International Journal of Industrial Organization 30 (2012) 321–325

Contents lists available at SciVerse ScienceDirect

International Journal of Industrial Organization

journal homepage: www.elsevier.com/locate/ijio

Media market concentration, advertising levels, and ad prices ☆

Simon P. Anderson [a], Øystein Foros [b], Hans Jarle Kind [b], Martin Peitz [c,*,1]

[a] Department of Economics, University of Virginia, PO Box 400182, Charlottesville, VA 22904-4128, USA
[b] Norwegian School of Economics, Norway
[c] University of Mannheim, Germany

ARTICLE INFO

Available online 2 January 2012

JEL classification:
D11
D43
L13

Keywords:
Media economics
Pricing ads
Advertising clutter
Information congestion
Mergers
Entry

ABSTRACT

Standard media economics models imply that increased platform competition decreases ad levels and that mergers reduce per-viewer ad prices. The empirical evidence, however, is mixed. We attribute the theoretical predictions to the combined assumptions that there is no advertising congestion and that viewers single-home. Allowing for crowding in viewer attention spans for ads may reverse standard results, as does allowing viewers to multi-home.

1. Introduction

When Fox television entered the US market, advertising levels on NBC, CBS, and ABC rose from 7 minutes per hour in 1989 to around 9 minutes in 1998.[2] This suggests that entry may induce higher ad levels. However, standard models of advertising-financed media platforms, such as Anderson and Coate (2005), predict that entry should lower ad levels (and raise per-viewer ad prices). They also predict that mergers should have the opposite effect, of raising ad levels and lowering ad prices.[3] Some support for this standard prediction is provided by the radio industry executive cited in Anderson and Coate (2005), who argued that ad levels rise after a merger.

Some empirical studies indicate predictions opposite from the standard theory. Focusing on local radio markets, Brown and Williams (2002) find that local ownership concentration slightly increases ad prices. Brown and Alexander (2005) report a similar result in the TV market (interestingly, they find that the ad volume might increase as well). Jeziorski (2011) finds that ad levels fall with concentration.

Most studies indicate mixed evidence or no clear-cut result in one or the other direction. Chipty (2006) finds no systematic relationship between ownership structure and ad prices (or ad levels). Sweeting (2010) investigates advertising levels using a panel of data from music stations based on airplay data from 1998 to 2001. He does not find clear evidence of a relationship between ownership of several stations and the advertising level. In a structural analysis of two-sided radio markets, Tyler Mooney (2011) finds that ad prices and ad volume may increase or decrease with concentration.[4]

Standard theory models assume that viewers single-home and that there is no advertising congestion. The former means that each

☆ This paper has been handled by Neil Gandal. Thanks to Ambarish Chandra, Fabrizio Germano Lisa George, Charlie Murry, Andrew Sweeting, Catherine Tyler Mooney, Ken Wilbur, Yiyi Zhou and EARIE participants for discussion.

* Corresponding author.
E-mail addresses: sa9w@virginia.edu (S.P. Anderson), oystein.foros@nhh.no (Ø. Foros), hans.kind@nhh.no (H.J. Kind), martin.peitz@googlemail.com (M. Peitz).

[1] Author is also affiliated with CEPR, CESifo, ENCORE, and ZEW.

[2] See TV Dimensions 2000 (18th Ed), Media Dimensions, Inc.

[3] Gal-Or and Dukes (2006) analyze the profitability of media mergers in a somewhat different setting. They postulate that advertisers compete in the market place and that advertisers and media platforms engage in bilateral bargaining over the advertising price. Advertising is informative as in Grossman and Shapiro (1984) and, thus, imposes a negative externality on the competitor in the market place. Gal-Or and Dukes (2006) find that "small" mergers may be profitable when "large" mergers are not. The driving force for their results is that a media merger affects the bargaining position of the media platform vis-a-vis the advertiser. They confirm the standard result that a merger leads to higher advertising levels.

[4] Chandra and Collard-Wexler (2009) find that mergers of Canadian newspapers did not change ad prices. This is consistent with received theory because when there are subscription prices the ad level is independent of the number of firms (Anderson and Coate, 2005).

0167-7187/$ – see front matter © 2012 Elsevier B.V. All rights reserved.
doi:10.1016/j.ijindorg.2011.11.003

platform has a "monopoly bottleneck" position over advertising to its own viewers, and the latter means that attention spans are unlimited.

In this short paper, we explore two potential avenues that can reverse the results of standard models and help to reconcile theory with empirical findings. We also argue that introducing competition for advertisers can imply that mergers reduce media differentiation, which is in sharp contrast to the received wisdom following Steiner (1952). We first sketch how Anderson and Peitz (2011) introduce competition for advertisers by allowing for advertising congestion of viewers who mix between channels. Competition for limited consumer attention brings direct competition between platforms for advertisers. In contrast to the standard predictions, a merger between ad-financed platforms reduces ad levels and increases ad prices. The reason is that a merged firm internalizes more the congestion problem. Conversely, more platform entry has the opposite effect because congestion is internalized less with a larger overall congestion level.

The presence of multi-homing viewers also generates competition for advertisers. To highlight this property, Anderson et al. (2011) assume that advertisers are willing to pay nothing for a second impression with a viewer who has already been reached. Competing platforms can then charge advertisers only for viewers they deliver exclusively. Anderson et al. (2011) term this the Principle of Incremental Pricing. However, two merging platforms can charge advertisers for viewers who visit both platforms. If some viewers multi-home, a merger will consequently raise the price per ad even if the total number of viewers stays constant. Again, the result contrasts with the predictions of the standard models of media economics. Competition for advertisers due to multi-homing viewers may also alter the standard prediction that a merger among ad-financed platforms leads to more program diversity. The reason is that while competing ad-financed platforms have incentives to attract exclusive viewers through differentiation, a shared viewer has the same value for merged platforms as an exclusive viewer.

The rest of the paper is organized as follows. In Section 2 we present the standard model without competition for advertisers, following the lines of Anderson and Coate (2005). The advertising congestion framework is introduced in Section 3, while the consequences of multi-homing viewers for advertising competition are discussed in Section 4. Section 5 provides some concluding remarks.

2. Backdrop

Consider n platforms that provide program content to attract viewers. They deliver these eyeballs to advertisers. Advertising revenue is the sole source of finance to platforms, and advertisers are assumed to be price takers (so there is no bargaining over prices). Platform i's profit is thus $\pi_i = P_i a_i$, $i = 1, \ldots n$, where P_i is the price per ad and a_i is the number of ads aired. We shall shortly break this profit down to break out the role of viewer demand.

Content is attractive to viewers, but the embodied ads are a nuisance. Under the standard assumption, viewers are assumed to be annoyed by ads, so that nuisance is the "price" to viewers from watching. Viewers' tastes over platforms are differentiated. Assume that each viewer makes a discrete choice over which platform to watch, corresponding to a single-homing assumption on viewers. Let then $N_i(a_i, \mathbf{a}_{-i})$ be the number of viewers (demand) for platform i as a function of its ad level and the vector of ad levels, $\mathbf{a}_{-i}$, of its competitors. The functions $N_i(.)$ are then just like those of a standard discrete choice (substitute products) demand system, decreasing in own advertising, and (weakly) increasing in the advertising level of each rival.

On the advertiser side, assume that there is no advertising clutter, so that all ads on a platform are registered by all consumers watching. Furthermore, let advertisers have different willingness to pay for reaching viewers (impressions). Assume that the advertiser's willingness-to-pay for advertising on each platform is a linear function of the number of viewers on the platform, so there are constant returns to reaching prospective customers. This means that targeting by platform is not an issue: viewers on one platform are not inherently more valuable.

Then we can rank advertisers in terms of decreasing willingness to pay per eyeball, from large to small in standard fashion, to generate a demand curve per eyeball. Call this $p(a)$ so that the price per ad is $P = p(a_i)N_i(a_i, \mathbf{a}_{-i})$. Hence, under these assumptions, we can write

$$\begin{aligned}\pi_i &= a_i p(a_i) N_i(a_i, \mathbf{a}_{-i}) \\ &= R(a_i) N_i(a_i, \mathbf{a}_{-i})\end{aligned}$$

where $R(a_i)$ is the revenue per ad per viewer.[5]

The first-order condition (with ad levels as the strategic variables) is written as

$$\frac{R'(a_i)}{R(a_i)} = \frac{-N_i'(a_i, \mathbf{a}_{-i})}{N_i(a_i, \mathbf{a}_{-i})} \tag{1}$$

which says (equivalently) that the elasticity of revenue per viewer should equal the viewer demand elasticity. In this we recognize a variation on the standard elasticity condition for oligopoly pricing. Indeed, consider the (Bertrand) oligopoly problem of

$$\max_{p_i} \pi_i = (p_i - c_i) N_i(p_i, \mathbf{p}_{-i}).$$

where now $N_i(p_i, \mathbf{p}_{-i})$ is the demand addressed to firm i and p_i is (temporarily) the price i sets for its product, while c_i is its marginal cost (and $\mathbf{p}_{-i}$ is the vector of other firms' prices). Then the first-order condition sets

$$\frac{1}{(p_i - c_i)} = \frac{-N_i'(p_i, \mathbf{p}_{-i})}{N_i(p_i, \mathbf{p}_{-i})} \tag{2}$$

which, in elasticity form, gives the inverse elasticity (Lerner) rule for pricing. The parallels are now easily developed. First, from Eq. (2), lower prices result (because $1/(p_i - c_i)$ decreases in p_i) when the equilibrium value of $-N_i'(p_i, \mathbf{p}_{-i})/N_i(p_i, \mathbf{p}_{-i})$ increases following a change (in, say, the number of platforms, n). Likewise, from Eq. (1), as long as $R'(a)/R(a)$ is decreasing in a (which holds under the weak condition that $lnR(a)$ be concave), then lower ad levels result whenever the equilibrium value of $-N_i'(a_i, \mathbf{a}_{-i})/N_i(a_i, \mathbf{a}_{-i})$ increases.

Consider first the effects of entry of platforms at a symmetric equilibrium: under regular conditions, the right-hand side expressions of Eqs. (2) and (1) decrease. For example, in the case of the Vickrey–Salop circle model we have

$$\frac{-N_i'(a^*, \mathbf{a}^*)}{N_i((a^*, \mathbf{a}^*))} = \frac{n}{t},$$

where the transport parameter t measures the degree of platform differentiation. For the logit (see Anderson et al., 1992) this ratio is $(n-1)/(\mu n)$, where the taste variance parameter μ measures the degree of platform differentiation in the multinomial logit. Both expressions are increasing in n. In the differentiated products context, this means simply that more competition leads to lower prices. Transposing this result to the media economics context, entry leads to lower equilibrium ad levels. The reason is that competition for viewers plays out as competition in nuisance levels (both price and ad levels are nuisances). More competition reduces the equilibrium nuisance level. The lower equilibrium level of ads implies a higher equilibrium price per viewer per ad, as we move back up the per viewer advertiser demand curve.

[5] We have included here no costs: it suffices that the costs of screening ads are the same as those for programs, so the cost of an hour of programming is independent of its composition.