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## Target Advertising and Market Transparency

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# News aggregators and targeted advertising

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## Abstract

This paper examines the effects of increased transparency over online news sources, which, for example, is enhanced by the new institution of news aggregators. The role of news aggregators is controversially discussed, where the discussion widely points on user side effects. The present paper widens the discussion on the advertising side and shows that they can help to better target advertising messages to a more homogenous group of users and, in turn, may both benefit advertisers and news outlets.

*Keywords:* news aggregators; targeted advertising; transparency

*JEL-Classification:* L22, L82

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# 1 Introduction

Recently, some providers have responded to the variety of sources of news in the Internet by creating so called news aggregators, such as Google News and Yahoo! News. News aggregators collect headlines and short snippets of news stories from various online sources and provide an overview of the stories on a single site. Users click through to access the content of the proprietary site. They may further personalize the aggregators' websites adjusting for individual preferences for news. In general, the Internet has changed the way of news consumption. A news consumer can purchase a single article of interest without having to buy a bundled newspaper. Different news outlets are consumed for different topics of interest. The new institution of news aggregators tend to amplify this trend since they are becoming an important source of information and over the variety of news and thus, facilitate the consumption of disaggregated content. By 2009 around one half of visitors to the five major US newspapers arrived via the intermediaries Yahoo, Microsoft or Google (Weir, 2010). Many of these users are not loyal to one specific news outlets. Athey and Gans (2010) find that users who switch between news outlets use news aggregators to search amongst firms.

The advent of news aggregators has induced an emotional debate about their impact on the proprietary news sites, is, however, not well understood in the academic literature. Advocates of news websites allege the aggregators of copyright infringement and of stealing traffic from their sites, whereas advocates of the aggregators point on a complementary service for the websites.

Empirically, Chiou and Tucker (2011) conclude that aggregators are more likely to bringing traffic to the websites rather than stealing traffic from the websites. The discussion still focuses on the effects on the user side. The present paper intends to widen the discussion by pointing on possible effects of the advertising side and thereby focuses on the effects of market transparency on the user side on the advertisers' ability to target their ads to a more homogenous group of users.

A model assumes that some fraction of consumers is initially uninformed about the variety of news sources and randomly visits one website. Another fraction of consumers is informed about the variety of news, for example because they visited a news aggregator, and can allocate according to their preferences over news. This induces a positive effect for the advertising industry, and, in turn, for media firms, which is widely neglected in the above mentioned dispute. The increasing importance of targeted advertising in the media is stressed by Chandra (2009). He empirically obtained that if media firms are better able to segment readers according to their location and demographics the advertisers' willingness to pay for such readers increases. This result implies a substantial benefit of transparency on the ability to target advertising messages both for the media and the advertising industry.

In the style of the empirical observation, the present theoretical paper allows advertisers to better segment readers if readers allocate according to their preferences for news. An increase in market transparency, e.g., due to the widespread usage of aggregators, alters the composition of users in a differentiated user and advertising market. The introduction of news aggre-

gators induces ambiguous effect for the media outlets: On the one hand, in line with the empirical observation by Chandra (2009), the advertisers' willingness to pay to contact good targets increases, however, on the other hand, the amount of advertising sold decreases. The results show that media outlets may only benefit from the increased transparency over online news sources if targeted advertising is sufficiently important for profits. Then, an increase in market transparency can even soften competition in the user market if advertisers favor to contact users which have a positive appeal for their products.

According to the Pew Research Center (2011), targeted display advertising is one of the fastest growing categories of online advertising.<sup>1</sup> The role of targeting for advertisers has received some but few attention in the theoretical literature. An early related paper is Iyer et al. (2005) who consider targeted advertising to segment consumers and analyze equilibrium prices for advertised products. More recent papers by Athey and Gans (2010) and Bergemann and Bonatti (2011) study the implications of targeting technology for competition between offline and online media outlets. In line with Bergemann and Bonatti (2011) the present paper stresses the importance of targeting to segment the advertising market. Brahim et al. (2011) analyze the transition from random advertising to targeted advertising and investigate the benefits of targeted advertising for firms in an initially uninformed market. Whereas most of the papers focus on the benefits of targeted advertising for the advertising firms, the present paper is in line with a small literature focusing on the effects of targeted advertising for the media outlets.

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<sup>1</sup><http://stateofthemediamedia.org/2011/online-essay/>.

Gal-Or et al. (2012) study how matching between heterogenous advertisers and heterogenous viewers affect the media bias in advertising funded and subscription based models. George and Hogendorn (2012) show how news aggregators can alter the market participation when users multihome on content. In their model aggregators reduce the search costs for multihoming viewers. They show that when users have a taste for variety and advertisers are differentiated such intermediaries can alter advertising strategies in ways that reduce the value of targeting.

The paper is organized as follows: Section 2 provides the base model. Sections 2.1 and 2.2 analyze two polar cases where all advertisers choose to multihome or all advertisers choose to singlehome. Section 3 modifies the base model by analyzing market expansion effects. Section 4 concludes.

## 2 The model

Consider a market with two news outlets,  $i = 1, 2$ , competing for users and advertisers. Outlets simultaneously charge a user price of  $k_i$  and an advertising fee of  $p_i$ . In practise, news outlets adopt different pricing strategies. For many entertainment content it is still common to provide all of the content for free as long as sufficient scale of the advertising funded model is reached. In contrast some outlets, such as The Times have erected pay walls which prevent aggregators from searching and listing their content. A more common model is to have some form of metered pay wall which allows users to read some limited amount of content for free before charging for further

access. The New York Times recently announced that it would be moving the pay wall to 10 free articles a month. Readers who came through links from search will continue to be able to access those individual articles, even if they have reached their reading limit. For some search engines, users will have a daily limit of five free links.<sup>2</sup> A comparably kind of model is also adopted by, e.g., the Financial Times, the Wall Street Journal, the Boston Globe or by an increasing amount of local newspapers. The Neue Zürcher Zeitung is planning to successively implement a metered pay wall on its digital newspaper beginning in summer 2012.<sup>3</sup> Thus, the present setup mirrors the increasingly applied payment model of a metered pay wall which allows for aggregators to crawl the proprietary subscription based websites.

Users are uniformly distributed according to their preferences for news. Preferences are in the interval  $[-\frac{1}{2}, \frac{1}{2}]$ . For instance, liberal users are located in the left part and conservatives in the right part of the interval. Platforms are located at the opposing endpoints with platform 1 located at  $l_1 = -\frac{1}{2}$  and platform 2 located at  $l_2 = \frac{1}{2}$ . Users exclusively join one of the two platforms (that is, they singlehome). A user's utility from joining platform 1 is denoted as

$$U_1 = v - t(x + \frac{1}{2}) - k_1 \tag{1}$$

and from joining platform 2 as

$$U_2 = v - t(\frac{1}{2} - x) - k_2, \tag{2}$$

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<sup>2</sup>Press release from March 20, 2012; <http://www.nytco.com/press/index.html>

<sup>3</sup>Press release from June 08, 2012; <http://nzzmediengruppe.ch/medienmitteilungen/>

where  $v$  describes the generic utility of being informed about the state of the news. Users incur "transportation costs", intensified by a parameter  $t$ , if the reported news do not entirely match their political belief. As in Schultz (2004) there are two groups of users. A share of  $\phi$  users are informed about both the locations and prices of news outlets and allocate according to the best combination of preferences and user prices. The parameter  $\phi$  measures the market transparency, the higher  $\phi$  the higher the market transparency, which, for example, is enhanced by news aggregators. Empirical evidence suggests that consumers who switch amongst outlets use aggregators to search for their articles of interest. In this interpretation the parameter  $\phi$  captures the share of viewers using aggregators. Comparing net utilities there exists an indifferent user located at

$$\tilde{x} = \frac{k_2 - k_1}{2t}. \quad (3)$$

The remaining share of  $1 - \phi$  users is uninformed and randomly allocates on the outlets since they are not aware of the variety of content. They have to form expectations over locations and prices and only learn the location when buying. That is, the news article is an experience good.<sup>4</sup>

In the sequel I concentrate on symmetric equilibria where each platform receives a demand of  $\frac{1}{2}$  of uninformed users distributed over the entire interval,

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<sup>4</sup>This seems to be a reasonable assumption for many media where the quality can only be evaluated after consumption.



where I used symmetric expectations. Total user demand thus reads as

$$s_1 = \frac{1 - \phi}{2} + \phi\left(\frac{1}{2} + \tilde{x}\right) \quad (4)$$

for platform 1 and

$$s_2 = \frac{1 - \phi}{2} + \phi\left(\frac{1}{2} - \tilde{x}\right) \quad (5)$$

for platform 2.

I widely borrow the structure of the advertising market from Gal-Or et al. (2012): Advertisers are distributed according to their appeal to consumers having conservative beliefs. The appeal parameter  $\alpha$  is uniformly distributed along the users' distribution in the interval  $[-\frac{1}{2}, \frac{1}{2}]$ . Positive values in  $[0, \frac{1}{2}]$  designate advertisers offering products appealing to conservatives, with bigger values indicating an increased appeal to conservative users. In turn, negative values in  $[-\frac{1}{2}, 0]$  indicate advertisers offering products unappealing to conservatives.

An advertiser located at  $\alpha$  receives an expected revenue from contacting a user at position  $x$  of

$$E(\alpha, x) = h + \lambda\alpha x, \quad (6)$$

with  $h > 0$ . Hence, an advertiser pursues two objectives. Given a base revenue of  $h$  per user an advertiser aims to reach as many users as possible. Otherwise, the expected revenue from advertising depends on the compatibility between the advertised product (at position  $\alpha$ ) and a user's appeal (at position  $x$ ) towards the product. Hence, targeting enhances the per-user revenue from advertising if liberal users receive a message from a liberal

product, whereas the expected revenue decreases if they receive a message from a conservative product. The overall importance of targeted advertising is measured by a parameter  $\lambda > 0$ .

Advertisers may place ads on one or both outlets, that is, they may singlehome or multihome. An advertiser's expected profit from singlehoming on platform 1 reads as

$$E_1(\alpha) = \frac{(1-\phi)}{2} \int_{-\frac{1}{2}}^{\frac{1}{2}} (h + \lambda\alpha\beta) d\beta + \phi \int_{-\frac{1}{2}}^{\tilde{x}} (h + \lambda\alpha\beta) d\beta - \left(\frac{1}{2} + \phi\tilde{x}\right)p_1 \quad (7)$$

and

$$E_2(\alpha) = \frac{(1-\phi)}{2} \int_{-\frac{1}{2}}^{\frac{1}{2}} (h + \lambda\alpha\beta) d\beta + \phi \int_{\tilde{x}}^{\frac{1}{2}} (h + \lambda\alpha\beta) d\beta - \left(\frac{1}{2} - \phi\tilde{x}\right)p_2 \quad (8)$$

from singlehoming on platform 2. If advertisers choose to multihome their expected profit reads as

$$E_{12}(\alpha) = \int_{-\frac{1}{2}}^{\frac{1}{2}} (h + \lambda\alpha\beta) d\beta - \left(\frac{1}{2} + \phi\tilde{x}\right)p_1 - \left(\frac{1}{2} - \phi\tilde{x}\right)p_2. \quad (9)$$

Uninformed users (of share  $\frac{(1-\phi)}{2}$  per platform) stem from the entire interval, some are a good target, some are a bad target. Both is equally likely. Informed users are allocated according to their political beliefs net of user prices and are thus more likely to be a good target.

An advertiser chooses to singlehome if  $E_i(\alpha) > E_{12}(\alpha)$  and  $E_i(\alpha) > 0$ . Comparing Eqs. (7) to (9) shows that advertisers closer to the endpoints singlehome whereas advertisers in the middle of the interval multihome. Ad-

vertising demand on platform 1 reads as

$$a_1 = \frac{1}{2} + \tilde{\alpha}_1 \quad (10)$$

and on platform 2 as

$$a_2 = \frac{1}{2} - \tilde{\alpha}_2, \quad (11)$$

where  $\tilde{\alpha}_i$  denotes the advertisers indifferent between single- and multihoming on the platforms.

A platform's profit is denoted as

$$\Pi_i = \left( \frac{1-\phi}{2} + \phi s_i \right) k_i + a_i p_i. \quad (12)$$

In the remainder I derive symmetric equilibria with the market of advertisers fully covered. I will focus on two polar cases: a scenario with multihoming, where all advertisers choose to place ads on both outlets and a scenario with singlehoming, where each advertiser chooses to advertise in a single outlet. This allows to highlight the main effects of market transparency.

### 2.1 All advertisers multihome

The multihoming scenario of  $\tilde{\alpha}_1 = -\tilde{\alpha}_2 = \frac{1}{2}$  can be established if all advertisers find it worthwhile to place ads on both outlets. This holds if the expected base revenue from advertising  $h \geq \frac{3}{8}\lambda\phi$ .

Platforms simultaneously maximize their profit function of (12) with respect to the user price and the advertising charge, yielding an equilibrium user

price of

$$k_i = \frac{t}{\phi} + \frac{1}{32}\lambda\phi - \frac{2h^2}{\lambda\phi} \quad (13)$$

and an equilibrium advertising charge<sup>5</sup> of

$$p_i = \frac{1}{2} + \frac{1}{16}\lambda\phi. \quad (14)$$

In equilibrium platforms earn a profit of

$$\Pi_i = \frac{1}{2}\frac{t}{\phi} + \frac{1}{4}h + \frac{1}{32}\lambda\phi. \quad (15)$$

The advertising charge increases both in the importance of mass advertising ( $h$ ) and targeted advertising ( $\lambda\phi$ ). The effect of advertising income on the user charge is ambiguous, however. Common to other paper on media economics there is pass through effect of mass advertising income

$$\frac{\partial k_i}{\partial h} = \frac{-4h}{\lambda\phi} < 0 \quad (16)$$

in the per user charge<sup>6</sup>, since with a higher advertising income per user, platforms more aggressively compete for users. Interestingly, the opposite holds for the targeted advertising component, that is,

$$\frac{\partial k_i}{\partial \lambda} = \frac{1}{32}\lambda + \frac{2h^2}{\phi\lambda^2} > 0. \quad (17)$$

With targeted advertising not the mere number, but the composition of users

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<sup>5</sup>For an interior solution it has to be ensured that  $\frac{\partial^2 \Pi_i}{\partial k_i^2} < 0$  which holds for  $t > \frac{2h^2}{\lambda\phi} - \frac{\lambda}{32}$ .

<sup>6</sup>See, for example, Peitz and Valletti (2008) or Stühmeier and Wenzel (2011).

becomes important. Here, platforms compete less aggressively for users in order to attract only the good targets which widely allocate according to preferences and not according to the lowest per user price. Hence, the importance of targeting in the advertising market can soften competition in the user market.

*Lemma 1.* The introduction of news aggregators increases the advertising charge, whereas it may increase or decrease the user price.

Advertisers benefit from a higher market transparency since the probability of contacting a good match increases. This directly decreases the advertising volume since with a more homogenous user market the need of multihoming in order to find a good target decreases.

The total effect of market transparency on a platform's profit writes as

$$\frac{\partial \Pi_i}{\partial \phi} = \frac{1}{32} \lambda - \frac{1}{2} \frac{t}{\phi^2}. \quad (18)$$

*Proposition 1.* In a pure strategic equilibrium where all advertisers multihome the introduction of news aggregators hurts news outlets.

*Proof* To ensure multihoming by all advertisers the base revenue of advertising has to be sufficiently high such that also the remote advertisers multihome, that is,  $h \geq \frac{3}{8} \lambda \phi$ , where I assume the equality in the remainder. Following Schultz (2004), when deriving the above equilibrium it was assumed that it pays to serve all informed users. Note from Eq. (13) that if competition for users is intense ( $t$  is low) the equilibrium user charge becomes very low and the pure strategy Nash equilibrium fails to exist. Here, it

pays to raise the user price and only serve the fraction of  $\frac{1-\phi}{2}$  of uninformed users arriving in equilibrium. If the platform  $i$  decides only to serve all uninformed users it sets a users price of  $k_i = v - \frac{t}{2}$ . Then, an advertiser's profit on platform  $i$  is denoted as

$$E_i = \frac{1}{2}(1 - \phi)(h - p_i). \quad (19)$$

Assuming that the rival platform  $j$  serves all informed users and the remaining fraction of uniformed users an advertiser's profit on this platform is denoted as

$$E_j = \frac{1}{2}(1 + \phi)(h - p_j). \quad (20)$$

Since both platforms are equally composed by the same share of good and bad targets they are homogenous from an advertiser's perspective. Hence, on the advertising side the game reduces to a standard Bertrand game where platforms may always slightly undercut the rival's advertising charge to steal the entire advertising demand and so, the equilibrium advertising charge reduces to  $p_i = 0$ . This, however, only holds if advertisers singlehome. If advertisers always multihome, there is nothing to gain from undercutting and a platforms can commit to a high advertising charge of  $p_i = h$ .

Then, platform  $i$ 's profit reads as  $\Pi_i = h + \frac{1-\phi}{2}(v - \frac{1}{2}t)$ . To ensure that it does not pay to serve only the uninformed users this profit may not be higher than the profit from Eq. (15). This holds for  $\hat{t} \geq \frac{1}{4}\lambda\phi(1 + \phi)$ . Inserting  $\hat{t}$  into Eq. (18) it holds that  $\frac{\partial \Pi_i}{\partial \phi} = -\frac{3}{32}\lambda - \frac{\lambda}{8\phi} < 0$ , and, thus, the platform suffers from increased market transparency. ■

With higher market transparency on the user side, advertisers are more willing to pay to contact an individual user since the likelihood of being a good target increases in transparency on the user side. An increase in  $\phi$ , however, also reduces the incentives for all advertisers to multihome, that is, advertisers place less ads on either platform. In equilibrium, this negative quantity effect dominates the positive price effect on news outlets.

On the user side, if  $h$  is sufficiently high, firms compete aggressively for users, that is, the user charge of (13) decreases in  $\phi$ . In total, effects on both sides leads the profit of Eq. (15) to decrease.

In addition to possible user side effects, this may serve as one explanation on the advertising side for media outlets being worried about the advent of news aggregators. If all advertisers multihome and competition on the user side is already intense, media outlets would prefer not to be listed on an aggregators website to forego competition for informed users - this changes if all advertisers singlehome or only a subset of advertisers multihomes.

## 2.2 All advertisers singlehome

In the singlehoming scenario all advertisers place their ads on a single outlet. This holds for  $h \geq \frac{1}{4}\lambda\phi$ .<sup>7</sup> The indifferent advertiser solves  $E_1(\alpha) = E_2(\alpha)$  and in equilibrium is located at  $\tilde{\alpha} = 0$ .

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<sup>7</sup>Observe, that for  $h \in [\frac{1}{4}\lambda\phi, \frac{3}{8}\lambda\phi]$  both a singlehoming and a multihoming equilibrium can be established. As noted by Gal-Or et al. (2012) this stems from the advertisers' two objectives for a large number and a good composition of users. Moreover, platforms find it beneficial to serve all users in equilibrium if  $\frac{t}{v} \geq \frac{2\phi(1-\phi)}{(1+\phi)(2-\phi)}$ . Given the remote user's participation constraint of  $v - \frac{t}{2} - k_i^* = 0$  this condition can be ensured for any  $t \geq \frac{1}{4}\lambda\phi$ .

The solution of equilibrium user prices reads as

$$k_i = \frac{t}{\phi} + \frac{1}{2}\lambda\phi - 2h \quad (21)$$

and of equilibrium advertiser prices as

$$p_i = \frac{1}{4}\lambda\phi. \quad (22)$$

Platforms profits are denoted as

$$\Pi_i = \frac{1}{2}\frac{t}{\phi} + \frac{3}{8}\lambda\phi - h. \quad (23)$$

*Proposition 2.* In the singlehoming scenario platforms benefit from news aggregators if targeting is sufficiently important for advertisers, that is,  $\frac{\partial \Pi_i}{\partial \phi} > 0$  if  $\lambda > \frac{4}{3}\frac{t}{\phi^2}$ .

Fig. 1 illustrates the above proposition.<sup>8</sup> If targeting is relatively unimportant no pure strategy equilibrium exists, since it pays for the platforms to only serve uninformed users in equilibrium. Otherwise, if targeted advertising is sufficiently important, platforms do not only care about the mere number but also about the composition of user. Then, for high  $\lambda$  platforms have an incentive to raise the user prices in order to be composed by target users. This countervails the previous tendency and in the singlehoming scenario platforms may indeed benefit from transparency, since with singlehoming advertisers do only have one opportunity to contact a user and

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<sup>8</sup>The other parameters are set to  $v = 1, h = 0.35$  and  $t = 0.5$ .



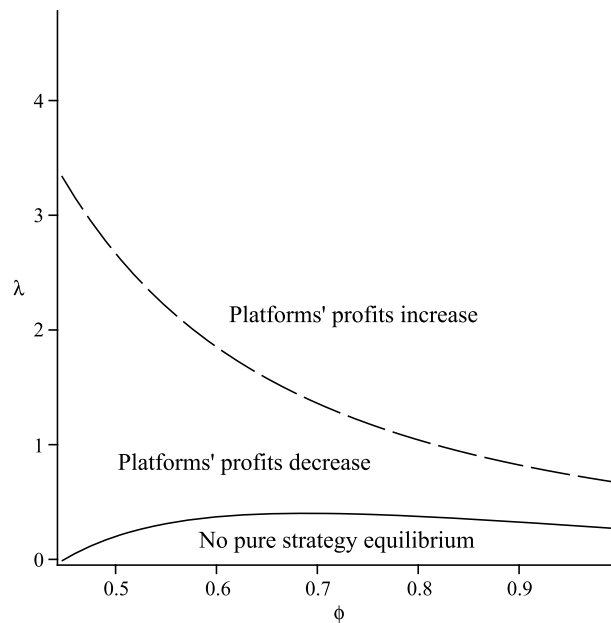


Figure 1: Equilibria in the singlehoming scenario.

thus, targeting is more important than in the multihoming scenario. It can be shown that this holds even more generally when a subset of advertisers singlehomes and a subset multihomes.

### 3 The complementary view

In the previous section an introduction of news aggregators affected the composition of uninformed and informed viewers, leaving the market size unaffected. Firstly, Chiou and Tucker (2011) empirically obtain, though, that news aggregators are likely to bring additional traffic to the proprietary websites. Secondly, Athey and Gans (2010) find that consumers who often switch amongst platforms use aggregators to search amongst platforms.

This section follows this complementary view by allowing the total market size to increase, e.g., due to an increase in the usage of aggregators. Technically, I apply the so called Hotelling model with hinterlands. There, again, platforms serve two groups of users. In their hinterland they serve loyal consumers which, if at all, only consider consuming from the respective media outlets. Switchers, instead, access the news outlets which brings the highest utility.<sup>9</sup> In line with empirical evidence, it is assumed that switchers use aggregators to identify their articles of interest, where the parameter  $\phi$  captures the mass of switchers.<sup>10</sup> As  $\phi$  increases, relatively more users in the competitive segment search for articles by using an aggregator. Then market shares of eqs. (4) and (5) are modified in the following way:

$$s_1 = U_1|_{U_1 \geq 0} + \phi\left(\frac{1}{2} + \tilde{x}\right) \quad (24)$$

and

$$s_2 = U_2|_{U_2 \geq 0} + \phi\left(\frac{1}{2} - \tilde{x}\right) \quad (25)$$

where  $\phi$  measures the market expansion due to an increase in transparency over news sources.

On the advertising side I assume that advertisers earn some positive amount  $\kappa > h$  on loyal consumers whereas revenues from the competitive segment are modified upon users preferences similarly to eq. (6). In total an advertiser's expected revenue from singlehoming on either platform is denoted as

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<sup>9</sup>Here, the switchers correspond to the informed users in the previous section.

<sup>10</sup>With this interpretation, the parameter  $\phi$  is not restricted to  $\phi \in [0, 1]$ .

$$E_1(\alpha) = \left(\frac{v - k_1}{t}\right)\kappa + \phi \int_{-\frac{1}{2}}^{\bar{x}} (h + \lambda\alpha\beta)d\beta - p_1 \quad (26)$$

and

$$E_2(\alpha) = \left(\frac{v - k_2}{t}\right)\kappa + \phi \int_{\bar{x}}^{\frac{1}{2}} (h + \lambda\alpha\beta)d\beta - p_2, \quad (27)$$

where, due to technical complexity, it is assumed that advertisers pay a lump sum advertising charge.

I restrict the analysis to the singlehoming scenario. In equilibrium platforms set an user charge of

$$k_i = \frac{2 + t\phi - \phi h - \kappa}{4 + \phi} \quad (28)$$

and an equilibrium advertising charge of

$$p_i = \frac{1}{8}\lambda\phi. \quad (29)$$

An increase in the market transparency has a non-monotonic effect on profits. Without transparency, platforms can exploit the loyal users' surplus in their monopoly segment. An increase in transparency adds a competitive segment to a monopoly segment which may push pressure on user prices but expands the total market size. The total effect on user prices is denoted as

$$\frac{\partial k_i}{\partial \phi} = -\frac{3h + 2 - 4t}{(4 + \phi)^2}. \quad (30)$$

Hence, the market expansion decreases the per user price if competition for users is intense because mass media advertising is sufficiently important ( $h$  is high) and users' perceived platforms differentiation is relatively low ( $t$  is

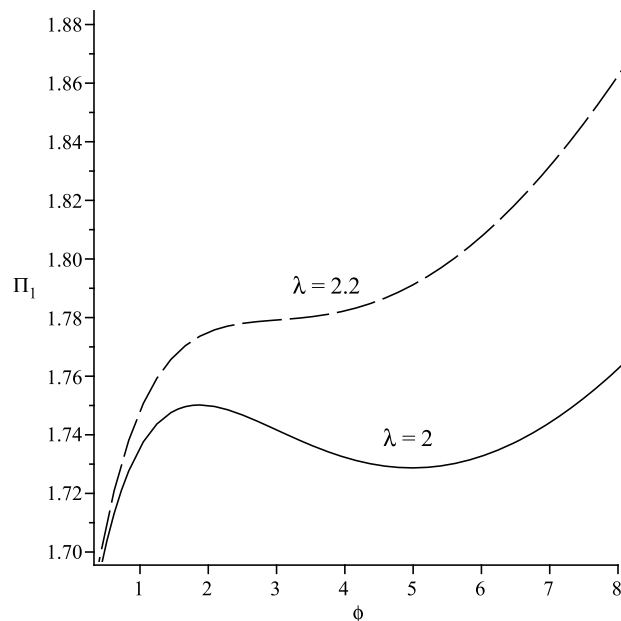


Figure 2: Profits depending on market expansion.

low). Up to a certain point profits may decrease. However, then, the market expansion effect dominates and total profit increase again. This more likely holds if targeted advertising is relatively more important than mass media advertising ( $\lambda$  is high) which Fig. 2 illustrates.<sup>11</sup>

For  $\lambda = 2$ , first the market expansion effect and the positive effect on the advertising charge dominate, bringing profits up. Then, the negative effect on individual user prices dominates, bringing profits down again. Up to a certain point, the former positive effects dominate, bringing profits up again. As stated above, if targeting is sufficiently important, the latter negative effect on per user price is reduced or diminished at all, and thus, the introduction of news aggregators is unambiguously beneficial, which is depicted for  $\lambda = 2.2$

<sup>11</sup>The other parameters are set to  $v = 1, h = 0.25, \kappa = 0.3$  and  $t = 0.12$ . The existence of a pure strategy equilibrium is ensured for these values.

in Fig. 2.

## 4 Conclusion

The model offers one of the first attempts to analyze how news aggregators may shape the online media landscape. A simple theoretical model focuses on the primary effect of the new institution of news aggregators, that is, they provide transparency over the variety of sources of online news for Internet users. This enables users to better allocate according to their preferences over news, which helps advertisers to better target their messages to a more homogeneous group of users. The present paper shows that an increase in transparency over sources of news enhances the effectiveness of targeted advertising. It further shows that this harms news outlets in an equilibrium where all advertisers multihome. If the group of users becomes more homogenous, advertisers less often multihome to contact their target group. This decreases the total amount of advertising in the market and thus, news outlets earn less on the advertising side. Instead, if only some advertisers multihome or all singlehome, news outlets can benefit from an increase in the price for advertising if targeted advertising is sufficiently important for advertisers. This also holds if market expansion effects are present which can exert a non-monotonic effect on outlets' profits. The paper intends to point on some effects new institutions of news aggregators may have on the media outlets. It can confirm both alleged positive and negative effects on profits and offer some explanation for the contrary view on such institutions.

An interesting direction for future research would be to analyze the impact of such institutions on larger and smaller outlets, since it is often the large outlets which claim to be harmed by aggregators. Smaller media outlets, e.g., local news sites are relatively silent, yet. By means of the above model, large outlets often serve more heterogenous users and local outlets more homogenous users. Thus, there might be more multihoming on large and more singlehoming of advertisers on small outlets, which could explain the different attitudes towards aggregators by help of the above model results. Moreover, more has to be learned on outlets strategic positioning in the media spectrum. It would be interesting to determine if aggregators would enhance or distort the variety and quality of the media. For instance, the German press publishers are currently lobbying for a neighbouring right which should protect even short snippets of online press articles on the aggregators' websites. The right should protect the press publishers' investments to guarantee high quality content and variety in the online environment which could not be guaranteed otherwise since other intermediaries would free-ride on their investments.

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