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The digital transformation of news media and the rise of disinformation and fake news

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JRC TECHNICAL REPORTS

JRC Digital Economy Working Paper 2018-02

The digital transformation of news media and the rise of disinformation and fake news

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Contents

ABSTRACT	4
1. BACKGROUND AND SUMMARY	5
2. WHAT IS DISINFORMATION OR FAKE NEWS? THE QUALITY OF NEWS...	8
3. SOME EVIDENCE ON CONSUMER TRUST AND THE QUALITY OF NEWS	12
4. PLATFORMISATION OF NEWS DISTRIBUTION AND THE QUALITY OF NEWS	15
5. SOME EVIDENCE ON THE DISTRIBUTION AND IMPACT OF FAKE NEWS	26
6. ARE DIGITAL NEWS MARKETS FAILING?	35
7. POLICY RESPONSES TO ONLINE NEWS MARKET FAILURES.....	47
BIBLIOGRAPHY	53

Abstract

This report contains an overview of the relevant economic research literature on the digital transformation of news markets and the impact on the quality of news. It compares various definitions of fake news, including false news and other types of disinformation and finds that there is no consensus on this. It presents some survey data on consumer trust and quality perceptions of various sources of online news that indicate relatively high trust in legacy printed and broadcasted news publishers and lower trust in algorithm-driven news distribution channels such as aggregators and social media. Still, two thirds of consumers access news via these channels. More analytical empirical evidence on the online consumption of genuine and fake news shows that strong newspaper brands continue to attract large audiences from across the political spectrum for direct access to newspaper websites. Real news consumption on these sites dwarfs fake news consumption. Fake news travels faster and further on social media sites. Algorithm-driven news distribution platforms have reduced market entry costs and widened the market reach for news publishers and readers. At the same time, they separate the role of content editors and curators of news distribution. The latter becomes algorithm-driven, often with a view to maximize traffic and advertising revenue. That weakens the role of trusted editors as quality intermediaries and facilitates the distribution of false and fake news content. It might lead to news market failures. News distribution platforms have recently become aware of the need to correct for these potential failures. Non-regulatory initiatives such as fact-checking, enhanced media literacy and news media codes of conduct can also contribute.

1. Background and Summary

The European Commission (2018b) Communication on Tackling Online Disinformation constitutes a first step in adopting a common approach at EU level, with the overall aim of empowering citizens and protecting our democracies. The Commission proposed four objectives:

- To improve transparency regarding the way information is produced or sponsored
- To promote diversity of information through support to high quality journalism and the rebalancing of the relation between information creators and distributors.
- To foster credibility of information, shape information-friendly online systems and strengthen collective monitoring capacities and promote media literacy
- To fashion inclusive solutions between all stakeholders.

As part of the policy initiative the Commission consulted Member States and stakeholders, set up a High Level Expert Group and launched a public consultation complemented with a Eurobarometer public opinion survey¹. Against this policy background the JRC has been asked to produce an overview of the relevant economic research literature with regard the digital transformation of news markets and the impact on the quality of news. The current report responds to that request.

Chapter 2 in the report presents a brief overview of a variety of definitions of fake news, ranging from a narrow definition based on verifiably false news to a broader definition that encompasses various forms of disinformation and, more generally, quality variations in news. In the economics literature on news markets, quality can be defined with respect to consumer preferences for accurate news but also for confirmation of prior beliefs. Filtering and "slanting" of news is frequently used to strengthen the commercial position of news publishers in news market and boost consumer welfare from reading news. False news is an extreme version of filtering that disconnects news content from observed facts. However, there are many intermediate forms that mix observed facts with false news and relatively benign or malign distorted presentations. There is no consensus definition on fake news or disinformation.

Chapter 3 presents some recent empirical evidence, mostly from survey data, on consumer perceptions of the quality of news. Traditional print and broadcasted news remain the most trusted sources. Despite the much wider availability and accessibility of online news, user trust in online sources of news, is lower and differs considerably by age, education and country. Consumer concerns about quality go beyond the narrow category of fake or false news and points to wider distrust of polarized news reporting and spin. Much of the lack of trust in the quality of news revolves around algorithm-driven social media and online news distribution sites. Evidence suggests that they are the main distribution channel for fake news.

Chapter 4 explores how digitization has transformed the news media landscape and affected production, advertising, distribution and quality of news. The cost of news publishing has declined as printing and physical distribution is no longer needed. This expands geographical market reach

¹ Links to these initiatives can be found here:

- Long before the current policy initiative on fake news was started, the EU established the East Stratcom Task Force in November 2015 to address Russia's ongoing disinformation campaigns and state propaganda aimed at EU from its eastern neighbours: <https://euvsdisinfo.eu/>
- High Level Experts Group on Fake News and Online Disinformation: <https://ec.europa.eu/digital-single-market/en/news/experts-appointed-high-level-group-fake-news-and-online-disinformation>
- Public consultation on fake news and online disinformation: <https://ec.europa.eu/digital-single-market/en/news/public-consultation-fake-news-and-online-disinformation>

and may facilitate market entry for new publishers. It has also transformed the traditional business model into a multi-sided market or platform with at least three interacting sides: news publishers, readers and advertisers. This has shifted market power and revenue streams from news publishers to platform operators who have the data to match readers, articles and ads in a more efficient way, compared to offline newspapers that could only do bulk targeting of a bundle of articles and ads on a wider audience.

A large part of online news is now freely accessible to consumers. Consumers can select articles and no longer buy a bundled package of articles in a print edition. This increases demand for news and facilitates access to a wider variety of news sources. Apart from direct news distribution via news publishers' own websites, two-thirds of online news consumption is channeled through algorithm-driven platforms such as search engines and news aggregators, and social media websites. A defining feature of these online news platforms is the separation of roles of news production (the editor) and distribution (the curator). Editors retain control over the content of articles but lose control over the curation or selection of articles that effectively reach potential readers. Algorithm-driven platforms mix articles from different publishers and rank them according to popularity criteria, often with a view to maximize traffic and advertising revenue. What readers see does not only depend on their preferred news sources but also on the preferences of close friends in social networks and many others. These spill-over effects help readers to get out of their "echo chambers" and widen their news horizon. On the other hand, it may confront them with news content that they dislike or distrust.

Online algorithmic distribution blurs the branding efforts of newspaper editors and weakens their trusted intermediary relationship with readers. False news producers may deliberately game the network features of social media and ranking algorithms in order to reach unsuspecting consumers. They may also use targeted advertising mechanisms to propagate their messages. It is not so much the shift from offline to online distribution that has led to quality concerns in news but rather the shift from direct access to newspapers to indirect algorithm-driven distribution of news.

Chapter 5 presents some empirical studies on the role of social media networks in the propagation of news, on the reach and consumption of false news articles and on the impact of false news on political choices. Studies that focus on direct news consumption on websites conclude that true news audiences dwarf false news audiences, though false news may capture consumer attention longer than true news. Studies on indirect news consumption in social media such as Facebook and Twitter find that false news diffuses faster and broader than true news. Several factors contribute to that. The novel information content of false news attracts human attention and is a prime driver of diffusion. The expression of moral emotions when posts are shared in social media facilitates propagation but the balance of positive to negative comments declines with further propagation. Weak social ties can spread news beyond echo chambers but weaken trust in the news. We should be cautious however about these findings because they are very sensitive to the sample selection of false and real news sources. Collecting and analyzing empirical evidence on the production and online consumption of false news is only starting. Our understanding of these new phenomena is still rather limited and will no doubt improve in the future as more evidence becomes available. Progress in research will also depend on access to relevant data held by commercial operators. There is a variety of studies on the impact of false news on political choices, with very different methodologies and variable findings. Most studies find a very limited impact.

Chapter 6 explores possible causes of market failures in online news markets that would require regulatory intervention in order to restore social welfare. Market failures have been studied extensively in offline news markets. The main role of journalists and editors is to bridge the information asymmetry between observed events in the world and consumers who want to be informed about these events. This requires a trusted intermediary relationship between editors and

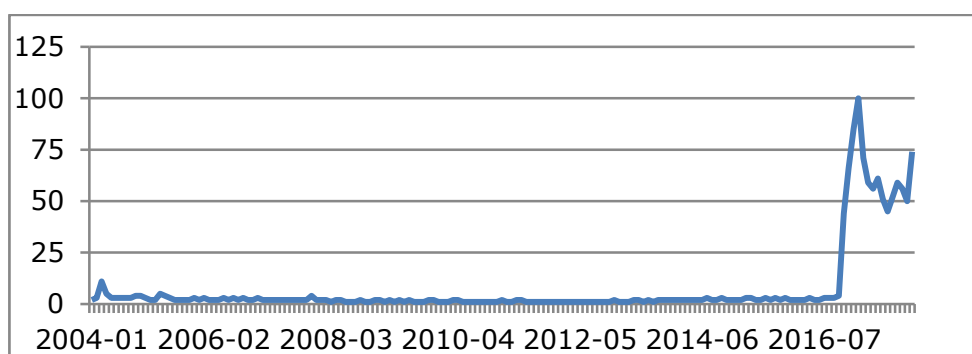
readers. As the role of editors and their newspaper brands weakens in online algorithmic news distribution, and the possibility of less trusted sources of news and even disinformation slipping into the system increases, this may create market failure because consumers may not be able to distinguish news qualities. Online distribution brings new entrants on the supply and demand side into the market, some of them with lower quality news products and more extreme views. Externalities in algorithm-driven distribution have a negative impact on consumer welfare. However, the available empirical evidence in support of these views remains very limited to date and is insufficient to come to firm empirically supported conclusions on market failures.

Chapter 7 explores possible private sector and public policy responses to online news quality concerns. Platform operators are best-placed to take corrective measures. One of the largest algorithmic news distribution platforms recently took measures to reduce negative externalities, strengthen news quality signals to readers and weaken the mechanisms that facilitate the propagation of false news. Fact-checking is a good tool to identify false news but its effectiveness to reduce propagation may be limited. Strengthening media literacy may help consumers to better assess the quality of news articles but also shifts the burden of quality control from distributors to consumers. There is a long history of government interventions in news markets through competition policy tools, state aid and regulation. Most of the potential quality problems in online news markets seem to be associated with distribution and advertising mechanisms, not with a lack of quality news producers.

2. What is disinformation or fake news? The quality of news

The label "fake news" is a recent addition to the news media vocabulary. According to Google Trends it led a relatively obscure life for many years, until the US presidential elections in November 2016 when its frequency as a search term suddenly increased very sharply (Figure 1). Related terms such as "post-fact" and "alternative facts" also peaked in Google Trends around that time. They all refer to perceived and deliberate distortions of news with the intention to affect the political landscape and to exacerbate divisions in society. People are worried about fake news because it creates confusion². Suspicions about attempts by Russian agents to influence elections and undermine social and political coherence in several countries have contributed to these worries.

Figure 1: The frequency of "fake news" in Google Trends (2004-2018)



Source: Google Trends

In fact, fake news is not a new phenomenon at all; it is as old as the newspaper industry. The first occurrence of fake news was reported in the 16th century³. It is only recently however that it has surged back onto our radar screens, in the wake of the digital transformation of news from offline to online distribution and the rise of social media as a news distribution channel.

There are many definitions of fake news. The UK Cambridge Dictionary defines fake news as "false stories that appear to be news, spread on the internet or using other media, usually created to influence political views or as a joke". The addition of "jokes" to this definition seems less appropriate. A small but active satirical press has always spread false stories as jokes but they can easily be traced back to well-identified publishers who do not hide their intentions and have customers who enjoy reading these stories. The US Collins Dictionary definition looks more to the point when it says "false, often sensational, information disseminated under the guise of news reporting". The inclusion of the word "false" in this definition suggests that true and false news can be distinguished by means of verification of the underlying facts. According to Reuters (2017), defining fake news is fraught with difficulties because it is often applied to three distinct

² See for instance this Pew Research Center for Journalism and Media survey <http://www.journalism.org/2016/12/15/many-americans-believe-fake-news-is-sowing-confusion/>

³ See the Economist 1843 Magazine: <https://www.1843magazine.com/technology/rewind/the-true-history-of-fake-news>

categories: (1) news that is made up or 'invented' to make money or discredit others; (2) news that has a basis in fact, but is 'spun' to suit a particular agenda; and (3) news that people don't feel comfortable about or don't agree with. Fake news can also be classified according to various characteristics such as the source of the news (as in Russian agents or Macedonian click-baiting teenagers), the content (factually wrong or distorted views), the propagation method (targeted advertising, bots⁴, social networks) and the intention (to influence elections, to divide and stoke discontent, or to earn money). Reuters (2017) defines the quality of news along four key attributes: (1) accuracy and reliability, (2) helping with understanding complex issues, (3) communicating strong viewpoints and opinions, and (4) providing amusing and entertaining content. Using survey data it finds that besides the left-right political divide, consumer perceptions of news producers can take very different positions in this four-dimensional setting.

Wardle & Derakshan (2017) distinguish between three dimensions of harm and falseness: (1) misinformation when false information is shared, but no harm is meant, (2) disinformation when false information is knowingly shared to cause harm and (3) malinformation when genuine information is shared to cause harm, often by moving information designed to stay private into the public sphere. Macedonian click bait farms or, more generally, producers of sensational articles with false content to attract advertising revenue would fall under misinformation in this definition; they have no intention to harm, only to earn money.

The EU High Level Expert Group (2018) adopts a similar definition of fake news as disinformation that "includes all forms of false, inaccurate, or misleading information designed, presented and promoted to intentionally cause public harm or for profit". The addition "for profit" includes commercial click-bait but the report explicitly excludes hate speech and satire. In a similar vein, Gelfert (2018) argues that the term fake news "should be reserved for cases of deliberate presentation of typically false or misleading claims as news, where these are misleading by design, (...) systemic features of the sources and channels by which fake news propagates and thereby manipulates (...) consumers' pre-existing cognitive biases and heuristics". Combining misleading claims with cognitive manipulation might blur the borderline between fake news, sensational news and some forms of advertising.

The European Commission Communication on Tackling Online Disinformation (2018b) defines disinformation as "verifiably false or misleading information that is created, presented and disseminated for economic gain or to intentionally deceive the public, and in any event to cause public harm". It clarifies that this definition excludes reporting errors, satire and parody, or partisan news and commentary, nor illegal content. It distinguishes between verifiably false news and misleading information.

From an economic perspective, the debate on fake news can be re-formulated as a debate on quality concerns in news markets. Gentzkow et al (2016) define the quality of news in two dimensions: the accuracy of the news report and the extent to which it matches consumers' prior beliefs and preferences. News producers report to consumers on a state-of-the-world or events that consumers cannot observe. Producers decide on a reporting strategy that requires collecting an amount of information about the event and produce a report based on this information. Production a report is costly. False news is cheap to produce and an extreme case with no overlap between the information reported and the event or state-of-the-world. At the other extreme,

⁴ An Internet Bot, also known as web robot or simply a bot, is a software application that runs automated tasks (scripts) over the Internet. Typically, bots perform tasks that are both simple and structurally repetitive, at a much higher rate than would be possible for a human alone. See https://en.wikipedia.org/wiki/Web_Bot

perfectly accurate news reporting would require the report to include all information on the event or state of the world. That is rarely feasible because a full description of an event may be very complex and require a lengthy treatise that surpasses the scope of a news article. Selective filtering of the most relevant information is therefore a normal reporting strategy. A reporter will take into account the preferences of his readers. While different articles may report on the same event, reporters may choose a different degree of information filtering and give a particular "slant"⁵ to the filtered facts, a particular wording or interpretation. "Slanting" may be deliberate, to bring a news item in line with the editorial line and branding of the news producer, and/or to match the expectations and prior beliefs of readers. News producers apply these reporting strategies to create more trust for consumers and thereby enhance their sales. Accuracy is not necessarily the main issue in a reporting strategy that leaves a degree of information asymmetry between news producers and consumers. We return to the role of supply and demand side factors in the determination of the quality of news in Chapter 6.

Alcott & Gentzkow (2017) define fake news as intentionally and verifiably wrong or false news produced for the purpose of earning money and/or promoting ideologies. Their definition explicitly excludes "slanted" news, conspiracy theories, rumors and "false statements by politicians". They argue that there is a market for verifiably false news because (1) it is cheaper to produce false than accurate news, (2) it is costly for consumers to distinguish between accurate and fake news, and (3) consumers may enjoy reading fake news because it confirms their beliefs.

Fake news can also be distinguished from illegal content, though the two may overlap in some cases. In the EU, the dissemination of hate speech, racism and harmful content for minors are illegal⁶. Many news and social media platforms organize and tag a large quantity of video content. They will have to protect minors from harmful content and all citizens from incitement to hatred. The German government implemented a law whereby social media platforms have to remove hate speech from their websites. The law became controversial when it led to text removals that were considered excessive and might constitute a form of censorship⁷. France is launching a law proposal that would include legal action against false news and intentions to provide disinformation and create public disorder. This proposal is subject to considerable debate⁸.

This brings us to two possible definitions of "fake news":

- A narrow definition would be limited to verifiably false information. Fact-checking can expose false news items and identify the sources of these articles. Most empirical social science research on fake news follows this narrow definition because it requires an identifiable and well-defined set of false news articles and sources to measure the reach and impact of false news (Alcott & Gentzkow, 2017; Fletcher et al, 2018). Some measures taken by social media networks against fake news concentrate on verifiably false news: hiring fact-checkers, tagging suspicious postings, removing false news posts, etc. We discuss the findings from that recent literature in this report.
- A broader definition of fake news would encompass deliberate attempts at disinformation and distortion of news (European Commission, 2018a; Wardle & Derakshan, 2017; Gelfert, 2018),

⁵ To slant: to distort (information) by rendering it unfaithful or incomplete, especially in order to reflect a particular viewpoint.

⁶ The proposed revision of the EU Audio-visual and Media Services Directive (AVMSD), adopted by the Commission on 25 May 2016, includes video-sharing platforms in the scope of the AVMSD only when it comes to combatting hate speech and dissemination of harmful content to minors.

⁷ See for example: <https://www.reuters.com/article/us-germany-hatecrime/german-opposition-calls-for-abolition-of-online-hate-speech-law-idUSKBN1EW0Q9>

⁸ See https://www.francetvinfo.fr/politique/emmanuel-macron/trois-questions-soulevees-par-la-loi-sur-les-fausses-nouvelles-souhaitee-par-emmanuel-macron_2545025.html

the use of filtered versions to promote ideologies, confuse, sow discontent and create polarization. We may include disinformation for the purpose of earning money but not to harm. That brings us closer to clickbait practices and the intentional filtering and "slanting" of news for commercial purposes, to attract particular audiences. This broader definition is more difficult to verify objectively but brings us closer to economic models of news markets and variations in the quality of news. A simple view on the quality of news would distinguish only between high and low quality news. A more economic view looks at competition between varieties and sources of news. There is a long-standing economics research literature that (started long before digital media were born and) explores product quality differentiation in particular market settings and applies this to news markets. We discuss that literature and examine what it can contribute to (a) our understanding of the fake news as a quality problem in news markets and (b) tracing the sources of this problem in the digitization of news.

We employ this dual-track approach throughout this report. The narrow definition – verifiably false news – will be used mostly in empirical studies that examine consumer behavior. The wider definition – variations in the quality of news – will be applicable in studies that look at the structure of news markets, compare pre-digital offline news with digital online news markets and try to assess the impact of digitization on the quality of news production and consumption.

3. Some evidence on consumer trust and the quality of news

Citizens want to be informed about the state of the world but do not have the resources to investigate this on their own. They rely on news publishers as intermediaries to bridge the information gap between them and the world. All news reporting is necessarily a form of filtering of information and deciding what is more relevant for an audience. Consumer trust in the quality, accuracy and coverage of news reports by intermediaries is essential in that relationship.

Newman & Fletcher (2017) carried out an in-depth survey and analysis of consumer perceptions of the quality of news in nine countries. They find that people do not operate with categorical distinctions between "fake" and "real" news but rather see the difference as one of degree. The main reasons (67%) for not trusting media relate to bias, spin, and agendas, the feeling that powerful people are using the media to push their own interests, rather than represent ordinary readers. These feelings are most strongly held by those who are young and by those that earn the least. The authors conclude that:

- News media need to differentiate more from information that has not gone through professional checking and do a better job in separating facts from opinion
- Media should be more representative – in terms of age, politics, economic outlook, and gender – rather than only looking after the interests of the establishment.
- Media platforms should consider signaling the quality and origin of content, improving the branding of trusted brands, and taking steps to reduce the speed with which extreme or disputed content can spread through the network.

This indicates wider quality concerns about news media channels in the digital age. False news – the narrow definition of fake news – is only the top of the iceberg.

Several surveys reveal a lack of trust in the accuracy and reliability of news media in general, and more specifically for social media. For example, a European Broadcasting Union (2017) survey in the EU shows that traditional media (radio, TV, newspapers) are more trusted than online social media, though the level of trust for each of these news distribution channels varies significantly across countries. A Kantar (2017) survey⁹ in Brazil, France, the US and the UK revealed that the reputation of traditional print and broadcast media outlets has proven more resilient than social media platforms, messaging apps and online-only new outlets against efforts to brand mainstream media as 'fake news'. People believe that quality journalism remains key to a healthy democracy but are skeptical about what they read. Audiences are becoming more widely informed and sophisticated in their engagement with, and evaluation of, news content.

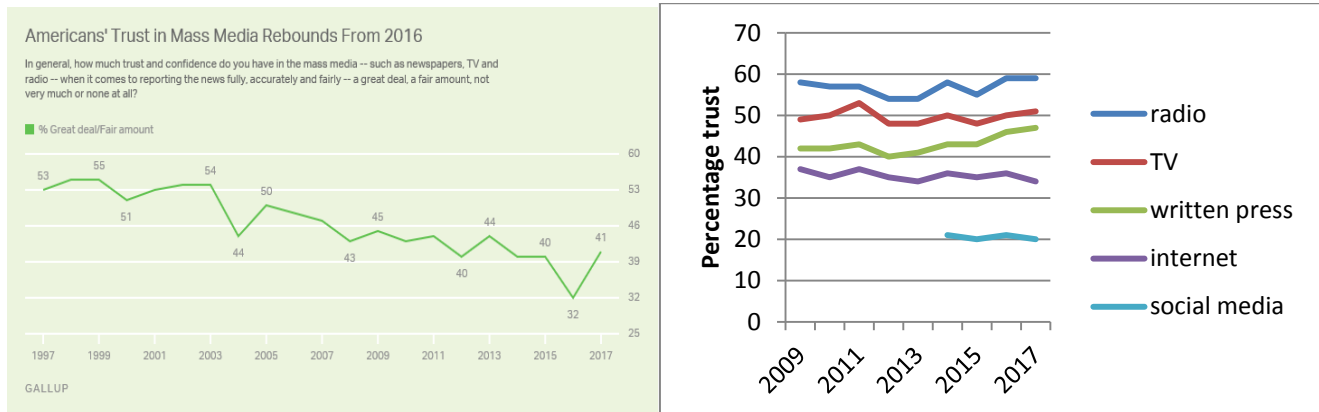
The Eurobarometer¹⁰ opinion polls in the EU show a fairly steady level of trust in media over the period 2009-2017, with radio, television and the written press being the most trusted channels. Trust in the internet and especially in social media is much lower. In the US the annual Gallup poll shows a secular decline in trust in news media over a longer period of two decades, with a deep dip in 2016. Clearly, this decline started before the birth of social media but coincides more or less with the rise of digital news media in the early 2000s. Correlation is not necessarily causality

⁹ See <https://uk.kantar.com/business/brands/2017/trust-in-news/>

¹⁰ See standard Eurobarometer report November 2017, p 21, available in French at <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/82499>

though. The Gallup data also confirm that distrust is higher among the political right (Republicans) than the left (Democrats).

Figure 2: Gallup (US) and Eurobarometer (EU) polls on trust in the media



Sources: Gallup¹¹ and Eurobarometer¹²

Newman & Fletcher (2017) found that two-thirds of the respondents were concerned about bias, spin, and hidden agendas in news media. Their survey shows how news media polarization varies across countries. The US has a very polarized media landscape with media outlets widely spread across the left-right political spectrum. By contrast, the German media landscape is very concentrated around the middle, with the UK somewhere in between the US and Germany in terms of polarization. Citizens on the political right were three times more likely to distrust the news media than those on the left. Trust is higher in traditional media with TV, radio or print presence. Distrust is higher among younger and lower-income respondents who are more intensive users of social media news channels.

Prior (2013) examines if the emergence of more partisan media has contributed to political polarization. Evidence points to some polarization among the politically involved citizens in the US. Proliferation of media choices lowered the share of less interested, less partisan voters and thereby made elections more partisan. But the evidence for a causal link between more partisan messages and changing attitudes or behaviors is mixed at best.

The Reuters Digital News Report 2017 conducted a survey in 36 countries and finds that "only a quarter of all respondents think social media do a good job in separating fact from fiction, compared to 40% for the news media" (Reuters, 2017, p 10). Trust is highest in Northern European and Scandinavian countries as well as Portugal. Central, Southern, and Eastern European countries tend to be at the other end because media are considered to be too close to government (p 20). The combination of a lack of rules and viral algorithms are encouraging low quality and 'fake news' to spread quickly. There are wide variations in trust across countries, with a strong connection between distrust in the media and perceived political bias. This is particularly true in

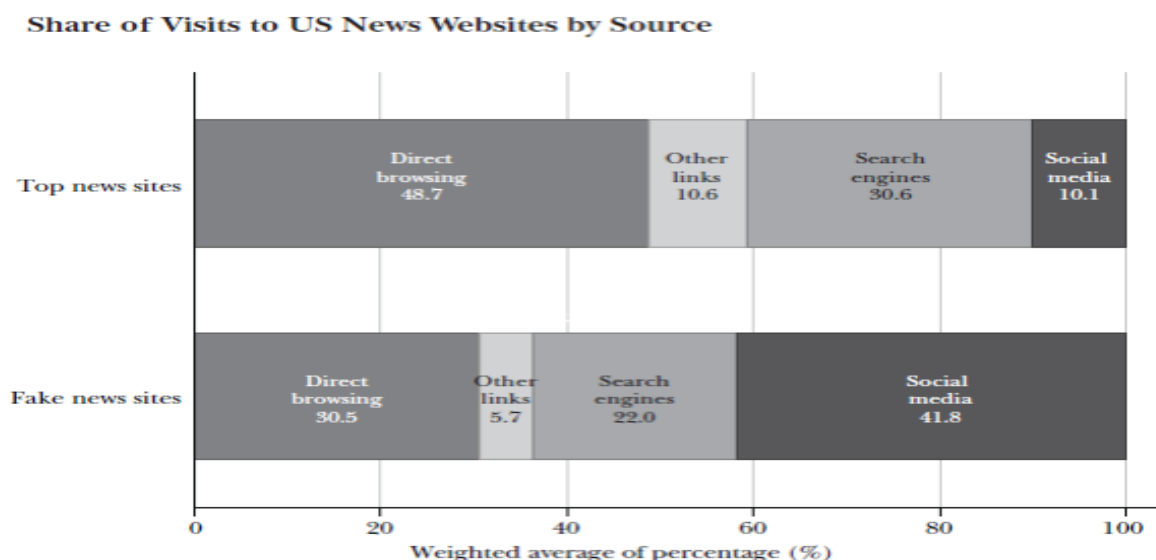
¹¹ Available at http://news.gallup.com/poll/219824/democrats-confidence-mass-media-rises-sharply-2016.aspx?g_source=link_news9&g_campaign=item_225470&g_medium=copy

¹² <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/82499>

countries with high levels of political polarization like the US, Italy, and Hungary. This is confirmed by a Pew survey that provides evidence that people do not like partisan news reporting by media¹³.

With regard to the narrow definition of fake news, Alcott & Gentzkow (2017) confirm that false news is closely related to the rise of social media because they have substantially reduced editorial quality control in news distribution. The figure below illustrates this: verifiable wrong news items are more frequently visited via social media channels than via traditional edited news sites.

Figure 3:



Note: This figure presents the share of traffic from different sources for the top 690 US news websites and for 65 fake news websites. "Other links" means impressions that were referred from sources other than search engines and social media. "Direct browsing" means impressions that did not have a referral source. Sites are weighted by number of monthly visits. Data are from Alexa.

Source: Alcott & Gentzkow (2017).

Much of this evidence points a finger at social media sites, and online news distribution sites in general, as the main sources of rising concerns about fake news, false news and the quality of news. In order to understand why this is so we explore in the next chapter how digitization has transformed the news media landscape and affected the production and distribution of news.

¹³ See <http://www.pewglobal.org/2018/01/11/publics-globally-want-unbiased-news-coverage-but-are-divided-on-whether-their-news-media-deliver/>

4. Platformisation of news distribution and the quality of news

The media industry has been continuously exposed to technology-induced turbulence. Printed news used to be expensive to produce and distribute. News travelled very slowly before the invention of the telegraph, paper and printing were expensive and paper distribution costly. The printed news industry started to expand fast at the end of the 19th century as a result of improvements in communication and printing technology and the introduction of subsidized postal rates. The first signs of pressure on printed news started in the 1930s when radio became a competing communication channel for news and advertising. In the 1950s TV added further pressure and contributed to a decline in newspaper circulation. The internet is another formidable competitor to printed news. It triggered a drastic decline in news distribution costs by eliminating the need to print and physically distribute news on paper. Even more importantly, it introduced a sophisticated advertising channel that allowed direct matching between advertisers and consumers but also diminished the role of newspapers as conduits for advertising.

These technological changes had a strong impact on the news media industry. The following US statistics illustrate that. Between 2000 and 2012 newspaper advertising revenue in the US fell from approximately 62 bln to 22 bln USD in real terms, the same level as in 1960 (Chandra & Kaiser (2016, p 407 and 412). The number of newspaper titles, and print circulation of these titles, declined by more than 50% over this period. The number of full-time journalists at daily newspapers fell but less so, from 57.000 to 41.000 or 18%. The largest loss was in classified advertising that moved away from newspaper to online websites. At the same time and due to the elimination of distribution costs, online newspapers managed to extend their geographical reach¹⁴. The largest news media like US Today, the New York Times, the Washington Post and Fox News reached 80-100 million online readers per month in 2017¹⁵.

A central feature of this digital transformation is the shift from a linear business model in offline news publishing to a multi-sided market or platform¹⁶ business model in online news publishing. Our objective in this chapter is to investigate the impact of this shift on the quality of news. We look at all sides of the news market: new ways of producing news on the supply side, new online distribution mechanisms to reach consumers via platforms and changes in the market for advertising that is combined with news content. We discuss the three main access channels to online news: direct access to newspapers via websites or apps, access via search engines and news aggregators, and news distribution via social media. Some of these channels may facilitate the distribution of fake/false news and, more generally, lower the quality of news production and consumption.

By way of introduction, the graphs below (taken from Reuters, 2017) illustrate the relative importance of these channels¹⁷. Digitization does not just mean that newspapers move their content online for direct reading by consumers. Only a third of all consumers prefer to access news

¹⁴ The impact of distribution technology on news markets is not new. During the newspaper boom period 1870-1920, changes in technology led to a repositioning of newspapers in the market (Gentzkow et al, 2006). A few large city newspapers became national newspapers and started to compete with smaller local newspapers. They changed their editorial line and produced more information and less political spin in order to attract a wider audience. Local papers re-focused more on local news to protect their market. George & Waldfogel (2006) study a similar combination of national expansion and local contraction in the US newspaper market in the 1990s.

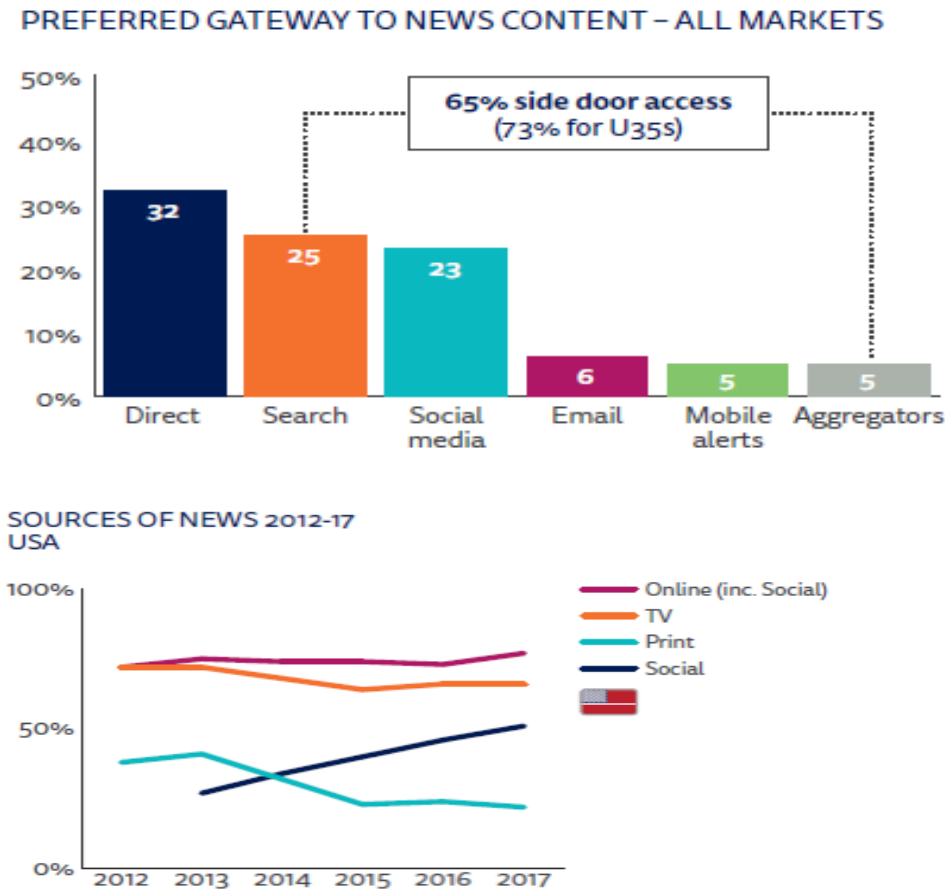
¹⁵ See ComScore rankings <https://www.comscore.com/Insights/Rankings>

¹⁶ For a more detailed discussion and overview of the literature on the economic model of platforms or multi-sided markets, see Martens (2016).

¹⁷ Once could also distinguish between text and video news messages. Reuters (2017) shows that between 7 and 15% of news consumers prefer video-based news content. That leaves text news in an overwhelmingly dominant market position.

content in this way. Two thirds prefer access via third-party operated algorithm-driven platforms. Only 32% of all readers use direct access a news site as their main information channel, either in a web browser or in an app. 25% get their news mainly via general search engines and 5% through specialized news aggregators. Nearly a quarter of all news (23%) is read via social media. Note that these shares vary considerably by country.

Figure 4:



Source: Reuters Digital News Report, 2017.

Note: The top graph refers to the main source of news per user; the bottom graph combines all sources.

The shift from direct access to a newspaper to algorithm-driven access to unbundled news articles represents an important structural change in news markets. Newspaper editors control both the content and the distribution of articles on their own websites. They lose control of the curation or selection of news articles in algorithmic distribution channels. The algorithm determines the selection of articles that a reader sees. Furthermore, in social media readers add comments to articles and another layer of curation when they share it with others. In the next sections we discuss the characteristics of these online access channels and how these might affect the perceived quality of news.

4.1. *Direct access to newspapers*

The traditional pre-digital business model in news media was based to a large extent on vertical integration between production and distribution. A newspaper would have journalists that collect the news and write articles, a printing press that produces the newspaper and a distribution network to get the printed paper to the consumer. The paper consisted of an inseparable bundle of articles and advertising, edited and "ranked" by human editors according to the editorial line, branding and market position of the newspaper, and sold at a fixed price to subscribers and daily buyers. Some newspapers carry classified ads. The "last mile" in distribution could be outsourced to independent retailers. Radio and TV news production and distribution (broadcasting) were also vertically integrated and delivered in a bundled package of news items and possibly advertising. In the pre-digital era, news media revenue consisted mainly of print sales and subscriptions, advertising and classified ads. Broadcasted news could sometimes benefit from government subsidies and pay TV had subscription revenue.

The arrival of digital technology and the internet completely changed that. The cost of distribution was dramatically reduced to virtually zero as the internet eliminated the need to print and transport printed paper to the consumer. The newsroom remained the only fixed cost in news production. However, new forms of online production emerged that could further reduce that fixed cost. This lowered entry costs into the news market on the supply side and facilitated entry for many more newcomers, from edited online-only newspapers to bloggers, vloggers, social media "influencers", etc. Some online newspapers outsource (part of) their content production to external contributors in order to increase the variety of content without increasing the fixed costs of the editorial room. For example The Huffington Post follows this model. With lower fixed costs and zero distribution costs, news producers could produce for smaller market segments. It may also have facilitated market entry for more extreme views and opinions (Mullainathan & Schleifer, 2005; Gentzkow et al, 2016) that cater to niche market audiences¹⁸.

In the early days of online newspapers, legacy printed news producers simply created an online presence as a complement to offline sales. As internet bandwidth improved, radio and TV news broadcaster could also put their audio-visual material online¹⁹. They had to compete with new online-only news producers who put their entire production and distribution system online. Still, news publishers remained in control of distribution because readers came directly to their web pages, without an intermediary. Production and distribution remained vertically integrated however, even for online-only newspapers.

Moving news distribution online had implications for checking the quality and sources of news production. Traditional daily newspapers followed a 24 hour cycle producing one new version per day. Online news production enabled a continuous production cycle with articles added and updated continuously throughout the day. Competition means that newspapers can no longer afford to wait until the next day to report on breaking news. Online articles can be seen by anyone, including other newspapers. They monitor each other's website and immediately take over new news items. Cagé et al (2016) investigate the speed and modalities of online news dissemination. On average, it takes two hours for information published by one online media outlet to be

¹⁸ There is a lot of anecdotal evidence but, to the best of our knowledge, there is no systematic and comprehensive empirical study that looks into the number, type and market reach of new market entrants and exits in the newspaper or broader news media market.

¹⁹ There is considerable convergence between online text and audio-visual news media. News "papers" can insert video messages into their web content and radio and TV news broadcasters can put text online. Podcasts are a form of delayed radio broadcasting.

published on another news site, but less than 45 minutes in half of the cases and less than 5 minutes in 25% of the cases. Very short production cycles leave little time for fact-checking and quality control. Unchecked false news items may slip more easily through the editorial net, even of high-quality newspapers. Another consequence is that articles in different newspapers become overlapping substitutes. That may decrease consumers' willingness to pay for news that is ubiquitous. With strong competition, newspapers can boost their revenue by following a product differentiation model and by "slanting" articles to attract particular audiences (Mullainathan & Shleifer, 2005). Online newspapers that are linked to a legacy offline printed version have less freedom in this regard because they need to protect their brand name. Alternatively, news publishers can differentiate the offline and online versions, surrounding free online articles with more advertising and "clickbait" in order to maximize advertising revenue.

The online business model is usually based on "freemium" access: some articles can be accessed for free while others require a subscription, separated by a paywall. Subscription pricing and positioning of the paywall is tricky because news has become so ubiquitous on the internet that few consumers are willing to pay for it²⁰. Chiou and Tucker (2013) find that the introduction of a paywall leads to a 51% decrease in online visits and thus advertising revenue. It is not clear how much of that loss is compensated by an increase in subscription revenue. The success or failure of hybrid "freemium" business models is very dependent on the brand value of newspapers. Only high quality and/or specialized newspapers that cater to audiences with a low price elasticity of demand for news can still muster a reasonable willingness-to-pay for online content²¹. Paying subscribers constitute only a small minority, ranging from 10-15% of news readers in Scandinavian countries to less than 5% in Southern and Eastern European countries (Reuters, 2017).

Printed newspapers bundle a package of articles and sell it at a given price. Switching newspapers is relatively costly for consumers because it implies paying several times that fixed price. That tends to lock consumers into a single news source. With online unbundling readers can multi-home online between several newspapers and the various qualities or "slants" of news that they produce at virtually zero costs. Free access implies that, rather than buying an entire bundle of news articles in a printed version at a given price (the price of the newspaper), online readers can select the articles they wish to read across a variety of newspapers. The marginal cost of multi-homing between newspapers online is very low. Readers who buy an online subscription have an incentive to spend more time with the newspaper they subscribed too.

Unbundling and free access lower costs for consumers and increase market reach to an audience that was not willing to pay the access price for a printed offline newspaper. Mobile access represents another step in this direction. Consumers can now access news at any moment when no other preferred alternative time use is available. That lowers the opportunity cost of reading. Lower access costs that bring more readers into the news market may also imply bringing readers with more extreme views into the market. It creates market opportunities for producers of these extreme views.

²⁰ Gentzkow (2007) estimates the economic impact of free online news in the early years of online newspapers. He finds that free online distribution reduces print distribution by 2% only. The revenue raised by online advertising exceeds the loss in print revenue. Free online reading boosts consumer welfare. The optimal online price would be 0.20 \$ per day. These estimates date back to the first decade of the century when algorithmic distribution was still in its infancy. They may well have changed considerably by now.

²¹ <http://www.niemanlab.org/2017/09/newsonomics-our-peggy-lee-moment-is-that-all-there-is-to-reader-revenue/>

4.2. Access through search engines and aggregators

This direct access model came under pressure when search engines, such as Google Search, Microsoft Bing and Yahoo, became an important intermediary to guide readers to online news articles. Search engines are multi-sided markets that match consumers and producers. They generate an algorithm-driven search ranking of articles among which consumers can choose. It results in loss of control by the editor. In traditional print newspapers editors decide on the "ranking" or positioning and visibility of articles. Front page articles with bold titles are more visible and more widely read than small print articles on subsequent pages. In a search engine these positioning features are replaced by a linear ranking. Top-ranked articles will be more frequently read than lower-ranked articles²². Consumers have a tendency to favour top-ranked products as a way of reducing search costs. However, the ranking may be endogenous (Moraga-Gonzales et al, 2013) as frequently read articles get to the top and therefore become more frequently read; bottom-ranked articles go further down because they are rarely read. This phenomenon is known as superstar and long-tail effects (Rosen, 1981). Rankings are controlled by the search algorithm, not by newspaper editors. Many factors may affect the search ranking, including the popularity of "trending" news articles that will move them up the ranking. Editors remain in charge of the content but have weaker control over the curation and distribution of content. Search engines can also collect data on readers' preferences and use algorithms to select and position the articles that are most likely to draw the attention of the reader.

Search rankings are subject to manipulation. This is known somewhat euphemistically as Search Engine Optimization (SEO). The SEO industry matches the advertising industry in size and manipulation techniques have become a major problem for search engine operators, including Google. There are many factors that drive search ranking algorithms. Knowledge of these drivers can be exploited to push items higher up the ranking²³. SEO seeks to reverse engineer the search algorithm in order to "game" it. "Black hat" adversarial SEO techniques include frequent republishing of similar stories in fake domains and linking them up to generate an artificial set of links between fresh news stories and coordinated posting of URLs on a news media website. This can make fake/false news articles look as if they are "trending" so that they can be picked up by search engines and pushed up the search rankings.

Google went a step further and created a news aggregation platform, Google News. This is a reduced version of its search engine that generates only news articles as search results, including a short extract from that article (called a "snippet") and a link to the full article. Google News allows users to set filters for preferred and unwanted news topics and sources. Readers' own search and browsing activity will also affect the articles shown. Google labels articles by type and origin, including an indication of possibly false content where applicable. Apple, Microsoft, Yahoo and many others developed similar news aggregator platforms. Aggregators reduce search costs for consumers who get a range of articles from a variety of news sources on a single page without having to switch between news sites. Lower search costs attract larger audiences, mainly low opportunity cost consumers in the long tail of the reader distribution who browse quickly through short snippets of news text, only occasionally taking the time to read full-length articles.

²² There are many studies on the impact of search rankings on click-through rates, mostly carried out by online marketing agencies because this is a vital statistic for their campaigns. They all show that CTR decline with ranking, though the rate of decline may vary considerably by study, by category of websites and over time.

²³ See https://en.wikipedia.org/wiki/Search_engine_optimization

“Snippet” reading introduces an extreme form of filtering in news. Readers only get a very short message that summarizes some essential features of the news article but does not offer any background, explanation or context of the news event. Snippets are a partial substitute for the full text of the articles. The click-through rate to the full article depends on the length and content of the snippet (Delalocras et al, 2015). Reading snippets lowers the opportunity cost of time for readers to quickly scan news messages. It lowers news market entry costs and brings more readers into the market, thereby extending the consumer reach of news. However, these additional readers are less well informed unless they click through to the full text article. Research shows that a significant number of readers do so. The advantage for consumers is the wide diversity of news sources available at low cost (Cornia, 2016). Consumers can read a wider variety of news sources than they would normally use (Reuters, 2017, Calzada & Gil, 2017)²⁴.

While aggregators will respect users' filter settings, the algorithm will make a selection and ranking of articles whereby frequency of views and links by other readers will play an important role. Reader preferences thus get mixed up with the preferences of other readers and the popularity of articles. Advertising revenue for news publishers and platform operators will also play a role in the rankings. The Google News aggregator carries no advertising on the home page. However, the full articles that readers click on will have advertising in places selected by the news publisher. A large share of these advertising slots will be sold through the Google ad auction market. Google shares the revenue with the news publishers. This is their main source of online advertising revenue. Popular articles do not only end up higher in the search ranking but will also have higher click-through rates and generate more advertising revenue for news publishers. Both the platform and the news publishers have a commercial interest in pushing trending articles up the search ranking.

Printed offline newspapers also have a profit motive but this is tempered by branding and market positioning. Putting too much advertising and trending news into a newspaper may erode its audience. While printed newspapers could only target a bundle of content and ads on the average reader, search engines can match contents and ads with individual reader profiles. Search engines and aggregators are not branding or positioning their news content in particular market segments. They seek to maximize their overall market share, irrespective of the branding of the news content. They can pursue their advertising-related profit motive in a less constrained way, as long as they return relevant news articles to users. Unless the ranking becomes personalized, targeting the most popular articles is a good strategy to generate revenue. As such, they can use search rankings to drive a wedge between consumer preferences and news publishers²⁵ in order to pursue the advertising revenue interests of the platform. Trending news articles will be pushed up the search rankings because they may attract more expensive advertising and are more likely to be

²⁴ Calzada & Gil (2016) study the impact of the introduction of copyright for news publishers in Spain and Germany. Their data do not only track the volume of web traffic but also the sources that generate the traffic (direct access to the news pages, aggregators, search engines, social media sites, links from other web pages, etc.). They find an 11% drop in Spanish newspaper traffic (quantity effect) and an 8% drop in the number of newspaper pages visited (a reduction in the variety of news) following the change in the copyright law. The latter could be interpreted as evidence that news aggregators increase access to a plurality of media resources rather than reduce it. They also find a drop in search and direct traffic to newspaper sites by 12% and 14% respectively. It may indicate that users quickly grew tired of the additional transaction costs to do their own news aggregation via search and direct access to newspaper sites and simply reduced the number of news sources that they consulted. That would confirm the variety or media plurality effect of news aggregators. Aggregators may actually increase the number of direct visits to news outlets by allowing consumers to rediscover new sources of information. For the German case they find a 7% reduction in daily visits to news outlets controlled by the Axel Springer group that initially opted out of Google News during a 2-week period. There was also a 10% reduction in visits via search engines and 7% direct visits.

²⁵ Several studies (Ursu, 2015 for Expedia; Chen et al, 2015 for Uber; Fradkin, 2014 for AirBnB) have found empirical confirmation for the view that search rankings in commercial platforms drive a wedge between the interests of suppliers and consumers, to the benefit of the platform operator. There are no empirical studies yet on news article rankings in aggregator platforms and how they affect the interests of the publishers and news readers. Such studies would be very useful to assess the impact of news aggregators on media plurality.

read. Aggregators share the advertising revenue with the news publishers but article rankings will not maximize the revenue of all publishers.

Another disadvantage of aggregators from the perspective of news publishers is that readers may get confused by the variety of news sources. A test by Reuters (2017) revealed that less than half of the respondents could recall the name of the news publisher when coming to an article from search engines (37%) and social media (47%). It is often difficult to distinguish between genuine news items and paid-for content on news pages. That makes it difficult, even for discerning readers, to appreciate and distinguish the quality and credibility of all these channels.

The advantage for newspaper publisher is that aggregators offer an increase in audience reach and advertising revenues (Calzada & Gil, 2017; Athey & Mobius, 2012; Chiou & Tucker, 2015). This explains why most newspapers actively collaborate with online news aggregators. The flip side of the deal is the loss of editorial control and brand recognition. This undermines news publishers' attempts at building editorial profiles and branding as readers care less and often do not even know the source of the news. The vast increase in media channels makes it more difficult, even for discerning readers, to identify and assess the credibility of these sources.

Newspapers can experiment with several strategies to push back against search engines and aggregators. Some newspapers are joining forces to build their own news aggregation platform, with a subscription fee attached to it²⁶. That combines the advantages of lower search costs and more variety for consumers, with more revenue for news publishers. It is difficult to see however how such high-quality but still limited-variety news platforms can compete with Google and Facebook on consumer reach. This experiment mainly targets the market for discerning news consumers with a willingness to pay for high-quality content. Others are pushing back by creating their own mobile app, usually coupled to a subscription. This enables them to keep their articles, readers and ads in an environment over which they have more control. However, limited willingness to pay and low subscription rates limit the effectiveness of these strategies.

4.3. Social media and news distribution

A further step in the digital transformation of news distribution is the increasingly important role that social media, including Facebook and its affiliated companies, play in online news publishers' efforts to expand their consumer reach. First, users are spending more time on social media to interact with each other and with the world at large. As consumer attention and eyeballs gradually shift away from traditional linear media to social media, news media publishers had to follow consumers and create a presence on social media platforms. Second, users increasingly prefer mobile devices over PCs and laptops to access the internet. Social media apps like Facebook and Instagram are important intermediaries for the delivery of news articles because they are more convenient tools than web browsers and search engines like Google Search and Microsoft Bing on a mobile phone. Users may of course put a newspaper app on their phone to access that online content directly. Apps are usually associated with a paid subscription. But for browsing articles across newspapers social media apps offer more convenience. A major advantage of bringing news to the mobile phone is that consumers can now easily read news at moments of low opportunity cost of time: sitting in a bus or on the train or waiting at the cashier in the supermarket. This extends the consumer reach of news because the opportunity cost of reading declines. Reuters

²⁶ See for example Blendle <https://launch.blendle.com/>

(2017) reports that today more than half of all survey respondents use a Facebook product to access news, including Whatsapp, Messenger and Instagram. Together with Google News it is among the most important algorithm-driven distributors of news, especially for younger generations, though there are shifts between media apps. Apple Spotlight and Snapchat Discovery are reported to be the fastest growers in online news apps (Reuters, 2017).

Social media go beyond search engines and add another distribution mechanism: the links between networked users. What users read in social media not only depends on the sources that they selected but also on what their "friends" or networked group members are posting and sharing. For example, on Facebook Newsfeed users can select whose content or which pages they want to see first on their screen. Pages include newspaper articles from selected sources. Users can also choose the "top stories" setting that shows the most popular stories from selected friends, pages and groups at the top of the Newsfeed²⁷. As in the case of Google News, filter settings limit the sources of news but within these settings the algorithm selects content that fits with user interests and is popular among other users and generates more interaction between users elsewhere in the social network. More interaction generates more traffic, more user attention and more advertising revenue²⁸ for the social media network. Content can propagate through a network of stronger and weaker links between users. These links can be used strategically to target and distribute both user-generated, shared content as well as paid-for content. Algorithms on the social media platform organize and filter this distribution process and exercise leverage over these channels. Like search ranking algorithms, they can be gamed by strategic players to promote their own paid and unpaid content.

News publishers can propagate content to social media in various ways. Most online news articles nowadays contain clickable links that send (a hyperlink to) the article to social media accounts. The account holders can share them in their network, possibly with comments, "likes", and they can be shared and propagated further in the network. News publishers can partially monitor but have no control over these social media propagation mechanisms. The news publisher's role as content editor and curator of articles diminishes because the prominence, speed of distribution and added "slant" in social media comments can diverge considerably from the original message and intentions of the editor.

Social media management services (SMMS) are a newly emerging type of online services providers that add another layer of content distribution mechanisms on top of social media sites (Gosh & Scott, 2018). SMMS can coordinate content promotion campaigns across different social media sites. They can launch large-scale automated and contingency-based campaigns for commercial advertising purposes or for political information campaigns, including dis-information campaigns. For example, they can be pre-programmed to immediately respond to a press release from a political opponent via a variety of media channels. With news cycles and distribution delays getting ever shorter, they are a powerful tool in sensitive commercial and political campaigns that require instant and massive reactions. They use machine learning and AI to target and continuously update specific audiences, content, timing and other factors.

Anyone who is willing to pay for content distribution can use these social media channels and mechanisms, including for political content and disinformation campaigns. Gosh & Scott (2018) argue that platform-based commercial advertising technologies have facilitated the spread of "adversarial" (dis-)information campaigns that seek to counteract, discredit and distort news items

²⁷ See <https://www.facebook.com/help/371675846332829?helpref=related>

²⁸ Facebook Instant Articles (FBIA) displays the full text of a news article, with ads in the article. The articles are loaded onto Facebook servers and into the Facebook app environment. News publishers retain 100% of the ad revenue on their own ads and 70% of the revenue on Facebook-produced ads.

and policy campaign. Most of this is entirely legal and protected by free speech. These technologies suit the vertically integrated data and advertising side of multi-sided platforms and constitute the core financial sources of the largest platforms. Blocking and censorship is tricky and will only result in whack-a-mole games as technologies and targets are continuously adapted. Transparency may help but the problem is deeply systemic and will require better remedies. Gosh & Scott (2018) present an overview of the technologies used for targeted advertising and other paid content distribution on media sites.

4.4 Advertising and the platformisation of online news

The vertically integrated business model whereby a newspaper editor controlled the entire production and distribution process came under pressure from algorithmic distribution platforms and the new opportunities they offered for advertisers. It led to vertical disintegration of the linear business model and turned it into a multi-sided platform model.

Pre-digital printed newspapers (and radio and TV stations for that matter) already had some characteristics of two-sided markets or platforms. They brought together readers and advertisers around a set of news articles. They (partially) subsidized consumers (below-cost pricing of print sales and subscriptions) with advertising revenue. Chandra & Kaiser (2016, p 417) explain how the early economic research literature on newspapers already emphasized the indirect network effects between print circulation and advertising: more readers attracted more advertisers. Rosse (1970) produced the first two-sided market model that combines advertisers and readers and estimates price elasticities and optimal pricing on each side of the market, many years before the first formal two-sided market models entered economics (Armstrong, 2006; Rochet & Tirole, 2006; Caillaud & Julien, 2003; Parker & Van Alstyne 2005). However, these were not true two-sided market or platform models in the modern sense of market places where advertisers and readers could be matched directly and individually with each other. Printed and broadcasted news were crude platforms because they lacked the data and technology for targeted advertising. Advertisers could only target the entire audience of a newspaper with the same ads. Newspapers and news broadcasts came as an inseparable bundle of articles and ads that was targeted at a large but undifferentiated audience of readers/listeners.

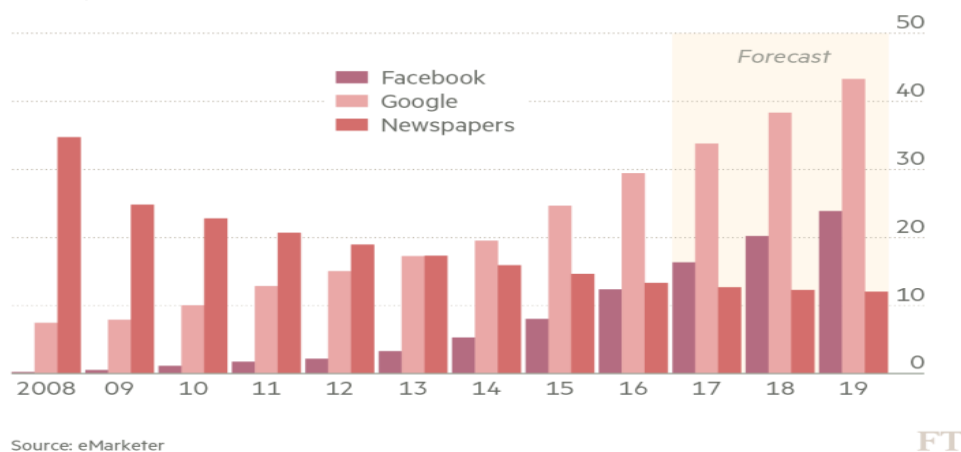
Putting newspapers online not only turned them into true two-sided markets or platforms where readers and advertisers could be matched on an individual basis. The arrival of intermediary distribution platforms added a third side to this market because they aggregated news content from a variety of newspapers. Collecting data on reader profiles (not only on newspaper websites but from many other sources) and news articles and the application of sophisticated matching algorithms led to the emergence of a three-sided market where readers, advertisers and articles can be directly matched with each other. Contrary to a bundled print newspaper, the combination of articles and ads that readers see online may vary substantially between readers.

This led to vertical disintegration between news production on the one hand and distribution and advertising on the other hand. The number of platform users is much larger compared to a single newspaper website or app. That gives platforms a wider market reach than newspapers and enables them to improve the accuracy of matching between news publishers, advertisers and consumers. As a result, advertisers and readers moved away, at least to some extent, from direct access to newspaper websites and preferred to access the news via algorithm-driven platforms such as search engines, news aggregators and social media platforms. This put pressure on the traditional business model of vertically integrated newspapers. Sticking to that model reduces

market reach and weakens network effects. Only highly specialized newspapers with a high willingness to pay among readers and less dependence on advertising may escape these market forces.

Figure 5:

Digital v print ad spending US only (\$bn)



Source: Financial Times and eMarketer.

Online advertising has become a quasi-duopoly, with Google and Facebook accounting for the bulk of all online advertising revenues. Surprisingly and worryingly, up to 90% of legacy newspaper revenue still comes from print (sales and advertising) for most legacy newspapers, even after years of decline in print advertising and circulation and almost 20 years of investment in digital media (Cornia et al, 2016, p 7-8).

Unbundling of articles shifted more advertising power to platforms. In the pre-digital era, print readers did not multi-home much. They usually bought only one printed newspaper, perhaps a second, at a given price. Since readers did not multi-home, print advertisers would typically not be able to multi-home either because they needed to be in a particular newspaper to reach the audience of that newspaper. Advertising costs depended on the number of readers reached by a newspaper. With digitization readers started to multi-home between newspapers because the marginal cost of doing so has diminished drastically from the price of a printed paper to zero for an online article. Unbundling allows them to select articles from a variety of newspapers. The extent of multi-homing by users on each side of the market affects pricing on either side (Armstrong, 2006). Advertisers now pay-per-view instead of a fixed cost for an entire newspaper audience. Still, advertisers continue to subsidize online news readers. Since users multi-home online, advertisers can also multi-home and are no longer bound to a particular newspaper to target specific readers. That reduced newspapers' leverage on advertisers. Multi-homing between many websites is steered by large advertising platforms such as Google and Facebook that collect data across all online services and can target particular reader groups in many ways. As a result, advertisers' willingness to pay for ads linked to news articles declines. They tried to hold on to some advertising revenue. That turned out to be hard. A large chunk of ad revenue got diverted away to other online channels.

There is actually a fourth side of the market in these online marketplaces: data analytics and data use. This fourth side usually remains vertically integrated in the platform that has monopoly access to data and uses them for price discrimination in online advertising auctions (Bergemann & Bonnatti, 2015). Platforms may sometimes (partially and temporarily) open access to data for analytics purposes in order to stimulate innovation in services on the platform (Parker, Van Alstyne and Jiang, 2017). Many platforms provide API access to selected users and subject to contractual conditions to boost the range of innovative services available around the platform. Newspapers could benefit greatly from more access to news platform data. It would enable them for example to generate better reader and content engagement data, raise more revenue from tailor-made subscriptions adapted to the preferences of customers and post more sponsored news content (as opposed to advertising content). Both Google and Facebook have started to offer news publishers more possibilities to use these data for raising subscription revenue²⁹.

Gosh & Scott (2018) explain how personal behavioral tracking data are collected and permit refined targeting of ads. It starts with collecting data from first and third party cookies, undeletable Flash cookies, tracking via emails, web beacons, GPS and more fine-grained location tracking, cross-device tracking with unique identifiers and browser fingerprinting. Facebook's pixel tracker now collects data from webpages visited even by people not on Facebook³⁰. It can be complemented with more personal information, content analysis of emails, search terms and social media content, and information from other personal data sources such as e-commerce and financial transactions, electoral registers, etc. This creates fairly accurate personal profiles that can be used for detailed targeting of ads. The efficiency of these campaigns (as measured by click-through rates - CTR) is constantly monitored and targeting is adjusted to optimize the CTR. Advertisers can re-sell their target lists to others to enable them to reach like-minded and look-alike audiences. More sophisticated psychometrics-based advertising techniques extract personal psychological profiles from social network data (Matz et al, 2017). Besides well-known general cognitive biases in human behavior these datasets seek to discover personal psychopathologies ranging from extroversion and introversion to emotional stability, anxieties, aggressiveness and compulsive behaviours. These personal profile data can then be used for targeting of sponsored messages, from ordinary ads to more political messages. In the recent high-profile case of Cambridge Analytica and the use of personal data from Facebook users³¹, this triggered a wider public debate on the ethics of using personal psychological profiles for political targeting, based on unauthorized access to personal data.

²⁹ The Facebook Journalism Project and Google's Digital News Initiative go in this direction. See <https://www.ft.com/content/8cf89782-9e4c-11e7-8cd4-932067fbf946> and <http://www.niemanlab.org/2018/03/google-announces-a-300m-google-news-initiative-though-this-isnt-about-giving-out-grants-directly-to-newsrooms-like-it-does-in-europe/>

³⁰ This practice has been condemned in some Member States' Courts. See for instance this case in Belgium <https://www.theguardian.com/technology/2018/feb/16/facebook-ordered-stop-collecting-user-data-fines-belgian-court>

³¹ Cambridge Analytica used Facebook data for psychometric targeting. Inquiries by UK and US data protection authorities in this case focus on possible violations of US and EU privacy rules in the use of personal data by Cambridge Analytica and its partners.

5. Some evidence on the distribution and impact of fake news

The previous chapter explained how the transition from offline print and broadcasted news to online news distribution, and especially algorithmic news distribution platforms such as search engines, news aggregators and social media, have substantially changed news markets. Online news distribution has diminished the role of news editors. It separated the roles of editor and curator of news and to a large extent transferred the latter role to advertising-driven algorithms. They maximize traffic and advertising revenue, so far without much constraint in terms of preserving trust in news brands. This has triggered concerns about the quality of news and facilitated the rise of false news and other forms of disinformation.

While the previous chapters were more descriptive the current chapter presents some empirical evidence regarding online news distribution, especially in social media platforms.

5.1 *The impact of social media on news propagation*

Here we present some empirical evidence gathered by a rapidly growing research literature that illustrates the power of social media networks in propagating content as well as the impact this may have on consumer quality perceptions of news in the broader sense (not limited to false news).

Tan et al (2016)³² use Facebook data to examine the propagation of news from original sources in social media. They track the evolution of 170 press releases in four different areas – politics, science, technology and finance – and trace how they generate 777 news articles which are shared 132k times on Facebook, and commented on 112k times. A typical news cycle on Facebook lasts only 48 hours, with the vast majority of sharing happening in the first 24 hours. The original press releases are shared very rarely on social media, but news articles are. They also trace how sentiment about the news changes across the stages of propagation, compared to the original press release. Sentiment is dampened in news articles that have fewer subjective words than the original press release. It rises again in social media shares and comments. The balance of positive to negative comments declines with each layer of propagation. Positive comments facilitate propagation. Some words that are emphasized in the press release and news articles fail to propagate and new words may be added that affect the meaning, sentiment and interpretation of the original message – an illustration of "slanting" (Gentzkow et al, 2016). They find an increasing subjectivity in the diffusion of news due to the social interactions that take place in the process. News articles that stay true to the wording of the source press release enjoy no advantage in terms of popularity.

³² There is also an older theoretical research literature on social learning and social networks that started before the arrival of digital social media networks. Banerjee (1992) and Banerjee and Fudenberg (2004) show how agents' behaviour influences the spread of information through networks. Acemoglu et al (2010) use a social learning model to explore the trade-off between information aggregation and the spread of misinformation. Their model includes agents with an explicit willingness to influence other agents' beliefs in a specific direction. They relate the extent of misinformation to the properties of the underlying social network, as well as to the local structure of the social network and the position of the "influencers" in the network.

Some older studies include Bakshy et al (2011)³³ who use Twitter data on 1.6M users and 74M diffusion events to quantify the influence of followers on Twitter. They find that most posts are not spreading at all, getting stuck at the first cascade. Still, most information spreading happens at that level, via a large number of single-step cascades, mostly triggered by ordinary individuals. The deepest cascades can propagate as far as nine generations from their origin but they are very rare. They find that past performance and the number of followers are necessary features of likely future success in spreading news but not a sufficient feature. Even individuals that have these attributes are mostly unsuccessful because deep cascades are extremely rare. Content attributes also play a role. Content that is rated more interesting and elicits positive feelings generates deeper cascades.

In a similar vein, Bakshy et al (2012) test the role of strong and weak ties in the propagation of messages in social networks. Facebook social connections are known to be representative of offline social connections. Homophily, the tendency to associate with individuals with similar characteristics, creates a difficulty in measuring the role of strong ties. Those who interact more offline are more likely to have similar information sources. Those who have weak ties and interact less frequently may benefit more from novel information that does not flow inside their circle of strong ties. The authors use data from a behavioural experiment on Facebook that seeks to randomize the spread of information between groups with strong and weak ties in order to have an unbiased comparison of how information spreads in these groups. They find that strong ties are more influential but are often redundant to exposure to information outside the social network while weak ties carry more information than one might otherwise have been exposed to. In other words, weak ties on social media are a good way to spread information across homophilic "filter bubbles" and "echo chambers". This experiment confirms the findings of Granovetter's (1973) work on the (offline) importance of weak ties in spreading information. Arnaboldi et al (2017) confirm that online social networks on Facebook and Twitter have the same qualitative and quantitative properties as offline social networks. The strength of ties is a good proxy for trust. However, relying only on trusted links drastically reduces information spread. Using weaker ties with lower trust increases information spread.

Barbera et al (2014) show that weak ties expose users to a wider range of views than they would normally be exposed to in offline interaction. Using Twitter data for millions of users in Germany, Spain and the US the authors show that most social media users are embedded in ideologically diverse networks, and that exposure to political diversity has a positive effect on political moderation. Contrary to conventional wisdom, these data suggest that social media usage that involves participation in several networks reduces mass political polarization and echo chambers.

Jang et al (2018) use twitter data to compare the origins and evolution patterns of false information. Tweets about real news spread widely and quickly, but tweets about fake news underwent a greater number of modifications in content over the spreading process. Using Facebook data, Del Vicario et al (2016) explore how two types of information, scientific news and conspiracy theories, may lead to a scenario where homogenous communities with similar news consumption patterns are polarized in echo chambers. Their analysis suggests that selective exposure to information is a main driver for the formation of echo chambers. Using Facebook data,

³³ There are some older studies as well, though they may not be so relevant anymore in this rapidly evolving social media world. Lerman and Gosh (2010) use information from Digg and Twitter to track how interest in news stories is spread among users. They show that, even if the two sites under study are structurally different, the spread of information through them follows similar patterns. Networks are endogenously created by users through the election of the friends they want to follow, which implies a degree of bias towards friends' preferences in the dissemination of content. Bakshy et al (2009) find that contents are shared more rapidly among friends than among strangers in Second Life. Interestingly, their results show that a higher number of friends is associated with a lower probability to be influenced by any particular one. Intuitively, this is related to the difficulty of maintaining a higher number of ties, and the consequent weakness of the links.

Conti et al (2017) provide additional empirical evidence reinforcing the hypothesis of echo chambers.

Del Vicario et al (2018) show that algorithms can be used to generate early warning signals of debates that might potentially developed into themes for fake news. Spreading disinformation on social media is directly related to polarization and segregation of users. Given the key role of confirmation bias in fostering polarization, the authors use the latter as a proxy to determine in advance the targets for fake news. They introduce a general framework for identifying polarizing content on social media in a timely manner and thus predicting future fake news topics. They test their classifier model on Italian news data on Facebook and demonstrate that it can predict fake news topics with 91% accuracy. More importantly, this work shows that social media debates that lend themselves to the production and propagation of fake news can be detected in advance by algorithms.

Bakshy et al (2012) examine strategies for spreading paid content through "influencers" in Facebook: is it better to target many individuals who exert little influence at a low cost or target a few highly influential individuals with a large network of followers but at a high cost per targeted individual? They find that the latter strategy is more effective. This explains the emergence of a market for "influencers" in social media who are highly paid and have commercial incentives to push content. Their cascade depth may not reach far but it is sure to be wide. Social media "influencers" with a dense network of followers may carry a lot of brand market value and may be able to push content further and wider than an established newspaper.

Bardya et al (2017) demonstrate that the expression of moral emotion is key for the spread of moral and political ideas in online social networks. Using a large sample of social media communications about three polarizing moral/political issues they observed that the presence of moral-emotional words in messages increased their diffusion by a factor of 20% for each additional word. Moral-emotional language increased diffusion more strongly within and less between groups. This confirms models of social influence and group polarization as people become increasingly immersed in social media networks.

Social networks can be used not only to propagate legitimate news but also to set up adversarial campaigns to counteract information signals from whatever source. Ayman et al (2017) make this more explicit in a model that emulates the presence of an "outside adversary" in a social network who wants to influence opinion in favour of a specific position through biasing private information of other agents in social networks. The authors model the spread of news as a social learning game in a network. They assume that users, on average, identify fake news more frequently than not. The spread of fake news is less effective when agents know about the existence of an adversary. It examines the vulnerability of social networks to fake news, providing a starting point for a computational framework to study this issue. They find that friends of a user in social networks are not just passive intermediaries for the news, but they influence their friends' beliefs with their stance towards the news. This shows the need to educate users about fake news. Agents' position in the social network and their private signals facilitate the intentional spread of fake news. Preventing adversaries' access to this information could reduce the dissemination of fake news.

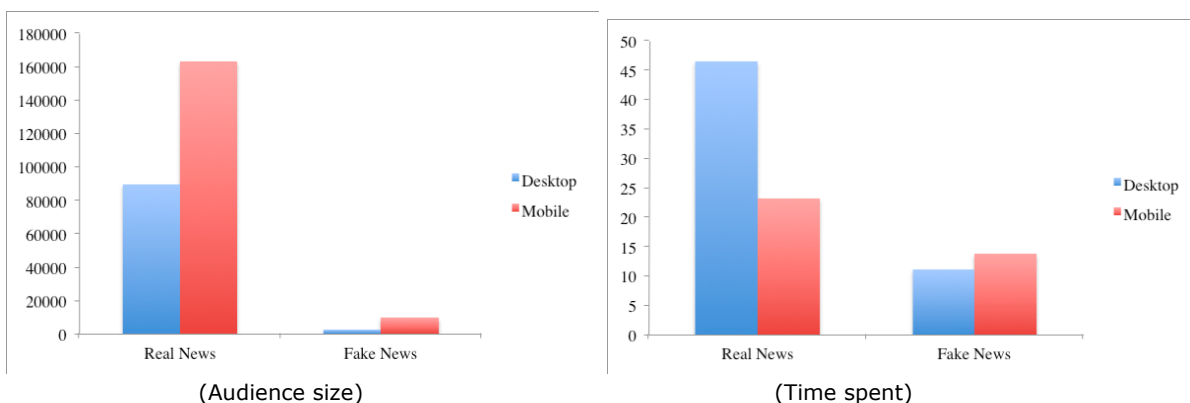
5.2. The consumption of false news

In this section we return to the narrow definition of fake news in the sense of verifiable false news. This narrowing of the definition is necessary for quantitative social scientists who want to measure the extent and reach of fake news. They need a measurable dataset of fake news items. Verified false news items lend themselves well for this purpose.

Guess et al (2018) use a survey to collect subjectively reported visits to false news articles and compare these visits between Trump and Clinton supporters. Visits to fake news websites are highest among people who consume the most news from traditional news sites. These visits do not measurably decrease among politically knowledgeable individuals. As such, false news consumption seems to be a complement rather than a substitute for real news. More conservative individuals read considerably more false news articles. They find a strong correlation between Facebook use and reading false news articles. None of the survey respondents who visited fact-check websites perceived the fact-check as debunking the false claim.

Nelson & Taneja (2018) go a step further and use objectively measured data from ComScore to compare traffic to 30 false and 24 real news websites. They find that real news audiences dwarf false news audiences. However, false news to some extent catches up with real news in terms of time spent. Time spent per visit on real news sites is still twice as high as on false news sites. The distribution of news consumption is very unequal. Most false news is consumed by a small group of heavy internet users, mostly coming in via referrals from social network sites. The authors suggest that audiences with high demand for media consumption are more likely to seek variation in media sources and dig deeper into the long tail of less visited news sites. Most internet users stick to popular news sources, regardless of ideology, while a minority of heavy users consume extreme sources in addition to popular content (as already confirmed by Gentzkow & Shapiro, 2010; Guess 2018). They examine cross-website visitation patterns and find large overlaps between visitors to false and real news sites. They conclude that false news audiences do not live in filter bubbles but rather look for more variation in media sources. Social media facilitate this. The use of Facebook by itself does not lead to the consumption of false news. Rather, it is the amount of time a user spends with Facebook that is correlated with levels of false news consumption. The authors emphasize that they do not want to underplay the distorting impact that false news may have in society, irrespective of audience figures.

Figure 6: Audience size and time spent on real and false news sites



Source: Nelson & Taneja, 2018.

Their research raises new questions. Why would heavy internet users, who would also be more savvy users, be tricked into reading false news? The study does not say anything on the profile of these heavy readers or their motivations. A limitation of the data used in this study is that it does not cover exposure to false news within social media sites, only exposure for those who leave the site and click on a website. Moreover, it does not cover exposure to false news in walled-off social groups in messaging apps like Whatsapp.

Fletcher et al (2018) further improve on this methodology by combining ComScore with CrowdTangle data. The latter provide engagement measurement inside Facebook accounts. The authors compare engagement data between 300 real and false news websites that publish verifiably false news in France and Italy. They find that none of the false news sites has a monthly reach above 3.5% while the most popular real news sites can reach 20-50% of online readers. However, in France interactions inside Facebook for three false news sites matched or exceeded those produced by popular news brands. These cases include a health news site, a satire site and an extreme right political site. The authors confirm that these few cases are the exception rather than the rule. Other false news outlets in their sample generated far less interactions than established news brands. In line with other studies, this study also finds considerable overlap between reading real and false news sites. For example, 45% of readers of the false health news site also used Le Figaro and 34% used Le Monde. In Italy none of the false news sites comes anywhere near the consumer reach or Facebook interactions of established news outlets. The selection of websites may have affected the results. It may be more appropriate to compare interactions on a health site with the many magazines that dispense health advice rather than with mainstream newspapers. Still, false news on health sites may actually be more damaging to consumer welfare than false political news. Humor sites may also not be the best choice for comparison with false news.

It is tempting to conclude from these recent studies that false news consumption is relatively limited and mostly confined to heavy social media users who have an appetite for more variety in news consumption and therefore dig deeper into the long tail of far-from-mainstream news sources. Not echo chambers but demand for variety of news could be a driver of false news consumption.

Vosoughi et al (2018) shed new light on the false news propagation process. These use Twitter retweet data for false and true news stories. They find that falsehood diffuses significantly farther, faster, deeper, and more broadly than the truth in all categories of information, and even more pronounced for false political news. False stories inspired fear, disgust, and surprise in replies, true stories inspired anticipation, sadness, joy, and trust. Differences in user characteristics and network structures do not explain the differences. The authors provide two alternative explanations. First, false news contains more novel information than true news; second and relatedly, spreading novel information may increase the social standing of the propagator. When controlling for robots in the retweets, the authors find that, contrary to conventional wisdom, robots accelerated the spread of true and false news at the same rate. This implies that false news spreads more than the truth because humans, not robots, are more likely to spread it. Human cognitive biases are at the root of false news. Going after the robots may not have much impact in that case.

We should be careful not to conclude too quickly on the basis of a few very recent studies, especially since these studies do not contain much information on user profiles. They are limited to interactions in social media sites and with verifiably false news only. More empirical studies are likely to come up in the near future that may shed more light on these questions.

5.3. The impact of (fake) news on politics

Concerns about fake news started in the wake of the US presidential elections in 2016 and were repeated during the French elections in 2017. The Mueller indictment³⁴ of Russian operatives for interference in US politics shows the extent and sophistication of these operations that go far beyond spreading false news and include the organization of real events under false identities. The indictment does not claim that it had any impact on the outcome of the elections. Researchers however have picked up this theme and started to explore the potential impact of (fake and real) news on politics and voter behavior.

There are a number of relatively older empirical studies about the impact of newspapers on voters' behaviour. They pre-date the rise of online news aggregators and social media platforms. Gerber et al (2009) measure the effect of exposure to newspapers on political behavior and opinion using a field experiment. Focusing on the Washington, DC area, the authors exploit the presence of the two main newspapers *Washington Times* – a conservative journal - and the *Washington Post* – a more liberal outlet. A month before the 2005 gubernatorial election, a sample of individuals were randomly assigned to a *Washington Post* free subscription treatment, a *Washington Times* free subscription treatment, or a control treatment. The results show no effect of receiving either paper on knowledge of political events, opinion of those events, or on voter turnout in the 2005 election. Perhaps surprisingly given the slant of each news outlet, the authors find that receiving either paper led to more support for the Democratic candidate. This suggests that media slant mattered less than exposure to media. One explanation for these findings is that the news environment at that time was politically challenging for Republicans. What the news coverage had in common could therefore have been more important than any differences between the newspapers.

DellaVigna and Kaplan (2007) ask whether media bias affects voting behaviour. The authors use the entry of Fox News in cable markets to measure the effects of the channel's news coverage on the Republican Party vote share in presidential elections. They estimate that Fox News caused about one-half of a percentage point shift toward George W. Bush in the 2000 presidential election. Their estimates imply that Fox News convinced between approximately 5 percent and nearly 30 percent of its non-Republican viewers to vote Republican. These results imply that exposure to more conservative coverage had a sizeable persuasion effect.

Enikolopov et al (2011) estimate the impact of the only independent national TV channel in Russia on voting behaviour during the Russian 1999 parliamentary elections. They find large and significant effects of independent TV availability on voting outcomes. The pro-government party lost about a quarter of its voters as a result of independent TV broadcasts, and the opposition increased their political support by a factor of 1.6. Access to independent TV broadcasts additionally decreased turnout by 3.8 percentage points. At the individual level, their results show that exposure to independent TV had a significant effect on votes in favor of two of the three opposition parties, even controlling for voting intentions measured one month prior to the elections. It had a particularly large negative effect on the vote for the pro-government party among voters who were undecided a month before the election.

³⁴ See <https://ig.ft.com/documents/russia-indictment-mueller-probe/>

More recent papers focus specifically on online news channels. Boxell et al (2017) use survey data to analyse how trends in political polarization relate to the respondents' propensities to obtain news or information online or from social media. Using nine different measures of political polarization, their results show that the growth in polarization is largest for demographic groups that are least likely to use the Internet and social media. These findings go against the hypothesis that the Internet in and social media are drivers of rising political polarization. One possible interpretation of these findings would be that echo chambers and polarization are more prevalent in offline horizontally segmented news media markets (Gentzkow et al, 2016). Online news readers on the other hand get more exposed to a wider diversity of views, especially when they use algorithm-driven channels that blur the distinction between different sources and "slants" of news. This doesn't mean that social media doesn't play a role. But it means that it's not the whole story.

King et al (2017) provide convincing empirical evidence from a matched-pair randomized experiment on the effect of exposure to the news media on public expression and national political agendas.³⁵ To run the experiment the authors recruited 48 small media outlets to publish articles on pre-determined topics at randomly assigned dates. In particular, in the treatment week a pack of up to five media outlets ran the articles on the pre-determined topics while in the control week all media outlets published their articles without any influence from the experimenters according to their usual procedures. King et al (2017) estimated the causal effect of their media treatment by looking at page views, Twitter posts in the subject of the articles and posts in the broad policy areas of the articles. They find that their media treatment increases public expression in each of the broad policy areas under study by about 62.7%.

Allcott and Gentzkow (2017) use a mixture of fake news data sources and voter surveys to examine the impact of exposure to fake news items – narrowly defined as verifiably wrong items – on ideological re-alignment, i.e. to what extent does it make voters switch ideological camps in the 2016 US presidential elections. They find that Republicans are more likely than Democrats to correctly believe articles that were true. However they were less likely to report articles that were false. Democrats are overall more likely to correctly identify true and false articles. Correct identification is highly correlated with underlying factors: higher education, higher age and more time spent on news media. They also find that there are no statistically significant differences between Republicans and Democrats in the magnitude of ideologically aligned inferences, i.e. the impact of prior political beliefs on correct identification does not significantly differ. With respect to the impact of social media they find that a 10 percentage point increase in the share of social media friends that preferred the same presidential candidate is associated with a 1.47 percentage point increase in believing ideologically aligned headlines relative to ideologically cross-cutting headlines. Undecided voters are less likely to believe ideologically aligned articles than more decisive voters.

Recent survey evidence from a representative sample of 1,037 randomly selected German voters suggests that the subpopulation of far-right voters is more likely to believe in fake news than the full population of voters (Sängerlaub, 2017; Scott, 2017)³⁶. Sängeraub's (2017) survey was conducted in the week after the German general election in 2017 to evaluate the prevalence of fake news during the election as well as the voters' attitudes towards the traditional media such as

³⁵ See Gentzkow (2017) for comments on this research.

³⁶ There is no information on the statistical relevance of the dataset but the underlying data is available here: https://www.stiftung-nv.de/sites/default/files/tabellenband_fake_news.pdf

newspapers, radio and public-service TV as well as social media and online news. Overall, the survey provides evidence that 63% of all respondents trust the media in general while only 26% of the voters of the right-wing Alternative for Germany (AFD) do. In terms of media usage, the study finds that social media as a source of information was far more important for AFD voters than for the full population of voters. It also suggests that AFD voters are more likely to believe fake news if they reinforce their views, i.e. confirmatory fake news. However, overall Sangerlaub (2017) also suggests that the extent of fake news during the German general election was at a rather low level as compared to the recent US presidential election. The author argues that this may be due to the fact that there is a less favorable environment for fake news in Germany because of relatively high levels of trust and confidence of the voters in traditional mass media (Swift, 2016). Neudert et al (2017) provide additional empirical evidence on the prevalence of fake news and political bots during the German general election. Using Twitter data on bot activity, their evidence suggests that, overall, the general impact of political bots during the German general election was relatively small as compared to, for instance, the US or UK. Neudert et al (2017) argue that this may be due to a relatively high level of professional news consumption and a relatively low level of automation and fake news consumption in German Twitter during the election. Notably, however, Neudert et al's (2017) findings also suggest that most political bots on Twitter were working in the service of the AFD.

Mocanu et al (2015) examine the social dynamics around pages of political activism on the Italian Facebook pages during the 2013 electoral campaign. More specifically, they track 50 public pages during 6 months and analyze the interactions of users with the public posts. After classifying the pages into three categories – mainstream news, alternative news and political activism – they analyze whether there are differences in the patterns between these three groups. Their results show that users consume unsubstantiated and main stream news in similar ways. The authors also explore how users react to false information. To this aim, they monitor reactions to 2788 false information created by a troll page. Their results show that users who prefer alternative information sources are more susceptible to false information. They attribute this to the stronger concerns of this type of users to avoid the potential manipulation of mainstream media controlled by the government.

To the best of our knowledge, there is only one paper that explores the causal effect of fake news on voter turnout: Barrera et al (2018) administered an online survey-based experiment to 2480 individuals in March 2017, during the French presidential campaign. The participants were voting-age French inhabitants of five French regions with traditionally strong support for the extreme right. They were randomly allocated to four equally sized groups asked to read different messages. Participants in the alternative facts group were asked to read several statements by Marine Le Pen on immigration, each containing factually incorrect information. Participants in the "Facts" group were asked to read a short text containing facts from official sources on the same issues. Participants of the "Fact Check" group were initially provided with the same quotes from Marine Le Pen, and then with the same text containing facts from official sources. The control group was presented with no information. The results show that political statements based on alternative facts are highly persuasive and fact checking is useless in undoing this effect: being exposed to Marine Le Pen's rhetoric significantly increases voting intentions in her favor by 7 percentage points, irrespective of whether they are accompanied by fact checking. So while fact checking works well in terms of increasing factual knowledge of voters, it does not translate into anti-Marine Le Pen policy preferences. The authors additionally find a backfiring effect of the facts treatment on voting intentions: the voters that are exposed facts without Marine Le Pen's statements are 4 percentage points more likely to vote for her compared to the control group. This result may be driven by a salience effect, whereby fact checkers may alert the voters on the

importance of the facts being checked (e.g. immigration issues), thus shift their support towards the politician whose campaign is centered on the issue.

Flynn et al (2017) explore the psychological reasons why people hold on to false beliefs and why it is so difficult to convince them otherwise, even with facts. They argue that this is rooted in directionally motivated reasoning that seeks to information that reinforces preferences (confirmation bias) and prior attitudes. Directional reasoning occurs frequently in subject areas that are affect-laden, such as politics and individual and social identity. When new information is received, affective reactions occur prior to conscious awareness. That limits the effectiveness of corrective information. This can be contrasted with situations where people seek accurate information that reflects the true state of the world. Corrective information from elites and media outlets who share the respondent's world view may be more effective. Salience also affects the degree of partisan perceptual bias.

6. Are digital news markets failing?

Consumers buy news because they want to be informed about the state-of-the-world and events around them. It is too costly for them to collect all the information directly, so they delegate this task to news producers who act as intermediaries. Since consumers do not have access to the original information it is difficult for them to assess the credibility and veracity of news reports. To overcome this information asymmetry gap they have to be able to trust the news producers as intermediaries³⁷. Good news producers will invest in building trust. But bad intermediaries may spoil the game and cause news market failure. Akerlof (1970) described this trust problem in his seminal paper on the market for "lemons" or bad quality products – such as fake news articles for example. He shows how uncertainty about the quality of products and the inability of consumers to properly assess quality can depress the entire market. Low quality products have negative spill-over effects on demand for high-quality products if consumers cannot distinguish between the two types. The welfare of producers and consumers is reduced compared to what it could be in the presence of mechanisms that allow consumers to distinguish quality and build a more trusting relationship between producers and consumers. This results in market failure. Besides lack of trust and information asymmetry, other reasons such as monopolies or market dominance by one news producer, and externalities or spill-over effects between news producers, are commonly associated with market failure.

In this chapter we explore reasons why market failures may occur in digital news markets. This is somewhat paradoxical because one would have expected that the internet puts more information within easy reach of consumers and would therefore reduce information asymmetry. The opposite has taken place however because consumers are overwhelmed by the huge amount of information and need to rely more than ever on intermediaries to filter it and bring the most relevant, reliable and preferred items to their attention. We discuss possible remedies for market failures in the next chapter.

We start from pre-digital offline news markets where product quality differentiation along political lines and voters' preferences is well-known. We explore potential causes of market failure in such news markets and look into some of the empirical evidence. We then transpose this model to online news markets and see how this may affect consumer welfare outcomes.

We conclude that there are several indications that online news markets present new sources of risks of market failure, compared to offline news, that may diminish the quality of news consumption and reduce consumer and producer welfare. However in many cases there are several drivers working in opposite directions and the net effect remains an empirical question. It is difficult to unambiguously identify market failure because there is not enough empirical evidence available.

6.1. Market structure and the quality of news in pre-digital markets

³⁷ This information asymmetry is very well illustrated in a model by Li and Whinston (2017) that explores the tension between the news producer and consumer, where the latter has to decide whether to continue consuming news from the same source or not. The consumer does not know ex-ante whether the news producer sends fake news. Producers have to make strategic choices how much to invest in accuracy. The model suggests that it is optimal for the consumer to initially have at least some suspicion with respect to news quality and learn gradually the true quality. The model assumes that fake news has a negative effect on the consumer and excludes the possibility that the consumer may actually like it, for instance because it reinforces beliefs about the state-of-the-world.

News producers report to consumers on a state-of-the-world or events that consumers cannot observe. Producers decide on a reporting strategy that requires collecting an amount of information about the event and produce a report based on this information. False news is an extreme case with no overlap between the information reported and the event or state-of-the-world. At the other extreme, perfectly accurate news reporting would require the report to include all information on the event or state of the world. That is rarely feasible however because a full description of the state of the world or event may be very complex and require a very lengthy treatise that surpasses the scope of a news article. Selective filtering of the most relevant information is therefore a normal reporting strategy. A news reporter will also take into account the preferences of his readers. While different articles may report on the same event, two reporters may choose a different degree of information filtering and give a particular "slant" to the filtered facts, a particular wording or interpretation. "Slanting" may be deliberate, to bring a news item in line with the editorial line and branding of the news producer, and/or to match the expectations and prior beliefs of readers. News producers apply these reporting strategies to create more trust for consumers and thereby enhance their sales. Mullainathan & Shleifer (2005) argue that the traditional view of news media as a source of information where accuracy is the only quality is not realistic. Consumers want the news not only to inform but to explain, interpret, persuade and entertain. Readers have their own biased views and prefer news that confirms their views rather than having to cope with the psychological dissonance costs of absorbing news that challenges their views. Media slant is often perceived to come from the supply side (editors, journalists and media owners). But it may also be induced by consumer demand with news publishers trying to cater to the preferences of their audience – a standard feature in product differentiation strategies.

Gentzkow et al (2016) assess potential failures in offline news markets. In a baseline scenario news producers only care about profit and consumers care only about the accuracy of news reporting. News is paid by advertising and consumers pay no (monetary) price. The authors show that there is no media bias in this scenario because all producers will report accurately. Consumer welfare is maximized, both with a single monopoly news producer and with competition between producers. There is no market failure. The authors then introduce biased news reporting on the supply side. News producers may have their own ideological preferences and use their information advantage over consumers to manipulate the news in favour of their own preference. Producers will "slant" their reports and produce lower accuracy, even at the cost of lower profits, because it satisfies their subjective preference for a particular ideology. Consumer welfare decreases when there is only one news producer, say a state-controlled media outlet. However, if competition between news producers with different ideological preferences is allowed consumer welfare is restored. All consumers will choose the more accurate news producer. Biased media cannot be a market equilibrium position because producers are better off in this scenario by undercutting any competitor's bias. There is no market failure in this scenario.

In a next step Gentzkow et al (2016) introduce bias on the consumer side. Consumers have their own prior beliefs and ideological preferences. They do not like to be exposed to news that contradicts these priors because it causes cognitive dissonance and forces them to re-think their priors, or reject the news³⁸. This leads to market equilibrium with product market segmentation³⁹.

³⁸ Flynn et al (2017) provide an overview of the psychological origins of consumer prior beliefs and the psychological stress associated with conflicting information signals.

Producers will adapt to the preferences of consumers and produce different "versions" of news that match these preferences. In equilibrium a variety of news reports will be delivered, each with an optimal bias that corresponds to the preferences of a segment of consumers⁴⁰. The welfare impact of this scenario depends on the combination of two effects: the market size effect and the news accuracy effect. The combined net welfare impact is an empirical question.

The market size effect is always positive with news market segmentation and wider product variety. More consumers will buy news because they are more likely to find a newspaper that matches with their preferences. Some will prefer left-wing news while others prefer right-wing, nationalist, populist, liberal or local newspapers, and some want only sports or financial news or prefer sensational reporting in tabloid newspapers, etc. Product differentiation expands the market for news. More producers will come into the market and sell more news. The number of diversified products will increase up to the point where market size is insufficient to cover the fixed cost of producing an additional news product.

The welfare implications of the news accuracy effect are ambiguous. Accurate reporting on the state-of-the-world will be reduced as the reporting bias in newspapers increases with market segmentation. That may increase or reduce consumer welfare, depending on the relative importance that consumers attach to accuracy and prior beliefs. Consumers may of course reconstruct a more complete and accurate picture by buying several newspapers that report from different perspectives. However, that increases consumer costs (purchase of papers, time spent reading different papers).

In a last scenario, Gentzkow et al (2016) include reputation effects for news producers. A high-quality news producer reports accurately while a normal producer behaves strategically by reporting accurately when it suits their preferred consumers and inaccurately with a "slant" in other situations. They combine the demand for accuracy and for consistently meeting consumer preferences and stick to their editorial line. Bias will increase with more extreme prior consumer beliefs. In equilibrium the accurate producer will continue to report accurately while the number of biased news producers may increase with market size and segmentation. The main difference with the previous scenario is that consumers with an absolute preference for accuracy will find a news product that caters to this preference, without having to incur the costs of reading across several different newspapers to get an accurate picture. The net overall social welfare implications of this scenario are again an empirical question.

These models have some limitations. There are no market prices for news in the Gentzkow et al (2016) model. Consumers "pay" for news by consuming advertising. The benefit of consuming less accurate and more politically "slanted" news is a reduction in psychic costs associated with reading news that diverts from prior beliefs and preferences⁴¹. Mullainathan & Shleifer (2005) have market prices for news in their model. When market segmentation is lower and newspapers are bunched together around a central mainstream view, competition increases and drives down prices. More

³⁹ Gentzkow and Shleifer (2006) present a model where market equilibrium can emerge without prior beliefs, as a result of news producers' desire to establish a reputation for accuracy. When consumer prior beliefs are introduced, horizontal market segmentation will still occur however. Producers will report honestly on the part that confirms prior beliefs and strategically on other parts.

⁴⁰ Note that the structure of ownership of news media does not matter in this model. In a duopoly with two news producers, bias would be $[0, 0.5]$ so that average bias = 0.

⁴¹ There may be second-round consumer welfare effects associated with reading less accurate news when consumers take action on the basis of that news, for instance voting. To the best of our knowledge, there are no models that include these second-round welfare effects.

market segmentation and product heterogeneity decreases competition and increases prices and producer profits. Moreover, these models implicitly assume that the reporting costs are similar across all producers and irrespective of the accuracy of news. This is not very realistic, as shown by the extreme case of false news that does not require collecting information on the actual state-of-the-world.

6.2. *Some empirical evidence on news market segmentation*

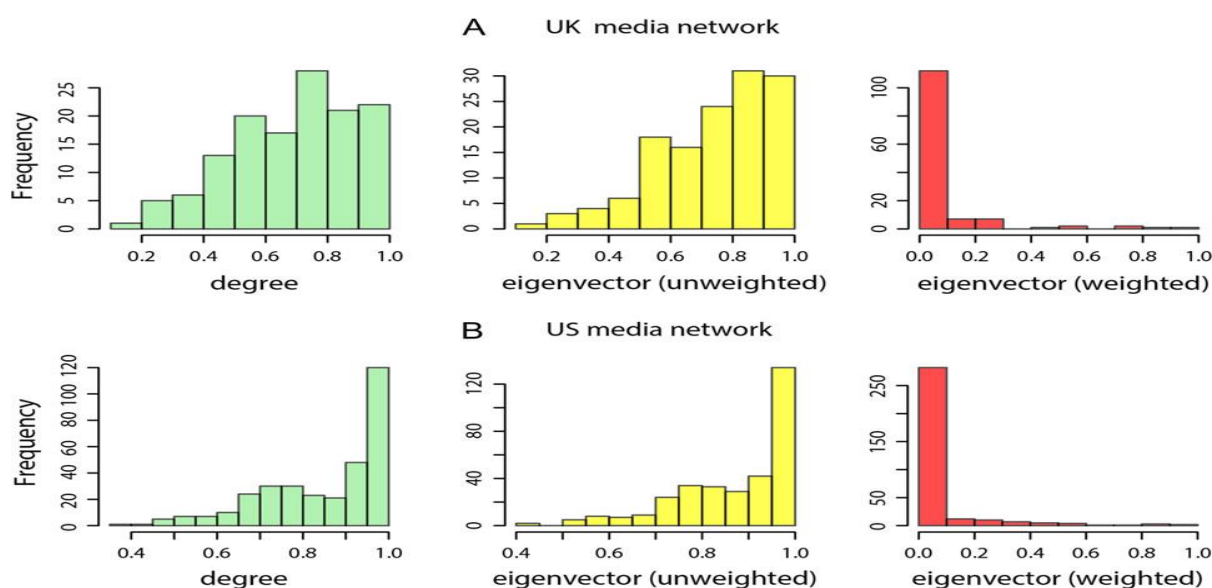
Gentzkow & Shapiro (2010) find empirical evidence in support of the market segmentation or news product variety model, using measures of political "slant" in US newspapers. The slant index measures the frequency with which newspapers use language that sways readers to the left or the right of the political spectrum. They use this measure to estimate a model of consumer demand for newspapers that depends on the match between the newspaper's slant and the consumer's beliefs. Using news market data at US zip-code level they find that variations in slant are strongly related to the political makeup of their potential readers and thus to profit-maximizing behavior. Variation in consumer political attitudes explains only about 20 per cent of the variation in measured slant. This leaves the bulk of the observed variation unexplained however and suggest that there are other dynamics at work. An important finding from this study is that the stronger causal effect runs from consumer demand to news quality: news producers adapt to consumer beliefs. This does not mean that newspapers do not affect consumer beliefs. Rather, it shows that the effect of bias or slant on consumer beliefs is smaller than the effect of consumer beliefs on the slant or quality of news production.

While most of the older work on news market segmentation focuses on offline news consumption, recent research work presents some evidence from online news markets. That work combines measures of market segmentation and market concentration.

Flaxman et al (2017) use clickstream data for 50k US online news readers to measure market segmentation in online news consumption. On the one hand, free online news makes a wide variety of sources and perspectives available and accessible to all consumers, compared to paid and bundled news articles in pre-digital print newspapers. On the other hand, consumer preferences for views that confirm their beliefs, or the psychic cost of being confronted with articles presenting different beliefs, may lead to ideological segregation in news consumption. The authors find that both effects are present: social networks and search engines increase the mean ideological distance between individuals but also increase exposure to material from the less preferred side of the political spectrum. The vast majority of online news consumption is accounted for by individuals visiting only their favorite, typically mainstream, news outlets.

Mukerjee et al (2018) doubt that digitization has increased fragmentation of news media consumption and reduced media centralization. Using ComScore clickstream data that track user access to online news outlets during the US presidential elections and the UK Brexit referendum in 2016, they improve the data analysis. They argue that if fragmentation is measured as the number of media outlets that are available for consumption, this has obviously drastically increased due to the reduced cost of publishing news online and the consequent rise of niche content. However, if fragmentation takes into account audience overlaps and clustering around outlets, the results can be very different.

Figure 7: Concentration in the consumption of online news in the UK and the US



Source: Mukerjee et al, 2018.

The histograms in Figure 7 show that, at first sight (the left-hand panels), online news sites have a high degree centrality and thus large overlapping audiences. The histograms in the second and third columns show how these results change when the weights of these ties are introduced. The middle panels measure overlap with a binary variable. The resulting distribution looks very similar to left-hand panels because most sites have some overlap with other sites. The right-hand panels put a numerical value on strength of the overlap. The resulting centrality distribution is very different. A small minority of online news outlets have a significantly higher centrality score than the vast majority. They find that centralization occurs around a small number of both legacy news producers and digital-born online news sites. In other words, despite a high degree of market fragmentation on the supply side, the vast majority of online news consumers read across the same small number of highly central news outlets. Consumers are not fragmented but rather concentrated. Market fragmentation may have been true in offline news markets where reading across news outlets was costly. That cost has decreased with free online news sources and consumers benefit from this by reading massively across a limited number of highly central news outlets. That evidence undermines the "echo chambers" view of digital news consumption.

An important limitation of studies that use clickstream data to measure online news consumption is that they do not cover in-app news consumption. Proprietary in-app consumption data are not accessible to researchers. That bias could result in underrepresentation of mobile news consumption, including consumption via social media that is mostly routed through apps. Another limitation is that the clickstream data used in this study measure the number of unique users but not their engagement, i.e. the time spent and the number of articles read on a news site. Bringing in these data might still considerably affect the findings.

The traditional view of well-functioning welfare-enhancing news markets is that access to a variety of sources of news enables consumers to get an accurate picture and be well-informed. That was costly in offline news markets because it required buying several printed newspapers - leaving aside the higher opportunity cost of time and possible psychic discomfort of being exposed to other

views. In online news markets the cost of consuming a variety of news is lower because the monetary cost of access has declined to zero for a significant part of the market, unbundling makes access to many sources much easier and search engines, news aggregators and social media sites reduce the opportunity cost of time to find these sources. Despite this lower cost, some research suggests that this is a luxury reserved for the older, wealthier and more educated (Kennedy & Prat, 2017) while others point out that readers seem to bunch together around a small but highly diversified number of online media outlets (Mukerjee et al, 2018). We don't know enough yet about the demographics of these across-the-board readers and their preferences.

6.3. *Introducing online algorithmic news distribution*

Survey data shown in Chapter 4, Figure 4, indicate that two-thirds of online news consumption goes through algorithm-driven multi-sided markets or platforms, rather than direct consumption from the news publisher's website. These platforms introduce two important changes in the business model of news publishers. First, they cut the link between news production and distribution. The latter is done by the platform and not by the news producer. Second, they unbundle advertising. The platform organizes advertising via an algorithm that matches consumers directly with advertisers. This section focuses on the consequences of vertical disintegration and algorithmic distribution. We discuss the consequences of direct advertising in the next section.

Vertical disintegration may upset the market segmentation model that we discussed in the previous section. If news publishers no longer sell their news directly to consumers they lose control over the matching process between consumer preferences and product quality. We explore some potential impacts on market structure and size, on the information quality of news, on potential externalities and on competition in news markets. It should be emphasized however that most of this is still rather speculative. There is very little empirical evidence yet on these questions, other than circumstantial evidence that may be derived indirectly from some observations on market behavior.

a) The market size effect

The shift from offline printed news to online distributed news triggers a new round of market size effects, on top of the market segmentation related effects that we discussed in the previous section.

Online news distribution lowers market access cost for consumers. Consumers paid a fixed price for a bundle of articles in a printed newspaper. Online news is unbundled and often free. The monetary access cost is zero. Online distribution is by definition geographically unlimited, so that consumers get access to a much wider variety of newspapers than available from their local print distributor. Non-monetary access costs are also reduced with laptops and mobiles that facilitate consumption at moments of low opportunity cost of time. Moreover, consumers have access to a larger variety of news because they can read across many newspapers at zero switching cost. Offline, switching involved paying for another newspaper. All this brings additional consumers into the market. However, these are consumers with a low willingness to pay for news who were excluded from offline markets with higher prices. Bundling news with advertising is the only way to

generate revenue from these consumers. New entrants on the supply side of news may run business models on that basis.

Online news distribution also lowers market access costs for news producers. Printing and transportation costs are eliminated. The fixed costs of setting up a newsroom remain but may be reduced to some extent by labour productivity effects stemming from digitization of information. Some producers may have a very small newsroom and rely on the internet and social media for much of their information feed. This promotes entry of new news publishers into the market and further fragments the market, possibly including coverage of very small niche markets and more extreme views (Mullainathan & Shleifer, 2005; Gentzkow et al, 2014). However, the statistics of the last decade show that there are also producers who exit the market because of shrinking revenue. Revenue has substantially declined with digitization, almost entirely due to a decline in commercial and classified advertising revenue while subscription revenue remains more or less constant, with the vast majority still linked to paper subscriptions⁴². The net effect of a combined strong decline in revenue and a small decline in fixed cost should be more market exit than entry (Anderson & Waldfogel, 2016). The statistics point in that direction. For example, the number of daily print newspapers in the US has declined from 1750 in 1975 to less than 1300 in 2017⁴³. Similar declines are registered in many countries.

However, a decline in the number of newspapers does not necessarily mean a decline in the supply of news however since many newspapers produce at least partially overlapping news articles covering the same events. Furthermore, these overall figures may hide substantial variations between newspapers. The geographical market reach of online newspapers is worldwide, though subject to cultural and linguistic barriers. This enables successful newspapers to expand in a much larger online market, at the expense of other newspapers with a limited local reach (George & Waldfogel, 2007)⁴⁴. To the best of our knowledge there are no studies that document the changes in the sales distribution of newspapers as a result of digitization. Another measurement issue is that the market for news is not so clearly defined anymore with digitization. There are many new low-costs entrants at the fringes of the market. Blogs, vlogs, podcasts, social media based newsgroups, and not to forget producers of fake news. These cheap newspaper substitutes will not produce the same quality of news and may cater to very specific niche markets and consumer interests. Still, they may partially substitute for traditional news producers.

At the extreme end of the market, completely false news can be brought into the market because it is cheap to produce and distribute. In offline markets, producers of fake news would quickly be exposed and lose their credibility. They would be unable to set up a viable business model. In online markets, low production and zero distribution costs, combined with (so far) guaranteed access to advertising revenue, make false news production economically more sustainable.

b) Externalities

⁴² Source PEW <http://www.journalism.org/fact-sheet/newspapers/>

⁴³ Source: Statista <https://www.statista.com/statistics/183408/number-of-us-daily-newspapers-since-1975/>

⁴⁴ For example, the UK Guardian newspaper reaches over 120 million worldwide users per month. <https://www.theguardian.com/help/insideguardian/2015/apr/20/giving-our-international-readers-a-fresh-take-on-the-news>

Externalities or spill-over effects can be another important driver of market failure. Here we examine how the shift from offline to online news distribution may induce news sources of externalities for consumers.

In offline news distribution, news markets were reasonably well segmented and fenced off from each other. Readers would buy a bundled package of edited and curated news articles which could not be unbundled. Few would buy two or more newspapers to compare views. Even in linear radio and TV news broadcasting, news came as a bundled time series of items, often with all news channels broadcasting at the same time (hour) so that consumers could not switch between broadcasters. Still there were "preference" externalities in printed news (Anderson & Waldfogel, 2016). First, bundling of articles may be a source of negative externalities. Newspapers try to cater to a variety of consumer tastes. Consumers had to buy the entire bundle, including articles and content they were not interested in. Externalities also occurred in terms of advertising. There were no individually targeted ads. Advertisers targeted the entire readership in one shot. All readers had to accept all ads including the ones they were not interested in. With digitization and unbundling of articles and ads, preference externalities are reduced. That increases the welfare of consumers and advertisers, though at the expense of declining revenue for news publishers.

Online algorithmic news distribution is a new source of negative preference externalities that blurs segmentation. Machine learning algorithms are trained by observing the behavior of millions of users of the algorithm. These algorithms select the articles that readers see on their screen. While a minority of online readers go directly to newspapers websites where they can see a selection of articles curated by the editor, the majority access news items via search engines, aggregators and social media channels where they receive news from various sources (Reuters, 2017). The selection and ranking of these articles does not only depend on the reader's preferences but also on the preferences of others. Readers may have signaled their preferred and trusted news publishers to an aggregator or a social media site. But even within these constraints, the selection of articles may escape the control of trusted editors. News articles that are "trending" receive more clicks and will be pushed up the search ranking or get wider distribution in social media networks. In social media, the "likes" of my friends end up on my news feed. Consumer-driven spill-over effects make news market segmentation walls more porous. The negative consumer welfare externalities are illustrated by Tan et al (2016). They use Facebook data to show that sharing of content across cascades gets accompanied by increasingly negative comments from users, an indication that they are more likely to dislike the news when it spills over outside their narrow social circle.

The separation of producer and distributor roles in online news markets turns the algorithm into a news curator. The editor still maintains control over the content of articles but not over their distribution. While editors seek to preserve and strengthen their newspaper brand name and market position, algorithmic curators seek to maximize advertising revenue and overall market share in online traffic. This leads to superstar effects (Rosen, 1971): what is popular becomes more popular. For consumers whose preferences match with popular preferences, this is good news. For those with more off-mainstream preferences it increases search costs and reduces welfare.

How the combination of positive and negative welfare effects (more variety of news sources at lower prices, possibly less preferred varieties) affects consumer welfare and overall social welfare is an empirical question. To the best of our knowledge, this has not yet been addressed in economic research. The fact that a large number of consumers use algorithmic access channels suggests that this low-cost high-variety access to news generates substantial benefits. However, a

key question remains how this access channel affects the quality of the news that they consume and how the quality of news is perceived by consumers.

c) Information asymmetry and the quality of news

In offline news markets, consumers looked for their preferred news quality by buying a bundled set of articles in the form of print papers from a trusted news publisher and editor. Trust did not necessarily mean the most accurate news but a combination of accuracy and preferred selection and presentation of the news to reduce cognitive dissonance costs. There is no absolute quality standard in segmented markets, only a relative quality standard with respect to consumer preferences. That relative quality standard becomes harder to maintain in online algorithmic distribution channels because it is more difficult for consumers to identify trusted sources of news. A Reuters (2017) study showed that less than half of the participants in a test could recall the name of the news publisher when coming to an article from search engines (37%) and social media (47%). When consumers fail to recognize news brands, producers' incentives to invest in trust and preferred news qualities diminish. This could lead to a resurgence of the vicious circle of "lemons" markets (Akerlof, 1970) that diminishes trust and welfare for consumers, producers and ultimately also for distributors. The steep drop in Facebook's stock market value in March 2018 in the wake of the Cambridge Analytica case⁴⁵ illustrates how the loss of trust can affect intermediary platforms as well.

Another source of "lemons" in the news market can be attributed to declining market cost and the market expansion effect that facilitates the entry of niche market news producers. This includes producers of outlier views and, in the extreme, producers of completely false news that has no relationship with actual events or the state-of-the-world. Irrespective of their motives, whether for ideological reasons or to earn money, they can use various tricks to mislead the algorithms (Gosh & Scott, 2018) and ensure that their false news items reach "trending" status in the news curation algorithm. They can also use targeted advertising mechanisms. On the internet, these "lemon" producers of false news can easily hide and remain anonymous. Online algorithms mix up a wide variety of news sources and link them to advertising revenue, irrespective of the credibility of the source or the content of the news item. That gives false news producers a guaranteed source of revenue irrespective of trust.

Not everything can be blamed on algorithms and advertisers in media distribution platforms though. Cognitive biases in the mind of consumers also play a role in the rise of fake news and the decline in news quality. Studies have confirmed that consumers do not necessarily prefer more accurate news and have a penchant for news that confirms their prejudices (Gentzkow & Shapiro, 2010; Flaxman et al, 2017). A recent study finds that humans attribute bias mostly to others and recommend that others should follow a course in online media literacy (Jang & Kim, 2018). Vosoughi et al (2018) find that falsehood diffuses faster and wider than the truth because it responds to consumer preferences for novelty and for acquiring social status by spreading novelty. Several other studies show that human news consumption is to a large extent driven by confirmation and desirability bias and that debunking false news has little impact (Barrera et al, 2018; Flynn et al, 2017; Guess et al, 2018).

⁴⁵ See <https://www.nasdaq.com/symbol/fb/stock-chart>

Exploiting these fallacies in human reasoning has become easier in algorithm-driven online news markets. In offline news markets, news publishers could not hide and therefore could not afford to build a reputation as a false news producer, unless it was clearly identifiable as humor. The online separation of the roles of editor and distributor has changed that setting.

d) Market dominance

Market dominance, or rather the abuse of dominant positions in the market, is a well-known source of market failure.

There is some empirical research on market power or dominance in news markets. Kennedy & Prat (2017) use data from the Reuters (2017) news consumption survey to draw a broader picture of the power of news producers to influence public opinion. They calculate the reach, attention share, and media power index for the top 15 media organizations in each of the 18 countries surveys. They confirm that traditional news platforms still play a dominant role. Taking the three most powerful media organizations in every country, or 54 organizations, 41 specialize mainly in television broadcasting, 11 are print sources, and just 2 are pure Internet players (in Japan and Finland). Around 80% of subjects worldwide watch news on television and 40% read newspapers. In contrast, only 25% use pure-Internet sources. Internet sources are consumed more widely when they are associated with a traditional platform, especially newspaper websites. The most powerful media organization in a country controls on average about 19% of the market. In all 18 countries, there is at least one media organization with an attention share of at least 14%. In most countries one of the top-3 media organizations is state-sponsored. Per-capita public funding is positively correlated with a country's media concentration level. The country with the highest media concentration index is the United Kingdom, where BBC has a 36% attention share. They find no indication that public broadcasters systematically reduce information inequality. On the contrary, public broadcast viewers are less likely than commercial television viewers to belong to information-poor socio-economic categories. These data suggest that concentration of news consumption is may be high but falls far short of the EU dominance threshold level of 40% of the market⁴⁶.

Rather than looking at the supply side of news content, one may also look at market concentration on the advertising side of the news market. Figure 5 shows that two advertising giants, Facebook and Google, have a duopoly in this market. However, a duopoly is still not a monopoly, unless collusion between the duopolists could be proven. On the contrary, duopolies may result in intense competition. In short, the case for market dominance as a source of market failure looks weak at this stage.

6.4. *The impact of online advertising on consumer welfare*

⁴⁶ See http://ec.europa.eu/competition/antitrust/procedures_102_en.html

In a multi-sided market or platform, the two (or more) sides are inextricably linked; what happens on one side will affect the other side. This is also true for the reader (consumer) and the advertiser side of news platforms.

Equilibrium between advertising and news content on a page is reached when the marginal ad revenue (the price) equals the marginal nuisance cost of the ads for news readers. Readers' attitudes towards advertising are important for advertising welfare outcomes, both in offline and online news. There is a large empirical research literature on this subject (see Chandra & Kaiser, 2016, pp 420-425 for an overview), though very little of that deals with online markets let alone online news markets. Findings diverge on readers' positive, negative or neutral appreciation of advertising. Kaiser & Song (2009) find evidence that advertising is positively evaluated by readers. Van Cayseele & Vanormelingen (2009) show that Belgian news readers are advertising-neutral. The appreciation may depend on the effectiveness of targeting ads to match with readers' interests. When ads are appreciated by readers, the platform will charge advertisers a lower price in order to bring more readers on board. The reverse happens when readers have a negative perception of the ads: the price of ads will go up and the number of ads is reduced. Anderson & Waldfogel (2016, p 49) and Rysman (2009) point out that a stronger advertising side (in terms of revenue per visitor) implies that access costs are lower on the reader side because that attracts more readers to the ads. This explains why a large part of online news is freely accessible for readers. Advertisers and news publishers earn more by attracting more readers to the ads than by charging readers access costs (subscription pricing). Only content that is highly valued by readers is subject to access pricing on that side – on top of advertising side pricing.

There is empirical evidence that the value of advertising lowers when readers can multi-home, which they do in news platforms. Ambrus et al (2012) find that multi-homing viewers are worth less to advertisers and thus bring less ad revenue to an online newspaper. Chandra & Kaiser (2014) question this view and show that multi-homing news readers may generate more ad value because new data technologies allow advertisers to trace and target them across channels. If advertisers can trace readers across platforms, all these platforms can be treated as a single advertising platform from which readers cannot escape via multi-homing.

A distinction should be made between the impact of ads that appear on a news article page and the impact of advertising on the ranking of articles and the selection of content that readers see. If ad revenue drives the selection of articles that readers see this may be welfare reducing because readers would get less of their preferred content and more content preferred by others. The number of ads in an article may cause reader distraction and divert his attention away from the news content. The net welfare impact of that distraction depends on the positive or negative appreciation of the ad content by the reader. Ad blockers are a solution to shut off possible negative welfare effects if any, though news publishers might block the news content too in that case.

There are several ways in which the advertising-driving algorithm business model can affect the quality of news and facilitate the propagation of false and low quality news articles.

First, advertising mechanisms can be used to directly distribute false news content to targeted audiences. Targeted advertising has been used for political campaigns, often combined with sophisticated psychometric profiling (Matz et al, 2017) that goes beyond general cognitive biases and targets readers according to their personal pathologies, anxieties and compulsive behaviours. Second, false news producers can game the algorithms by artificially boosting traffic to their own content by means of robots, fake websites and fake social media accounts. The algorithm will pick up this content as "trending" and push it up in the search rankings in order to increase ad revenue.

Third, the reduction in news publishers' advertising and subscription revenue as a result of platformisation of news distribution may have affected their ability to invest in high quality news. De Cornière and Sarvary (2017) present a theoretical model that shows how the diversion of advertising revenue to other platforms may affect newspapers' ability to invest in the quality of news. Their model starts from competition between a monopolistic newspaper and a monopolistic social media platform for consumers that consume news and user-generated content. Consumers can consume news directly from the newspaper or indirectly from the social media platform which also provides user-generated content. In particular, the social media platform may bundle content, i.e., show a mix of user-generated content and news. The model suggests that the profit of the newspaper is always lower if the social media platform chooses to bundle content. Overall, this leads to lower news consumption. The quality of news depends on the investment of the newspaper. Whether or not content bundling of the social media platform has negative effects on news quality depends on whether the platform can monopolize the market by providing customized content bundles at the individual level. If this is the case, news quality under the scenario with content bundling will always be lower than under the scenario without content bundling.

Fourth, some studies have explored the link between advertising and news content. Peitz & Valletti (2008) use TV advertising data to show that the ratio of advertising to content is larger in free-to-air TV, where all revenue comes from advertising, compared to pay TV that generates subscription revenue. They show that content is less differentiated in free-to-air TV compared to pay TV where differentiation is maximal. Pay TV audiences are attracted by more specific content that matches their preferences and increases their willingness to pay. Both consumers and advertisers pay in this case. Free-to-air TV tries to reach a wider audience to maximize advertising revenue with less differentiated content and free access. Advertisers fully subsidize readers. This model might be transposed to online newspapers where advertisers also subsidize free access. It would explain why free online versions of newspapers usually have a higher ratio of advertising to content than the paid print version. However, to the best of our knowledge, there is no empirical evidence yet in support of this view. This question is relevant in the context of the current debate on algorithm-driven news distribution in social media that seeks to maximize advertising revenue. While TV stations and offline newspapers have to use less differentiated content to attract a wider audience to the ads, online platforms can target ads to well-profiled users who are looking for highly differentiated content.

7. Policy responses to online news market failures

As explained in the previous chapter, the shift from offline to online news has lowered costs and expanded market reach for news producers and consumers. It has facilitated the entry of new types of online-only news producers but also led to a separation between news producers (editors) and distributors (curators). The latter role was taken over by algorithmic advertising and distribution platforms such as search engines, news aggregators and social media sites. There are concerns about these platforms because their main objective is not the provision of quality news but rather to maximize traffic and advertising revenue. They may weaken consumer trust and news brand recognition and facilitate the introduction of disinformation and false news into the market. This may contribute to news market failure when it becomes difficult for consumers to distinguish between good quality news and disinformation or fake news.

Market self-correction: The first question is whether news distribution platforms have sufficiently strong incentives to self-correct and ensure a better alignment between their revenue and traffic maximizing objectives and the interests of genuine news producers and consumers who favor reliable sources of news.

Facebook is the main player because of its dominant position in algorithmic news distribution channels (see Chapter 4). In a series of announcements⁴⁷ in January 2018, Facebook took steps to change its algorithm that drives the distribution of news items on its social network with a view to improve the perceived quality of news⁴⁸. First, Facebook announced measures to reduce the drivers of fake/false news including (a) insisting on true identity accounts, with meaningful activity, no hidden identities or fake accounts to propagate fake news only, (b) create transparency in the sources of (political) advertising: who publishes the ad and (c) weed out the bots: accounts that send each other high-frequency messages just to boost traffic. Facebook estimates that as many as 60 million bots may be infesting its platform⁴⁹. Second, another series of measures are meant to reduce the externalities and spill-overs of unwanted content in Facebook. Automated newsfeed distribution will be limited to first-degree friends and no longer cover friends-of-friends. That will slow down the speed and extent of distribution of news items. This is expected to reduce the amount of news from 5% to roughly 4% of the total news feed that users see on their Facebook pages. The intention is to lower the risk of exposure to views that do not match with user beliefs. It might strengthen the "echo chambers" and market segmentation. Facebook also intends to introduce a quality control mechanism that will give preference to news that is trusted by individual users and/or by the wider community of users. This will not change the amount of news that users see but it will affect the composition of news sources in favor of more trusted sources.

These measures will make it easier for Facebook users to distinguish different qualities of news and to bring back more trusted brands into newsfeed. Transparency in the sources of news would force producers of false news and other forms of disinformation to come out of hiding and become more

⁴⁷ See <https://www.facebook.com/zuck/posts/10104445245963251>

⁴⁸ Since then the Cambridge Analytica case has added further urgency to corrections in Facebook's commercial strategies. This case was not so much related to fake news and more to personal data protection and targeted advertising strategies. Facebook's 15 per cent drop in stock market valuation in the wake of the Cambridge Analytica case should be a strong financial incentive to take action. See <https://www.nasdaq.com/symbol/fb/stock-chart>

⁴⁹ This figure is quoted in Lazer et al, 2018, p 1095

easily identifiable for news consumers and for platform operators who could take that information into account in their algorithmic distribution mechanisms. Mechanisms to identify the trustworthiness of news sources would address Akerlof's (1970) "lemons" problem in the news market. Crowd-sourced news quality markers from "the wider community" may however generate preference externalities and reinforce superstar effects in newsfeed content. The welfare effect of that component will depend on how close or remote an individual user is to the community average. Mukerjee et al (2018) show that online news consumption outside media apps is already very concentrated. This measure may bring a similar degree of concentration inside news media apps.

Public policy initiatives: Whether these private measures are sufficient or will require additional action by policy makers remains to be seen. Meanwhile, policy makers have explored possibilities for further action. The European Commission report (2018a) from the High Level Group on Fake news recommends five lines of action:

- enhance transparency of online news, involving an adequate and privacy-compliant sharing of data about the systems that enable their circulation online;
- promote media and information literacy to counter disinformation and help users navigate the digital media environment;
- develop tools for empowering users and journalists to tackle disinformation and foster a positive engagement with fast-evolving information technologies;
- safeguard the diversity and sustainability of the European news media ecosystem, and
- promote continued research on the impact of disinformation in Europe to evaluate the measures taken by different actors and constantly adjust the necessary responses.

The European Commission Communication on Tackling Online Disinformation (2018b) proposed several actions including:

- Swift action by online platforms to protect users from disinformation, including facilitating user assessment of the sources and quality of content
- Rebalancing of the relation between media and online platforms
- Facilitating cooperation between independent fact checkers;
- Fostering media literacy
- Harnessing new technologies such as artificial intelligence to tackle disinformation
- Support to quality journalism via State Aid by Member States to the media sector.

These recommendations do not involve new regulatory policy initiatives; they build on existing policy instruments such as the General Data Protection Regulation, the Audio-visual Media Services Directive and State Aid mechanisms. They are soft ways of improving the environment in which news platforms operate and nudging them to take the necessary steps to improve trust, transparency and accountability.

Fact-checking has often been proposed as a solution to bridge the information asymmetry between consumers and news providers. Fact-checking only applies to the narrow definition of verifiably false news; it does not address the wider concerns about the quality of online news. Fact-checkers can signal suspicious content to editors who review "flagged" content and possibly remove it or mark it as potentially false news. Pennycook & Rand (2017) conducted five experiments to test the effectiveness of attaching warnings to news stories that have been disputed by third-party fact-checkers. They find that while warnings do lead to a modest reduction in perceived accuracy of fake news relative to a control condition, there is also an implied truth effect: the presence of warnings caused untagged stories to be seen as more accurate than in the control. Fact-checking

becomes ineffective when confirmation and desirability bias are prevalent. Another problem with this flagging strategy is that it can take a considerable amount of time to do the flagging, compared with the duration of an average news cycle that does not exceed 48h (Tan et al, 2016) and possibly much shorter for the bulk of sharing on social media websites.

Combating fake news is ultimately a question of creating efficient news quality differentiation mechanisms to avoid that news markets are invaded by low quality disinformation and false news. In offline news, editors and journalists are the main fact checking mechanism. They are trusted agents that bridge the information asymmetry gap between events observed in the world and consumers who want to be informed about these events. In online news markets journalists can be bypassed by algorithmic curators who may pick less trustworthy news reports because they contribute to traffic and advertising revenue. Fact checkers are a functional substitute for journalists⁵⁰.

Making quality distinctions in news reporting is sometimes considered to be a limitation on free speech. While journalists and news publishers may still be bound by ethical codes to fact-check their stories, on social media platforms everyone has a right to say whatever s/he likes. So far, in Western countries, the only legal limitations are hate speech and calls to violence⁵¹. Since a lot of fake news is propagated through social media accounts it is hard to see how journalistic standards could apply there. An option would be to let users choose if they want news from "accredited sources" only or from any source. But judging quality by the source alone is not robust. A single source may produce a variety of qualities and degrees of veracity. Hence Facebook's proposal to crowd-source news producers with a consistent track record of true messages. However, just like online robots and algorithms, these are mechanisms that can be gamed by malevolent players and lead to a technology arms race between the two parties⁵² (Lazer et al, 2018).

It is unclear to what extent the consumption of false news or low quality news is due to a lack of media literacy and the ability to judge the credibility of news sources. Some of the empirical evidence points to a link between false news consumption and heavy use of social media (Nelson & Taneja, 2018). That could suggest that users who spend more time are more exposed to false news. We do not know enough about the profiles of these intensive users to judge their level of media literacy. We also do not know how they respond to false news: do they accept it or reject it? Using survey data Jang & Kim (2018) detect a strong believe that fake news has more effect on out-group than on in-group members: "the problem is with others, not with me". Partisan identity, socially undesirable content and external political efficacy are positive predictors of this third-person perception. Interestingly, more third-person perception was associated with more support for media literacy but less for media regulation. Lazer et al (2018) are not convinced about the need for media literacy training and suggest a rigorous evaluation of the impact of existing media literacy skills on ways of dealing with fake news.

⁵⁰ The supply of fact-checkers may be socially insufficient in an online news market where news generates externalities that are not captured by the producer. Online news platforms have started to hire them because that contributes to consumer trust and ultimately boosts their revenue. But it is likely to be insufficient. See for example <http://www.politifact.com/truth-o-meter/article/2017/dec/15/we-started-fact-checking-partnership-facebook-year/>

⁵¹ See for example the German NetzDG or hate speech law <http://www.dw.com/en/germany-implements-new-internet-hate-speech-crackdown/a-41991590>

⁵² With current progress in artificial intelligence one could imagine a world where we are overwhelmed with divisive and false disinformation messages produced by artificial-intelligence-driven robots that are not distinguishable from humans (Turing machines). This would require counter-artificial-intelligence to detect these robots.

In the presence of human cognitive biases, media literacy involves teaching users to switch from fast to slow thinking in the assessment of news. This has an individual cognitive cost. Professional journalism and the press emerged precisely to overcome these costs and reduce the information asymmetry gap between observed events and consumers who want to be informed about these events at a lower cost to society than the cost of individual checking. While consumer checking of news quality may be socially costly it may be required again as long as algorithmic online news distribution platforms do not plug the holes that they punched in the professional fact-checking layer. Moreover, in social media users themselves play a key role in preventing the spread of disinformation. Enhanced media literacy would help consumers to distinguish between false and real news and prevent the former from spreading.

One of the main structural changes in online algorithmic news markets is the separation of content producer (editor) and distributor (curator) roles. The editor-producer maintains control over the content of articles but not over their distribution or curation. That is taken over by the platform's algorithm. While editors seek to preserve and strengthen consumer trust in their newspaper brand, algorithmic curators prioritize advertising revenue and traffic, with little regard for the quality of content and consumer trust in that quality. The separation of these two roles, and the resulting discrepancy in managerial objectives between the two, is at the root of the current debate on the quality of online news and the responsibility of algorithmic online news distribution platforms in this matter. Offline news markets do not split these roles and there is no extant regulation that deals with this issue.

Online, the responsibilities attached to these two roles may have to be reassessed. Facebook recently took steps to accredit trustworthy news sources and privilege these sources in the newsfeed algorithm. However, this idea is opposed by Google that fears that it may restrict free speech for all on the internet and, perhaps more importantly, that such an approach would turn news distribution platforms into media companies, with all responsibilities that come with that status⁵³. Lazer et al (2018) seem to be more in line with Google and point out the risk of sliding into corporate or government censorship in efforts to contain sources of false news.

The European Commission report (2018a) from the High Level Expert Group on Fake News recalls that "most of the responses will be of a non-regulatory character (...) as government or EU regulation of disinformation can be a blunt and risky instrument". An alternative to regulatory intervention would be industry self-regulation. For instance in the UK, in response to the News-of-the-World phone hacking scandal in 2012, a decision was taken against government regulation of the news media and in favour of self-regulation. This led to the establishment of the Independent Press Standards Organisation (IPSO)⁵⁴ that set up an Editors Code of Practice. The first article of the Code defines news accuracy standards. A similar code may be agreed for news Curators or distributors. The Code of Practice proposed in the European Commission Communication (2018b) would be a step in that direction.

Besides regulatory intervention or endorsing self-regulatory industry organisations, governments have a long track record of financial intervention in news media markets with state aid. For example, newspaper distribution subsidies were common in the print news era, mainly in the form of outright subsidies via the postal system. This helped to give newspapers a wider market reach. It also had an impact on the content of newspapers because less polarized opinions made them

⁵³ See <https://www.ft.com/content/3929bb2c-2de9-11e8-9b4b-bc4b9f08f381>

⁵⁴ See <https://www.ipso.co.uk/editors-code-of-practice/>

more attractive to a larger readership audience (Chandra & Kaiser, 2016). Several EU Member States have state aid schemes for news producers. Since news production is characterized by high fixed costs and low marginal costs, aid schemes are often justified with a view to promote a diversity of independent news producers in small geographic and language markets (minority languages) where they would have difficulties. High fixed costs could lead to underproduction with respect to a desirable degree of diversity of newspapers. In the case of news agencies their role in providing services of general economic interest is often cited as a justification for state aid. In the case of Denmark for example⁵⁵, a state aid scheme that originally provided subsidies for the distribution of printed newspapers to the postal service was re-allocated to production and innovation aid for smaller newspapers and internet-only newspapers, including online start-ups. In this case explicit reference was made to the declining profitability of newspapers as a result of the shift to online distribution and the risks that this creates for high quality news production. It was assumed that the market would be unable to support the desired news output necessary for media pluralism. There are no specific guidelines for state aid to news producers. The general Article 107/3c of the EU Treaty applies. State aid should not distort the market and competition between different technological platforms.

Some argue that channeling more financial resources to quality news producers would help to stop the advance of fake news or low quality news production. The analysis in the previous chapters has demonstrated that the growth of fake and lower quality news is intimately linked to the transformation of news distribution in online markets, in particular algorithm-driven distribution that seeks to maximize market share and does not take into account trusted news brands. State support for the production of quality news by trusted brands would not stop the production of false news and other forms of disinformation. Changes in consumption patterns would depend on the introduction of quality signals for trusted news brands. That, in turn, could shift some advertising revenue back to these brands.

Proponents of state aid often refer to the significant decline in advertising and print sales revenue of legacy news publishers over the last decade and the concomitant decline in the number of printed newspapers and newspaper circulation (see Chapter 2). However, production costs have also declined and new online publishers have come into the market, some of which enjoy strong consumer demand and trust (Mukerjee et al, 2018). There is no evidence that links the decline in printed newspaper titles and circulation to a decline in the supply of news or in the quality of news. As the Danish example shows, state aid should not artificially maintain outdated business models or target only the traditional printed press. This would risk undermining the position of new start-ups and reduce the variety of views in segmented news markets.

Digitization has brought many benefits and welfare-enhancing improvements to news markets that benefit consumers, including lower access costs for a wider range of news sources. At the same time it has transformed the news industry, from a vertically integrated production & distribution chain into a platform-based industry that separates content producers and distributors. On the negative side, readers have difficulties assessing the quality of news and may run into false news items that have been propagated by algorithms. The impact of all these changes on the welfare of

⁵⁵ A non-exhaustive list of cases of state aid to the press vetted by the European Commission includes: N 74 / 2004 - Aid to the Flemish written press, 2005, N 1/2006 - Promotion of the publishing industry in Slovenia, 2006, N 537/2007, SA.34885 Aid for newspapers, Finland, 2007, SA.36366 - Production and innovation aid to media in DK, 2013, SA.45512 - Aid to Valencian Press, 2016, SA.44942 - Aid to local media published in the Basque language, 2016, SA.30481 - State aid in favour of Agence France-Presse (AFP), 28.10.2014 and SA.35474, State aid to the Spanish news agency EFE, 2016. See http://ec.europa.eu/competition/state_aid/register/

consumers, producers and society as a whole is not so clear. There is very little empirical evidence to date, also because relevant data are often proprietary and not accessible to independent researchers. The European Commission (2018a) report states that "effective action will require continuous research on the impact of disinformation, increased transparency, and access to relevant data, combined with evaluation of responses on a regular, ongoing basis".

The discerning reader will have noticed that many of the studies cited in this report are very recent, often produced in the last months only. This indicates that the subject is entirely new for researchers and probably still has a long way to go in order to get better insights in the phenomenon of fake news. Some suggested topics for further research include:

- The empirical work of Mukerjee et al (2018) seeks to measure the extent of market fragmentation and concentration in online news consumption. This could be improved by adding consumer engagement measures and completing it with data from social media platforms and apps. Adding user profile data would also be useful to get a more complete picture of consumer demand and access to various online news transmission channels.
- On the supply side we are still missing a comprehensive picture of news market entry and exit as a result of digitization, in particular competition between legacy print and digital-only news publishers and the trade-off between online subscription paywalls and advertising revenue.
- More detailed measurement of the prevalence, propagation channels and mechanisms, and consumer engagement with false news items would be required in order to get a better understanding of the problem.
- Lazer et al (2018) suggest a rigorous audit of the algorithms of major platforms and how they filter news. They admit however that scientific collaboration between industry and academic can be challenging. More generally, an empirical investigation of the link between news curation and online advertising, and how it affects consumer search costs and perceptions of news sources, would be very useful. The latest research on algorithm optimization and welfare implications should be taken into account.

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