

# Newspapers' market shares and the theory of the circulation spiral

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## Abstract

We consider a model of daily newspapers' competition to test the validity of the so called "theory of the circulation spiral". According to it, the interaction between the newspapers and the advertising markets drives the newspaper with the smaller readership into a vicious circle, finally leading it to death. In a model with two newspapers, we show that, contrary to this conjecture, the dynamics envisaged by the proposers of the theory, does not always lead to the elimination of one of them.

## 1 Introduction<sup>1</sup>

The daily newspaper industry has been the object of several empirical studies documenting a dramatic tendency to concentration (see, for instance, Bagdikian (1983), Dertouzos, J.N and W.B. Trautman (1990), Genesove (2003), Kaitatzi-Witlock, S.(1996), or Rosse (1980)). One explanation of

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this phenomenon was proposed by the media scholar Furhoff (1973), under the name of the *theory of the circulation spiral*. The essence of this theory is that a larger readership attracts more advertising which in turn attracts more readers, which in turn will attract more advertisers... As a consequence, an initial asymmetry in the readership sizes will entail the elimination of the minority newspaper. In turn the circulation spiral has received two interpretations. The first can be summarized by the following quotation:

”the larger of two competing newspapers is favoured by a process of mutual reinforcement between circulation and advertising, as a larger circulation attracts advertisements, which in turn attracts more advertising and again more readers. In contrast, the smaller of two competing newspapers is caught in a vicious circle; its circulation has less appeal for the advertisers, and it loses readers if the newspaper does not contain attractive advertising. A decreasing circulation again aggravates the problems of selling advertising space, so that finally the smaller newspaper will have to close down” (Gustafsson (1978), p. 1)<sup>2</sup>.

We shall refer to this interpretation as the *advertising-driven* spiral, in the sense that readers are assumed to be *ad-lovers*. Another possible interpretation of the circulation spiral is that having more readers means having more ad revenue, which in turn allows a newspaper to attain higher and higher quality, which makes it more and more attractive to its readers compared with the rivals’ newspapers. Thus, there is finally only room for one newspaper in one and the same market. In Furhoff’s words:

"The reason for this (...) is that readers make the same demands upon competing newspapers, regardless of their economic resources. Thus the level of aspiration prevailing is determined by the economically stronger newspaper, which enjoys larger circulation and advertising revenues than does its competitor. It is this

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<sup>2</sup>Several other elements have been proposed to explain this tendency to concentration in the daily press industry, like the existence of large economies of scale (Rosse 1967) or the two-sided market structure of the press and advertising industries (Gabszewicz *et al.* 2004).

newspaper which determines to what standards both will aspire in respect of the scope and quality of editorial control, as well as speed of distribution and technical quality of the product." (Furhoff (1973), p.7).

We shall refer to this second interpretation as the *quality-driven* spiral<sup>3</sup>. In this note we provide a simple duopoly model of the daily press market in order to test whether the dynamics implicit into the circulation spiral leads indeed to the *elimination* of one of the competitors, as predicted by the theory. From the outset, it is interesting to stress that this model can be adapted to capture either one or the other explanation of the circulation spiral proposed above. Hence both explanations lead to the same dynamics. The bulk of the present paper adopts the first explanation of the circulation spiral and derives its implications, while a special section is devoted to show how to transpose the model formulation to fit the second explanation.

In the first explanation, the circulation spiral argument for elimination rests crucially on the implicit assumption that readers are not only interested in reading the news, but also, as noted by Furhoff, into canvassing advertisements in newspapers, in particular classified ads<sup>4</sup>.

The reader's taste for one or the other newspaper clearly depends upon the way news are represented. One element defining a daily newspaper's attribute can be its political stance. Even if this particular aspect is not so relevant in the United States – where the left wing *vs.* right wing distinction does not appear to be important in daily newspaper competition –, it constitutes a cornerstone element when explaining competition in European countries newspaper industries.<sup>5</sup> Of course, the reader's taste for newspapers can be differentiated using alternative criteria, like the proportion of content

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<sup>3</sup>We thank Joel Waldfogel and an anonymous referee for attracting our attention on this alternative interpretation.

<sup>4</sup>"Another fact of vital importance (...) is that the first newspaper determines readers' expectations in respect of the advertising content, which to some extent and in some situations constitutes one of the attractions for the readers" (Furhoff (1973), p.8). In this statement the "first" newspaper is meant to be the one with the larger readership.

<sup>5</sup>In Europe most European countries are characterized by an oligopolistic newspaper industry each oligopolist representing a specific political image: in France, *Libération* (left) and *Le Figaro* (right), in Italy, *La Repubblica* (left) and *Corriere della Sera* (right), in Spain *Il Mundo* (right), *El Pais* (left), in U.K. the *Daily Telegraph* (right) and the *Guardian* (left),...

devoted to entertainment *vs.* culture, sport *vs.* news, local *vs.* national focus, and so on. In what follows we choose to differentiate newspapers and consumers' tastes according to the political stance criterion, keeping in mind that this choice does not preclude the alternative interpretations. Thus, consumers' tastes are here distinguished one from each other by their preferences over the political views patronized by the newspapers. On the contrary, we assume that the utility of reading an ad is totally independent from the political color of the newspaper reporting it.

Furthermore, a reader can always ignore the ads if he wants to do so. Thus, contrary to what happens for medias like television and radio, ads may not diminish the utility of reading, somewhat supporting the assumption of this theory. The combination of information content and advertisements makes of a newspaper a good with two main characteristics. Buyers are interested in consuming these characteristics rather than the good itself. Thus, it is natural to represent a typical reader, in the political stance interpretation, as endowed with some political opinion, "leftist" or "rightist", say, and with a desire to learn about buying and selling opportunities through reading ads. The importance attached to the political color of the newspaper, however, varies across readers of both camps. To some extent a reader should be willing to accept to read a newspaper of a different political orientation, provided he gets enough benefit from the amount of advertisements to be canvassed in it. Our model tries to reflect the above elements in the simplest possible way, keeping its ingredients as close as possible to the informal set-up of the theory initially proposed by Furhoff.

We find that the conclusions drawn from this informal proposal must be qualified. It is not always true that the circulation spiral leads to the elimination of one of the competitors. Several elements play a role in driving the dynamics of the competitors' market shares, like the intensity of readers' preferences for ads, or the proportions of readers who are leftists and rightists in the readership. We find a necessary and sufficient condition on these magnitudes that governs whether the minority newspaper is able to survive when the circulation spiral evolves, granting that elimination never occurs and that the market shares stabilize at a long-run equilibrium level. The two following sections are devoted to analyze the dynamics of the circulation spiral when being advertising-driven while the third is concerned with the transposition of the same dynamics to the case where the circulation spiral is quality-driven.

## 2 Advertising-driven dynamics

### 2.1 The Model

Consider a population of readers split into two types; the first (respectively second) type consists of all leftist (respectively, rightist) readers and is uniformly distributed on the interval  $[0, 1]$  with mass of readers  $\lambda_1$  (respectively,  $\lambda_2 = 1 - \lambda_1$ ): at each point  $m$  in  $[0, 1]$ , there corresponds a number  $\lambda_i$ , with  $i = 1, 2$ , of similar readers. Accordingly, the total mass of the readership is equal to  $\lambda_1 + \lambda_2 = 1$ . Readers choose their newspaper in accordance with their political preferences and the amount of advertisements included in it. We denote by  $a_i$  the amount of advertisements included in a copy of newspaper  $i$ . For readers of type 1, represented by the point  $m$  in  $[0, 1]$ , the utility for reading newspaper 1 is equal to

$$u_1(1, m) = m + sa_1, \quad (1)$$

while their utility for reading newspaper 2 is equal to

$$u_1(2, m) = sa_2, \quad (2)$$

and similarly for the readers of type 2 represented by the same point  $m$ , with the appropriate change of indices. The parameter  $s$ , identical for all readers, measures the intensity of readers' attraction for advertising. The total number of advertisers is equal to  $A$ ,  $A < 1$ , and each of them has a one unit advertising budget to be allocated between the two newspapers. A larger proportion of this budget allocated to a specific newspaper by one advertiser can be interpreted as a higher informative content, higher frequency over the period, available to the reader in this newspaper with respect to the other. We assume that each of them allocates this unit in proportion to the size of their readership<sup>6</sup>. Therefore we get

$$a_i = \lambda_i A, \text{ for } i = 1, 2. \quad (3)$$

Readers represented by point  $m$  and belonging to type 2 buy newspaper 2 if, and only if,

$$u_2(2, m) = m + sa_2 \geq sa_1 = u_2(1, m),$$

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<sup>6</sup>This behavior corresponds to the choice by an advertiser maximizing the utility of money spent in advertising, when the utility function is given by  $\sqrt{a_1\lambda_1} + \sqrt{a_2\lambda_2}$  subject to the budget constraint  $a_1 + a_2 = 1$ . In that case the solution implies that the  $a_i = \lambda_i$  for  $i = 1, 2$ . Therefore, the aggregate advertising amount in paper  $i$  is equal to  $\lambda_i A$ .

or else,

$$m \geq s(a_1 - a_2). \quad (4)$$

Accordingly, when the number of advertisements in the leftist newspaper exceeds that in the rightist one, the fraction of rightist readers who switch to newspaper 1 has measure  $s(a_1 - a_2)$ , while their mass is equal to  $\lambda_2 s(a_1 - a_2)$ . Obviously, when  $a_2 > a_1$ , this measure is equal to zero and the switch occurs from left to right.

## 2.2 Dynamics

Now we analyze how the readership sizes evolve over time as a consequence of an initial asymmetry in their relative sizes. Without loss of generality, assume that initially the leftist readership exceeds the rightist one, namely,  $\lambda_1 > \lambda_2$ . We shall denote by  $n_1(t)$  and  $n_2(t)$  the readership sizes at time  $t$ , so that  $\lambda_1$  and  $\lambda_2$  are the readership sizes  $n_1(0)$  and  $n_2(0)$  of the two newspapers at time 0.

We suppose that advertisers know these sizes at date 0 and send, before the first issues are printed, their advertisements to the two newspapers, according to the corresponding proportions, namely,  $a_i(0) = \lambda_i A$ . This implies that  $a_1(0) > a_2(0)$ . Due to the insertion of these advertisements into the newspapers, the utility from buying newspaper 1 is increased for both types of readers and some readers decide to switch at date 1 from the rightist to the leftist one, which determines a first change in the readership sizes, namely

$$\begin{aligned} n_1(1) &= \lambda_1 + s\lambda_2 [a_1(0) - a_2(0)] \\ n_2(1) &= \lambda_2 - s\lambda_2 [a_1(0) - a_2(0)]. \end{aligned} \quad (5)$$

Clearly,  $n_1(1)$  is larger than  $n_1(0)$ , while the readership of newspaper 2 gets smaller of the same amount (namely  $s\lambda_2 [a_1(0) - a_2(0)]$ ).

At date 1, advertisers react, before a new issue goes to print, to these new readership sizes so that we get  $a_1(1) = n_1(1)A$ . This engenders again a new switch from rightist readers to the leftist newspaper, at date 2, which determines new readership sizes at time 2 given by the equation

$$\begin{aligned} n_1(2) &= \lambda_1 + s\lambda_2 [a_1(1) - a_2(1)] \\ &= \lambda_1 + s\lambda_2 A [n_1(1) - n_2(1)] \end{aligned}$$

and, obviously,  $n_2(2) = 1 - n_1(1)$ .

More generally, we have

$$a_1(t) = n_1(t)A,$$

so that

$$n_1(t+1) = \lambda_1 + s\lambda_2A [n_1(t) - n_2(t)].$$

Since  $n_2(t) = 1 - n_1(t)$ , we get

$$n_1(t+1) = \lambda_1 + s\lambda_2A [2n_1(t) - 1].$$

This first-order linear difference equation has, as unique solution, the expression

$$n_1(t) = \frac{s\lambda_2A(2\lambda_1 - 1)}{2s\lambda_2A - 1} (2s\lambda_2A)^t + \frac{\lambda_1 - s\lambda_2A}{1 - 2s\lambda_2A}. \quad (6)$$

When  $\beta = 2s\lambda_2A > 1$  holds, the coefficient of the term  $(2s\lambda_2A)^t$  in (6) is strictly positive (recalling that it has been supposed that  $\lambda_1 > \lambda_2$ ). Moreover,  $\beta > 1$  implies that the expression  $\beta^t$  tends to  $+\infty$  when  $t$  tends to  $+\infty$ . Consequently, the trajectory corresponding to the above difference equation diverges to  $+\infty$  when  $t$  goes to  $+\infty$ : the leftist newspaper attracts more and more readers over time, and at an increasing speed, due to the increase in the number of advertisements; at some date, the rightist newspaper readership collapses to zero and the newspaper is eliminated. Now, suppose that  $\beta < 1$  holds instead. Then we have  $2s\lambda_2A < 1$  and the coefficient of the term  $(2s\lambda_2A)^t$  is now negative. Moreover, since  $\beta$  is smaller than one, the expression  $\beta^t$  is decreasing with  $t$  and tends to 0 when  $t$  goes to  $+\infty$ , so that the sequence corresponding to the first term in the difference equation approaches 0 by negative values when  $t$  tends to  $+\infty$ .<sup>7</sup> Finally, the whole expression is increasing with  $t$  and converges to the constant  $n_1^*$ , namely

$$\lim_{t \rightarrow \infty} n_1(t) = n_1^* \equiv \frac{\lambda_1 - s\lambda_2A}{1 - 2s\lambda_2A} \quad \text{and} \quad \lim_{t \rightarrow \infty} n_2(t) = n_2^* = 1 - \frac{\lambda_1 - s\lambda_2A}{1 - 2s\lambda_2A}. \quad (7)$$

where we notice that  $n_2^*$  is always positive, however small is  $\lambda_2 > 0$ , so that there is no minimal initial readership needed to obtain survival. We may summarize the above discussion in the following way. Either  $\beta > 1$  and

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<sup>7</sup>It is easy to check that all terms in the sequence  $\{n_1(t)\}$  are strictly positive because the sequence itself is increasing, so that  $n_1(t) > n_1(0)$ .

the rightist newspaper is necessarily eliminated after some period of time, or  $\beta < 1$  and the market share of the leftist newspaper necessarily converges to the value  $n_1^*$ . Then a natural question arises: can this limit  $n_1^*$  be larger than the total readership size? If the answer is yes, it means that the leftist newspaper becomes a monopolist after some period of time, as conjectured by the theory of the circulation spiral. If, on the contrary, this limit is smaller than the total readership size, then some room is left for the minority newspaper to survive for ever. The next proposition answers this question without any ambiguity.

**Proposition 1** *Both newspapers keep strictly positive market shares over all periods if and only if the "survival condition"*

$$2s\lambda_2 A < 1$$

*is satisfied.*

**Proof :** The necessary part of the proposition has already been proved above: the survival condition has to be satisfied for otherwise the trajectory of  $n_1(t)$  diverges and leads to the elimination of the rightist newspaper. Now let us show that this condition is also sufficient. Suppose on the contrary that the survival condition holds and that the rightist newspaper is eliminated. Under the survival condition, we know that the whole expression in (6) is increasing with  $t$  and converges to the constant  $n_1^*$  in (7) when  $t \rightarrow \infty$ . Since we have assumed that the rightist newspaper is eliminated at the limit, we must have  $n_1^* > 1$ . It is easy to check that this inequality contradicts the survival condition  $\beta < 1$ . Q.E.D.

Notice that, for avoiding the elimination of newspaper 2, the larger is the ad-attraction intensity  $s$ , the lower must be the number of advertisers,  $A$ , all other things being equal. Further, since newspaper 2 is the minority one, we know that  $2\lambda_2 < 1$ , and therefore the inequality  $s < 1/A$  is a sufficient condition for survival.

Figure 1 depicts the trajectory of  $n_1(t)$  in both cases,  $\beta > 1$  and  $\beta < 1$ . The elimination date, denoted by  $t^*$ , is also depicted in figure 1. The exact expression for  $t^*$  can be recovered by setting  $n(t) = 1$  in (6) above (letting  $R = (sA - 1) / (sA(2\lambda_2 - 1))$  one has  $t^* = \ln \beta / \ln R$ ). It can be seen, that  $t^*$  is increasing in  $\lambda_2$ , which indicates that the larger the minority, the longer



the life period for the minority newspaper, even if, finally, elimination is to be the end of the process.<sup>8</sup>

### 3 Quality-driven dynamics

Now we turn to the second interpretation of the spiral. Readers compare the quality of the two newspapers and decide whether to switch from one to the other. The intensity of the preferences for one *type* of newspaper (e.g. the attachment to local news *vs.* national, or to sports *vs.* culture), or the intensity of *brand loyalty*, varies across readers and is represented by a loss,  $m \in [0, 1]$ , which they incur when deprived from their most preferred type. Readers split into two groups; the first (respectively, second) group consists of all readers preferring newspaper 1, (respectively, newspaper 2) when newspaper qualities are identical. Thus newspapers are differentiated into two dimensions, vertically, *via* quality, and horizontally *via* content type. Each group is uniformly distributed on the interval  $[0, 1]$  with mass of readers  $\lambda_1$  (respectively,  $\lambda_2 = 1 - \lambda_1$ ): at each point  $m$  in  $[0, 1]$ , there corresponds a number  $\lambda_i$ , with  $i = 1, 2$ , of similar readers. Accordingly, the total mass of the readership is equal to  $\lambda_1 + \lambda_2 = 1$ . Thus, the heterogeneity across readers within the same group, introduced in the present interpretation, bears on the loss incurred when switching from their most preferred newspaper, while in the first interpretation it was related to the intensity of political preference. We denote by  $q_i$  the quality of newspaper  $i$ . For readers of type 1, represented by the point  $m$  in  $[0, 1]$ , the utility for reading newspaper 1 is equal to

$$u_1(1, m) = q_1, \tag{8}$$

while their utility for reading newspaper 2 is equal to

$$u_1(2, m) = q_2 - m, \tag{9}$$

and similarly for the readers of type 2 represented by the same point  $m$ , with the appropriate change of indices.

Quality depends upon advertising *via* the advertising revenues reinvested in quality enhancements, like the hiring of more, or better qualified, journalists, higher quality of paper, of pictures; or increased richness of content,

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<sup>8</sup>To be precise, the partial derivative of  $t^*$  with respect to  $\lambda_2$  is found to be equal to  $\left[ \ln(R) \frac{1}{\lambda_2} + \left( \frac{2(As-1) \ln(2s\lambda_2 A)}{As(1-2\lambda_2)^2} \right) \right] (\ln(R))^{-2}$ .

increased speed of circulation, improved distribution system, and so on. We assume that the technology relating these investments to quality is summarized by a constant returns technology, namely,

$$q_i = \tau r_i, \quad (10)$$

where  $r_i$  denotes the advertising *revenue* of newspaper  $i$ . We denote by  $R$ , the aggregate advertising budget over all advertisers, with  $R < 1$ . Like in the previous section, each advertiser is assumed to have one unit of advertising budget to be allocated between the two newspapers. Therefore we get

$$r_i = \lambda_i R, \text{ for } i = 1, 2. \quad (11)$$

Hence quality of newspaper  $i$  is given by

$$q_i = \tau \lambda_i R. \quad (12)$$

Readers represented by point  $m$  and belonging to type 2 buy newspaper 2 if, and only if,

$$u_2(2, m) = q_2 \geq q_1 - m = u_2(1, m),$$

or else,

$$m \geq q_1 - q_2 \text{ or } m \geq \tau R(\lambda_1 - \lambda_2) \quad (13)$$

Now we analyze how the readership sizes evolve over time as a consequence of an initial asymmetry in their relative quality. Without loss of generality, assume that the readership of newspaper 1 exceeds that of the other, namely,  $\lambda_1 > \lambda_2$ . As above we denote by  $n_i(t)$  the readership size of newspaper  $i$  at time  $t$ , so that  $\lambda_1$  and  $\lambda_2$  are the readership sizes  $n_1(0)$  and  $n_2(0)$  of the two newspapers at time 0.

Again, at time 0, advertisers place their ads in the two newspapers, according to the corresponding proportions, so that  $r_i(0) = \lambda_i R$ , implying  $r_1(0) > r_2(0)$ . Due to the insertion of these advertisements into the newspapers, the utility from buying newspaper 1 is increased for both types of readers and some readers decide to switch at date 1 from the rightist to the leftist one, which determines a first change in the readership sizes, namely

$$\begin{aligned} n_1(1) &= \lambda_1 + \tau R [n_1(0) - n_2(0)] \\ n_2(1) &= \lambda_2 - \tau R [n_1(0) - n_2(0)]. \end{aligned}$$

Finally, by replacing  $\tau$  by  $s$ , and  $R$  by  $A$ , we get exactly the system of first order difference equations identified by (5) engendering the advertising-driven

dynamics of the previous section. Accordingly all the conclusions derived from that section can be transposed, *mutatis mutandis*, to the quality-driven dynamics considered here.<sup>9</sup>

## 4 Conclusion

We have outlined a bare-bones model of the circulation spiral where, according to the corresponding theory, only the crude forces put in motion by pure demand-side effects are analyzed. Our main conclusion is that the elimination of daily newspapers cannot be explained only by these effects when the survival condition is satisfied. This hinges upon the importance of advertising in the utility function of the readers, and upon the size of the minority readership, lower minorities being better apt to survive, all other things equal. However, when the survival condition is violated, the larger the minority the longer the life of the newspaper representing it. In conclusion, other elements should necessarily be taken into account to ground the circulation spiral theory on firmer roots, and improve the understanding of the concentration phenomena in the daily newspaper markets.

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<sup>9</sup>In the quality-driven dynamics the parameter  $\tau$  is a technology datum, while  $s$  is a utility one.

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