

# Media market concentration and pluralism

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## Abstract

Media market structures are changing constantly. Traditional media outlets such as newspapers are being hard-hit by the digitalization of content, causing market exit and long-term consolidation in many countries. Competition policy in media markets is not only concerned with this trend because of reduced economic competition, but also because of potentially reduced pluralism. Accordingly, this paper analyzes the relationship between media market concentration and pluralism. In particular, we distinguish between internal pluralism, namely the range of views offered by a single outlet, and external pluralism, which refers to the market supply of pluralism. We show that internal pluralism is high in concentrated markets, but external pluralism is not. Moreover, a monopoly market does not necessarily offer less pluralism than a competitive one.

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# 1 Introduction

Pluralism is a basic general rule of media policy. In media markets, authorities are even more concerned with market concentration than in other markets because, besides protecting economic competition, they additionally wish to safeguard pluralism. Polo (2007) defines pluralism as the “objective of ensuring a balanced, fair and unbiased access of all the political opinions and views to the media.” Diversity of opinion is seen as a major public objective for the media sector, relating to political aims like deliberation, participation, and democracy, as well as to social aims like social cohesion and cultural diversity (see, e.g., the early works of Hayek (1945); Downs (1957), or more recent works of Armstrong (2005); von Hagen and Seabright (2007); Prat and Strömberg (2011)). The European Court of Justice therefore considers that, in the light of Article 10.2 of the Convention, there is a compelling public interest in maintaining a pluralistic media landscape.

The media landscape is undergoing constant structural change towards the digitalization of media content. According to the Pew Research Center<sup>1</sup>, newspaper and cable news consumption is decreasing persistently, and newspaper circulation is falling from year to year. Conversely, digital media consumption is steadily increasing. The change in media consumption habits has direct consequences for the markets, with traditional media outlets such as newspapers continuing to be hard-hit. According to figures from the Pew Research Center, newspaper ad revenue has been declining 4% each, to \$19.9 billion in 2015, less than half of what it was a decade ago.

This structural change is causing a long-term trend of media market consolidation in many traditional media markets worldwide. For example, in the US, in April 2016, one of the leading media companies Gannett, which, among others, publishes the national newspaper USA Today announced its plan to acquire the Tribune Publishing Company which operates newspapers such as the Chicago Tribune, Los Angeles Times, and the Baltimore Sun. In Germany, in 2013, the Federal Cartel Office approved two major takeovers, one of two regional dailies (Hamburger Abendblatt and Berliner Morgenpost) of Axel Springer AG by the media group Funke Mediengruppe and the other, of the daily newspaper Frankfurter Rundschau by Frankfurter

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<sup>1</sup>See PeW Research Center, State of the News Media 2015.

Allgemeine Zeitung. In the same year, Ofcom approved a joint venture in the UK regional newspaper market involving DMGT, Yattendon Group, and Trinity Mirror.

This consolidation trend is spurring a debate on the consequences for pluralism in the markets, raising concerns for media policy that strive towards safeguarding pluralism in the markets. Media pluralism is usually seen as threatened by concentration trends in the media markets. The concern that higher levels of market concentration reduce pluralism, however, implicitly assumes that a single outlet only offers a single view, e.g., on politics, so that the diversity of views necessarily decreases with a declining number of outlets. What is often not considered is that pluralism may also be realized within media outlets, each providing a variety of views. This notion of pluralism is defined as “internal pluralism”. Thus, when making presumptions about the effect of reduced economic competition on pluralism, one should adopt two views, firstly, pluralism within an outlet, internal pluralism, and secondly, pluralism offered by the broader market, defined as “external pluralism”.

Our paper focuses on both definitions of pluralism. In particular, we analyze whether an increase in concentration, i.e., a reduction in the number of media outlets in the market, necessarily reduces pluralism. The underlying question from an industrial organization perspective is whether a single media outlet will also find it profitable to offer a variety of views. If the answer is in the affirmative, the effect of reduced economic competition on external pluralism is not clear. This is the starting point of the present paper. We set up a two-sided market model and consider comparative static effects of the number of firms on a Salop circle on both internal and on external pluralism. We also distinguish between advertising-financed media and pay media, of which the latter is becoming more and more common.

An increasing amount of work has been focussing on the effect of concentration on external pluralism. The underlying question from an industrial organization perspective is whether the market really offers a variety of views. Early normative works on media economics starting with Steiner (1952), Spence and Owen (1977), and Wildman and Owen (1985) conclude that external pluralism is low in a free market.<sup>2</sup> Advertising-funded broad-

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<sup>2</sup>Sieg and Stühmeier (2015) survey the literature on several market imperfections in

casters seek to maximize their viewership by broadcasting the same kind of programs that appeal to the broadest possible audience. These early works, however, do not consider the two-sided market nature of broadcasting markets; advertising levels and prices are assumed fixed. Modern work paints a more diverse picture of competition on external pluralism. Gabszewicz *et al.* (2004) show that when there are negative advertising externalities, broadcasters are likely to differentiate their programs under competition. In a model of newspaper competition, Mullainathan and Shleifer (2005) show that newspapers segment the market when readers' political beliefs differ. Readers with access to all news sources can obtain an unbiased perspective, and reader heterogeneity is more important for media accuracy than competition per se. In their model of broadcasting competition, Anderson and Coate (2005) obtain comparable results, namely that markets can provide too few or too many programs. Under-provision can occur when the benefits of programming to viewers are high, relative to the benefits for advertisers. Over-provision can arise when program benefits are low, relative to advertiser benefits and the nuisance costs of advertising are low. Common to all these works is the assumption that a single outlet only offers one type of content, so they do not focus on internal pluralism.

Few works focus on the effect of competition on those view of pluralism, so that our paper aims to fill this gap. Our approach is in line with Garcia Pires (2014), whose approach allows outlets to adopt a multi-ideology strategy, in the manner of Alexandrov (2008). We use the same technology as Alexandrov (2008) and allow outlets to be located not only on single points on the spectrum of views, but also over an interval. In particular, we use a Salop-model of a circular city to test the relation between economic competition, measured by the number of firms on the circle, and pluralism, measured by the variety of content offered. We show that higher levels of market concentration lead a single outlet to offer a higher level of internal pluralism. However, in total, the market level of pluralism (external pluralism) is lower, the lower the level of economic competition. Moreover, we show that there is no clear-cut result as to whether pluralism is lower under advertising media than under pay media. This depends crucially on the revenue function for advertising. Finally, we compare our results to a setup in which all outlets

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media markets.

are owned by a monopolist. It turns out that pluralism is not necessarily lower subject to ownership concentration than under competition.

There is some empirical evidence on the relation between media market concentration and internal pluralism. Berry and Waldfogel (2001) examine the effects of ownership concentration on programming variety in radio broadcasting. They find that consolidation reduces entry, but increases the number of radio formats broadcast, both absolutely and relative to the number of stations in a market. George (2007) demonstrates that increases in ownership concentration in the US newspaper market lead firms to differentiate products to a greater extent and cover a larger number of reporting topics. There is more empirical work on the relation between media market concentration and external pluralism. Empirical evidence on how mergers affect diversity is mixed, mergers may even increase diversity in the market (see, e.g., Berry and Waldfogel (2001); Sweeting (2010); Gentzkow *et al.* (2014)).

The remainder of the paper is organized as follows. Section 2 provides the basic model. Section 2.1 analyzes the impact of concentration on pluralism in advertising-financed media, and 2.2 extends the model and allows outlets to additionally charge user prices. Section 2.3 compares the results under both financing schemes, and Section 3 assumes that all outlets are owned by a monopolist. Section 4 discusses potential extensions of the model, with Section 5 concluding.

## 2 The basic model

We are interested in modelling the relation between media market concentration and pluralism both provided by a single outlet (a newspaper, a website, a broadcaster, ...) and by the market. We use a two-sided market model (see, e.g., Anderson and Coate (2005); Armstrong (2006); Choi (2006)) to analyze such relation. Assume there are  $n \geq 2$  media outlets in the market, equidistantly located on a Salop circle<sup>3</sup> with a perimeter of one, and located clockwise from outlet 1 to outlet  $n$ . The perimeter of the circle is interpreted as the spectrum of available views, e.g., ideological views on politics or on

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<sup>3</sup>See Salop (1979).

the economy. Typically, it is assumed that media outlets only offer a single type view and that the variety of views in the market may therefore only be increased by market entry. What is often not considered is that a single outlet can also contribute to variety by itself offering more than one view. Following Polo (2007), we refer to the former aspect as “external pluralism (EP)” and to the latter aspect as “internal pluralism (IP).” In line with Alexandrov (2008) and Garcia Pires (2014)<sup>4</sup>, we therefore assume that outlets can adopt a multi-characteristic strategy, so that an outlet at position 0 may offer an interval of content from  $[-l_i, l_i]$ . Due to outlet symmetry, we can directly assume that  $-l_i = l_i$ , i.e., outlets offer internal pluralism of  $IP_i = 2l_i$ .

Consumers (readers, users, viewers, ...) with unitary density are uniformly distributed on the circle. We assume full market coverage and that each consumer consumes one type of content only (i.e., we assume that consumers “singlehome”)<sup>5</sup>. Consumers within the range of views offered by the outlets can consume their preferred content, and utility is denoted as

$$U_i^{in} = V - \gamma a_i - p_i. \quad (1)$$

They receive a gross utility from consuming their ideal variety of  $V$ , but face a disutility from consuming an amount of advertising  $a_i$ , where  $\gamma a_i$  denotes the nuisance cost of advertising. Additionally, they may have to pay a per-unit price  $p_i$ . Consumers outside the interval incur additional disutility from not consuming their ideal content ( $tx$  as “transportation cost”), so their utility is denoted as

$$U_i^{out} = V - \gamma a_i - p_i - t(x - l_i). \quad (2)$$

A consumer located at position  $x$  is then indifferent between consuming from outlet  $i$  or  $i + 1$  if

$$V - t(x - l_i) - \gamma a_i - p_i = V - t\left(\frac{1}{n} - l_{i+1} - x\right) - \gamma a_{i+1} - p_{i+1}. \quad (3)$$

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<sup>4</sup>Alexandrov (2008) and Garcia Pires (2014) assume that two firms are located on a Hotelling-line. We differ from their approach by assuming an arbitrary number of outlets on a Salop-circle.

<sup>5</sup>We discuss potential effects of multihoming in Section 4.

Each outlet receives a market share of  $s_i$  with

$$s_i = \frac{1}{n} - \frac{2\gamma a_i - \gamma(a_{i-1} + a_{i+1}) + 2p_i - (p_{i-1} + p_{i+1})}{2t} + \frac{2l_i - (l_{i+1} + l_{i-1})}{2} \quad (4)$$

for  $i - 1$  and  $i + 1$ , the neighbors of outlet  $i$  are to the left and to the right.

## 2.1 Advertising-financed media

We first focus on advertising-financed media and set  $p_i = 0$ . Although the exclusion of viewers through payments is generally possible, for many providers it is still common to provide content for free, as long as a sufficient scale of the advertising-funded model is reached. We consider advertising that informs consumers about new products that they would buy if they were aware of them (see Grossman and Shapiro, 1984), but which causes a utility loss for viewers (see also Anderson and Coate, 2005; Choi, 2006). Thus, let  $p(a)$  denote the inverse demand curve for advertising per viewer and define  $R(a) = p(a)a$  as the advertising revenue per viewer.<sup>6</sup> Assume that  $R(a)$  is concave in  $a$  and achieves its maximum at  $\hat{a}$ . The advertisers' surplus from advertising per viewer can be represented by the area under their inverse demand curve, that is, by  $\int_0^a p(x)dx$ .

The profit of outlet  $i$  is then given as

$$\Pi_i = s_i R_i - \frac{\delta}{2} l_i^2. \quad (5)$$

The first term gives the revenue from advertising and the second term reflects the cost associated with offering internal pluralism. We assume that it becomes increasingly more costly for outlets to provide more variety, for example, because they need to hire new journalists for every additional type of content. The parameter  $\delta$  is a scale parameter of the cost.<sup>7</sup>

The outlets decide simultaneously about advertising ( $a_i$ ) and variety ( $l_i$ ) by maximizing equation (5) and the first-order conditions are

$$\frac{\partial \Pi_i}{\partial a_i} = \frac{\partial s_i}{\partial a_i} R(a_i) + s_i \frac{\partial R_i}{\partial a_i} = 0; \quad (6)$$

<sup>6</sup>Since viewers singlehome, outlets have monopoly power over access to their viewers.

<sup>7</sup>Technically, the total cost of offering internal pluralism of  $2l_i$  is  $\delta \frac{(2l_i)^2}{8}$  which reduces to  $\delta \frac{l_i^2}{2}$ .

$$\frac{\partial \Pi_i}{\partial l_i} = \frac{\partial s_i}{\partial l_i} R(a_i) - \delta l_i = 0. \quad (7)$$

From  $\frac{\partial s_i}{\partial a_i} R(a_i) < 0$  in equation (6), it follows that outlets set lower advertising levels which would maximize per viewer revenue  $R(a)$ , i.e., it follows that  $\frac{\partial R(a)}{\partial a} > 0$  at optimal advertising levels of  $a_i^*$ .

Solving equation (7) for the optimal level of variety, it follows that

$$IP_i^* = 2l_i^* = 2 \frac{R(a_i^*)}{\delta}. \quad (8)$$

We see that internal pluralism depends positively on advertising revenue. This is in contrast to the traditional wisdom (Steiner (1952); Spence and Owen (1977); Wildman and Owen (1985)) that reliance on advertising income leads to a low content variety. Here, the opposite is true, because if advertising revenue per consumer is high, outlets have a stronger incentive to compete for consumers by offering their preferred content. Technically, outlets balance the marginal benefit of providing more variety in terms of an increase per viewer profit ( $R(a)$ ) against the cost of providing variety ( $\delta$ ).

**Assumption 1.** Assume that parameters are such that  $l_i^* \leq \frac{1}{2n}$ .

We have to impose restrictions on the parameters so that the outlets' intervals do not overlap, i.e.,  $l_i^* \leq \frac{1}{2n}$ .<sup>8</sup>

From equation (6), using the market share expression of equation (4), the optimal advertising level in the symmetric equilibrium is implicitly given as

$$R(a_i^*) = \frac{t}{n\gamma} \frac{\partial R(a)}{\partial a}, \quad (9)$$

or using  $R(a) = p(a)a$  as

$$a_i^* = \frac{t}{n\gamma} (1 - \epsilon) \quad (10)$$

where  $\epsilon = -\frac{\partial p(a)}{\partial a} \frac{a_i^*}{p(a_i^*)}$  denotes the elasticity of advertiser demand. Observe that because  $\frac{\partial R(a)}{\partial a} > 0$  at equilibrium, it necessarily follows that outlets set

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<sup>8</sup>If intervals overlap, each outlet can marginally decrease advertising and capture a positive amount of consumers. Standard Bertrand arguments apply, so that an outlet finds it more profitable to locate only on a point on the circle. As equation (8) shows, the restriction is fulfilled if offering pluralism is sufficiently costly, i.e., if  $\delta$  is high.



advertising levels in the inelastic region of the advertiser demand curve, i.e.,  $\epsilon < 1$  at  $a_i^*$ .

We are now interested in the comparative static effects of concentration, i.e., a decrease in the number of outlets  $n$ , on pluralism.<sup>9</sup> First, we analyze the effect of concentration on advertising. Differentiation of equation (10) with respect to  $n$  yields<sup>10</sup>

$$\frac{\partial a_i^*}{\partial n} = -\frac{t(1-\epsilon)}{n^2\gamma(1 + \frac{t}{n\gamma}\frac{\partial\epsilon}{\partial a})}. \quad (11)$$

From  $\epsilon < 1$  and from  $\frac{\partial\epsilon}{\partial a} \geq 0$  it follows that  $\frac{\partial a_i^*}{\partial n} < 0$  and thus:

**Lemma 1.** The equilibrium advertising level is higher in more concentrated markets.

The higher the market concentration, the less intense the competition for viewers and thus, the higher the equilibrium advertising level.

Internal pluralism is then affected by market concentration as

$$\frac{\partial IP_i^*}{\partial n} = 2\frac{\frac{\partial R(a)}{\partial a}\frac{\partial a_i^*}{\partial n}}{\delta}. \quad (12)$$

From  $\frac{\partial R(a)}{\partial a} > 0$  and from  $\frac{\partial a_i^*}{\partial n} < 0$  (see equation (11)) it follows that  $\frac{\partial IP_i^*}{\partial n} < 0$ .

Therefore, we can conclude:

**Proposition 1.** Internal pluralism is higher in more concentrated markets.

Outlets respond to an increase in concentration by increasing their variety. With fewer outlets active in the market, the distance between the indifferent consumer's taste and the outlets' positions increases and so do transportation costs. This puts pressure on the advertising level, reducing per viewer

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<sup>9</sup>We take a long-run perspective on the market outcomes after relocation to symmetric market structures. We do not analyze the short-run strategic behaviour of outlets after market entry or market exit.

<sup>10</sup>For details, see Appendix.

profit. Outlets therefore respond by offering a higher level of internal pluralism in order to increase advertising levels (see equation (11)) and advertising revenue per viewer.

This result is backed by empirical evidence from Berry and Waldfogel (2001) and George (2007). Berry and Waldfogel (2001) show that consolidation in the US radio market, triggered by the Telecommunications Act of 1996, reduced entry but increased the number of radio formats broadcast. George (2007) demonstrates that increases in ownership concentration in US newspaper market lead firms to differentiate products to a greater extent and cover a larger number of reporting topics.

Next, we are interested in the effect of concentration on external pluralism, that is, on the market supply of pluralism. We first need to define how external pluralism should be measured. There is no sound and clear definition of pluralism; it remains a concept which is very loosely defined in many countries. The Commission staff working paper “Media Pluralism in the Member States of the European Union” of 2007 describes media pluralism in the following way: “Media pluralism is a concept that embraces a number of aspects, such as diversity of ownership, variety in the sources of information and in the range of contents available in the different Member states. For many analysts or observers, media pluralism has come to mean, almost exclusively, plurality of ownership. Concentration of ownership, it is feared, may result in a skewed public discourse where certain viewpoints are excluded or underrepresented. [...]”<sup>11</sup> However, we have seen above that a definition only in terms of ownership is too narrow, because each outlet also provides internal pluralism, offering a range of different views. External pluralism might therefore also be high in a concentrated market, if outlets provide a high level of internal pluralism. The market supply of variety therefore has to take into account both the number of outlets and internal pluralism. Also, the Commission then notes that “[a]lthough pluralism of ownership is important, it is a necessary but not sufficient condition for ensuring media pluralism.”<sup>12</sup>

We operationalize external pluralism by looking at the aggregate transporta-

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<sup>11</sup>European Commission, DG information society and Media, 2007a, p. 5.

<sup>12</sup>ibid.

tion costs for consumers in the market<sup>13</sup> and quantify external pluralism as

$$EP = 1 - 2n \int_{l_i^*}^{1/2n} txdx \quad (13)$$

or inserting equilibrium results as

$$EP = 1 - nt \left( \frac{1}{4n^2} - \frac{t^2 \left( \frac{\partial R(a)}{\partial a} \right)^2}{n^2 \gamma^2 \delta^2} \right). \quad (14)$$

External pluralism is then maximized at  $EP = 1$  if each consumer finds its preferred content, i.e., if transportation costs are zero. This is both more likely to be true for a large number of outlets ( $n$ ) and due to high levels of internal pluralism within each outlet ( $l_i$ ). Differentiation of equation (14) with respect to  $n$  gives

$$\frac{\partial EP}{\partial n} = (2tnl_i^* \frac{\partial l_i^*}{\partial n} + tl_i^{*2} + \frac{t}{4n^2}). \quad (15)$$

After some manipulation<sup>14</sup>, using the previous equilibria, it can be shown that  $\frac{\partial EP}{\partial n} > 0$  if

$$n \left( 1 + \frac{t}{n\gamma} \frac{\partial \epsilon}{\partial a} \right) > (1 - \epsilon) \quad (16)$$

which is always true, because  $\epsilon < 1$  and  $\frac{\partial \epsilon}{\partial a} > 0$ .

Therefore, we can conclude:

**Proposition 2.** External pluralism is lower in more concentrated markets.

We hence conclude that with advertising-financed media, a more concentrated market leads to a lower level of external pluralism. Although an individual outlet increases its variety of views offered, the direct effect of a reduced number of outlets dominates. This is an important result for media policy, for example, in broadcasting markets where advertising finance is common. Here, public policy should be concerned with excessively concen-

<sup>13</sup>One may also look at the aggregate distance between the indifferent consumer and the level of internal pluralism. This yields the same result, because aggregate transportation costs are a function of the aggregate distance.

<sup>14</sup>For details, see Appendix.

trated markets, not only because of reduced economic competition, resulting in higher nuisance advertising, but also because of lower pluralism, resulting in the aforementioned negative social effects.

Media policy deals with this concern by assessing and judging both market power and pluralism in the media sector. Most Member States of the European Union recognize that competition policy alone is not an adequate mechanism for ensuring media pluralism and the Member States have the right to impose stricter regulations to ensure media pluralism beyond what competition alone can provide. Therefore, in Germany, for example, concentration in private broadcasting markets is not only subject to competition law, but constitutional law mandates specific broadcasting-oriented precautions against concentration. The so-called Commission on Concentration in the Media (KEK) was established in 1996 to safeguard pluralism in private broadcasting. The Commission examines whether any single company is able to exercise dominant power over public opinion through its media activities, and can sanction excessively high levels of concentration, for example, through a change in ownership or by refusing to provide new broadcasting licenses. Similar tests also exist in other countries, for instance, the Diversity Index in the US (2003), the public interest or plurality test in the UK (2003), or the integrated communications market (SIC) in Italy (2004).

## 2.2 Pay media

Next, we extend the model and allow outlets to charge consumers directly, by charging a price for content of  $p_i$ . In particular, in the traditional print media markets, there is a notable development towards subscription models as a response to the ongoing structural changes and the need for news outlets to develop new sources of revenue for their online content. News webpages such as BostonGlobe.com and NYTimes.com have erected paywalls that prevent consumers from accessing webpage content without a paid subscription.<sup>15</sup>

The profit of outlet  $i$  is then given as

$$\Pi_i = s_i(R_i + p_i) - \frac{\delta}{2}l_i^2. \quad (17)$$

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<sup>15</sup>Another common model is a “soft paywall”, which allows consumers to read a limited amount of content for free before charging for further access.

Differentiation of equation (17) with respect to  $p$  gives the standard pass-through effect of advertising revenue into the price (see, e.g., Peitz and Valletti, 2008) given as

$$p_i^+ = \frac{t}{n} - R(a_i^+). \quad (18)$$

The optimal level of internal pluralism is then given by solving the FOC of

$$\frac{\partial \Pi_i}{\partial l_i} = \frac{\partial s_i}{\partial l_i}(p_i + R(a_i)) - \delta l_i = 0 \quad (19)$$

which, given equation (18), gives

$$IP_i^+ = 2l_i^+ = 2\frac{t}{n\delta}. \quad (20)$$

External pluralism is then given as

$$EP^+ = 1 - \frac{t}{4} \frac{\delta^2 - 4t^2}{\delta^2 n}. \quad (21)$$

From equation (20), it follows directly that internal pluralism increases with increasing market concentration. Otherwise, from equation (21), it follows that external pluralism is strictly decreasing with rising market concentration, because for  $l_i^+ \leq \frac{1}{2n}$  (see Assumption 1) it must hold that  $\delta \geq 2t$ . It is thus straightforward to conclude:

**Proposition 3.** Internal pluralism is higher and external pluralism is lower in more concentrated markets.

Qualitatively, the comparative static effects therefore correspond to those of advertising-financed media.

### 2.3 Comparison between advertising-financed and pay media

Let us next compare pluralism under advertising-financed and under pay media. A comparison of equation (20) with (8) together with (9) shows that for a given number of outlets, pluralism under pay media may be lower or

higher than under advertising-financed media. This depends on the concavity of the revenue function, i.e., if  $\frac{\partial R(a)}{\partial a} > \gamma$ , internal pluralism is higher under advertising-financed media. That is, it is higher, if the marginal benefit of an increase in advertising in terms of advertising revenues is larger than the marginal cost in terms of a loss in market share.

This holds for a given number of outlets. The long-run equilibrium number of outlets may, however, differ between advertising-financed and pay media. Therefore, consider outlets additionally to incur some fixed entry cost of  $f$ . In the long-run equilibrium, outlets enter as long as profits are non-negative, i.e., as long as  $\Pi_i(n) - f \geq 0$ . Then, the free-entry equilibrium number of outlets under advertising-financed media is given by

$$n^* = \frac{\sqrt{2}\sqrt{f\delta t \frac{\partial R(a)}{\partial a} (2\delta\gamma - t \frac{\partial R(a)}{\partial a})}}{2f\delta\gamma} \quad (22)$$

and under pay media is given by

$$n^+ = \frac{\sqrt{2}\sqrt{f\delta t(2\delta - t)}}{2f\delta}. \quad (23)$$

Inserting the equilibrium number of outlets into equations (8) and (20) shows that advertising-financed outlets set a higher level of internal pluralism if

$$\frac{\partial R(a)}{\partial a} > \gamma. \quad (24)$$

**Proposition 4.** Whenever  $\frac{\partial R(a)}{\partial a} > \gamma$ , internal pluralism is higher under advertising-financed media than under pay media.

This is especially true if the equilibrium level of advertising in the market is low, e.g., because of low transportation costs or in markets with many outlets (see equation (10)). The marginal revenue of advertising is then high and outlets have a strong incentive to compete for consumers by offering more pluralism. With pay-media, such effects are already internalized in the price, such that internal pluralism is not affected by advertising income.

To demonstrate that such conditions can be fulfilled at equilibrium and that external pluralism may be also higher under advertising-financed me-

dia, consider the following example. As in Choi (2006), assume a per-viewer revenue of  $R(a) = a^{1-\beta}$  and set parameters of  $V = 1, t = 1, \beta = 0.1, \delta = 5$ , and assume a fixed entry cost of  $f = 0.1$ . For such parameters,  $n^+ = 3$  outlets enter in the long-run equilibrium under pay media, and external pluralism is  $EP^+ = 0.930$ . For advertising-financed media, the results depend additionally on the nuisance cost of advertising. Consider first a relatively low nuisance cost  $\gamma = 0.5$ . Then, three outlets enter in the long-run equilibrium<sup>16</sup>, and external pluralism under advertising-financed media is  $EP^* = 0.965$  and is thus higher than under pay media. For a higher nuisance cost of  $\gamma = 2$ , though, only two outlets enter, and external pluralism is  $EP^* = 0.880$ , and thus lower than under pay media.

### 3 Monopoly

So far, we have assumed that each of the  $n$  outlets is owned by an independent corporation. In media markets across many Western countries, there is a high level of ownership concentration. Media mogules such as Rupert Murdoch and Silvio Berlusconi are just two instances of concentrated media markets. The Australian newspaper market, for example, is one of the most concentrated worldwide. According to figures of Harding-Smith (2011), 98% of circulation comes only from three corporations, with Murdoch's News Corporation Australia controlling over 70% of metropolitan daily newspaper circulation. Such a concentration of newspaper ownership may pose a risk to overall media diversity. According to a study by the Pew Research Centers Project for Excellence in Journalism, newspapers are still the dominant source of current news.<sup>17</sup> They therefore play a disproportionate role in driving the overall news cycle. It is relevant whether a monopolistic or oligopolistic control of the media market is accountable for the public interest in pluralism. We consider the most extreme case of ownership concentration, a monopolist which is a single owner of the  $n$  outlets on the circle, and derive the monopolist's choice of internal and external pluralism.

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<sup>16</sup>We take account of integer constraints. Numerically,  $n^* = 3.96$  and  $n^+ = 3.0$ . Ignoring the integer constraint would not change the result qualitatively.

<sup>17</sup><http://www.journalism.org/2010/01/11/how-news-happens/>.

### 3.1 Advertising-financed media

We first focus on advertising-financed media and set  $p = 0$ . The monopolist maximizes the industry profit<sup>18</sup> of

$$\Pi = R(a) - n\frac{\delta}{2}l^2. \quad (25)$$

Assume again that  $R(a)$  is concave in  $a$  and achieves its maximum at  $\hat{a}$ . For outlets in competition, we concluded that  $\frac{\partial R(a)}{\partial a} > 0$ , because of business stealing between competing outlets. A monopolist, though, internalizes all business stealing and maximizes per viewer advertising revenue. Whether this is maximized at  $\frac{\partial R(a)}{\partial a} = 0$  or at  $\frac{\partial R(a)}{\partial a} > 0$  depends on the concavity of the advertising revenue function  $R(a)$ .

When evaluated at  $\hat{a}$ , where  $\hat{a}$  is given by the solution of  $\frac{\partial R(a)}{\partial a} = 0$ , the indifferent user between any two outlets is left with positive utility, it is straightforward to conclude that

$$a^M = \hat{a} \quad (26)$$

$$IP^M = 0. \quad (27)$$

There is nothing to gain from costly pluralism in this case. Thus, the monopolist chooses internal pluralism of zero (it locates on a point on the circle). This, for example, holds for  $R(a) = (1 - a)a$ , so that  $\hat{a} = \frac{1}{2}$  and  $V - t\hat{x} - \gamma\hat{a} > 0$  for sufficiently large  $V$ .

In the more interesting case, it holds that  $a^M < \hat{a}$ . The monopolist's optimal choice of  $a$  then sets the utility of the indifferent consumer to zero. This, for example, holds for  $R(a) = a^{1-\beta}$ . Thus,  $a^M$  satisfies

$$a^M = \frac{V - t(\frac{1}{2n} - l^M)}{\gamma}. \quad (28)$$

The monopolist then sets a strictly positive level of internal pluralism, because the indifferent user is then left with higher utility and so the monopolist can increase advertising levels. This is profitable because  $\frac{\partial R(a)}{\partial a} > 0$  at the optimum.

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<sup>18</sup>We assume that there are no economies of scale or scope in delivering media content to consumers.



Given  $a^M$ , the monopolist sets internal pluralism such that

$$\frac{\partial R(a)}{\partial a} \frac{\partial a^M}{\partial l} - n\delta l = 0 \quad (29)$$

which gives

$$IP^M = 2 \frac{\partial R(a)}{\partial a} \frac{t}{n\delta}. \quad (30)$$

This is the same condition as (8). As with any outlet in competition, the monopolist balances the increase in per-user profit against the cost associated with providing internal pluralism. However, it sets a lower level of internal pluralism than outlets in competition. This follows from the concavity of  $R(a)$  and from  $a^M > a^*$ , so  $\frac{R(a)}{\partial a}|_{a=a^M} < \frac{R(a)}{\partial a}|_{a=a^*}$  and thus,  $IP^M < IP^*$ .

Comparative static effects with respect to  $n$  are thus similar to those in Section 2:

**Proposition 5.** Internal pluralism is generally lower under monopoly ownership. An  $n$ -outlet monopolist chooses no internal pluralism if  $a^M = \hat{a}$ . Otherwise, if  $a^M < \hat{a}$ , internal pluralism is higher and external pluralism is lower in more concentrated markets.

Since internal pluralism is lower under monopoly than under competition, external pluralism is also lower for a given number of firms. But, we also have to consider, whether in a long-run equilibrium, the same number of outlets would prevail in monopoly than in competition. This ultimately depends on entry and operation cost. One cannot simply conclude that the number of outlets is lower in a monopolistic market than in a competitive one, because multi-product firms internalize business stealing. An owner who acquires a competitor quite similar to his own would not be likely to continue operating both outlets in their previous form. Rather, she may decide either to close the competitor or to differentiate both outlets by altering their content. We can easily construct an example in which the same number of outlets prevails in the long-run free-entry equilibrium in competition and at the  $n$ -outlet monopoly equilibrium. Assume again a per-viewer revenue of  $R(a) = a^{1-\beta}$  and set parameters of  $V = 2, t = 1, \beta = 0.1, \gamma = 0.5$ , and  $\delta = 5$ . Assume a fixed entry cost for an individual outlet of  $f = 0.1$ . At the free-entry equilibrium,  $n = 3$  outlets enter and each sets  $IP_i^* = 0.253$ . The  $n$ -outlet

monopolist chooses a number of outlets to maximize its monopoly profit, which is also true at  $n = 3$ . As shown above, it sets a lower level of internal pluralism at  $IP^M = 0.157$ .

### 3.2 Pay media

Assume now that the monopolist additionally charges user prices, so the industry profit becomes

$$\Pi = p + R(a) - n\frac{\delta}{2}l^2. \quad (31)$$

We only consider  $a^M < \hat{a}$ , so the monopolist sets a strictly positive level of internal pluralism. Now, the monopolist has two instruments at hand to set the utility of the indifferent consumer to zero. Consider, it sets  $p$  such that the indifferent consumer is left with zero utility, i.e.,

$$p^M = V - t\left(\frac{1}{2n} - l\right) - \gamma a. \quad (32)$$

Thus, when setting  $l$ , the monopolist simply balances the benefit stemming from higher utility for consumers (and thus, higher consumer prices) against the cost of providing pluralism. It thus faces exactly the same decision as an outlet in competition and thus, it sets the same level of pluralism as an outlet in competition, i.e. from  $\frac{\partial \Pi}{\partial l} = t - n\delta l$ , it follows that

$$IP^M = 2l_i^* = 2\frac{t}{n\delta} \quad (33)$$

which is the same as in equation (20).

**Proposition 6.** Consider that  $a^M < \hat{a}$ . An  $n$ -outlet monopolist which both sets user prices and advertising levels sets the same level of pluralism as an outlet in competition for a given number of outlets.

The comparative static effects with respect to  $n$  therefore follow section 2.2. Remember that this result is again only true for a given number of outlets.

## 4 Extensions

This section discusses potential extensions of the model.

### 4.1 Doublehoming consumers

So far, we have assumed that consumers only patronize one outlet. Some consumers may additionally find it beneficial to consume from multiple outlets. This is especially true with online content where consumers can easily spread their attention across multiple outlets, at least, if outlets are without subscription. We restrict the analysis to such a case. This section briefly highlights the effects of multihoming on pluralism.<sup>19</sup> Consider that consumers either decide to consume from one neighboring outlet or from both neighboring outlets, i.e., they decide to singlehome or to doublehome. A consumer located at position  $x$  between outlet  $i$  and outlet  $i+1$  and singlehoming at outlet  $i$ , receives a surplus of  $U_i = V - t(x - l_i) - \gamma a_i$  and a doublehoming consumer a surplus of  $U_{i,i+1} = 2V - t(x - l_i) - t(\frac{1}{n} - l_{i+1} - x) - \gamma(a_i + a_{i+1})$ .<sup>20</sup> Then, the consumer indifferent between singlehoming at outlet  $i$  and doublehoming is located at  $x_1 = \frac{1}{n} - l_{i+1} - \frac{V - \gamma a_{i+1}}{t}$  and similarly, the consumer indifferent between singlehoming at outlet  $i + 1$  and doublehoming at  $x_2 = l_i + \frac{V - \gamma a_i}{t}$ . Thus,  $x_1$  consumers singlehome at outlet  $i$  and  $\frac{1}{n} - x_2$  consumers singlehome at outlet  $i + 1$ . The rest of  $x_2 - x_1$  consumers doublehome at both outlets. This is depicted in Figure 1 for a market with four firms. The same logic holds for the other neighboring outlet all the way to outlet  $i$ , i.e., to outlet  $i - 1$ .

In total, each outlet receives a number of consumers

$$n_i = 2\left(\frac{V - \gamma a_i}{t} + l_i\right). \quad (34)$$

<sup>19</sup>For a general analysis on multihoming in media markets, see, e.g., Ambrus *et al.* (2016) or Anderson *et al.* (2016). Ambrus *et al.* (2016) show that advertising levels may go up or down with entry. Anderson *et al.* (2016) conclude that when consumers multihome, competing platforms want to differentiate from rivals in order to deliver exclusive eyeballs to advertisers.

<sup>20</sup>Here, we implicitly assume that consumers inside the range of pluralism do not doublehome. This can be ensured, if the extra benefit of doublehoming is small for these consumers.

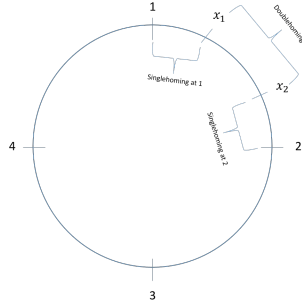


Figure 1: Single- and doublehoming consumers.

Outlets maximize profit of  $\Pi_i = n_i R(a_i) - \frac{\delta}{2} l_i^2$  with respect to advertising and pluralism.<sup>21</sup>

$$R(a^{dh}) = \frac{t}{\gamma} \left( \frac{V - \gamma a^{dh}}{t} + l^{dh} \right) \frac{\partial R(a)}{\partial a} \quad (35)$$

and the equilibrium level of pluralism ( $IP^{dh}$ ) is given as

$$IP^{dh} = 2l^{dh} = \frac{4R(a^{dh})}{\delta}. \quad (36)$$

We have to ensure that the number of consumers at each outlet is reasonable and below  $2/n$  at the equilibrium. At  $n_i = 2/n$ , all consumers would doublehome and a single outlet cannot capture more than this number of consumers. That is, it has to hold that  $n_i \leq \frac{2}{n}$  or

$$\frac{V - \gamma a^{dh}}{t} + l^{dh} \leq \frac{1}{n}. \quad (37)$$

We can now compare the equilibria to those derived in Section 2.1.

**Lemma 2.** The equilibrium advertising level with doublehoming consumers is lower than with singlehoming consumers.

A comparison of equation (9) with equation (35) shows that outlets set lower advertising with doublehoming consumers. This follows from condition (37).

<sup>21</sup>We assume that multihoming consumers are as valuable for advertisers as are single-homing consumers. Anderson *et al.* (2016) and Ambrus *et al.* (2016) assume that exclusive consumers are more valuable for advertisers.

Consider, to the contrary, that  $a^{dh} > a^*$ . Then, the left hand side of equation (35) would be smaller and the right hand side would be larger than the respective sides of equation (9), since  $R(a)$  is increasing and concave in the advertising level. Yet, this cannot be true. Thus, it has to hold that  $a^{dh} \leq a^*$ . But then, there is no straightforward answer as to whether internal pluralism is lower or higher with doublehoming consumers, because  $R(a^{dh}) < R(a^*)$  in equations (8) and (36). On the one hand, with doublehoming, outlets have an even larger incentive to offer internal pluralism in order to raise the number of consumers. On the other hand though, consumers are also more responsive to advertising (see equation (34)), causing a lower equilibrium level of advertising for the same reason. Whether internal pluralism is higher with doublehoming depends ultimately on the responsiveness of consumers to nuisance advertising. If consumers only respond moderately to advertising, internal pluralism is higher with doublehoming consumers.

**Proposition 7.** With doublehoming consumers, outlets might set lower or higher levels of internal pluralism than with singlehoming consumers.

The effect on external pluralism depends additionally on the number of doublehoming consumers and on the long-run free-entry equilibrium number of firms. We leave such analysis for future research.

## 4.2 Welfare

This section briefly considers the implications of market concentration on total welfare. Let us restrict the analysis again to advertising-financed media. Welfare in a situation with  $n$  symmetric outlets consists of consumer rent  $CS = V - \gamma a - 2n \int_l^{1/2n} txdx$ , benefits for advertisers  $\int_0^a p(x)dx$ , outlet costs for providing variety  $\frac{\delta}{2}l^2$ , and some additional fixed entry cost per outlet of  $f$ . Total welfare is thus given as

$$W = V - \gamma a - 2n \int_l^{1/2n} txdx + \int_0^a p(x)dx - n\frac{\delta}{2}l^2 - nf. \quad (38)$$

We now determine the comparative static effect of media market concentra-

tion on total welfare given oligopolistic behavior, that is, we employ effects on second-best welfare. From the above comparative static results, it is clear that consumer rent is lower in more concentrated markets, because both advertising levels and total transportation cost (our measure of external pluralism) increase with rising market concentration. By contrast, advertisers benefit from market concentration, because

$$\frac{\partial(\int_0^a p(x)dx)}{\partial n} = p(a^*)\frac{\partial a^*}{\partial n} < 0, \quad (39)$$

that is, the opportunity to display advertising is higher in more concentrated markets ( $\frac{\partial a^*}{\partial n} < 0$ ). Hence, market concentration has ambiguous effects on welfare, consumers suffer from higher levels of market concentration and advertisers benefit. Which of the two forces ultimately dominates depends on the parameters of the model. Consider again a per-viewer revenue of  $R(a) = a^{1-\beta}$  and set parameters of  $V = 2, t = 2, \beta = 0.1$  and  $\delta = 4$ . Additionally, assume a fixed entry cost for an individual outlet of  $f = 0.1$ . Whether total welfare increases or decreases in  $n$  depends on consumers' nuisance cost of advertising. Assume a nuisance cost of  $\gamma = 1.5$ . Welfare is then maximized for a number of three outlets. Otherwise, for a lower nuisance cost of  $\gamma = 1$ , welfare is maximized for  $n = 2$ . If advertising causes less nuisance for consumers, welfare is maximized for a lower number of outlets, because the resulting higher equilibrium level of advertising (see Lemma 1) has a lower impact on consumer welfare for lower values of  $\gamma$ , but benefits the advertising industry (see equation (39)).

Comparison with the free-entry equilibrium, where outlets enter as long as  $\Pi_i(n) \geq 0$ , shows that welfare may or may not fall short, compared to the free market. For  $\gamma = 1.5$ , there are  $n = 3$  outlets active in the market and thus, the long-run equilibrium number of outlets corresponds to the welfare-optimal number of outlets. Hence, any further reduction of the number of outlet leads to lower welfare. For  $\gamma = 1$ , three outlets are also active in the long-run equilibrium, but now there is excessive entry, so that the exit of one outlet would increase welfare. We can therefore conclude that further market concentration would harm consumers and benefits advertisers. It may therefore both increase or decrease welfare.

**Proposition 8.** Second-best welfare might be lower or higher in more con-

centrated markets.

## 5 Conclusion

The present paper analyzes the connection between economic competition and pluralism in media markets. Competition policy often assumes that more concentrated media markets lead to a lower variety of views or opinions offered in the markets. Such a perspective is based on the so-called external pluralism and assumes that outlets only offer one type of view, so that the market supply of views necessarily decreases with the number of outlets. The above analysis demonstrates, though, that higher market concentration leads outlets to increase what is referred to as internal pluralism, i.e., they increase the range of views offered within an outlet. It turns out that a monopolist also may not necessarily offer less pluralism than in a competitive market. Also, advertising-financed media does not necessarily offer less pluralism than pay media, which contradicts the old wisdom that pluralism under advertising-financed media is low. Our findings are consistent with those in the empirical literature, that ownership concentration in radio or newspaper produces greater programming variety.

There is scope for future work on this topic along several dimensions. For example, one could focus additionally on media bias. A higher level of pluralism may reduce bias, since diverse political opinions find their way into the news market. Moreover, one could elaborate more on multihoming and, for example, also allow advertisers to multihome. We showed that it is a priori unclear whether pluralism is larger or smaller than with singlehoming. Outlets might set higher levels of internal pluralism to enlarge their number of consumers, but on the other hand, they set lower advertising levels for the same reason, which again reduces internal pluralism. One could also focus on the role of media intermediaries. Increasingly, traditional media industries are being supplanted by digital gatekeepers, such as Google or Facebook. Although these are not traditional content creators, such companies are hitherto often the means by which consumers access digital media content. A general debate about pluralism in the media must certainly include the role of these gatekeepers.

## A Appendix

We derive the comparative static effect of concentration on the equilibrium advertising level given by equation (11). From equation (10), it follows that

$$\frac{\partial a^*}{\partial n} = -\frac{t(1-\epsilon)}{n^2\gamma} - \frac{t}{n\gamma} \frac{\partial \epsilon}{\partial n} \quad (40)$$

or

$$\frac{\partial a^*}{\partial n} = -\frac{t(1-\epsilon)}{n^2\gamma} - \frac{t}{n\gamma} \left( \frac{\partial \epsilon}{\partial a} \frac{\partial a^*}{\partial n} \right). \quad (41)$$

Dividing both sides by  $\frac{\partial a^*}{\partial n}$  gives

$$1 = -\frac{t}{n^2\gamma} \frac{(1-\epsilon)}{\frac{\partial a^*}{\partial n}} - \frac{t}{n\gamma} \frac{\partial \epsilon}{\partial a}. \quad (42)$$

Rearranging gives

$$\frac{t}{n^2\gamma} \frac{(1-\epsilon)}{\frac{\partial a^*}{\partial n}} = -\left(1 + \frac{t}{n\gamma} \frac{\partial \epsilon}{\partial a}\right) \quad (43)$$

and finally gives equation (11).

We next derive condition (16) and show that external pluralism is lower, the higher the market concentration. It holds that  $\frac{\partial EP}{\partial n} > 0$  if

$$\frac{\partial EP}{\partial n} = \left(2n \frac{\partial l_i^*}{\partial n} + l_i^* + \frac{t}{4n^2 l_i^*}\right) > 0. \quad (44)$$

The last term is always positive. We thus check whether the sum of the first two terms is positive as well. Given equations (8) and (9), the first two terms can also be written as

$$2n \frac{\partial R(a)}{\partial a} \frac{\partial a^*}{\partial n} + \frac{t}{n\gamma} \frac{\partial R(a)}{\partial a}. \quad (45)$$

Since at the optimum,  $\frac{\partial R(a)}{\partial a} > 0$ , it holds that  $\frac{\partial EP}{\partial n} > 0$  if

$$2n \frac{\partial a^*}{\partial n} + \frac{t}{n\gamma} > 0 \quad (46)$$



or using equation (11) if

$$2n\left(1 - \frac{1 - \epsilon}{n\left(1 + \frac{t}{n\gamma} \frac{\partial \epsilon}{\partial a}\right)}\right) > 0. \quad (47)$$

This is true if

$$n\left(1 + \frac{t}{n\gamma} \frac{\partial \epsilon}{\partial a}\right) > (1 - \epsilon) \quad (48)$$

which is always true, because  $\epsilon < 1$  and  $\frac{\partial \epsilon}{\partial a} > 0$ .

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