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Will Competition Reduce Attention Costs of Social Media?

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Will Competition Reduce Attention Costs of Social Media?

ABSTRACT: Unlike other monopolies, social media networks almost uniformly give access to their services for free to everybody. Economists refer to these markets as "zero-price markets." The main, and often sole, source of revenue for the network owners comes from fees that are paid by advertisers. Network owners offer access to users in exchange for users' attention to advertisements. Economists refer to these implicit market exchanges under the heading of "attention economy." Regulatory solutions and antitrust remedies have been considered to foster consumer protection in the market economy. This paper investigates the conditions under which an increase in competition in the social media market would reduce the attention cost problem highlighted in the literature. Contrary to intuition, this paper shows that an increase in competition in the social media market could increase, rather than decrease, the attention costs imposed on users. Social media networks with monopoly power charge higher prices to advertisers to maximize their profit. Competition in the social media industry would lead to lower (competitive) prices for advertisers which lead to more advertising and higher attention costs imposed on users.

Keywords: Attention Economy; Social Media; Network Effects; Advertising

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1. Introduction

In recent years, there has been a wealth of scholarship and public skepticism to problems related to the zero-price services and the attention costs imposed on users,[1] as reflected in the warnings of Justin Rosenstein, former Facebook and Google Chief Engineer, who alerted, "If you are not paying for the product, you are the product."[2]

Social media platforms have been classified as monopolies by the Federal Trade Commission (FTC)[3] and the U.S. Department of Justice (DOJ),[4] although the nature of these monopolies and the associated social deadweight loss remain to be established, both theoretically and empirically.[5] According to conventional economic wisdom, competitive forces can curb the profit opportunities of monopolistic firms to the benefit of users. In recent years, structural remedies were advocated for the case of Facebook in 2019 by Massachusetts Senator Elizabeth Warren, Texas Senator Ted Cruz, and former Secretary of Labor Robert Reich, who argued that antitrust remedies including a potential

[1] During the last decade, several scholars in the legal and economic academic community have given attention to the problems of the attention economy. See, Brynjolfsson, E., & Oh, J.H. (2012); Evans (2020); Gal and Petit (20210; Gal and Rubinfeld (2016); Ghosh, D. (2019); Gilbert (2021); Jullien and Sand-Zantman (2021); Lindner (2017); Newman (2015, 2016 and 2020); Parisi and Parisi (2020); Wagner (2009); Wallsten (2020); Wu (2016a, 2016b and 2019).

[2] The warning was made during an interview in the documentary "*The Social Dilemma*" (2020) by Jeff Orlowski (Director). Viewable on Netflix: https://webcache.googleusercontent.com/search?q=cache:CbprXXT8V8MJ:https://www.netflix.com/title/81254224+&cd=13&hl=en&ct=clnk&gl=it . In the same documentary, Yale Professor Edward Tufte, interestingly noted that there are only two markets in which "consumers" are referred to as "users": illegal drugs and software.

[3] In its suit against Facebook, Federal Trade Commission v. Facebook, Inc., No. 20-03590 (D.D.C. filed Dec. 9, 2020, refiled amended Aug. 20, 2021) the Federal Trade Commission (FTC) along with 46 other state attorneys general, focused on the market for attention. The FTC noted that "Facebook monetizes its personal social networking monopoly principally by selling advertising, which exploits a rich set of data about users' activities, interests, and affiliations to target advertisements to users," seeking to "leverage […] high engagement and frequent contact with users." Further, the FTC alleges that "[b]y monopolizing personal social networking, Facebook . . . deprives advertisers of the benefits of competition, such as lower advertising prices and increased choice, quality, and innovation related to advertising."

[4] The House Antitrust Subcommittee recommended structural separations because of the vast amounts of data social media networks possess and the ability to use that data to exclude rivals, the exploitation of their dominance in one market as leverage in other markets, the ability to tie products and services, and the ability to use supra-competitive profits from dominant markets to subsidize entry into other markets. Structural separations seek to "eliminate the conflict of interest faced by a dominant intermediary when it enters markets that place it in competition with dependent businesses." Structural separations may include "(1) ownership separations, which require divestiture and separate ownership of each business; and (2) functional separations, which permit a single corporate entity to engage in multiple lines of business but prescribe the particular organizational form it must take." Subcomm. on Antitrust, Commercial, and Administrative Law of Comm. on the Judiciary, Investigation of Competition in Digital Markets, 378–81 (Oct. 2020). The proposed enforcement measures advocated for bright-line rules and structural presumptions in concentrated markets, increased protection for potential rivals, nascent competitors, and startups, and strengthening of the vertical merger doctrine among other measures to strengthen the antitrust laws in the U.S.

[5] Parisi and Parisi (2022) discuss the unique nature of social media "monopolies," observing that zero-price monopolies create a social deadweight loss, that is not directly analogous to the deadweight loss created by traditional positive-price monopolies.

"break up" of the social media giant were needed to limit the "insidious effects" that had been seen pertaining to the activities carried out on Facebook and similar networks (Ghosh, 2019). On October of 2020, the House Antitrust Subcommittee (U.S. House of Representatives), issued a report recommending several ways to mitigate Facebook's market power, including "structural separations" of the company and increased enforcement measures.[6]

Although the recent financial reports reveal that the user base of Facebook is naturally shrinking without the force of legal intervention,[7] questions have been raised as to whether the traditional instruments used to tame the abuse of a monopolistic position fit the needs of regulators in social media, zero-price markets.[8] Equally concentrated digital markets can behave competitively or non-competitively, depending on the degree of substitutability of the platforms. Some zero-price networks are unable to maintain high attention costs in a competitive market. For example, internet radio stations offer similar products, and their substitutability is high. Listeners have no ties to specific radio stations and can migrate from one station to another by clicking a button, without breaking away from their social networks. In these substitutable zero-price markets, competition can help reduce advertisements and attention costs. As it will be shown in our analysis, things are different for social media networks. In a competitive environment, social media networks also want to render their platform more appealing to new and existing users, by reducing advertisements, but – as it will be shown in the following section – their ability to do so will be impaired.

2. Effects of Competition on Attention Costs

In this paper we address the question of whether an increase in competition in the social media industry can help decrease attention costs. We investigate whether the equilibrium level of advertising observable in a competitive market is lower than the advertising observed in a social media monopoly. We develop a simple model comparing the equilibria obtainable in a social media monopoly to those obtained when additional platforms become available to users and advertisers. The analysis unveils an interesting counter-intuitive result, which challenges the idea that more competition reduces deadweight loss to the benefit of consumers. In the specific case, we show that, even if market de-

[6] More generally, structural remedies have been advocated for the digital industry in both the U.S. and the E.U., at least as a preventive measure with respect to prospective mergers: see, for example, "Furman Report" (Furman et al., 2019), "Stigler Report" (Scott-Morton et al., 2019); "EU Report" (Crémer et al., 2019).

[7] Facebook's earnings report on February 4, 2022 showed the social media platform losing users for the first time in 18 years of operation. Facebook pointed to TikTok's competition for users as one of the factors that contributed to the shrinking in its users base.

[8] In different contexts, Evans, D. S. (2011) and Gal and Petit (2021) have suggested that the traditional instruments used to tame the abuse of a monopolistic position do not fit the needs of regulators in social media, zero-price markets.

concentration could be sustained by regulatory intervention,[9] competition between social media networks leads to an increase in advertising and would drive up attention costs imposed on users. A social media monopoly can charge higher prices to advertisers. To maximize their profit, social media monopolies would restrict the quantity of advertising and impose lower attention costs on users. We shall refer to this counterintuitive result as the "attention monopoly paradox."

2.1 Set Up of the Model

In the following, we provide a model to examine the attention monopoly paradox of social media platforms, identifying the conditions under which the counter-intuitive positive effect of competition on attention costs might be observed.

We consider social media platforms with the following characteristics: (i) marginal cost of serving additional users is almost zero; (ii) users get access free of cost (in fact, some platforms provide incentives to join); (iii) strong network effects for users (i.e., the users may find it difficult to switch across media platforms, because they may not want to leave their social networks).

In our setup, there are three players: (1) social media platforms; (2) social media users; and (3) firms advertising on social media. In this paper, we focus on the first two players. A social media platform can be set up at a fixed-cost, F. We consider an existing number N of users of social media, spread across the available platforms. Assume that each user spends a fixed amount of time on a social media platform. Each platform provides free access to the platform and users do not pay any price (in monetary terms) for using social media. Without loss of generality, let's assume that when multiple platforms are available, a user utilizes only one of the platforms. The choice of a platform might depend on several factors (e.g., number of friends using a given platform, quantity of advertisements and attention costs imposed on each platform, etc.). Depending on the relative magnitude of these effects, a user may or may not be induced to switch across platforms, if the option of more than one platform is available.

The source of revenue for a social media platform is the advertisement space purchased by firms. Firms want to advertise their products on social media because advertisements help firms

[9] Parisi and Parisi (2022) suggest that social media networks are a unique form of natural monopolies, due to the "network effects" that they generate on the consumption side for their users (in addition to the standard economies of scale and scope on the production side). An increase in the number of users makes a platform more attractive to both users and advertisers (e.g., by fostering easier communication, networking opportunities, etc.). As a result, divestiture of social media networks may not be sustainable in the long run, because users will simply converge to a single network to enjoy the benefits of being connected to each other.

increase their sales, and maximize profits. A social media platform offers advertising services at a price. The quantity of the advertisement shown by a platform can be thought of in terms of the total number of eye-ball hours spent on viewing advertisements by the users. Therefore, one way to quantify the total advertisement services is in terms of the total time spent by all users on viewing the contents of advertisements.

Let $Q(p)$ denote the total demand function for advertising services (from all advertising firms combined), i.e, $Q(p)$ denotes the total number of eye-ball hours of attention demanded at price p. Let, $p(Q)$ denote the inverse demand function, with $p'(.) < 0; Q'(.) < 0$ and $\lim_{p\to\infty} Q(p) = 0$. From the supply side, the total demand is shared across the available platforms. If there are two platforms, for any given price p the total demand can be expressed as the sum of the demand met by the two platforms, i.e., $q_1(p) + q_2(p) = Q(p)$. It is plausible to assume that $q_1(p)$ and $q_2(p)$ depend on and are proportional to the number of users – the larger is the number of users on a platform, the higher will be its share of the total demand.

There is a cost of providing the advertising services because the process requires the platform to make users devote some of their attention to the advertisements. Besides the indirect cost incurred by redirecting users' attention to the ads and possibly rendering the platform less attractive to users, advertising requires marketing and administrative tasks by the social media platform for the sale of advertisement space. This may also entail the use of AI to identify the set of users who would be most interested in the advertisement of a given product, screening ads that are appropriate for the target users, and design of native ads that blend with the content of the media page. All these costly techniques provide greater incentives for the users to pay attention to targeted advertisement and greater returns to advertisers.[10] Formally, a platform i providing q_i amount of advertising services has to incur costs $c(q_i); c'(.) > 0$. So, the operative profits for platform *i* can be expressed as $p(Q\ )q_i - c(q_i)$.

Advertisements lead to greater sales and profits at firm level. A firm can advertise its products on all of the available platforms. Since our focus is on the platforms and their users, we assume the aggregate payoffs of all the advertising firms and their consumers (i.e., profits of firms plus consumer surplus enjoyed by their consumers) are constant and taken to be zero for simplicity.

[10] Targeted advertisements are ones that use data to focus on consumers' traits, interests, preferences, etc., to better engage these consumers and lead to higher conversion rates. Native ads are are ads that match the look, feel and function of the surrounding media content in which they appear.

As mentioned above, the platforms do not charge any fee to users. The users derive benefit from the social media without paying any direct price. Let u denote the direct benefit received from this free service by a social media user. Given the network effects, u depends on the number of users on the platform. The larger is the number of users on a platform, the greater is the direct benefit to an individual user. Formally, u is an increasing and (weakly) convex function of the number of users on a platform, i.e., $u' > 0$ and $u'' \geq 0$. To recoup its start-up cost and sustain profitability, the platforms impose 'attention costs' on the users through advertising. That is, a social media user exposed to advertisements incurs attention costs in terms of time spent and possible health costs. Although some of the advertisements may be informative and beneficial to the users, others may be perceived as an unwanted encroachment on the users' time. In the interest of generality, let's denote the net balance of undesired advertisements as A. Let assume that all users on a platform are exposed to the advertisements shown by the platform. Let, A be a function of the users' total exposure to advertisements. Assume $A' > 0,\ A'' \geq 0$. For a platform user, the net payoffs thus become, $U = u(.) - A(.)$, which depends on the number of users on the platform and the number of advertisements shown on the platform.

In order to address the question of whether competition will help correct the social media attention cost problems, let's begin our analysis by assuming that the advertising firms can switch between platforms costlessly or choose to advertise on different platforms simultaneously. As far as the mobility of users is concerned, although in the real world social media users form networks and generally face costs in moving from one platform to another (and may find it less convenient to use two platforms simultaneously), in the following we will consider the social media paradox under both users' mobility scenarios.

As a benchmark of comparison for both scenarios, let's consider the attention cost equilibrium observable when there is only one social media platform. The monopolistic platform will choose q to maximize its profits. Since the number of users is given, there is no risk of losing a user. So, the optimization problem for the social media monopoly is to choose $q(= Q)$ to solve:

$$\max_{q}\{p(Q = q)q - c(q)\}$$

Assuming, $c(q) = cq$. Let the solution be $\bar{q}$. That is, under a monopolist platform, all users combined will spend $\bar{q}$ eye-ball hours on viewing advertisements on the platform. So, the average exposure to advertisements is $\frac{\bar{q}}{\mathrm{N}}$. That is, a user is exposed to $\frac{\bar{q}}{\mathrm{N}}$ amount of advertisements with

corresponding attention costs equal to $A\left(\frac{\bar{q}}{\mathrm{N}}\right)$. The net benefits to a user are: $u(N) - A\left(\frac{\bar{q}}{\mathrm{N}}\right)$. The total attention costs for all users is $N\ A\left(\frac{\bar{q}}{\mathrm{N}}\right)$.

The aggregate benefits, *B*, under monopoly can be taken as the sum of the payoffs of the social media monopoly and the users. That is,

$$B(Monopoly) = p(\bar{q})\bar{q} - c\bar{q} - F + N\left[u(N) - A\left(\frac{\bar{q}}{\mathrm{N}}\right)\right] \qquad (1)$$

We can now compare the above equilibrium to the one obtainable by introducing competition among social media platforms. In Section 2.2 we will consider the effects of competition on attention costs when users have no mobility, and in Section 2.3 we will consider the effects of competition on attention costs when users have full mobility.

2.2 Attention Costs Without User's Mobility

In this first scenario, we consider the case where users cannot switch across platforms. This may be the case where there are close ties and network effects among the users on a platform, and coordination costs prevent individual users to switch platforms, even when the current platform imposes large attention costs on them.

We can now compare the equilibrium of the social media monopoly to the one obtainable by introducing competition among social media platforms, when users face high mobility costs. Let's begin assuming that there are two platforms competing for the advertisement revenue. Let n_1 and n_2 denote the number of users on platform 1 and 2, respectively. For simplicity, assume each platform has equal number of users; so, $n_1 = n_2 = \frac{N}{2}$. For a given price, the total demand is split between the two platforms as $q_1(p)$ and $q_2(p)$; $q_1(p) + q_2(p) = Q(p)$. In particular, in view of $n_1 = n_2$, at a given price p, the total demand is divided equally between the two platforms; $q_1(p) = q_2(p) = \frac{Q(p)}{2}$. Therefore, the platform *i* will choose supply of advertisement services as in a duopoly game, i.e., choose q_i to solve

$$\max_{q_i}\{p(Q)q_i - cq_i\}$$

Let the solution be q_i^D. Given the symmetry between the two platforms, $q_1^D = q_2^D = q^D$. The total supply of advertisement will be $2q^D$. In view of our assumptions on the demand function, it is easy to see that $2q^D > \bar{q}$. Since a platform has $\frac{N}{2}$ users, under duopoly each user is exposed to $\frac{2q^D}{N}$ amount

of advertisements. So, the average attention cost is $A\left(\frac{2q^D}{N}\right)$. Note that $\frac{2q^D}{N} > \frac{\bar{q}}{N}$, and hence $A\left(\frac{2q^D}{N}\right) > A\left(\frac{\bar{q}}{N}\right)$. The total attention costs from both platforms is $NA\left(\frac{2q^D}{N}\right)$. This brings to light an important counterintuitive result.

Proposition 1: *When users face high mobility costs, the average and total attention costs imposed on users under a monopoly are less than under a duopoly,* $N\,A\left(\frac{\bar{q}}{N}\right) < NA\left(\frac{2q^D}{N}\right)$. *A social media monopoly pollutes its platform with fewer advertisements.*

Corollary 1: *When users face high mobility costs, the attention cost problem is amplified when the social media industry becomes more competitive, with a larger number of platforms*.

In other words, the attention monopoly paradox is amplified when the social media industry becomes more deconcentrated. The attention costs imposed on users are not curbed, but they further increase when competition in the social media industry increases.

To see this, consider the case when there are three platforms, i.e., there is a triopoly. As demand is shared equally by the platforms, under triopoly platform *i* will solve

$$\max_{q_i}\{p(Q\,)q_i - cq_i\}$$

Let the solution be q_i^T. In view of the symmetry of the profit maximization problems, $q_1^T = q_2^T = q_3^T = q^T$. So, the total advertisement will be $Q = 3\,q^T$. It is easy to see that $3\,q^T > 2q^D > \bar{q}$. That is, as the number of social media platforms increases, the quantum of total advertisement time will also increase. Moreover, an average user is exposed to $\frac{3q^T}{N}$ amount of advertisement, which is greater than the duopoly case and to the detriment of social media users.

The advertisement revenue for all three platforms combined will also increase: $p(Q)Q = p(3\,q^T)3\,q^T$. That is, $p(Q)Q$ is now larger than the duopoly case, but the total operational profits of all platforms, $[3p(3\,q^T)\,q^T - 3c(\,q^T)]$, is actually less than the total profit in duopoly.

We can now compare the aggregate welfare of platforms and users under monopoly, duopoly and triopoly. First consider, the case of the duopoly with the monopoly alternative. For the duopoly case the aggregate benefit of the platforms and the users is

$$B(Duopoly) = 2[p(2q^D)q^D - \mathrm{c}q^D - F] + N\left[u\left(\frac{N}{2}\right) - A\left(\frac{2q^D}{N}\right)\right] \qquad (2)$$

As shown above, compared to monopoly the users are clearly worse-off under duopoly. The platforms are also worse-off as their operating profits and net profits are lower under duopoly. It can be easily shown that this effect is exacerbated with an increase in competition as the number of platforms increases. In the case of triopoly, a user's benefit is $u\left(\frac{N}{3}\right)$ and the average attention cost is $A\left(\frac{3q^T}{N}\right)$. The aggregate benefit of the users and platforms combined is given by

$$B(Triopoly) = 3[p(3q^T)q^T - cq^T - F] + N\left[u\left(\frac{N}{3}\right) - A\left(\frac{3q^T}{N}\right)\right] \qquad (3)$$

Note $u\left(\frac{N}{3}\right) < u\left(\frac{N}{2}\right) < u(N)$ but $A\left(\frac{3q^T}{N}\right) > A\left(\frac{2q^D}{N}\right) > A\left(\frac{\bar{q}}{N}\right)$. That is, under triopoly the users' benefit will be less than under a duopoly and hence less than under a monopoly. Attention costs further increase under a triopoly beyond their level under duopoly, which is greater than the attention costs under the monopoly case. Therefore, users are worse-off as competition increases. The net payoff for all the platforms is given by $3[p(3\,q^T)\,q^T - c\,q^T - F]$ which is less than the duopoly case. Therefore, the platforms' payoffs similarly decrease with the level of competition in the industry This is an interesting result, since competition usually corrodes producers' profit, enlarging consumers' surplus and overall welfare. The analysis thus far carried out reveals that introducing competition in a social media monopoly reduces the welfare of *both* social media platforms and social media users. Formally, comparing (1), (2) and (3), we get

$$B(Triopoly) < B(Duopoly) < B(Monopoly) \qquad (4)$$

That is, the effect of increased competition among the social media platforms is to reduce the aggregate benefits. The last remaining piece of the puzzle, which we do not formally address in this paper would be to assess the overall social welfare effect of competition in the social media market, by taking into account the effect of competition on the welfare of the advertising firms and their prospective consumers. We can conjecture that if the advertisements have purely redistributive effects and do not affect the total profits across the advertising firms or the total demand they face, or the surplus enjoyed by their consumers,[11] introducing competition in the social media industry would

[11] Clearly this is a simplifying assumption. In principle, advertisements can affect not only the distributions of sales and profits but also their aggregate levels. The analysis of these effects hinges on a variety of effects that have been extensively studied in the literature which fall outside the direct scope of our research. Studies have shown that advertising may be a rational investment for individual firms, but may not necessarily be beneficial for the aggregate profitability of an industry. When advertising aims at increasing the market share of a firm (at the expense of the

make things worse with respect to aggregate social welfare. Even when the adverting firms all together gain from increased advertisements, as long as this effect is relatively small, the overall welfare under duopoly would be smaller than under monopoly, and this negative effect on welfare would be exacerbated in the triopoly case.

2.3 Attention Costs with User's Mobility

The effect of competition on the attention costs imposed on users is different when users do not face mobility costs and can freely switch from one platform to another. To see this, consider a scenario where users do not have special ties with the platform and can switch across platforms without incurring any costs, and where choices to switch from one platform to the other are driven by the level of undesired advertisement. Generally speaking, this may be describing the attention cost equilibrium of internet radio stations, offering similar music products, where listeners have no specific ties to radio stations and can switch from one station to another by clicking a button.[12] In this case, we will see a different effect of competition on the level of attention costs that are sustained in an equilibrium.

Proposition 2: *When users face low mobility costs, the average and total attention costs imposed on users are reduced by competition.*

As a benchmark of comparison for the monopoly case, we shall refer to the results previously derived in Section 2.2.1. Next, consider the case of duopoly with users' mobility. Suppose there exists an equilibrium with two active platforms. Let the equilibrium number of users in the two platforms be n_1 and n_2, respectively. Let the equilibrium choice of advertising services be $\mathbf{q}_1$ and $\mathbf{q}_2$. So, the average user's benefit in the two platforms is given by $U(n_1, q_1) = u(n_1) - A(q_1)$ and $U(n_2, q_2) = u(n_2) - A(q_2)$, respectively. In equilibrium $U(n_1, q_1) < U(n_2, q_2)$ cannot hold; otherwise users

market share of other firms), without increasing the overall demand on the market, firms will face a zero-sum cooperation problem: advertising will be a dominant strategy leading to lower payoffs in the industry. When advertising increases market demand the total payoff of the industry can possibly go up or remain unaffected. Aggregate sales in turn will have consequences in terms of the consumer surplus, To sum up, competition among social media for advertisements cuts both ways. In some cases, it could be good for the advertising firms and their consumers in terms of π(Q), but it would always adversely affect the net payoffs of the social media platforms and the attention cost by their users.

[12] We examine this case to compare equilibria, not because we think that free user mobility is representative of the social media market. Parisi and Parisi (2022) pointed out that radio stations and social media networks differ in one fundamental characteristic: unlike radio stations, social media networks have low substitutability—users are tied to one or another network, because migrating from one network to another has effects on their ability to maintain ties with other members of their social network. In other words, strong network effects can lead users to stay with one social media network even when other platforms might impose lower attention costs through advertisements.

would switch to the second platform. Similarly, $U(n_1, q_1) > U(n_2, q_2)$ cannot hold. So, the only possible equilibrium is with $U(n_1, q_1) = U(n_2, q_2)$.

Let's begin by considering the case without network effects, where $u(.)$ does not depend on the number of users. Without loss of generality, assume $n_1 = n_2$ and $u(n_1) = u(n_2) = \bar{u}$. Now, $U(n_1, q_1) = U(n_2, q_2)$ implies $A(q_1) = A(q_2)$, i.e., $q_1 = q_2$. When the users' benefits from a platform do not depend on the number of users on the platform and the liking of the platform is only driven by attention costs, the equilibrium will be characterized by the same level of advertisements across the platforms.

Note, however, that even if users' on a platform have no connection with one another and the size of the platform does not affect the users' benefits, users are important for the platforms. The larger the number of users on a platform, the higher is the market share of the platform in the advertisement services. Under such a condition, starting from $q_1 = q_2$, consider the effect of a marginal decrease in advertisement by platform 2. Such a move would reduce attention costs and would make platform 2 the preferred choice for all the users. Users would migrate to that platform. To stay in business, platform 1 will have to follow suit. The process of reducing advertising services would continue 'till both platforms choose $q_1 = q_2 = 0$. If, as discussed above, platforms providing q_i amount of advertising services have to incur costs $c(q_i)$; $c'(.) > 0$, and the platforms do not have other forms of revenue, say from sale of users' data-based services, the equilibrium level of advertising would be the quantity generating a marginal revenue equivalent to Bertrand price competition, where q_1 and q_2 would be set to generate the revenue necessary to cover the marginal operational cost of the platform, $c'(.)$.

3. Conclusions

This paper unveiled an interesting attention monopoly paradox. When platform users have network ties and low mobility, high market concentration in the social media industry may be beneficial to consumers inasmuch as it would reduce the equilibrium level of advertising imposed on users. At the limit, the preservation of a monopoly would be a good way to limit the attention costs imposed on users. This conclusion parallels that of Buchanan (1973), who argued that the provision of addictive drugs under an illegal monopoly provider, such as the Mafia, would increase price and restrict output of drugs compared to the conditions of perfect competition. Similarly, by charging higher prices to advertisers, a social media monopoly will supply less, rather than more, advertising space to advertising firms. The social media price setting power would be beneficial to users (unless users derive a positive net benefit from their exposure to advertising), since a lower amount of their attention would be polluted by unwanted ads.

The different results obtained when introducing users' mobility, should be informative for policy analysis. The policy instruments that can be used to correct attention cost problems when users face mobility costs (such as in the social media industry) should not be extended to scenarios where users face no switching costs (such as in the internet radio industry). Policy instruments aimed at forcing competition in the social media market would likely exacerbate the attention economy problem that policymakers are attempting to correct.

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