sellers and customers).

- The quality of the service depends on data gleaned from interaction with other users. The ability to match customers to the information or service they require depends on algorithms calibrated using information from past users. Many platforms

include some kind of recommendation service based on patterns among other users (e.g. the music service Spotify) but data network effects are particularly important for search engines, where past use allows the service to understand queries and potential results written in natural language (not primarily intended to be comprehensible to machines).

There are two potential implications of network effects for how a market might function which often create concerns over the impact on market competition.

First, they can create a certain threshold, a critical mass, which a network needs to meet in order to be viable. If a social network is too small, it is unlikely to be useful to its users. This can create a kind of chicken and egg conundrum where a network needs to grow in order to reach a viable scale, but it needs to attain a viable scale in order to grow. If this kind of barrier to entry was sufficient that new entrants did not join the market, this might create market power for incumbents.

Second, they might provide an advantage to the largest networks. If someone is choosing between two networks (even if they are both large enough that they would be viable if the other did not exist), they might prefer the larger network. You might choose to sell an old television on eBay, for example, rather than another auction website because it is larger and you are therefore more likely to sell or attain a higher price, as it is more likely to find interested buyers. If this led to a market in which it was not practical for subsequent entrants to compete with an established incumbent (such that they might not even enter) it might create market power for the incumbent.

It is important to note that the latter is not necessarily a more pronounced form of the former. These effects are related but they are not simply more or less severe forms of the same effect.

For example, there is no critical mass for a search engine. If it returns helpful results, the user does not care if the search engine they are using is the same as the search engine that their family or friends are using. Early search engines were able to deliver results without any machine learning. An algorithm was simply designed reflecting the designer's understanding of how users were likely to query the content available. They often took advantage of machine-readable data which accompanied each page. Now that search engines are calibrated using machine learning, though, there is clearly the potential for data network effects to mean that a search engine used by a smaller share of the market will be at a material disadvantage.

Equally there will be some markets in which there is a critical mass required due to network effects but there is no reason to expect that a larger viable network will be better-placed to grow than a smaller viable network. Social networks are a plausible case of such a market. Many consumers clearly do not find it too inconvenient to use multiple social networks: perhaps using Facebook to share family news; Twitter to keep track of current affairs; and Instagram to share attractive photographs. They can increase or decrease the use of each social network depending on how rewarding they find each one and there is no reason to assume the raw number of users is a good guide to which will grow or decline over time. Price comparison websites might be viable if they have enough insurers that a given user is likely to find the best possible deal. Beyond that point, additional insurers offering worse deals will not add value.

Policymakers might have different concerns about the two types of result from network effects, as well. The winner takes all effect might be more problematic in terms of the potential for a firm to accrue market power. It might discourage new players from entering the market at all. On the other hand, the requirement for a certain critical mass might be more problematic in terms of its potential to lead to an under-supply of network services (a network might not exist because it is too expensive to attain viable scale). In either case, however, we should not simply assume that the typical dynamic is likely to be an inexorable tendency towards a single monolithic network.

Network effects might also encourage dynamic competition. The value of network effects on the one hand and their fragility on the other might create an incentive to innovate and otherwise invest in growing networks. That value might justify the initial investment needed to establish a network and in the course of reaching critical mass.

This process might continue even after there is an incumbent offering a high standard of service. There are, after all, a number of reasons why people might prefer smaller networks, despite their smaller scale:

- They might provide a distinctive service.

- They might make different choices with respect to certain trade-offs in the service.

- New networks might cater better to their particular community.

Early networks might overcome some obstacles (e.g. building consumer awareness, navigating regulatory obstacles) which are then less onerous for new networks. That might create room for new entrants able to differentiate themselves.

In some cases, users might prefer smaller networks precisely because they are small (i.e. there might be reverse network effects):

- Exclusivity might be a draw in itself, reflecting well on the user. Smaller networks might only be open to some (e.g. Facebook in its early days, when it was restricted to Harvard and then other university campuses), or simply knowing about it might reflect well on the nous of the user.

- Low quality content might drive out high quality content in larger networks. If market participants expect that a platform will be flooded with content, they could respond by investing in higher quality to distinguish their content, or they could resign themselves to the randomness of the discovery process and simply flood the market with low quality content.

- Malicious content might be more prevalent in larger networks. Computer viruses tended to be developed for Windows (and Apple computers were noticeably less susceptible to viruses) because there were more computers for them to infect.

In some cases, the advantages gained through network effects might be needed in order to mitigate the effects of these reverse network effects. A network operator might become trapped in a kind of arms race with manipulative or malicious parties in the network.

The most important facet of a market could be the extent to which it is possible for users to multi-home. If a user is able to use multiple networks at once then, while each network needs to attain critical mass, there is no reason to expect a winner takes all result. Networks can attain critical mass by: providing a valued service which does not depend on the network (e.g. Instagram's filters); leveraging an existing brand (e.g. Apple Music); or, in heterogeneous networks, by working directly to recruit one (normally more concentrated) side of the market, so the other (normally more dispersed) side of the market finds it attractive from the start (e.g. price comparison websites recruit insurers to attract consumers).[15]

A priority for policymakers might be to avoid regulatory interventions which discourage such investments, in order to maximise the number of competing networks. After all, network effects cut both ways. If a platform starts to lose market share, the loss of network effects might turn a slow decline into a rapid collapse. Potential entry could overturn settled markets quickly.

Multi-homing might be more difficult if it is expensive for a user to use each network. This might be the case for a few reasons:

- Connecting to a network is expensive, e.g. the cable connections required for a phone network.

- Learning-by-doing means that a user is able to attain much greater productivity with a given network over time as they gain experience.

- Goods and services need to be offered in one market at a time, to avoid selling the same good or service to multiple customers (and potentially being excluded from future participation in a network as a punishment). If I try to sell a given antique on eBay and in a physical store, for example, and do not remove it from eBay quickly if it sells in the physical store, I might disappoint a purchaser and get negative review scores.

- Network operators might contractually require sellers not to offer their goods on other networks. This has been the case with games and game consoles, for example, where games are secured as exclusives for one console or another.

- Users might have to invest in physical assets or rights to certain intellectual property which are specific to a particular network, which would not be portable to another.

In the event that multi-homing is more difficult, there might be the potential for a winner takes all result. There is still the possibility that such an incumbent's position is fragile, however, if a new entrant can make it easier to multi-home (or some combination of innovation and reverse network effects means the larger network is no longer the most attractive). It is also possible that regulations which curb factors that might lead to a winner takes all market might instead rule out mean by which new entrants might distinguish themselves.

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[15] These approaches are discussed in this presentation: http://www.slideshare.net/a16z/network-effects-59206938

This research question therefore turns on the question of whether or when network effects appear to be functioning as a source of market power for incumbent platforms; creates a requirement for a critical mass many platforms may not overcome; or, on the other hand, create a specific vulnerability for incumbents where a loss of market share could be compounded by a loss of network effects. If the latter effect predominates, we might expect to see sustained competition for the market as firms enter in an attempt to capture the network effects enjoyed by an incumbent or set of incumbents.

Other sectors

In many other markets, competition over time will see competition:

- Competition at the top between major players, but limited entry from smaller brands. An example of such a market could be cars.

- Stability at the top but competition among smaller players. An example of such a market would be trainers.

In many markets, the data used in the rest of this report, which measures how high profile a market participant is online, will not really be a good guide to market success (e.g. cars, where a given corporate web presence may support multiple brands). We can see a stable market pattern in the data for brands of trainers, however, which shows the potential to see the relative position of different market entrants in Google Trends data.
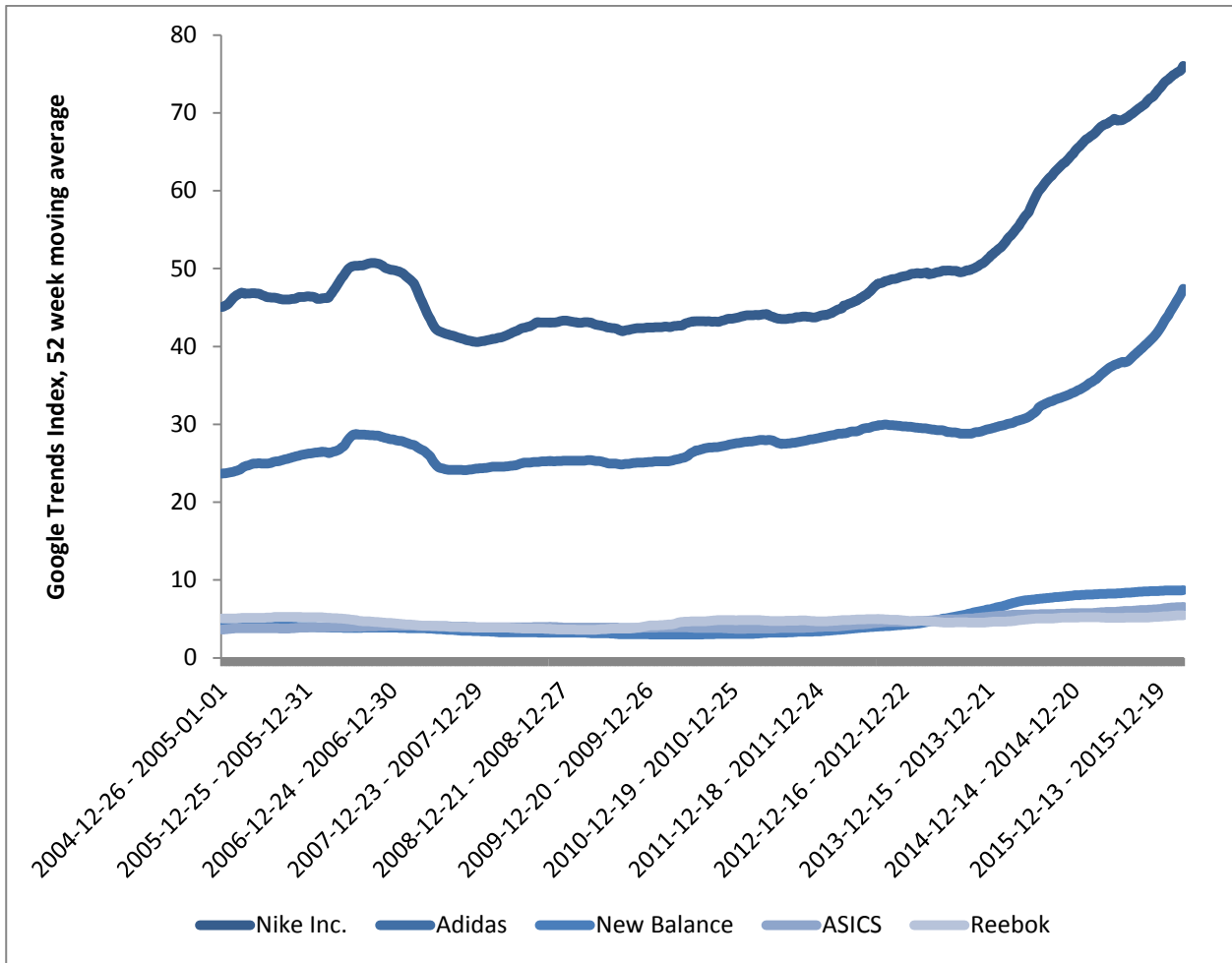
Figure 8: Google Trends, trainers

Search Engines

Year	Selected search engine entrants[16]
1990	Archie
1991	
1992	
1993	Excite Aliweb JumpStation
1994	Yahoo! AltaVista WebCrawler Lycos
1995	LookSmart
1996	Hotbot
1997	Ask.com (Ask Jeeves)
1998	Google Bing (MSN Search)
1999	AllTheWeb
2008	Cuil

The first search engine – Archie – went live in 1990 and gave users a searchable database of file names on File Transfer Protocol (FTP) sites. Other pre-web search engines allowed users to search different file systems.

Three early web search engines launched in 1993: Excite, Aliweb and JumpStation. Of those, JumpStation – developed by a student at the University of Stirling – had a number of similarities to subsequent search engines in that it used an index developed automatically by a web crawler, could be searched using keyword queries and then presented results in a list.

Yahoo! and AltaVista – two of the most popular pre-Google search engines – launched in 1994. Yahoo! offered a curated directory of websites. Yahoo! remains popular as a portal and still offers a search engine, though the search function is provided by others (Microsoft Bing or Google). AltaVista offered unlimited bandwidth, natural language queries and

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[16] https://www.wordstream.com/articles/internet-search-engines-history

search tips and was eventually purchased by Yahoo! Other popular pre-Google search engines included Lycos, WebCrawler (which provided full text search for the first time) and Ask Jeeves (which would later become Ask.com). Aggregators brought (and still bring) together the results of a number of search engines, e.g. Dogpile.

Google and MSN Search (which would later become Bing, Google's principal competitor now) both launched in 1998. Google, in particular, was based on an algorithm that judged relevance by the number of links to a site (in turn, the value of those links was weighted by their own ranks). That allowed it to improve the relevance of results returned.

Cuil entered in 2008, started by former Google employees, but closed in 2010.

Over time, search engines have competed on: a) their ability to return comprehensive results quickly; b) the relevance of their results (in an arms race with "search engine optimisation" by website promoters, attempts to exploit knowledge of search engine algorithms to secure prominent placement); and c) their placement as the default search engine for prominent portals and in widely-used browsers.

There is no doubt that search engines have been displaced in a process of dynamic competition. A more open question is whether such a competitive environment still exists today, or whether new entrants could not compete with the data network effects and brand enjoyed by Google. At least in the English-language market,[17] no search engine has succeeded in displacing Google as the most popular means of undertaking keyword searches.

There are network effects in contemporary search engines as the algorithms by which results are chosen are, in part, based on data relating to past search activity (information from interaction with other users).[18] The more users a search engine has, the more relevant and up-to-date it can make its results. This is a data network effect: a supply-side advantage with scale, experience and engagement with users in the search engine market. An increase in the number of users allows a search engine to supply a better service to future users.

Crucially this means that if a search engine (or some other kind of platform) could provide a superior ability to find content by other means, users would not care whether the service was used by their friends. The network effects are indirect. This means that even a search engine with a commanding market share and resulting data network effects is vulnerable to competition from innovative competitors. As discussed above, this has happened in the search engine market in the past. Network effects did not prevent the displacement of Yahoo! and AltaVista by Google.

More users could also make the search engine more attractive to advertisers, even for a given cost per click, as it would make a greater degree of targeting feasible. This does not necessarily make the search engine more attractive to users in turn, though. More

[17]   In non-English language markets, other search engines are often more popular, such as Baidu in China.

[18]   Only limited information is made public about how search engines algorithms work, but the importance of machine learning using data from past use is illustrated in this report on upcoming changes at Google: http://www.fastcompany.com/3057507/most-innovative-companies/inside-googles-rankbrain

advertisers do not make a search engine more attractive to users (in some cases, particularly when those advertisers are trying to overcome their natural ranking in search results, they will diminish its value). This means that the network effect itself will not tend to create a winner takes all market. The only way that result might be obtained is if a larger user base, leading to more focused advertising, leading to greater revenue, led in turn to a greater ability to invest in improvements to the network over time.

Reverse network effects might also exist in this market. Websites are often engineered to ensure that they get the best possible results in search engines (search engine optimisation, SEO). Search engine optimisation is not just available to those who offer content likely to satisfy a user, however, but can also be employed by those who wish to manipulate the search engine to promote dubious content (e.g. scam websites). The machine learning being undertaken by Google to improve its search results might be necessary, in large part, in order to overcome dubious results resulting from search engine optimisation manipulating its algorithms. There is a much greater incentive to invest in manipulating Google than other search engines.

Short-Term Accommodation

The travel industry was a very early adopter of technology to handle bookings internally.[19] The SABRE system for airline reservations, for example, allowed automated airline reservations over early mainframes from 1959. The first online travel agency – Expedia – was founded by Microsoft in 1996 and remains a major player in the market (no longer owned by Microsoft). A number of other online platforms functioning as online travel agencies have also been founded and exist to this day, including Booking.com and Hotels.com.

Services have developed in order to aggregate and compare the deals offered by different online travel agencies. TripAdvisor was founded in 2000 and added elements of a social network to this with influential customer reviews. Kayak (from 2004) and Trivago (from 2005) offer a simpler facility to search across multiple online travel agencies.

The discount publisher Travelzoo was founded in 1998. Again, a number of other online platforms marketing discounted accommodation primarily through email lists, have since been founded and exist to this day (e.g. Secret Escapes or Wowcher).

Airbnb was founded in 2008 and offers a Sharing Economy alternative to other short-term accommodation. Individual users can list their homes and the efficiency of the platform allows them to exploit relatively small market opportunities. For example, properties only available for small parts of the year (indeed, UK legislation has been altered to make it easier for let properties for parts of the year). A number of other platforms offer similar peer-to-peer short-term accommodation, with variations in the kinds of property offered or the social experience, including LoveHomeSwap, Onefinestay, Couchsurfing and others. Users are able to secure new accommodation which may be more affordable, or simply different (Airbnb advertises itself as offering an authentic local experience) to a conventional hotel or bed and breakfast.

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[19] There is a condensed history here: http://mashable.com/2012/02/21/online-travel-infographic/

All of these platforms compete on: a) the range of properties on offer and the volume of bookings they are able to generate; b) the ability to quickly and easily find an appropriate property; and c) the ability to highlight good or bad features of a property (e.g. through reviews and ratings on TripAdvisor or Airbnb). To some extent, multiple platforms also focus on different niches. This is true within segments in this sector, as well as between them. For example, onefinestay focuses on the luxury market within the Sharing Economy sector.

All accommodation platforms are subject to network effects. The more accommodation offered, the more attractive the platform is to potential customers. The more potential customers, the more attractive the platform is to those offering accommodation. In order to gain critical mass, Airbnb initially focused on markets in which there was a particular shortage of short-term accommodation (e.g. cities during major events). It also cultivated those offering properties through the platform by, for example, arranging for professional photography to present their properties well.

It should be noted that again the network effects are indirect, but in a different way to search engines. Customers do not generally have an interest in more customers taking part. They are only interested in other customers in cases where those customers are also providing accommodation, i.e. peer-to-peer platforms, or where they provide information, e.g. reviews on Trip Advisor. Accommodation platforms are therefore largely heterogeneous networks and can be distinguished from a homogenous network such a phone service where customers are interested in other customers undertaking the same activity.

The consequences of the heterogeneity in this network is that firms can invest in convincing one side of the market (normally the more concentrated side) to take part and be patient, giving them at least some time to reach critical mass on the other side of the market. Websites will sell their platform directly to those offering short-term accommodation (a lot of people, but much smaller than the number consuming it) in order to build up an attractive database, before offering it to consumers. They might also not charge a regular fee (or not charge it initially) to encourage the multi-homing of properties also offered on an incumbent platform.

Multi-homing could be difficult if each property has to be available for consumers to book immediately and there is no facility to coordinate whether that property is available across multiple platforms. This does not appear to be the case in current large platforms in practice, though.

To get an initial sense of the potential for dynamic competition over time, we can examine the series for some of the major platforms using Google Trends. The platforms shown are: an online reviews and booking aggregator (TripAdvisor); a Sharing Economy platform (Airbnb); and three conventional online travel agencies (Expedia, Priceline.com and Hotels.com).

The pattern shows a steady relative decline in the initial incumbent, the online travel agency Expedia, and steady growth in TripAdvisor. Consumers can book flights on Expedia through TripAdvisor (it is one of the online travel agencies which the site aggregates), but clearly Expedia is losing its relative position as a gatekeeper to the more social platform.

Hotels.com and Priceline (among many others) maintain a roughly stable relative interest over the period. This makes it difficult to sustain the notion that the market is subject to competition in which a winner takes all, or most, and other players are bound to decline.

Finally, and most recently, Airbnb grows enormously, overtaking Expedia in short order.

The overall picture is that the consistent market leader (at least in terms of search interest, a reasonable proxy for user profile) at the start of the period, Expedia, is now third. The current market leader, TripAdvisor, also looks like it might shortly be overturned by a new platform, Airbnb. None of those platforms have collapsed, however, and there is no suggestion that consumers booking short-term accommodation are converging on a single platform (even leaving aside the many other platforms not included here). There is no discernible tendency to a winner takes all or most market.
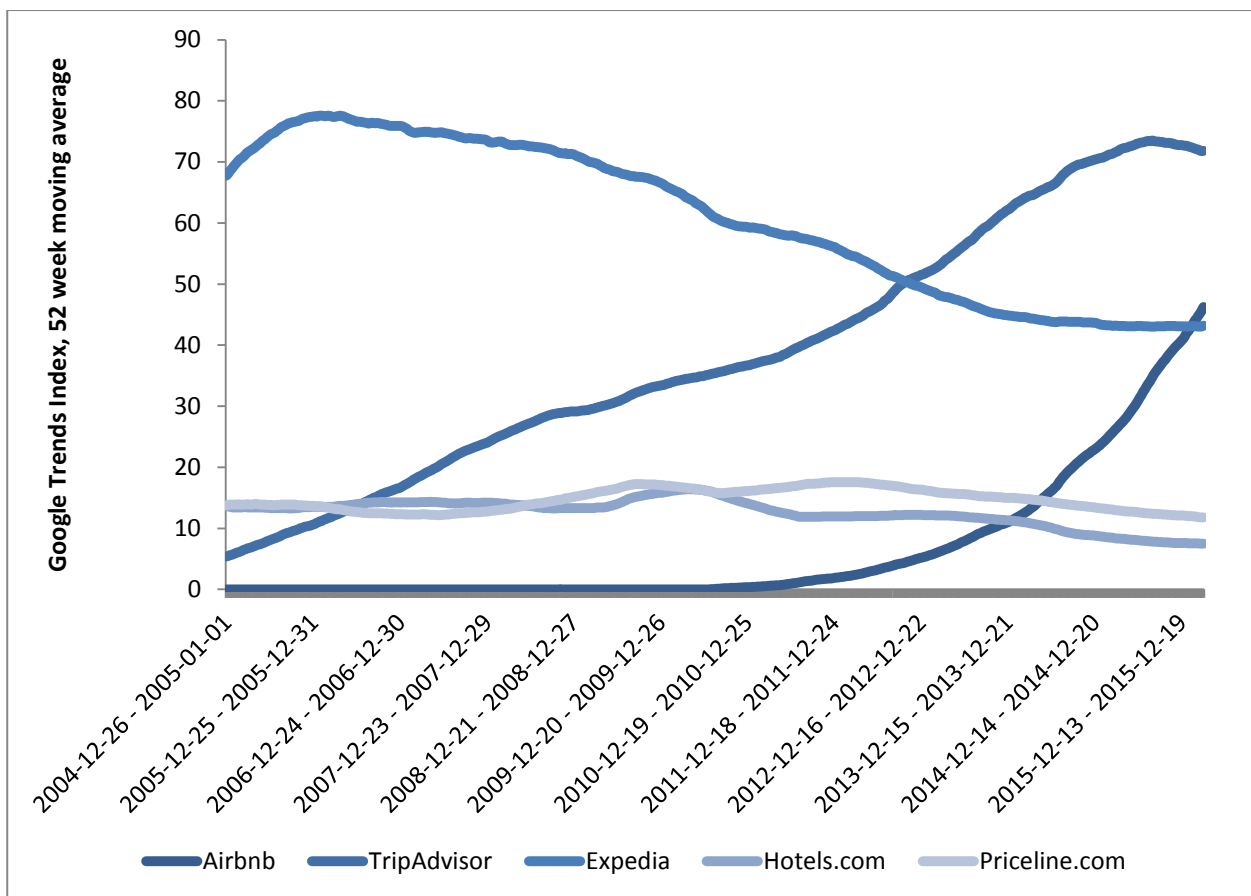
Figure 9: Google Trends, selected accommodation platforms

Using more recent, but more comprehensive data, from SimilarWeb we again see considerable movement in the sample. It is important to note that the category here does not include those websites that sell accommodation and flights (e.g. Expedia) which is a significant limitation.

The number one website remains Booking.com throughout the period but first agoda.com and then Airbnb displace hotels.com at the number two place. There is then enormous change among smaller platforms with platforms entering and exiting the top 10, e.g. Venere leaves; TravelZoo declines; and HomeAway grows over time.

Table 1: Website rankings, accommodation

Rank	March 2013	January 2014	January 2015	January 2016
1	booking.com	booking.com	booking.com	booking.com
2	hotels.com	hotels.com	agoda.com	airbnb.com
3	agoda.com	agoda.com	airbnb.com	agoda.com
4	gosur.com	airbnb.com	hotels.com	hotels.com
5	travelzoo.com	hotelurbano.com	hotelurbano.com	trivago.com
6	airbnb.com	trivago.com	trivago.com	homeaway.com
7	trivago.com	travelzoo.com	vrbo.com	vrbo.com
8	venere.com	vrbo.com	homeaway.com	couchsurfing.com
9	vrbo.com	homeaway.com	couchsurfing.com	jalan.net
10	jalan.net	gosur.com	easytobook.com	travelzoo.com

In terms of the overall market share, the pattern is one of a number of larger players all growing at the expense of fading smaller competitors. This might reflect a maturing in a market consolidating around a smaller set of players out of an initial larger pool.
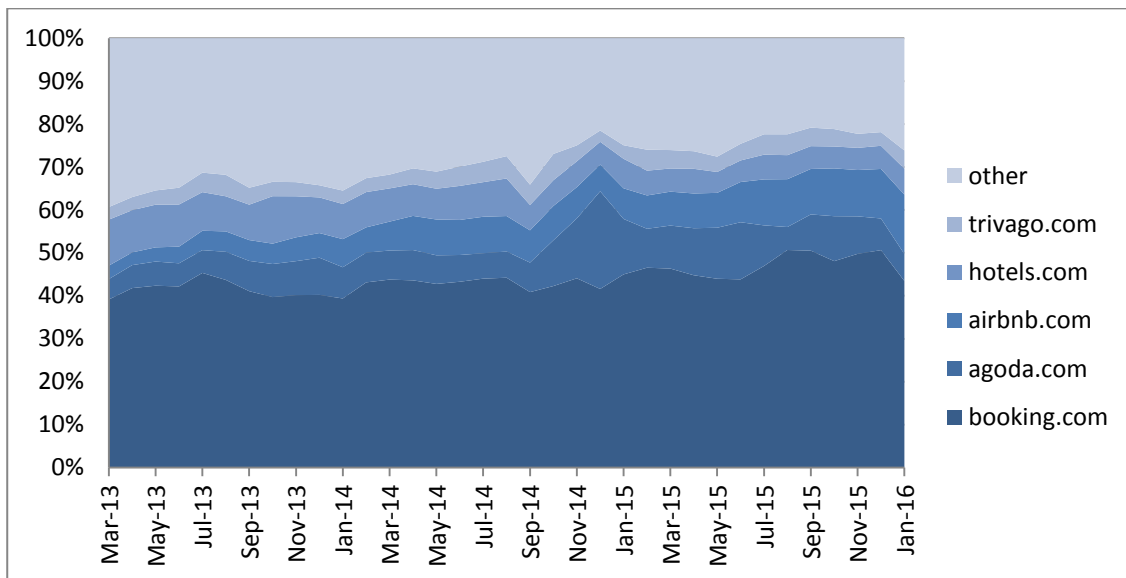
Figure 10: Website market shares, accommodation

The overall Herfindahl-Hirschman Index (HHI) for our dataset suggests significant and increasing concentration among the firms for which we have data.[20] It is notable that this did not prevent the rise of Airbnb as a new competitor to older platforms offering short-term accommodation (to the point where it would not be surprising if it were to emerge as the largest single platform in this sector).
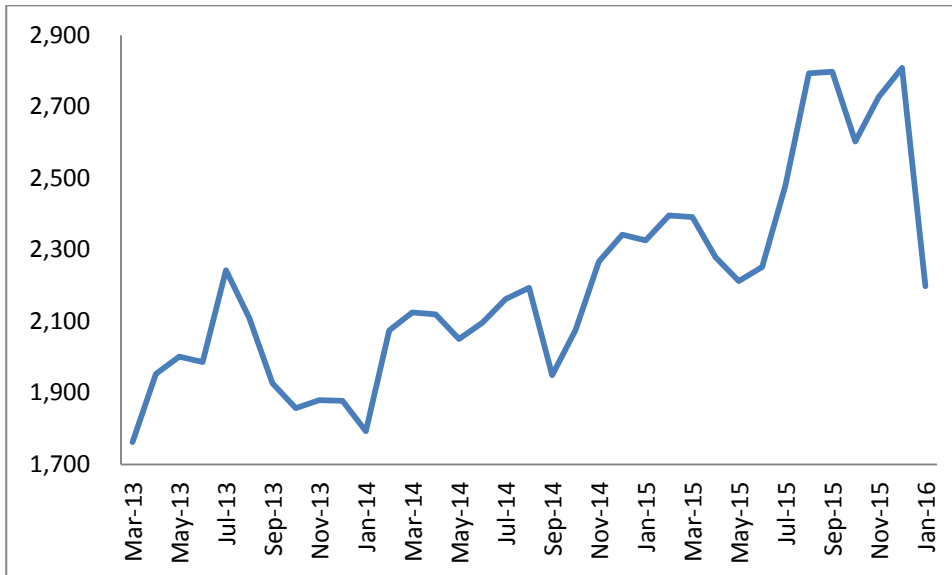
Figure 11: HHI, accommodation

Music

The platform that first brought online music distribution to broad attention was Napster, which was launched in 1998 and allowed peer-to-peer file sharing. The service was subject to extensive legal action from the recorded music industry for enabling copyright infringement and subsequently folded (the industry also launched the unsuccessful MusicNet as a competitor). Other peer-to-peer sharing services followed, such as Kazaa, but were also subject to lawsuits. New file sharing services generally became harder to use, less well-known and/or more risky for users (e.g. Kazaa was bundled with unwanted software that compromised user privacy and was intentionally difficult to remove). Users also faced a small, but high-profile, risk of prosecution.

BitTorrent launched in 2001 and attempted to address those issues with peer-to-peer sharing that was technically difficult to trace. The service still relied upon websites on which one might discover torrents, which were less amenable to inexpert users and were themselves subject to legal action.

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[20] The HHI is commonly-used in market studies to assess the degree of concentration in a market. It is calculated by squaring the market shares of each participant and then adding them together (here we use those percentages as whole numbers, meaning a maximum value of 10,000). Comparisons to normal benchmark values should be made with caution as our sample of websites is not complete and it is likely that smaller platforms are less likely to be included. This is particularly the case in the accommodation sector, where those platforms offering accommodation alongside other travel services are not included.

The iPod and iTunes were launched in 2001. Initially those services allowed users to "rip" (download) the music from CDs they owned and then use them as digital music files. The iTunes Music store launched in 2003 and allowed users to buy single tracks or albums directly and then download the digital files. Other such services launched over time, such as the sale of MP3 files through the generalist Amazon online store.

Music streaming developed initially as another form of illicit sharing. Music was uploaded to services such as YouTube (intended to be a video sharing service) where customers could then listen for free. The music industry would complain and have music taken down where it infringed copyright, but this process would rarely be complete.

Over time, legal sharing has grown with royalties paid to the industry (and some ongoing contention over payments to artists). Pandora Radio launched in 2004 and allowed users to listen with advertising or pay $10 a month to avoid adverts. It is not currently available in the UK. Spotify expanded beyond its native Sweden in 2011 with a similar commercial model and additional features enabled in the "Premium" version. Spotify is available in the United Kingdom. Not all services adopted this "freemium" model, however. Apple Music, which launched in 2015, has a trial period but no permanent, free option. On the other hand, YouTube has a paid service – YouTube Red (not available in the UK), but it can still essentially be considered an ad-supported service.

Online music platforms compete on: a) the range of music offered; b) the quality of curation, sharing and other services to help users find music they will enjoy; and c) the technical quality of the music delivered (e.g. Tidal offers Tidal HiFi, a lossless audio service).

There is a heterogeneous network effect for online music platforms similar to that for short-term accommodation. The more users a given platform enjoys, the greater a revenue opportunity it represents for the music industry for each given royalty rate. Given the near-zero marginal cost of allowing digital downloads, the reduction in profits will therefore be larger if a record label withdraws from the service, implying they will be more inclined to go ahead at lower royalty rates. In turn, users are more likely to adopt a service (for a given price) if it gives them access to a greater range of music.

An additional barrier to entry might exist in that the establishment of a successful platform could depend on a relatively small number of major deals with record labels for access to large volumes of music. A platform would need to have a certain profile in order to justify the transaction costs associated with coming to such a deal. This could mean that new entrants need either an existing scale or some other feature which causes the music industry to take notice (e.g. Spotify's evidence that its introduction was associated with a reduction in illicit sharing in the smaller Swedish market).

We can compare the series for several major platforms using Google Trends. YouTube is not plotted on this graph, in order to ensure that the other platforms are still discernible. It has maintained very high search interest since around 2008. This is likely to represent other content as much as its music offering, however. SoundCloud has also been left out, in preference for platforms more purely focused on their music offering, though it is included in the later web traffic data.

The growth of streaming services is clear: Pandora, then Deezer, then Spotify and finally Apple Music, relative to iTunes. The launch of Apple Music by the incumbent speaks to this shift in the market. The firm clearly has a range of strengths that mean it could compete effectively with Spotify.
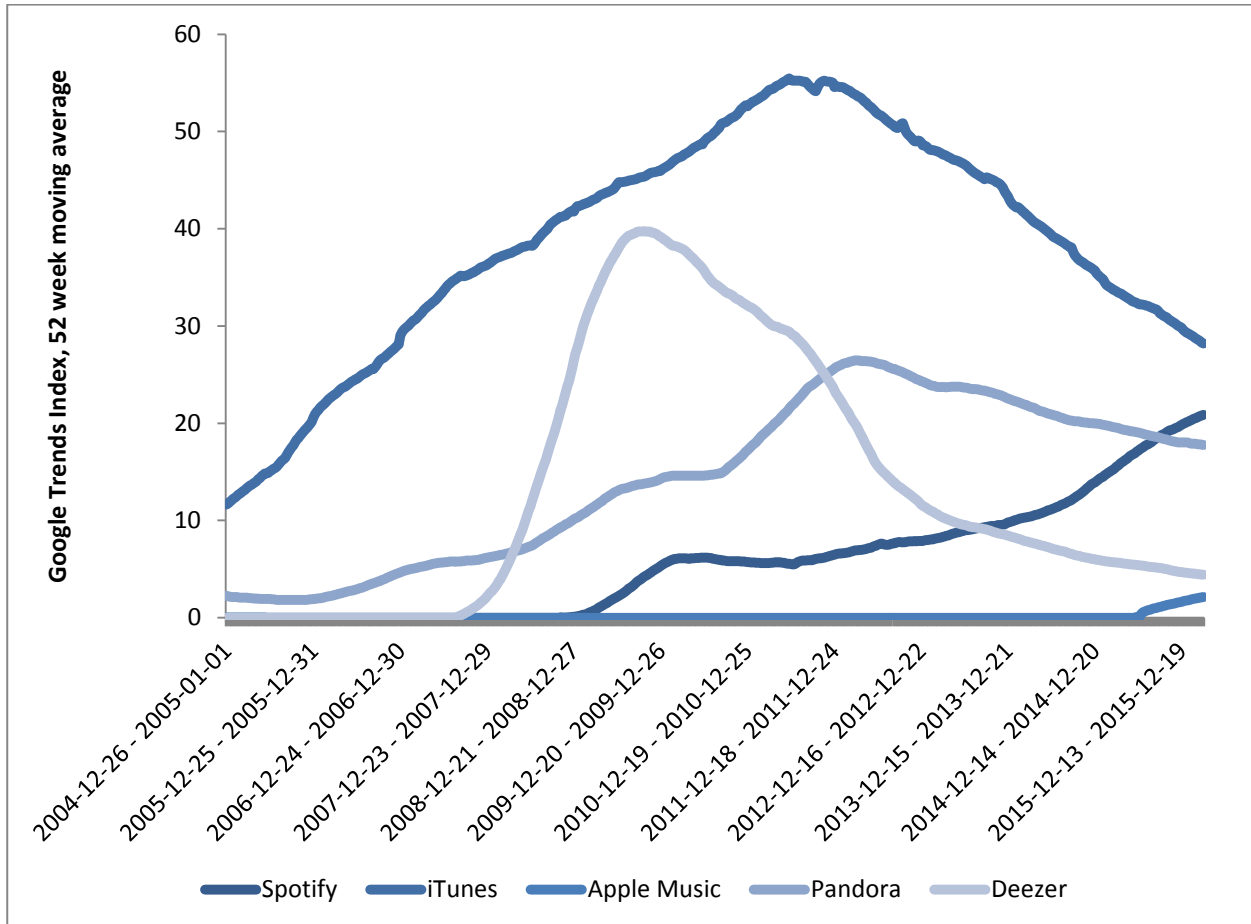

Figure 12: Google Trends, selected music platforms

There is also considerable geographical dispersion. Spotify continues to be particularly important in Northern Europe; iTunes in Australia and New Zealand; Apple Music in the UK and Canada; Pandora in the United States; and Deezer in France and other Francophone countries.

In traffic data we can see similar, dramatic change over the period. SoundCloud (which includes a large amount of non-music audio) remains the largest (this may also reflect the platform being particularly web-based), but Spotify rises from the 10th to 2nd in three years by this measure. Others, e.g. last.fm, enter and then leave the top 10. iTunes is not included as it is not a web-based platform.

Table 2: Website rankings, music

Rank	March 2013	January 2014	January 2015	January 2016
1	soundcloud.com	soundcloud.com	soundcloud.com	soundcloud.com
2	pandora.com	pandora.com	pandora.com	spotify.com
3	mp3.zing.vn	mp3.zing.vn	spotify.com	pandora.com
4	letras.mus.br	spotify.com	mp3.zing.vn	mp3.zing.vn
5	tunein.com	letras.mus.br	deezer.com	deezer.com
6	nhaccuatui.com	tunein.com	tunein.com	vagalume.com.br
7	deezer.com	deezer.com	vagalume.com.br	music.yandex.ru
8	kboing.com.br	vagalume.com.br	nhaccuatui.com	nhaccuatui.com
9	vagalume.com.br	last.fm	letras.mus.br	bandcamp.com
10	spotify.com	nhaccuatui.com	xiami.com	tunein.com

The market shares show a broadly stable share accounted for by the largest platforms. Some platforms grow and others contract but there is no stable trend towards the largest platforms.
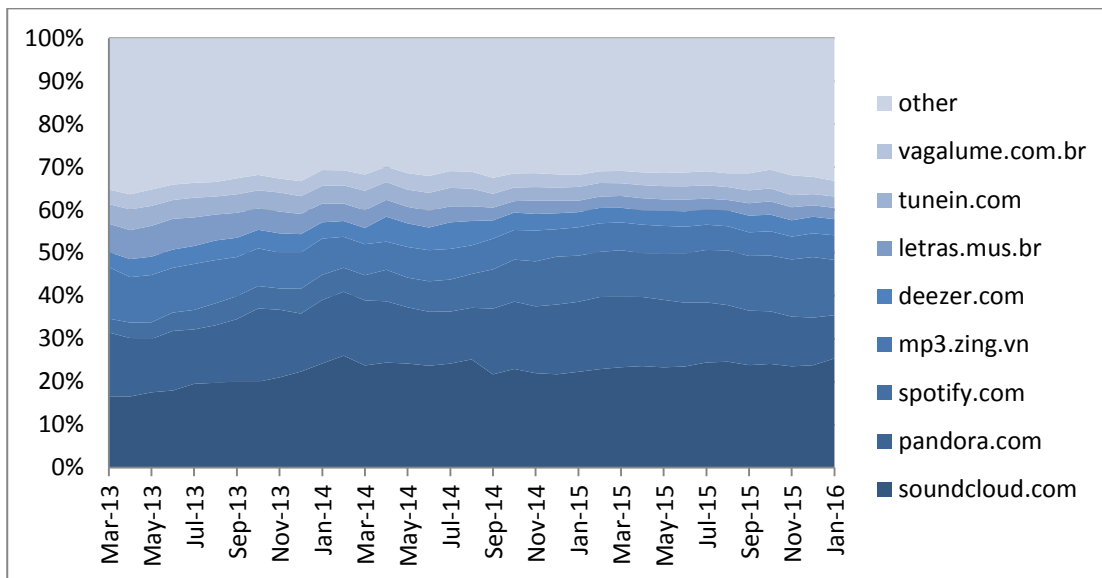
Figure 13: Website market shares, music

The HHI index for music sites suggests a much lower degree of concentration, which might reflect both a reduced sample and the exclusion of YouTube, but again a pattern of rising concentration among the firms included.
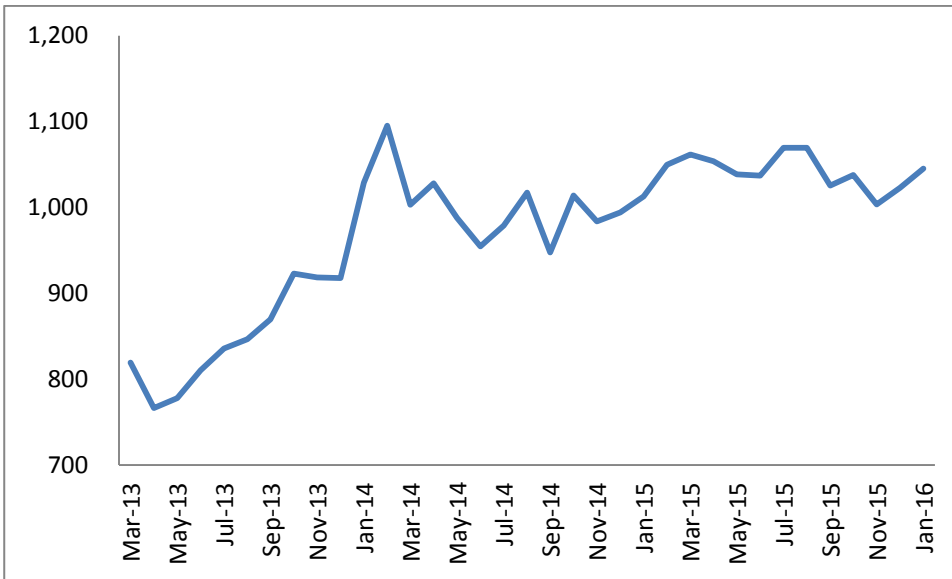
Figure 14: HHI, music

Of course, a platform might maintain a significant profile but be unable to recruit paying users. Many of the smaller sites above function as portals, allowing users in Brazil for example, to find music they are interested in that is available through YouTube (which itself does not charge for access). At present, Spotify is by some margin the largest streaming platform in terms of number of paying users, despite its freemium model. Apple Music is more significant on this measure, however, despite being a relatively new entrant as a streaming offer (though Apple already had a strong music offering through iTunes).
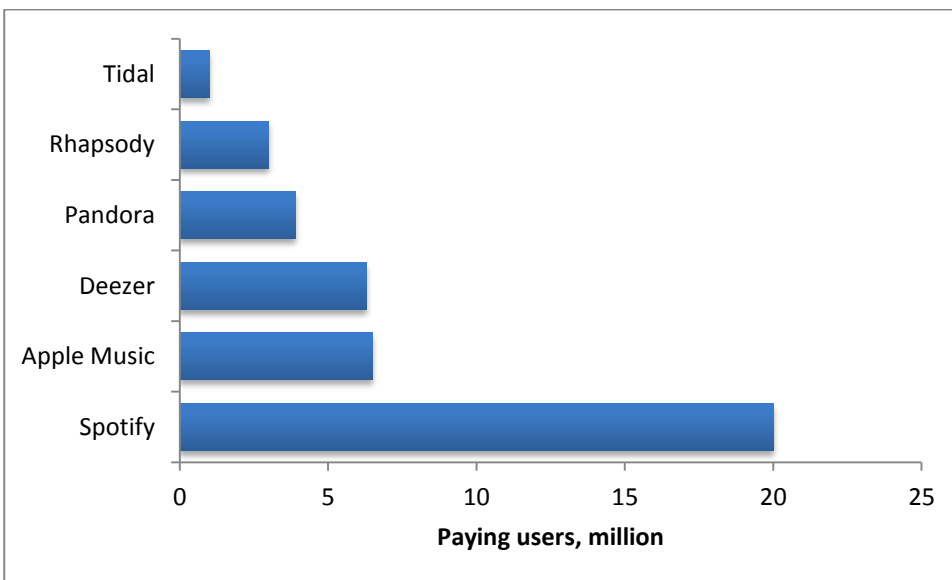
Figure 15: Streaming music services, global paying users

Price Comparison Websites

The origins of price comparison websites are diverse, reflecting expansion from start-ups (e.g. Gocompare.com); insurers, (e.g. Confused.com); firms previously offering other financial information (moneysupermarket.com); and firms previously offering price comparison for other services (e.g. Uswitch for regulated utilities).

Confused.com was established in 2001 and was the first UK website offering price comparison for car insurance. It is part of the Admiral Group (also the owner of several major insurers).

Moneysupermarket.com was established as Mortgage 2000 by a student – Simon Nixon – in 1993 as a provider of mortgage information to financial advisors. Moneysupermarket.com itself was established in 1999, again providing mortgage information. It later branched out into other products, including car insurance.

uSwitch was founded in 2000 and aimed to take advantage of deregulation in UK gas and electricity markets. It expanded into other markets (e.g. telecoms) along with car insurance.

BGL Group launched comparethemarket.com in 2006. Traffic to the website grew more than fourfold after the launch of a successful advertising campaign based around fictional meerkats.

Finally, Gocompare.com was established by a founder with experience in car insurance (at the insurer Admiral Insurance) in 2006. It was subsequently taken over by the insurer esure. Gocompare was distinctive in offering more information on the features of the insurance products, rather than their price alone, allowing price comparison website to more fully substitute for insurance broking.

In comparison with some of the other types of online platform discussed here, price comparison websites are relatively similar in how they function and their business model. There is no other obvious alternative means to find car insurance products besides purchasing from insurers directly. Insurers might see these price comparison websites as one means of reaching customers alongside advertising (including on other online platforms). The regulated nature of the product might mean that there are limitations to the degree to which platforms can technically differentiate themselves, leading to a focus on other means of competing (e.g. marketing).

There is a heterogeneous network effect for price comparison websites similar to that for short-term accommodation. The more users a given platform enjoys, the greater a revenue opportunity it represents for an insurer at a given fee. This therefore makes it harder for insurers to withhold their products from certain websites if they feel that the fee is unreasonable. At the same time, the more insurers offer products on a price comparison website, the more users will be able to trust that the time invested is worthwhile and they will not be missing out on other, potentially-better deals.

These network effects may be limited in practice by a) the potential for customers to search on multiple sites; and b) users simply not knowing how comprehensive different price comparison websites are to the extent that a given site reaching an attainable critical

mass would be at a material disadvantage relevant to one with somewhat more insurers listed.

Comparing the series for those major platforms using Google Trends suggests a pattern of considerable change: at one point the largest player, Confused has declined to the point where it has the least search interest. By contrast, the latest entrant, comparethemarket.com, is now the highest profile. At other times, however, Moneysupermarket.com and Gocompare.com have been the highest profile. The most recent new entrant still a major player in the market emerged in 2007.
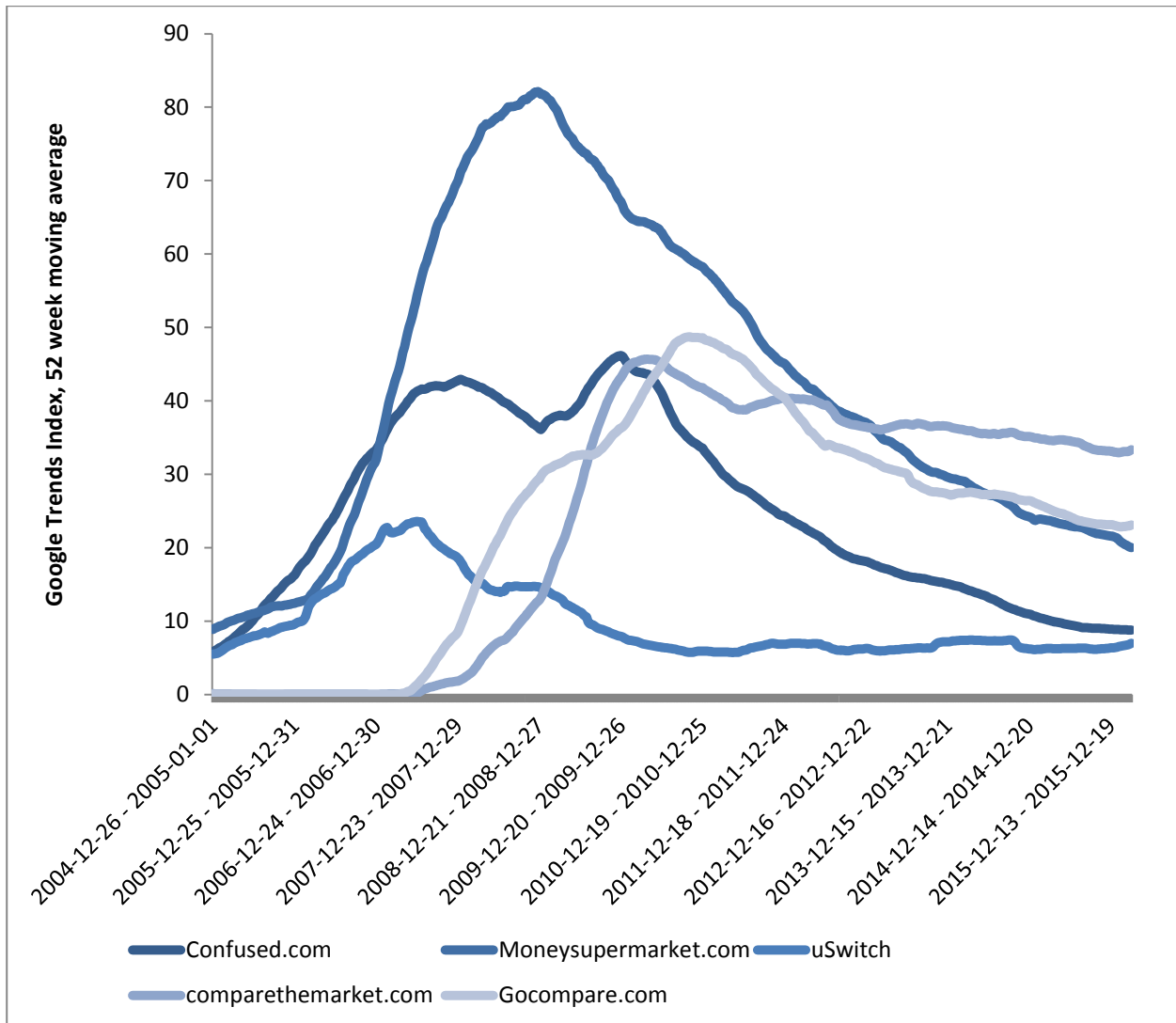
Figure 16: Google Trends, selected price comparison websites

Web traffic data suggests a somewhat different picture, with moneysupermarket.com the largest across the period; uSwitch trading places with Gocompare.com in second; and comparethemarket.com third. Some smaller platforms enter and then leave the market (e.g. TescoCompare) While the rank order is different, perhaps reflecting a greater or lesser use of search (measured by Google Trends), or the degree of advertising effort in a given period, the difference in the stability of the two measures might mostly result from the shorter time horizon measured in the traffic data. There is a similar level of variation from 2013.

Table 3: Website rankings, price comparison websites

Rank	March 2013	January 2014	January 2015	January 2016
1	moneysupermarket.com	moneysupermarket.com	moneysupermarket.com	moneysupermarket.com
2	uswitch.com	uswitch.com	gocompare.com	uswitch.com
3	comparethemarket.com	comparethemarket.com	comparethemarket.com	comparethemarket.com
4	gocompare.com	gocompare.com	uswitch.com	gocompare.com
5	confused.com	confused.com	confused.com	confused.com
6	money.co.uk	money.co.uk	money.co.uk	money.co.uk
7	netquote.com	quotezone.co.uk	insure.com	insure.com
8	insure.com	insure.com	quotezone.co.uk	moneyfacts.co.uk
9	quotezone.co.uk	netquote.com	netquote.com	quotezone.co.uk
10	tescocompare.com	moneyfacts.co.uk	moneyfacts.co.uk	netquote.com

In terms of market share, the pattern is broadly stable over time. Moneysupermarket.com increases its market share somewhat, but overall the pattern remains that of six significant players and then smaller options.
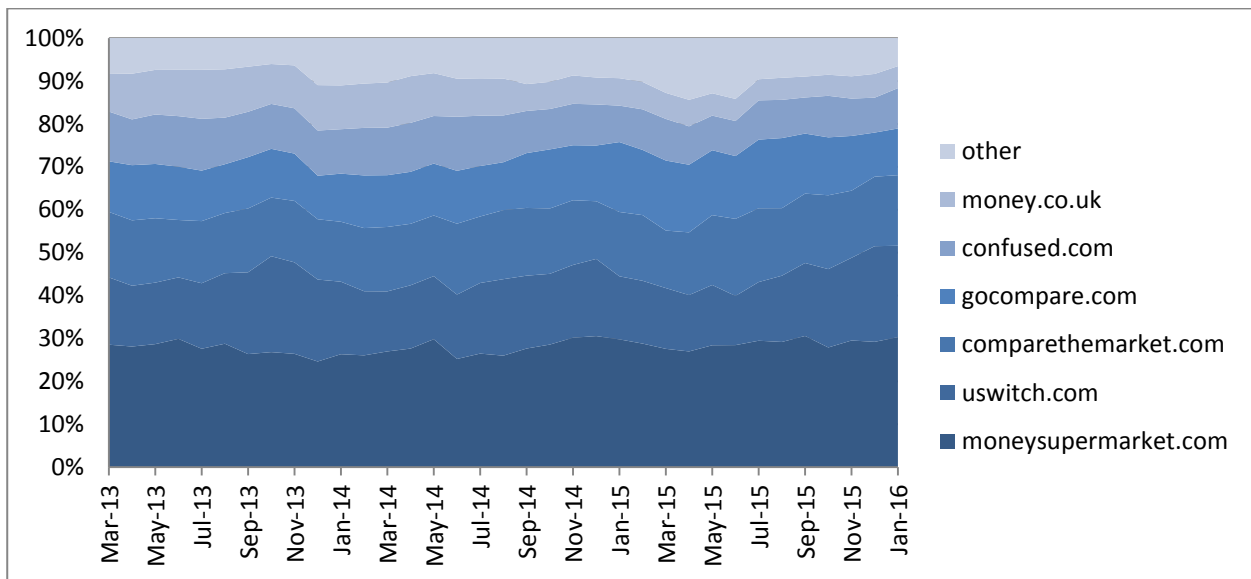

Figure 17: Website market shares, price comparison websites

The HHI shows little change until the end of the period. It then shows a significant increase in concentration among the firms in the sample.
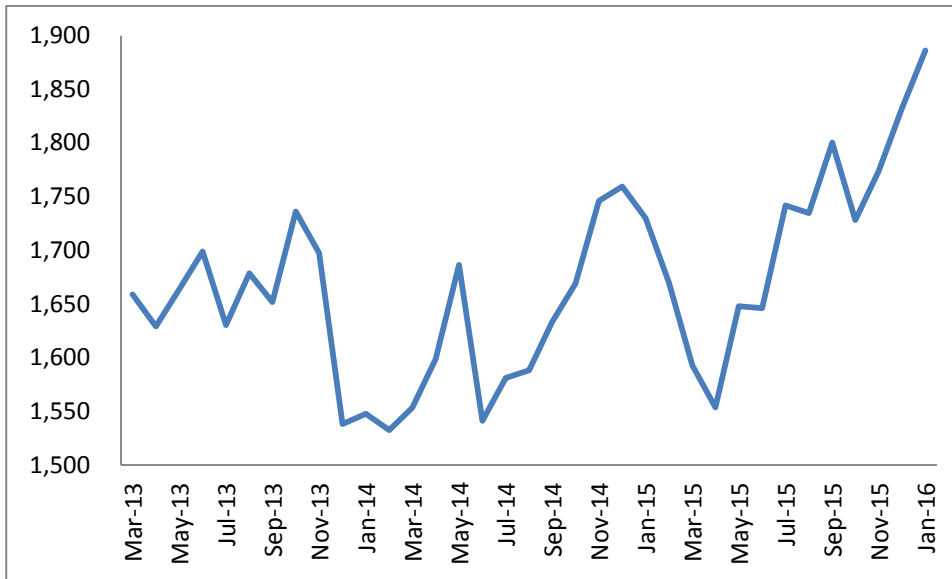
Figure 18: HHI, price comparison websites

Social Networks

Online social networks in some form or another have existed from before the Internet in its modern form. The Bulletin Board System (BBS) provided a forum for users to communicate and share files. Modems were used to dial into the services specifically over telephone lines (often restricting networks to local areas for cost reasons). These services were used in the 1980s and 1990s.

These were then displaced by online discussion forums, initially those offered by CompuServe (founded in 1969 as a business information service) and America Online (AOL, founded in 1983). The services offered by AOL included searchable member profiles.

The first dedicated social networks were aimed at enabling reunions, e.g. Classmates.com in 1995 and its UK equivalent Friends Reunited in 2000. Friends Reunited had 15 million members by December 2005.

An early attempt at a general social network of the kind used now was SixDegrees.com, which proved unsuccessful as its attempts to secure more users were seen as overly aggressive. Friendster also failed to develop and become viable despite achieving 3 million users within a year of launch. Other early social networks focused on specific demographics did better (e.g. BlackPlanet.com, which remains successful).

The next major social network was MySpace, founded in 2003, which attracted young users from Friendster offering content such as music and a wider range of features. The website declined over time, however, although it maintains a niche among musicians. LinkedIn launched the same year and remains successful, focusing on professional rather than personal social networks.

Facebook launched in 2004 and was initially restricted to Harvard and over time other university campuses before opening to the public in 2006. The site currently has over 1

billion daily active users and nearly 13,000 employees and is by some margin the largest social network.

Since then, however, other entrants have developed offering somewhat different services. Twitter offered a more broadcast user experience from 2006, with (initially short, text) messages shared with the wider world. It became popular as a source of news and a place to break major stories. Other services focused more specifically on visual content, e.g. Instagram (founded in 2010 and later acquired by Facebook) and Pinterest (also founded in 2010). YouTube also arguably has some features of a social network.

There are network effects in social networks in that the entire value of the network resides in the ability to engage with the community using that network. Most social networks therefore face a challenge establishing critical mass initially, which they can overcome with strategies including: starting with a defined community where they can attain critical mass quickly (e.g. Facebook started in the Harvard campus); offering a service that is valued even without the network itself having critical mass (e.g. Instagram's photo filters, which prepared pictures for posting to earlier social networks, e.g. Twitter); or convincing highly networked individuals to take part (the celebrities with very large numbers of followers who constitute a large part of the attraction of Twitter).

These network effects may be limited in the degree to which they create a barrier to entry in practice, though, as it is easy for users to use multiple social networks. Many users will have the apps for multiple social networks on their phones.

Smaller networks might be preferred despite their size because they make different choices in terms of trade-offs for users. Facebook can be seen as a social network that prioritises remembering, allowing people to easily access older content, whereas Snapchat prioritises being forgetful, allowing people to evade the consequences of content they might regret over time. One network could do both in theory, but it might be hard in practice.

They might also be preferred despite their size because they have strong network effects within particular niches. Myspace, for example, is no longer largest network overall, but it retains an enduring popularity among musicians, for whom it has significant network effects. Different networks serving a range of niches could, over time, add up to a larger market share (in total, or in some cases individually) than a general purpose social network (if it was abandoned by one niche after another).

Finally, smaller networks might be preferred because of their size for various reasons, reverse network effects. For example:

- Exclusivity might be part of the attraction to some users. Facebook might be less cool among younger users than newer networks, *because* of its increasing reach among older users. This might explain the strong growth of platforms such as Snapchat.

- Larger social networks might be flooded with dubious content, making a user feel that an investment in creating high-quality content is less likely to be rewarded. The

sheer volume of comments on a popular YouTube[21] video, for example, might discourage someone adding real value, as their contribution is likely to be lost in the crowd, to the point that the network is only attractive to those who lack other outlets (for good reason). In turn, users might find it harder to find good quality content. This might explain the growth of Pinterest, for example.

- Manipulation of social networks, e.g. attempts to message large number of users in order to trap them in some dubious scheme, might be targeted at larger networks. Popular scams that have targeted Facebook users for example, which are often used as a vehicle to install dodgy software, include:[22]

    - Applications claiming to show users who has viewed their profile.
    - Adverts offering free goods or services (including free credits for games which normally require in-app purchases).
    - Messages pretending to be from Facebook security and requiring users to log in.
    - Plug-ins offering new features (e.g. the ability to change the appearance of Facebook.
    - Messages which purport to come from friends requesting assistance.

The sheer scale of Facebook's profile obscures the trends in other platforms with less traffic. We should also be cautious about interpreting the decline from 2013. This might represent the service becoming so well known that it declines as a search term because people instead access the site directly (or by opening its native mobile app).

Behind Facebook there are clearly changes taking place: Myspace is initially the largest platform and is then displaced by Facebook and falls back. Eventually, Myspace is surpassed by three new social networks which emerge: Twitter, Instagram and Pinterest – as well as Facebook.

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[21] YouTube undoubtedly functions as a social network for many users.
[22] These scams are discussed here: http://facecrooks.com/Scam-Watch/Top-Ten-Facebook-Scams-to-Avoid.html
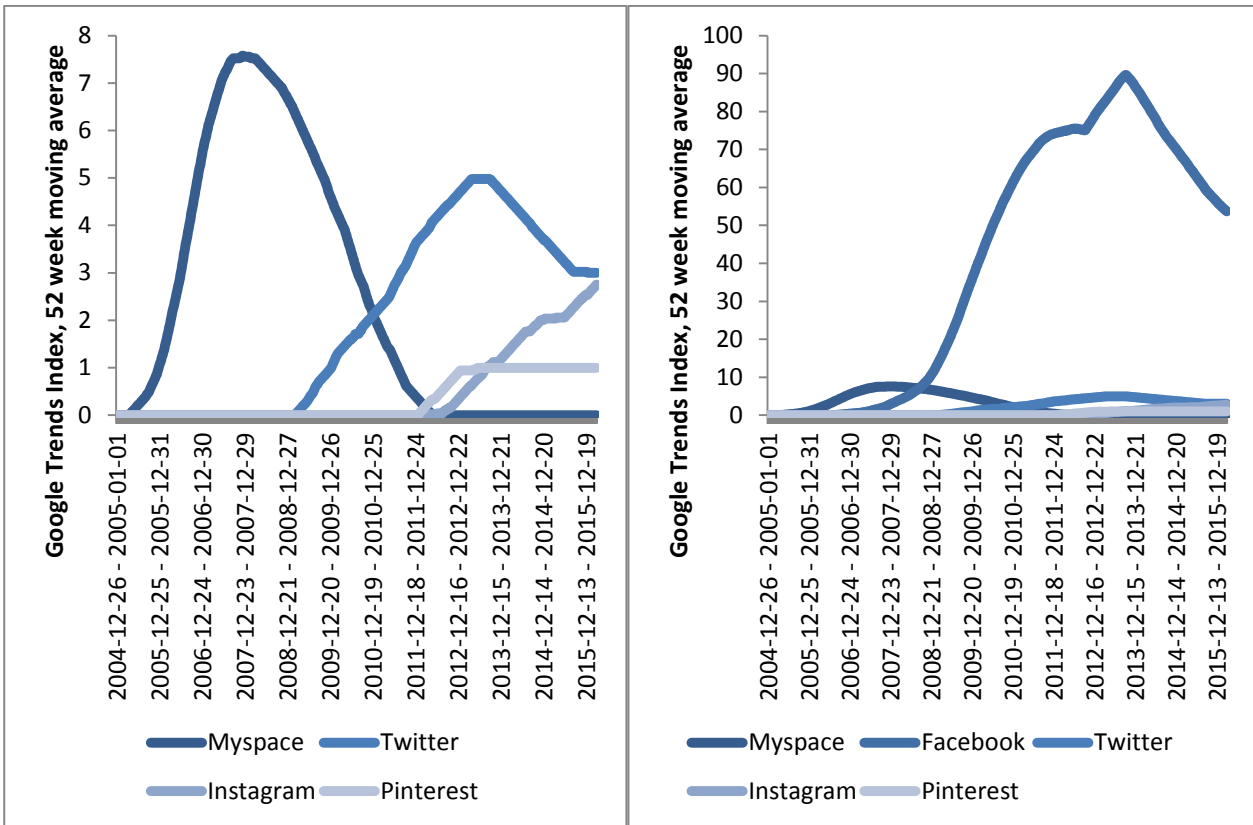
Figure 19: Google Trends, selected social networks, with and without Facebook included

In the traffic data, the pattern is similar but Instagram does not catch Twitter. This perhaps reflects that Instagram is particularly mobile heavy (even compared to other social networks). Also the Russian network vk.com is third. The shorter time profile means that there is less movement in the rankings, but both Instagram and Reddit move up the rankings at the expense of other social networks. Some of the platforms listed below (e.g. Tumblr) can be used as platforms for publishing with no social interaction within the network, but they do also function as an alternate social network. In the search data, we attempt to focus instead on those which function more purely as social networks.

Table 4: Website rankings, social networks

Rank	March 2013	January 2014	January 2015	January 2016
1	facebook.com	facebook.com	facebook.com	facebook.com
2	twitter.com	twitter.com	twitter.com	twitter.com
3	vk.com	vk.com	vk.com	vk.com
4	tumblr.com	tumblr.com	instagram.com	instagram.com
5	linkedin.com	instagram.com	linkedin.com	reddit.com
6	instagram.com	linkedin.com	tumblr.com	tumblr.com
7	ask.fm	ask.fm	reddit.com	linkedin.com
8	pinterest.com	pinterest.com	pinterest.com	pinterest.com
9	wikia.com	wikia.com	weibo.com	wikia.com
10	tagged.com	reddit.com	wikia.com	weibo.com

Over time, the market share of Facebook does seem to be declining as other market participants increase in traffic.
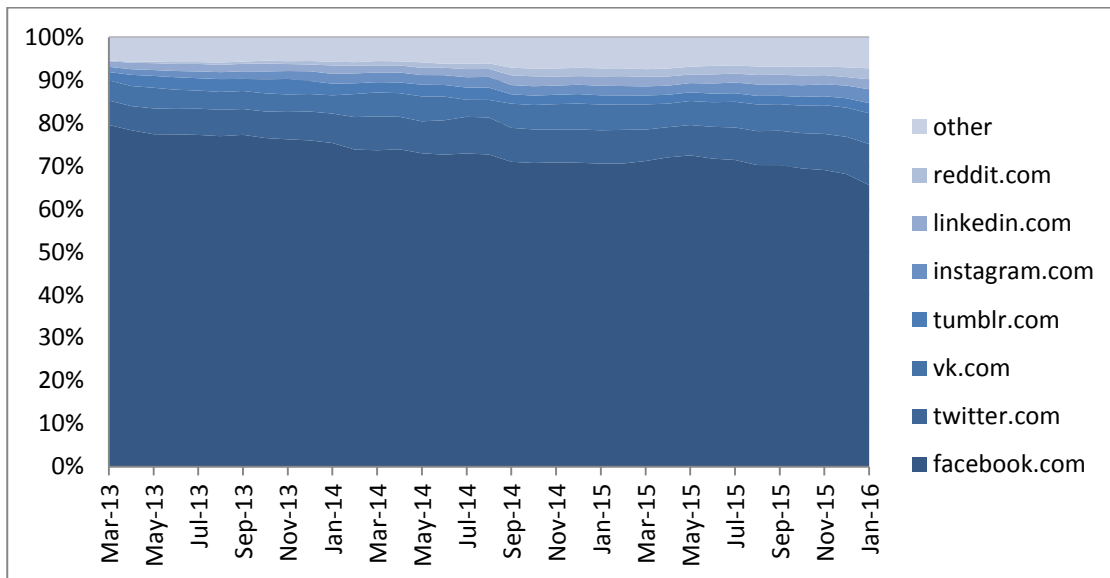

Figure 20: Website market shares, social networks

The HHI index suggests that the social network sector is very concentrated among the firms in the sample, but that concentration is declining over time. This probably reflects new entrants claiming parts of the Facebook market share as shown above.
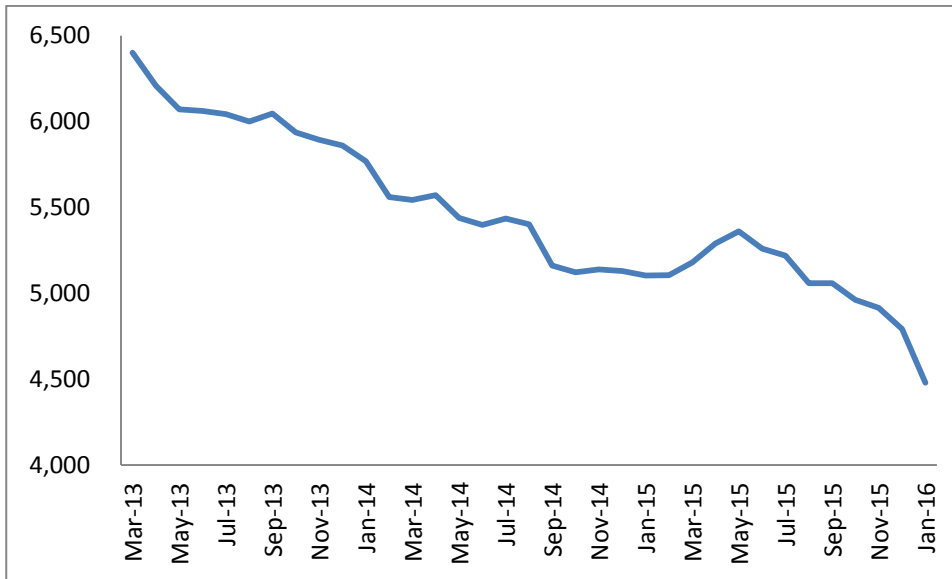
Figure 21: HHI, social networks

In order to include mobile, which is likely to be particularly significant for this kind of online platform, we can look at app downloads. The five most popular free apps (paid apps are overwhelmingly games) downloaded on the Apple iOS store in the United States as of 29 March 2016 were:[23]

1. Snapchat – a social network.
2. Messenger – a Facebook messaging app connected to the social network.
3. Stack – a game.
4. Instagram – a social network.
5. Facebook – a social network.

There was a similar pattern on the Google Play store (often used for Android devices):

1. Messenger – a Facebook messaging app connected to the social network.
2. Snapchat – a social network.
3. Facebook – a social network.
4. Color Switch – a game.
5. Pandora Radio – a streaming music service.

Instagram comes in sixth.

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[23] This data is available here: https://www.appannie.com/apps/ios/top/

In the United Kingdom, the most popular apps on the iOS store were:

1. Driving School 2016 – a game.
2. Stack – a game.
3. WhatsApp messenger – a messaging app (a category that might be considered to compete with social networks).
4. Snapchat – a social network.
5. Instagram – a social network.

And, on the Google Play store:

1. Messenger – a Facebook messaging app connected to the social network.
2. WhatsApp messenger – a messaging app.
3. Facebook – a social network.
4. Snapchat – a social network.
5. Color Switch – a game.

The number of these apps that are popular (eclipsing utilities like Google Maps – although that may partly reflect that many users already have that app installed) suggests that users are not choosing one, but using multiple apps (perhaps to keep in touch with different networks of friends and/or family).

Indeed, among some users that process may be taken to an extreme:[24]

> "I have eight different means of communication," says Ms. Van Gastel [a 21-year-old senior at University of Antwerp, in Belgium], whose phone audibly chirped in the background throughout our interview. "I have a personalized ringtone for every different messaging app so I can guess who is texting me," she adds.

New entrants therefore only need to attain their own critical mass, they do not need to match the largest existing social networks. Indeed the existence of earlier networks may even make it easier for new social networks to attain critical mass. Instagram, for example, could function for users as a means to post attractive photos to Twitter, before it attained critical mass as a social network itself.

It is also telling that the most popular social network overall (Facebook) is often not the most popular download, reflecting that in some relatively mature markets the growth is in newer social networks (even in absolute terms).

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[24] Mims, Christopher (2016) For Generation Z, Email Has Become a Rite of Passage, *Wall Street Journal*, 11 April 2016

Overall Findings

Entry is common and tends to materially affect the market

In the 12 years over which we have some form of quantitative data, all of the markets show entrants who rise to a substantial market share (sufficient to alter the HHI for the sample as a whole).

- In the short-term accommodation sector, the most notable new entrant is Airbnb, which may in time become the largest platform in the sector.

- In the music sector, Spotify grows rapidly relative to other platforms. More recently, Apple Music enters the market.

- In the price comparison website sector, two new platforms launch more recently – Gocompare.com and comparethemarket.com.

- In the social network sector, first Facebook, then Twitter, LinkedIn, Instagram and Pinterest all enter the market and become significant.

These increases in market share result in corresponding substantial declines:

- In the short-term accommodation sector, Expedia sees a steady decline relative to other platforms.

- In the music sector, iTunes declines steadily over time, to the point where Apple introduces a competitor to Spotify in the streaming market, Apple Music.

- In the price comparison website sector, confused.com sees a decline relative to the newer entrants, particularly comparethemarket.com.

- In the social network sector, Myspace in particular saw a dramatic decline in its market share to the point it became a niche platform.

While our data on existing sectors is limited, and some of the conclusions above might be contradicted in other datasets, the extent to which new entrants not only enter the market but become among the largest players does seem distinctive. Other markets, e.g. trainers (see data above), cars, soft drinks, do not see this kind of regular change. This suggests that network effects or other barriers to entry are either limited or offset by the incentive to compete for the market, while they mean that new entrants that do muster critical mass tend to grow very quickly and become more serious competition than they might otherwise.

The sector for which we do not have quantitative data (search data is not so meaningful and a relatively short series for traffic data seemed unlikely to yield much insight) may have been more stable. This may be due to a shift towards competition from new means of finding information. It may also represent a greater degree of maturity in this market, however.

Effective entry does not appear to be less likely in more concentrated digital markets

Network effects might function as a barrier to entry. Either by creating a critical mass new entrants were unable to overcome or a tendency to a winner takes all or most market, in which new entrants know they are bound to lose out. If this were the case, we would expect that more concentrated markets would see few entrants (or, at least, those entrants would struggle to attain material market share).

This does not appear to be the case. The most concentrated sector among our case studies is social networks. In that sector there are recent entrants who have attained a meaningful market share (e.g. Instagram, Pinterest). Instagram and Pinterest first appear in the traffic dataset above in 2012. The market share thus attained has been sufficient to reduce the degree of concentration in that market.

By contrast, the market for price comparison websites is less concentrated, with a number of very broadly similar platforms among which consumers choose each time they transact. However the market has remained broadly stable for a longer period with more-or-less conventional competition (through marketing and other means) between the existing platforms. The last point at which new entrants began to gain significant search interest was 2007, with the growth of Gocompare.com and comparethemarket.com.

There is no sense here that concentration reduces entry and the reverse appears more likely: new entrants are more likely in markets with a single large incumbent (or several large incumbents) than those with a number of competing incumbents. This supports a sense that network effects are encouraging competition for the market more than they are preventing entry.

The exception to this general pattern might be the music sector, which is highly fragmented and seeing considerable entry, however this might instead reflect the relative immaturity of that market with the business model still not settled: ad-supported versus paid; freemium versus subscription-only; streaming versus purchasing downloads (or cloud storage). Or it might reflect that we have included a number of platforms who do not offer streaming themselves, but represent portals used to access music in other sectors, or the geographical segmentation of the music market and the inclusion of lots of non-UK platforms.

Concentration tends to increase over time in each sector, but competition from other sectors often intensifies

In three of the four case study sectors for which we have quantitative data, concentration (measured by the HHI) increases over time. The exception is social networks, but that is also a sector in which the HHI remained high throughout the three-year period studied.

This means we cannot exclude the possibility that the pattern of dynamic competition noted above might be a temporary feature of these markets. It might be possible that dynamic competition has been very important as new platforms offer innovations which customers prefer, but those markets eventually settle on a given model that is good enough new entrants cannot distinguish themselves to a sufficient degree that an

incumbent cannot reliably duplicate any new features and maintain its market share (diminishing the incentive to pioneer those new features in the first place).

Another possibility, however, is that as these sectors grow and mature new innovations, which challenge incumbents, start to become different enough that they are regarded as separate sectors, different types of platform in the European Commission's parlance, despite competing with each other. An obvious example would be the growth of social networks engines which compete with search engines both a platform for highly-targeted adverts (indeed, many social networks have much richer information about the users advertisers might reach than search engines) and as a means for users to find content relevant to their needs.

Another example would be the market for purchased music downloads. Competition for that sector with iTunes might be less meaningful than competition from Spotify and other streaming services offering an alternative means of accessing music. In that case, different types of platform were included in the same sector.

The question therefore turns on market definition. We have used loosely-defined sectors above. It is not obvious that in any of our case studies a properly-defined market is not still seeing new entrants (it is beyond the scope of this study to attempt full market definitions). However we cannot exclude the possibility that, even if the general pattern we have observed is for there to be a high degree of entry encouraged by network effects, such entry might diminish over time.

To What Extent Does Dynamic Competition Produce Positive Competitive Outcomes, even Despite a Lack of Obvious Competition?

A firm can be subject to dynamic competition: if it raises its quality-adjusted prices, its revenue will decline over time as its short-term profits attract new entrants to serve the same consumer demand at a lower quality-adjusted price. In this chapter, we investigate the extent to which that process can produce positive outcomes for consumers by forcing an incumbent to remain competitive or by encouraging innovation.

Markets can be competitive in a static sense: if a firm raises its quality-adjusted prices, its revenue will decline as it loses market share to competitors who can profitably offer lower quality-adjusted prices. The sectors studied here might be competitive in a static sense. In some sectors, no firm has a commanding market share (e.g. price comparison websites). In others, the sector itself competes with (imperfect) substitutes in other sectors. A firm looking to advertise its goods might advertise on television, in local newspapers, on a radio station, on a social network like Facebook or on a search engine like Google. It is a matter for debate (and beyond our scope) to define the markets in which these platforms operate and the extent of imperfections in the static competition within those markets.

They can also be competitive in a dynamic sense: if a firm raises its quality-adjusted prices, its revenue will decline over time as its short-term profits attract new entrants to serve the same consumer demand at a lower quality-adjusted price. Our task is instead to assess the extent to which an analysis of static competition alone might underestimate restraints on market power, leading to positive competitive outcomes, resulting from dynamic competition.

Those new entrants might enter in a number of ways:

- New firms might enter the market by investing in new and broadly similar capacity. Despite the similarity of the product offered, they might have other advantages in their business model (e.g. the lower legacy costs and newer fleets enjoyed by newer low-cost airlines).

- New firms might enter the market by innovating and creating new capacity that addresses the same consumer demand. This might include what appear to be quite different offerings, e.g. physical stores might be displaced by online stores.

- Existing firms in other sectors might expand their offer to enter the market. This might take the form of creating new products (e.g. a manufacturer of aeroplanes

might start to make cars) or of adjusting existing products to serve that demand (e.g. a van repurposed as a family car with extra seats and windows).

The research question depends on whether we can observe these processes in the case study markets. In every case, these processes (or the threat of them) could restrain incumbents to a greater degree than would be implied by the degree of static competition. It would mean that competition was stronger than would be implied simply by the market share of existing market participants as new entrants would be able to offer either a distinctive service (by innovating, which would also mean new services for consumers); or make use of other strengths. This might therefore produce positive outcomes for consumers by forcing an incumbent to remain competitive, or by encouraging innovation.

Search engines

Of the platforms studied, respondents to our survey were most likely to report that they would pay £5 a month to use the Google service (this reflects in part that it was also the most widely used of the platforms included in the survey). However it was still only 13 per cent of users who reported they probably or definitely would be willing to pay such a fee.

Despite the large market share Google occupies most customers (81 per cent) believe they would find an alternative if it attempted to exploit its position in the market to extract even a modest monthly fee. If such an outcome materialised, there is then the possibility that the loss of data network effects that would entail further damage to the platform. Further research might ask whether an additional fee on top of that (e.g. an increase to £10 a month) would still be paid by those who reported they were probably (9 per cent) or definitely (4 per cent) willing to pay £5 a month.

Of course, it is possible that users underestimate the extent to which they rely on Google, and overestimate their ability to find adequate alternatives. It seems more plausible that this is evidence a platform's market is fragile and contingent on offering the service for free. Any deterioration in the quality of its offer will see market share lost to existing or potential competitors. This means that despite an obvious lack of competition (or, at least, obvious concentration in the sector) dynamic competition is producing positive outcomes.

In terms of advertisers, Google faces more conventional static competition. Advertisers can reach users with adverts through other online platforms that offer a similar (or greater, in the case of some social networks) ability to target to specific groups of users. While it might be an important part of the online advertising mix, with firms missing out on business if they do not advertise, there is no sense that it offers a product that is unique, where there are not alternatives if the quality-adjusted price of the service were to rise.

Crucially, there some commentators seem to see Bing as being distinguished by allowing advertisers to better monitor advert performance and target across some dimensions (e.g. demographics, device type, partners offering the search engine to their own user base).[25] This makes network effects in terms of a better ability to focus adverts across a larger user base an unlikely explanation for why advertisers choose Google. Google's advertising sales performance might simply result from the larger and better-established search

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[25] For example: http://www.wordstream.com/blog/ws/2015/02/25/bings-ads-vs-google-adwords

engine is the default for many advertisers. This leads to higher rates (for a given level of prominence), as more advertisers compete on given search terms, but the difference could be eroded in time as advertisers try to avoid that competition.

This discipline in rates is reinforced by two of the trends discussed above:

Entrants outside the search engine sector can enter by innovating and offering new substitutes. As a means for customers to find relevant information across the web, search engines in general are one option alongside the user recommendations passed through email and social networks. Users might also use social networks for certain keyword searches: Twitter for information about fast-moving events; LinkedIn for professional contacts.

This in part reflects the inability of search engines, even Google, to overcome manipulation through search engine optimisation, with users instead relying on recommendations from their own contacts. Advertisers can place the highly-targeted adverts they want as social networks can target with, in some cases, an even richer set of data on their users. We can therefore see the rise of platforms such as the Facebook social network as creating an alternative to Google with a similar kind of scale in terms of traffic. Google remains the number one ranked website overall, globally, and Facebook is second.[26] The two platforms are not exactly equivalent, they will have different advantages and disadvantages for different use cases, but advertisers in particular could use either to reach consumers in a highly-targeted manner.

Entrants from outside the sector can also enter by innovating and building on existing customer relationships. Services such as Siri in Apple iOS and Cortana in Microsoft Windows attempt to offer natural language voice queries and offer search as part of a broader ability to interact with the device (e.g. asking it to set a timer). They tend to use alternative platforms other than Google for search by default.[27] These services are also being developed in new devices (e.g. Amazon's Echo).

Short-term accommodation

Users of both Booking.com and Airbnb reported overwhelmingly that they would cease using the service if a charge of £5 a month was introduced. 94 per cent of those who reported using Booking.com and 96 per cent of those who reported using Airbnb respectively reported that they would probably or definitely find alternatives. This seems an unsurprising reflection of the number of alternatives that exist, competing for the market. It suggests that even if these platforms enjoy a large share in some particular segment (e.g. Airbnb for rentals in city centre locations), people feel there are adequate substitutes they would use instead if inconvenienced with a monthly charge.

Of course, the charges for these services are generally levied (either on a per transaction basis or a regular basis) on the person offering accommodation instead. The transparency

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[26]   http://www.alexa.com/topsites

[27] The Siri voice-activated service initially defaulted to Google, but has now defaulted to Microsoft Bing for some time. Microsoft Cortana only uses Bing. Facebook has launched M as another competitor in the voice search market. Google also offers voice search.

of these fees for consumers varies by platform. In some cases, all or part of the platform charge is reported as part of the quote for a property. In other cases, it is not and the charge is simply a matter for those offering accommodation, akin to advertising sales. There is again competition for this market among platforms.

Given the willingness of customers to move (which we can safely assume extends to a willingness to try other platforms if the range of properties declines) we can probably assume that the limit on charges is the potential to risk a material loss in property range relative to other platforms, leading to a loss of users and then over time to a general decline in the network. The ability of those offering properties to move will depend on their ability to multi-home (easing the transition from one platform to another) and the existence of multiple viable platforms (discussed earlier). The obstacles to users checking multiple websites are minimal (particularly if they are taking multiple trips in a year) and those owning properties can offer them on multiple platforms simultaneously (they can multi-home), though the ability to differentiate prices can be limited by MFN clauses on some platforms.

Entrants are able to enter the market by innovating. In particular, Airbnb initially entered the market by opening up capacity (private homes) which was often previously not available to rent. It therefore not only represented new competition in the platform sector, but also reduced barriers to entry in the accommodation sector itself. Higher-level platforms also allow people to check multiple online travel agents (or a direct booking). Sometimes this is a part of a larger platform (e.g. TripAdvisor, where the main attraction to users might be social reviews), sometimes it is a dedicated service (e.g. Kayak or Trivago). While this is not direct competition, it is an innovation which might make the market more competitive by allowing users to choose more easily between platforms based on price.

Entrants are also able to enter by building on existing customer relationships, often entering from other parts of the wider accommodation sector. TripAdvisor, for example, could establish its FlipKey service, competing with Airbnb, and use that service to power searches for holiday lettings through its platform.

Music

Many platforms in this area do institute a monthly charge. Almost all those charges match Spotify at £9.99 for a standard monthly package which allows users to listen to stream unlimited music. However a number of entrants allow users to reduce the cost in various ways, or purchase additional services:[28]

- Spotify and Apple Music allow users to purchase a multi-user "family" account for £14.99.

- Tidal and Qobuz allow users to pay £19.99 a month or more for a high fidelity option.

- Many services offer discounts for an annual subscription, including Tidal, Deezer and Qobuz.

- Napster offers a service that only operates through the web browser (as opposed to the full service, which also offers a native mobile app) at £5 a month.

- Amazon Prime Music is included as part of the Prime package (alongside video content and free or discounted priority delivery) at no additional cost, but offers a smaller selection of music than most other services.

- Microsoft Groove Music costs £8.99 a month and also offers a further discount for annual subscriptions.

The sheer range of services available, almost all of which offer a large music catalogue – suggesting they have at least temporarily realised any serious network effect, makes it hard to imagine that it would be feasible for an incumbent to increase their prices without losing market share. Dynamic competition has clearly played out to the point there is static competition, at least among streaming or cloud music services.

The number of services setting their price at £9.99 suggests that the amount charged by Spotify has become a kind of 'going rate' for streaming services. It might be seen as indicative of platforms attempting (for now at least) to avoid competing on price and instead seeking to compete based on differing feature sets (or music catalogues, Tidal offers exclusives from affiliated musicians). However there are still signs of price competition with some cheaper services (e.g. Microsoft Groove Music and Amazon Prime Music) and others which offer an annual discount.

Many services offer a permanent free option, normally supported by advertising. This is normally seen as reflective of the need either to introduce users to the service or to avoid users resorting to illegal file sharing instead. In the case of YouTube, at least in the UK, there is only a free and ad-supported service. Most users (87 per cent) report that they would probably or definitely find alternatives if a charge were introduced for the service.

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[28] The different options are discussed here: http://www.pocket-lint.com/news/126892-which-is-the-best-music-streaming-service-in-the-uk-apple-music-vs-spotify-vs-tidal-and-more

Most of the revenue for those platforms that offer paid services arises from paying customers, but the existence of free alternatives will exert limits on the quality-adjusted price of their paid services (which might in part explain why many of them lose money).

Entrants are able to enter the market by innovating. The classic example of this would be Spotify which offered a streaming service with an entry point through its free advertising-supported service (this may also have market impacts, as users no longer have to invest time and money in a music collection with a particular service). It has then attempted to defend and grow that market by offering algorithmic and social recommendations, while other platforms have chosen other means to try and distinguish themselves (e.g. higher-quality lossless audio files). Spotify and other streaming services had enough of an ability to displace iTunes that Apple then re-entered the market with its own streaming service, Apple Music.

Entrants are also able to enter the market based on a wide range of existing relationships with customers. Apple Music and Microsoft, for example, are able to offer their streaming service as part of an operating system. Tidal has made use of strong links with well-known musicians. Spotify can attempt to duplicate some of these advantages (e.g. cultivating its own links with musicians) but not all of them and they can be set against its large network of paying and free customers.

Price Comparison Websites

There is an ongoing debate over the merits of "most favoured nation" (MFN) requirements for price comparison websites, which prevent insurers offering a lower price outside the price comparison website. Those who support the clauses defend them as saving the user from the effort of having to check multiple comparison websites plus insurer websites. They also prevent insurers using price comparison websites to find a competitive insurer and then going to the insurers website directly, avoiding the commission charge which finances the platform. However the Competition and Markets Authority (CMA) has recently ruled against those broad MFN clauses that cover other PCWs, limiting them to narrower restrictions on offering cheaper deals directly through the insurers own website, arguing that broader MFNs prevent competition for users between PCWs passing on higher or lower commission rates.[29]

That regulatory debate is beyond the scope of this study. Leaving it aside, and to the extent any competition issues identified are addressed by new CMA rules, the existence of multiple platforms of a broadly similar scale implies that there is the potential for static competition. Users themselves do not pay (and we did not test the impact of a £5 a month fee, as the potential for confusion with insurer fees seemed considerable).

Dynamic competition in this case can be seen as a phenomenon that has played out with a succession of entries to the market (e.g. comparethemarket.com) which attained significant market share and offer a similar service to users. Those entrants did not particularly innovate in the product offered, which is often quite similar, or using existing

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[29] The report is available here: https://assets.digital.cabinet-office.gov.uk/media/5421c32ee5274a1314000003/Appendices___Glossary.pdf

customer relationships. They instead attempted a more conventional attempt to capture part of the market with investment in marketing.

Social networks

None of the social networks listed earlier charge users and they are all supported by advertising. This implies that they understand their consumer market to be fragile enough it could not sustain a charge (at least not without losing enough customers it would either lose more in advertising revenue or see a loss of network effects which would threaten the platform's attractiveness). It also means they all compete to attract advertisers with other social networks and other ad-supported online platforms such as search engines and free music streaming (they are all attempting to utilise the same business model).

We again tested the intuition that these platforms would see a substantial loss of consumers if they charged with a small survey. Five per cent of Facebook users and no Twitter users reported that they would be expect to pay and keep using those services if they instituted a £5 charge, almost all reported they would probably or definitely find alternatives.

Revenues are published by those firms which are publicly listed along with the number of users, which allows for a comparison. Facebook is able to charge more. This might be because a larger user base is more attractive to advertisers, however it seems more likely that technical features of the platform, particularly the large amount of information it collects about users (e.g. the films or books they like, their age, where they live) is attractive to advertisers. By contrast, Twitter has information about the networks formed – who follows who – and could attempt textual analysis of tweets. This information is public, though, and therefore available to others using the network besides Twitter themselves. Less precise targeting might therefore be possible with Twitter, and the network itself might capture less of the value.

LinkedIn has the highest revenue per user, probably reflecting a relatively valuable user base; the focus on careers, which might be relatively valuable; and possibly its paid services for users (giving them various additional freedoms in using the network). This is despite it being a considerably smaller platform.

Table 5: Revenues for selected social networks

	Facebook	Twitter[30]	LinkedIn[31]
Revenue, Q4 2015	$5,841,000,000[32]	$710,473,000	$862,000,000
Monthly active users, Dec 2015	1,590,000,000[33]	320,000,000	100,000,000
Revenue per monthly active user	$3.7	$2.2	$8.62

Successful new entrants in the social market space have generally been start-ups. Major players in other markets have attempted to start social networks (e.g. Google+) but with limited results. It is not clear why attempts to leverage other customer relationships have not been successful, but it might be taken to imply that innovation in the form of the social network has been valuable enough to consumers to outweigh any tendency to default to existing brands or device or operating system providers.

My.BarackObama.com is an example of how an online platform might be established using an existing brand (in that case, of a Presidential candidate). The strength of the brand establishes credibility that the network is worth persevering with and it will reach critical mass.

New entrants have instead innovated with respect to the form of the network, for example:

- Twitter offered a network based around sharing short text messages, which slowly developed towards greater use of photos and video (including through the Vine short video and Periscope live video components in the Twitter business). The network represented more of a broadcast model, with a relatively small number of users enjoying large followings, and became particularly attractive to those interested in rapidly discovering, or communicating, new stories.

- Instagram offered a network based around sharing photos, with limited text input. It allowed users to filter those photos in order to make them visually attractive and cultivated a community which appreciated the aesthetic value of those photos.

- Snapchat offered a network based around expiring video messages. This aimed to limit the social consequences for users who might post messages they would otherwise later regret.

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[30] http://files.shareholder.com/downloads/AMDA-2F526X/1794701311x0x874451/6C751539-C3F1-459A-9811-4688A03BFE39/Q415_Selected_Company_Metrics_and_Financials.pdf
[31] http://blog.linkedin.com/2016/02/04/linkedins-q4-2015-earnings/
[32] http://investor.fb.com/releasedetail.cfm?ReleaseID=952040
[33] http://investor.fb.com/secfiling.cfm?filingID=1326801-16-43

Overall conclusions

Online platform market shares tend to be fragile, limiting the extraction of material rents

The process of dynamic competition for the market, responding to network effects, which was observed in the last chapter seems to place limits on the quality-adjusted price of the services offered by online platforms.[34] In many sectors, e.g. search engines or social networks, firm behaviour and survey evidence suggests that in the event of even a modest hike in costs users would expect to find an alternative and cease using the service. It is difficult to reconcile this behaviour, and this finding, with the sense that there is an important "moat" which prevents users switching to alternative services over time. Any moat that does exist only seems to be enough to keep them in one place if the platform continues to be free and improve its service over time.

This implies that barriers to entry are generally low enough that there is a credible threat of entry (including from outside the market, either new types of platform or other alternatives like illegal music file sharing). In turn, the threat of losing market share, and therefore diminishing the network effects that make the platform attractive, often compels platforms to either offer a competitive service (e.g. they are not able to introduce a charge for users) or innovate in order to maintain their competitive position.

Innovation seems to persist among online platforms, even in concentrated sectors

New entrants continue even in concentrated markets (e.g. music before the expansion of streaming services, or social networks) and tend to succeed through innovation, offering different services to existing platforms.

Traditional competition concerns regarding conduct can still be relevant

There is no tendency to monopoly resulting from network effects apparent and technical barriers to entry are modest. To the extent there are barriers to competition in these sectors, they are rooted in other market distortions. Most favoured nation clauses in the accommodation or price comparison website sector, for example, might be thought to raise competition concerns. A lack of transparency over prices ultimately charged to consumers might be concerning if it is difficult to compare between platforms. The tying of services to other platforms in which a firm might be thought to be dominant (e.g. operating systems). These behaviours and how their effects might vary are considered in the next chapter, but the evidence gathered thus far makes clear that online platforms are, at least, not immune to competition issues which afflict other markets.

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[34] This does not necessarily mean that high valuations for online platforms are misplaced, except to the extent they are motivated by an anticipation of monopoly rents. They might instead be motivated by the potential for very strong growth (profits per customer, or per transaction, might not rise, but the number of customers or transactions might instead). At the same time, the expectation in a competitive market is not necessarily that a competitive price always prevails. There will be periods with prices above that level, attracting entry, and periods below, driving exit. Valuations might evolve along with prices over time.

To What Extent do the Effects of Market Practices Vary Based on Market Characteristics?

The market effects of market practices which might raise competition concerns in other contexts, or specifically in online platforms, might vary based on characteristics of the market. In this chapter, we consider a range of behaviours including those relating to corporate structure (e.g. horizontal and vertical takeovers) and those relating to interactions with consumers (e.g. potential distortion of algorithmic search results).

There are a range of market practices which might raise competition concerns in other contexts, or specifically in online platforms. The market effects of such behaviours might vary based on characteristics of the market. In this chapter, we consider a number of such behaviours:

- Ties to other products and services, e.g. software installed automatically on certain device, or services offered by default through certain platforms.

- Contractual commitments about the service offered through other channels, e.g. exclusives or most favoured nation clauses forbidding the offering of a given service at a lower price elsewhere.

- Distorting search results, e.g. promoting services in return for payment, or promoting your own services at the expense of rivals.

- Reactions to switching.

- Horizontal takeovers.

- Vertical integration.

Bundling and ties to other products and services

In other settings there has been concern that firms might abuse market power by bundling or tying the service in which a firm has a monopoly to one in which there is a competitive market, thereby coming to dominate the formerly competitive market. This concern is subject to theoretical debate, but it might also depend on market characteristics.

Bundling or tying could improve competition by acting as a means for market entry. It can allow a firm to establish a network, using their existing customer relationship to reach critical mass quickly. A range of streaming music platforms are available across platforms, with each expanding out of a device or operating system in which it is bundled. Bundling does not necessarily need to take place within the firm, either. To give an example from

our Music case study, Spotify is not bundled with an operating system, but can be bundled with some mobile phone contracts (e.g. Vodafone).

The effect will depend on how great the costs are in switching to another service. If it is simply a case that an app is installed on a phone by default, and a user can then install another app (bundling) this may be less significant than if it is difficult or impossible to use an alternative. Using other services besides iTunes to purchase songs for an iPhone was difficult, as was listening to music on iTunes on an Android phone. That tie ended with the advent of streaming services (there are no obstacles to installing Spotify on an iPhone). Apple Music is installed on iPhones by default and this might, along with the Apple brand, explain the rapid growth of the service. However there is still no obstacle to those who want to use Spotify (or another alternative) continuing to do so.

The effect will also depend on the extent to which a user needs to take additional steps in order to use it. An installed browser, for example, might be adequate for most users and, to the extent it is free and already installed, consumers might avoid the search costs in finding a new browser and stick to the default. However even if Apple Music is automatically installed on an iPhone, or Groove Music is automatically installed on a Windows PC, a consumer has to commit to monthly payments in order to take up the service and this seems likely to encourage many to check against potential alternatives. It is difficult to adjudicate on this process at this stage (both those services are quite new) but there seems no reason to assume at the outset that other services cannot compete even within the iOS or Windows operating systems.

Contractual commitments about the service offered through other channels

The most famous example here is most favoured nation clauses, as used in price comparison websites and some accommodation platforms — two of our case studies here.

On the one hand, these clauses might make price comparison websites credible (users would not feel they also need to check directly with the providers as well). In turn, that might improve competition within the sector by reducing the costs for users to find lower quality-adjusted prices, thereby increasing contestability in the provider market.

On the other hand, most favoured nation clauses (particularly broad most favoured nation clauses) might diminish the potential for competition across platforms on prices offered. Platforms could still compete based on other qualities (e.g. ease of use) but not on their ability to convince providers to offer lower prices. This might be seen (and has been seen by the CMA) as impairing competition.[35]

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[35] https://assets.digital.cabinet-office.gov.uk/media/5421c32ee5274a1314000003/Appendices___Glossary.pdf

Distorting algorithmic results

Many online platforms return information based on algorithms:

- Search engines find and then order relevant content in response to keyword queries.

- Accommodation and price comparison platforms offer consumers products from 'best' to 'worst' (this may simply mean offering the lowest price first, or it may mean offering the best mix of price and features given a consumer's preferences).

- Music platforms recommend songs based on a user's preferences and/or listening habits.

Concerns have been expressed over the potential for these algorithms in a platform to be manipulated to favour other services offered by a given firm (e.g. other Google services are given greater prominence in Google search results) or other firms paying for additional prominence (this is distinguished from explicit adverts).

Distortion of search algorithms could be another means to facilitate entry into other markets (including other platform markets). As noted previously, firms can enter new platform markets by leveraging existing customer relationships, a strong existing brand, or other strengths built in other markets, using those strengths to attain critical mass as a platform. One example of this might be a platform in a market in which search is important distorting its algorithms so as to favour a new accommodation platform, thereby enabling that new platform to reach critical mass more quickly or at all (facilitating entry in the accommodation sector).

Thus distortion of algorithmic results could either enhance or damage competition. Whether, overall, competition is more damaged or facilitated might depend on:

- Whether the manipulation of the algorithm affects the attractiveness of the original platform. If a search engine were to be heavily manipulated, to the point it produced less helpful results,[36] then that would create an opportunity for other platforms to increase their market share (assuming that the market position of that platform was sufficiently fragile).

- Whether there are other means for alternative platforms to achieve a similar prominence. It might be possible for other firms to obtain the same result by other means (effective search engine optimisation, or purchasing adverts). In that case, it would be hard to argue that those competing platforms were excluded, the platform manipulating its algorithms would simply be cross-subsidising its platform in other

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[36] This might be obvious to consumers, they might be able to tell that the results are worse for manipulation of algorithmic results, or it might be implicit, users might shift to more satisfying platforms (including different types of platform) over time if the results are poor, even if they never realise why the results are poor. They would simply find different platforms rewarding, and be more or less likely to return, depending on the results.

sectors. The effect on competition would not be clear and might be positive (if that cross subsidy was a means to overcome the initial costs of entering a new market).

Reactions to switching

Changing product offerings in response to actual or threatened entry

An example from our case study sectors of an online platform changing its product offering in response to entry was Facebook's modification of its status feature in response to the entry of Twitter. Facebook's original status took the form of a third-person statement concerning what the user was doing or feeling or had recently done (e.g. "John is digging the garden", "Jane feels sad", "John and Jane are now friends"). Twitter provided a freeform 140 character ability to post updates regarding status, eventually including pictures and other media. Facebook first added an ability to post similar flexible text updates. It subsequently added other features similar to Twitter such as the ability to "tag" friends in a status update.

Seeking to identify users that may switch and encourage them to remain

Where firms have market power, a well-established source of consumer detriment is where firms with large market shares deter switching by making the process cumbersome or by requiring engagement with sales staff who offer specific inducements to remain. We have not sought to provide any evidence of abusive conduct in this project and do not allege any. However, we observe that if a digital platform were in the future to attempt to engage in behaviours to deter switching, it might mimic or develop practices that do already exist, such as Facebook's practice of automatically emailing users who have not used the site for a certain period to highlight to them what has gone on in their absence. We observe that such practices might have motivations other than anti-competitive ones. For example, they could constitute a form of customer service. Even insofar as they seek to deter users from abandoning the service (as opposed to deterring them from using another service, bearing in mind that many users multi-home) this might be an attempt to reduce the risk of a cascade of lost network effects as users cease being active.

Horizontal takeovers

Innovative social networks have often been purchased by larger networks. Instagram was eventually purchased by Facebook. Live events network periscope was purchased by Twitter ($100m before the service had even launched).[37] To some extent, the ability of existing firms to purchase new entrants might be thought to limit competition for the market. This could easily be overstated, though:

- Assuming that those networks pay the market value of those start-ups, there is still a discipline on their behaviour in the market. The financial cost to shareholders in a platform like Facebook of losing market share or paying the value of potentially-lost market share might be seen as functionally equivalent. On the other side of the deal, the incentive to enter is clearly preserved (indeed, could be enhanced by

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[37] Koh, Yoree & Rusli, Evelyn M. (2015) Twitter Acquires Live-Video Streaming Startup Periscope, *Wall Street Journal*, 9 March 2015

reducing the time taken to realise that value) if a small platform like Instagram can enter the market, grow enough to attract the attention of a larger network and then sell itself for around $1bn. Particularly as all this can be achieved with a tiny staff and modest capital requirement (i.e. other barriers to entry are low).

- The innovation itself often persists, either because the network is maintained (Facebook has continued to operate Instagram), because its features are integrated into the network, or both (Facebook now offers photo filters too).

Whether innovation will proceed over time by: large platforms investing to maintain the advantage of their networks; large platforms purchasing innovative smaller platforms (in a similar manner to pharmaceutical firms purchasing start-ups that have developed innovative drugs, this process can continue indefinitely); or smaller, innovative platforms growing and displacing larger platforms; or by some mixture of all three, might not affect the overall pace of innovation. In social networks, the pattern appears to be a mix. Platforms also purchase non-social network businesses to access innovation (e.g. Facebook purchased the artificial intelligence firm Wit.Ai, which became part of its own artificial intelligence offering and research effort).[38]

The potential to purchase innovative networks will not necessarily allow platforms to extract rents. If innovative features allow a platform to enter and take market share, overcoming any network effects if they can establish critical mass, then the value for which they sell will be contingent on their ability to extract existing rents in the market (for their existing shareholders), or conversely their ability to prevent an existing player extracting rents. The new entrant will diminish the rents of the larger network, whether or not they are purchased.

However, it is conceivable that this process produces a market in which incumbents secure no rents for themselves — because in order to sustain their position as an incumbent they must continuous buy up new entrants — but users nonetheless still pay monopoly prices. Indeed, the incumbent is forced to charge monopoly prices in order to be able to afford to purchase new entrants. A market functioning in that way might result in higher quality-adjusted prices, but would, on the other hand, also result in ample (perhaps even excessive) innovation.

Vertical integration

It is quite common for platforms to be bought, or launched, by major providers of services through the platform. In theory, this might be a means for a provider to secure favourable treatment for its goods or services.

- Admiral Group owns the price comparison website Confused.com and a number of insurance brands: Admiral, Bell, Diamond and elephant.co.uk. Those brands are offered through Confused.com alongside others.

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[38] Kuchler, Hannah (2015) Facebook secret weapon for artificial intelligence: humans, *Financial Times*, 17 November 2015.

- Expedia owns metasearch engine Trivago, which will find offers of accommodation from online platforms including Expedia.

- Tidal is owned by a number of musicians, particularly rapper Jay Z.

The main limit on the use of vertical integration in order to favour particular content is that it might lead to a migration to other platforms. To the extent that there are multiple metasearch engines for accommodation, for example, if Trivago does not give users an efficient means to reach platforms when they have a cheaper offering than Expedia, users might migrate to other metasearch engines.[39]

If music is offered as an exclusive on Tidal, on the other hand, it might mean an artist misses out on revenues they might enjoy from Apple Music, but users cannot migrate and get the same music elsewhere. There is a barrier to entry in that the musician owns the copyright on their own music (illicit sharing aside, and this behaviour might plausibly cause a song to be shared illicitly more often).

We note that the view that market power at one point in a supply chain can be leveraged to create market power at another point and that the overall effect can be higher prices to final consumers and higher profits for the monopolist is disputed.[40]

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[39] In the event that the differences between the offerings of metasearch platforms became complex over time, not a simple matter of one platform offering more attractive deals, it might create an opening for a metasearch platform to allow the searching of metasearch platforms. Or, more plausibly, to coverage in the media of the merits and demerits of different metasearch engines.

[40] In particular, there is the so-called "Chicago view" according to which there is only one set of monopoly rents in a supply chain and a monopolist anywhere in the chain can extract them unless there is another monopolist at another point in the chain (in which case rents are shared, not increased).

To What Extent Might Regulatory Interventions Affect Innovation?

Regulatory interventions might affect innovation either by directly raising the cost of innovation or by affecting the market in some way which indirectly inhibits innovation. We consider some potential effects here, including requirements for platforms and providers, market restrictions and the potential for innovation to be impaired directly.

Existing requirements

Requirements for platforms

There are a range of regulatory requirements in the sectors covered:

- Data protection. Platforms need to ensure they comply with relevant rules over how they store and use data. In some cases, this might require them to hold data in certain geographical locations, creating a cost to expanding beyond national borders.

- Moderating user behaviour. This might include enforcement, or even screening beforehand, to prevent online abuse, copyright infringement or other negative behaviours.

- Consumer protection. It is often unclear whether online platforms should be treated as a forum in which certain goods or services or advertised, or as akin to those offering more personalised forms of advice, whether price comparison websites are financial advisers, for example. A lack of clarity could impair entry or limit innovation (platforms might not offer new, helpful information if it moved them from one category to another and thereby increased regulatory costs).

- Product-specific regulation. Regulations of categories of goods or services might limit the role of online platforms. The health sector, though not one of our case studies, offers an example: it appears the range of sensors in the Apple Watch was limited in order to avoid being classified as a medical device (subject to substantial additional regulation).[41] Innovation in health platforms could therefore be limited by the kinds of data available, in turn limited by regulation of the sensors used to collect that information.

- Tax and other corporate requirements.

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[41] Kastrenakes, Jacob (2015) Tim Cook says Apple might make a medical device, but it won't be the Apple Watch, *The Verge*, 9 November 2015

All of these requirements will create variable and fixed costs for platforms. It is important to note that they are not necessarily intended to regulate online platforms in particular. Regulations, both existing and prospective, which are intended to address wider phenomena such as medical devices or financial advice could affect online platforms. In some cases, that might be appropriate (if online platforms might otherwise create excessive risks to consumers, for example) but in other cases it might reflect policymaking predicated on an environment not present in online platforms (e.g. a monopsony in certain geographical areas, or material information asymmetries).

The impact might vary based on:

- The share of variable to fixed costs, or even the potential for larger platforms to face greater challenges (reverse network effects). The task of moderating user behaviour might initially be modest, as the amount of content to be monitored is small. However the scale of the task might then grow rapidly before a network enjoys the revenues that would make it economical to invest in extensive monitoring and enforcement.

- The extent to which such regulatory requirements create ongoing transactional costs. A key insight from the theory of the firm, as developed by Coase[42] is that the optimal scale of a firm depends upon technology-dependent and regulation-created transactions costs. Regulatory requirements could for example mean that some activities or economic relationships that might otherwise be kept between the firm and third parties would instead be brought within the boundary of the firm. A larger optimal size for firms might undermine dynamic competition by increasing the critical mass threshold, making entry more risky.

- The degree to which the required tasks can be standardised and a service industry can be established which new platforms can access. An established industry of accountants and lawyers can help platforms comply with tax law, for example. By contrast, there is no standard service available to moderate a social network (as the content in – for example – Instagram and Twitter is so different).

Regulatory requirements which create large fixed costs could clearly create a barrier to entry. Meeting those requirements might constitute an additional critical mass (in addition to that required due to network effects) for a network to be feasible. Those regulations might therefore impair the creation of new platforms which both provide additional competition to incumbents and embody new innovations (in the music sector, for example, it was new platforms that established streaming services).

This kind of impact might be a good candidate for inclusion in competition impact assessments for new regulations, or evaluations of regulations already in place.

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[42] Coase, R.H. (1937), The Nature of the Firm, *Economica*, 4 (16), pp386–405, http://www3.nccu.edu.tw/~jsfeng/CPEC11.pdf

Requirements for providers

In some cases, there are extensive regulatory requirements for those who wish to provide certain services. In the accommodation sector, properties are often required to have a certain set of features (e.g. disabled access) or meet certain registration requirements (even occasional short-term lettings require registration as a professional entity in some EU Member States).

These regulations might be necessary in some established markets in order to provide consumer protection in markets where cash payment is common and users may not be able to see the goods or services they are buying beforehand (e.g. when booking a hotel in another country). They might also be necessary if the number of options is limited, meaning that customers requiring certain features would not have a reasonable set of options unless everyone is required to offer those features. Online platforms can increase the range of options (as innovation unlocks new capacity, e.g. sharing private homes), increase the information available before a transaction (through the reviews and rating systems available on platforms such as TripAdvisor and Airbnb); and increase the monitoring of a transaction (as payments are electronic and logged by the platform). All of that might mean such requirements become less necessary.

At the same time, those requirements might be more onerous for some or all providers in online platforms. If requirements on providers create certain fixed costs, making it not economical for small providers to enter the market, that might impair innovations which rely on connecting consumers to smaller providers (e.g. the expansion of Sharing Economy platforms). It might instead cause the market to continue with platforms that organise existing provision better, rather than making use of alternative capacity.

Insofar as price comparison websites offer information on financial products, they can be affected by financial conduct regulation and other regulatory choices affecting the sectors in which they operate (e.g. around the automatic renewal of car insurance policies). Other barriers to competition in a financial market will lessen its appeal for online platforms seeking to facilitate competition within that market.

Barriers to multi-homing

In several of the sectors studied, multi-homing was an important component in competition. If someone had to choose only one social network, they might go for the largest and a winner takes all or winner takes most market might result. However if they are able to use multiple platforms (e.g. installing multiple social networks, checking on multiple price comparison websites) then each platform needs to obtain critical mass but there is no reason to assume a tendency to monopoly.

There are not regulatory restrictions on multi-homing in any of the case study sectors here. However they have been proposed elsewhere (for example, in proposed regulations for the private hire car market in London) and the evidence we have found of the importance of multi-homing suggests such rules might significantly impair dynamic competition. Barriers to multi-homing might also emerge as an unintended consequence of regulation if they raise the cost of either side of the market participating in a way that scales with the number of platforms in which they participate (e.g. if it increased learning costs).

New requirements

One of the most important implications of the BIS view that dynamic competition in digital platforms might mean the implications of regulation are different for them concerns the ways in which the potential for regulation in the future might be affecting innovation and market behaviour today. For example, if the establishment of a network involves bearing up-front costs that are then recovered later, the risk that regulators might intervene at the stage at which digital platforms started generating profits, capping those profits before the point at which the costs and risks of entry had been fully compensated, might deter firms from entering today.

A related possibility is that a successful digital platform might stimulate a regulatory response if its success began to disrupt traditional non-digital markets. The classic (though disputed) example quoted of this is the success of Uber triggering new Transport for London regulations designed to curtail its activities.

In the case studies we have considered here, there have been putative examples of the second form of regulation in certain EU Member States in the accommodation sector, specifically affecting Airbnb.[43] However, as we have seen these regulations have thus far not prevented Airbnb from expanding rapidly and eroding the market shares of larger players.

In our interviews, we sought to explore with stakeholders whether their investment decisions or other business planning were affected by a perceived risk of becoming subject to price regulation. No stakeholder reported that this was an important factor.

Our case studies thus do not show evidence that concerns about becoming subject to price regulation are a relevant concern.

To explore this issue in a slightly broader context, we have consulted the wider venture capital literature. These include an argument that the ability to create network effects that can then be exploited to generate profits is a key driver of online valuations,[44] and an exchange disputing common valuations of Uber, suggesting that insofar as network effects exist Uber would be subject to price regulation before it could exploit even a fraction of their potential.[45]

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[43]   The mayor in Barcelona – Ada Colau – has threatened to fine firms that market apartments to tourists without a number showing they are on the Catalan tourism register (the council also froze new licences for hotels and other tourist accommodation). The regional government in Madrid has set a minimum stay of five days in private homes and apartments. Airbnb has complained of additional regulations in Brussels which might, among other things, require landlords to submit "at least 15 forms" in order to rent out homes on the online platform.

[44]   A slideshow on network effects from a venture capital firm emphasizing how network effects create a "moat" which can then be exploited to generate profits: http://www.slideshare.net/a16z/network-effects-59206938

[45]   These include:
- An article criticising the Uber valuation: http://fivethirtyeight.com/features/uber-isnt-worth-17-billion/
- The response: http://abovethecrowd.com/2014/07/11/how-to-miss-by-a-mile-an-alternative-look-at-ubers-potential-market-size/

This literature suggests that concerns over successful digital platforms becoming subject to price regulation are a factor raised in the investment community but at this stage they do not appear to be deterring innovation.