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## Scale Economics, Market Power, and Pricing Behavior Evidence from German Newspaper and Magazine Publishing

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**Scale Economics, Market Power, and Pricing Behavior.**  
**Evidence from German Newspaper and Magazine**  
**Publishing**

by

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# Scale Economics, Market Power, and Pricing Behavior

## Evidence from German Newspaper and Magazine Publishing

Jürgen Weigand\* and Erik Lehmann\*\*

### Abstract

*The anomalous inverse concentration-price relationship observed by some researchers in the newspaper market has been attributed to scale economies. In this paper we suggest that the newspaper's (or magazine's) "double-product" feature (i.e., news supplied to readers and advertising space supplied to advertisers) is the main source of this anomaly. In a simple oligopoly model it is shown how a profit-maximizing publisher takes advantage of that feature. Empirically an inverse concentration-price relationship may arise if double-product pricing is not controlled for. Regression results for a cross-section of 222 German newspapers and magazines corroborate the theoretical implications.*

*Keywords: Scale Economics, Advertising, Concentration, Pricing Behavior*

*JEL classification: D4, L 13, L82*

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## 1. Introduction

Economic theory tells us that oligopolistic market structures are prone to cause higher prices and lower output than less concentrated markets. A huge body of empirical studies has been presented in the literature testing the structure-performance hypothesis across industries or firms. Due to data problems most of the studies had to rely on price-cost margins or some other measure of profitability as indicators of pricing behavior and performance. Only a handful of studies looked at prices directly, starting with George Stigler's famous article "A Theory of Oligopoly" [1964]. Leonard Weiss [1989], weighing own pioneering results and previous findings by other researchers, found overwhelming empirical support for the prediction of standard oligopoly theory, namely that concentration raises price. Yet some anomalies remained, e.g. concerning the newspaper market where monopolization seemingly did not raise prices at all. A bit puzzled Weiss [1989, p. 270] concluded: "Newspapers are clearly a special case. Huge economies of long production runs, the role of circulation in selling advertising, and the importance of at least local ads in selling papers all point to low monopoly prices! ... I don't know of any other unregulated industry that yields anything like that."

This paper tries to cope with that puzzle. It is organized as follows. Section II discusses the peculiarities of the market for newspapers and magazines and briefly reviews the previous literature. In section III we formulate a static profit maximisation model to derive implications about the pricing behavior of a newspaper publisher who caters to readers and advertisers under an oligopoly market structure. Using an unique set of data on 222 German newspapers and magazines for 1997 in Section IV we present regression results which shed light on the impact of economies of scale and scope as well as of market power on cover prices and advertising rates. We close with some tentative conclusions in section V.

## 2. Scale Economies, Competition, and Prices

A key feature of newspaper and magazine production is the existence of a large block of fixed costs. Costs for maintaining printing facilities, editorial staff, news gathering etc. do not vary with circulation. Consequently, a higher circulation leads to decreasing total unit costs (cf. Monopolies and Mergers Commission [1996]). If scale economies are very pronounced the extent of the market crucially limits the number of viable competitors. In the extreme, with unit costs falling over the whole circulation range, a monopolist will have the lowest possible unit costs. This argument is used in the literature to explain and justify the generally observed market structure of only one newspaper publisher per city (see e.g. Reimer [1992]). Monopolization of the (geographically delineated) newspaper market is thus seen as a necessary prerequisite for degression of fixed costs. Due to his cost advantage a monopoly publisher is able to charge lower cover prices and prices for advertising space than publishers under more competitive (e.g. oligopolistic) market structures who have higher unit costs. Competitive pressure from other information and advertising transmitters like TV and radio is expected to force the (local) monopoly publisher to pass cost savings on to readers and advertisers likewise.

However, technical progress not only in printing technology but also in computers and software (e.g. desk top publishing) has been undermining the natural monopoly argument. Norton and Norton [1986] report that due to new technologies medium size US publishers with a circulation of 10,000 to 100,000 units per issue gained market shares in the period 1964 to 1981 while market shares of large scale suppliers stagnated and very small publishers (with a circulation of 5,000 units per issue and less) exited. The importance of fixed cost degression and the need for monopoly may therefore be overstated.

Heinrich [1994, pp. 215-218] analysed the cost structure of German newspapers and magazines using aggregated data due to lacking firm-level data. In 1990 fixed costs of newspaper production (magazine production) amounted to 52.9 (38) percent of total revenues on average, the share of costs that vary with circulation was only about 34 (46) percent. The remaining share fell to miscellaneous costs and gross profit which was 6 (5.3) percent of total revenues. Labour costs amounted to almost 75 (60) percent of total fixed costs. Comparing these aggregated and unweighted averages with the averages of the German manufacturing

sector one can indeed conclude that the fixed cost burden is bigger in the newspaper and magazine publishing industry.<sup>1</sup>

There are at least two reasons why advertising rates, the price charged for standardized space of advertisement (e.g. price of column inch per 1,000 units), should decrease as circulation is raised. First, because of fixed costs unit costs decrease. Second, since the so-called base price for placing an advertisement is observed to rise at a decreasing rate with circulation<sup>2</sup>, the advertisers' willingness-to-pay should decrease, i.e., price-elasticity of demand for advertising space should increase.

Stigler [1964] used a 1939 cross-section of 53 US-cities that had one or two daily newspapers. He found a significant negative relationship between the log of advertising rate and the log of circulation. The estimated coefficient was greater than unity indicating the existence of scale economies. Further, in two-newspaper towns advertising rates were lower than the sample average and higher in one-newspaper towns. In other words, competition from an independent newspaper lowered prices charged for advertising space.

Rosse [1967, 1970], Dertouzos and Trautman [1990] and Reimer [1992] also reported strong evidence of scale economies for differing samples of US daily newspapers. In stark contrast to Stigler, Reimer found monopolization to make advertisers better off. Advertising rates charged by monopoly newspapers were not higher than under (duopolistic) competition. This result is corroborated by the study of Ferguson [1983] who had by far the largest sample at hand (covering 94% of the total daily US newspaper circulation). However, chain ownership of newspapers raised advertising rates significantly, whereas local newspaper-television cross-ownership and competition from independent local broadcast stations lowered rates. On the

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<sup>1</sup> The average firm in German manufacturing in 1990 had a variable costs share of 54 percent, a labour costs share of 24.7 percent, about 10 percent other fixed costs (taxes, interest payments etc.) and 4.3 percent gross profit. Taking the services sector and construction into account the variable cost share increases to 63.3 percent, the labour costs share decreases to 19.2 percent, other fixed costs amount to about 7.7 percent and gross profit drops to 3.5 percent. (Source: Deutsche Bundesbank [1993, pp. 20-23], own calculations)

<sup>2</sup> See Heinrich [1994, p. 290] who reports average base prices and advertising rates for a standard one-page black & white advertisement in 1990. For example, magazines with a circulation of 5,000 to 10,000 charged a base price of DM 2,156 while magazines with a circulation above 500,000 charged DM 27,585. The respective advertising rates (defined as pages sold×base price/circulation) were DM 302.50 and DM 19.50.

contrary, Dertouzos and Trautman [1990] concluded that competition for readers and advertisers resulted from rivaling newspapers, not from broadcast stations. Further, chain ownership had no efficiency enhancing (cost reducing) impact.

In a cross-section regression analysis of Australian magazines Round and Bentick [1997] studied the determinants of price discounts offered to subscribers. The coefficient on the competition variable (number of rivaling magazines in a given title's similar interest category) was positive throughout their four different specifications, and at least highly significant in one specification, implying that magazines compete for readers via subscription prices. Interpreting cover price as a proxy for individual market power they found a positive coefficient which was insignificant in three of four specifications. However, taking market segmentation into account a highly significant negative coefficient emerged in two of four segmentation groups, implying that publishers with market power offer less favorable discounts in these groups.

Summing up, there is sound empirical evidence in the existing literature for price reducing scale economies whereas evidence on the impact of competition and scope on prices is inconclusive.

### **3. Double-Product Pricing and Market Power**

Publishers of newspapers or magazines offer (at least) two distinct, but interrelated products simultaneously and receive revenues from these different sources. Firstly, they sell printed information (or entertainment) to their readership. Secondly, and jointly, they sell the opportunity to advertise. Moreover, these publishers are increasingly real multi-product firms producing more than one title in different market segments like news or lifestyle while, in addition, being strategically diversified into books, TV and/or radio. Pricing behaviour of publishers in a single market segment is then likely to result from some form of joint profit maximization taking advantage of dependent demands between supplied products. For example, cover prices of a magazine in one market segment could be held low and constant even in the case of monopolization to secure a high circulation while cover prices and/or prices charged for advertising are held well above unit costs in other market segments.

To our knowledge, Corden [1953] was the first to study the issue of profit maximisation by a newspaper. The point of analytical interest is that the "amount sold of the first product", the

circulation of the newspaper, "determines the quality of the second", the space offered and demanded for advertising (Corden [1953, p. 183]). Thus the pricing of the two products may be linked, namely by the circulation of the newspaper. Corden's graphical analysis was formalized to some extent by Rosse [1970] and Dertouzos and Trautman [1990] who assumed a publisher operating under a monopolistic or monopolistically competitive market structure. In this paper, however, we will focus on oligopoly to clarify the relationship between pricing behaviour and publisher concentration.

Suppose the publisher produces a single newspaper or magazine. Let  $n$  be the space which is devoted to news in each issue,  $s$  the respective space reserved for advertising, and finally  $v := n + s$  the newspaper's total space. There is no uncertainty with respect to demand and costs, i.e., demand curves of readers and advertisers are known to the publisher. The produced circulation  $q$  can be sold completely. Consider a homogenous oligopoly with  $i = 1, \dots, N$  publishers. A publisher's profit  $\pi$  is then given by

$$(1) \quad \pi_i = p(Q, V)q_i + a(Q, S)s_i - C_i(q_i, v_i) - F_i,$$

where  $p$  is the newspapers' cover price depending on market circulation  $Q := \sum_{i=1}^N q_i$  and total

newspaper space  $V := \sum_{i=1}^N v_i$ ,  $a$  is the base price of advertising being determined by market

circulation (as an indicator of coverage) and total advertising space  $S := \sum_{i=1}^N s_i$ ,  $C$  is variable

costs and  $F$  denotes fixed costs.

Profit is maximised by choice of  $q$ ,  $n$  and  $s$  if the following first-order conditions hold:

$$(2) \quad \frac{\partial \pi_i}{\partial q_i} = p + q_i \frac{\partial p}{\partial Q} \frac{\partial Q}{\partial q_i} + s \frac{\partial a}{\partial Q} \frac{\partial Q}{\partial q_i} - \frac{\partial C_i}{\partial q_i} = 0,$$

$$(3) \quad \frac{\partial \pi_i}{\partial n_i} = q_i \frac{\partial p}{\partial V} \frac{\partial V}{\partial v_i} \frac{\partial v_i}{\partial n_i} - \frac{\partial C_i}{\partial V} \frac{\partial V}{\partial v_i} \frac{\partial v_i}{\partial n_i} = 0,$$



$$(4) \quad \frac{\partial \pi_i}{\partial s_i} = q_i \frac{\partial p}{\partial V} \frac{\partial V}{\partial v_i} \frac{\partial v_i}{\partial s_i} + a + s_i \frac{\partial a}{\partial S} \frac{\partial S}{\partial s_i} - \frac{\partial C_i}{\partial v_i} \frac{\partial v_i}{\partial s_i} = 0.$$

To simplify we may assume Cournot conjectures, i.e.,  $\frac{\partial Q}{\partial q_i} = 1 + \sum_{j=1, j \neq i}^N \frac{\partial q_j}{\partial q_i} = 1$ ,

$$\frac{\partial V}{\partial v_i} = 1 + \sum_{j=1, j \neq i}^N \frac{\partial v_j}{\partial v_i} = 1 \quad \text{and} \quad \frac{\partial S}{\partial s_i} = 1 + \sum_{j=1, j \neq i}^N \frac{\partial s_j}{\partial s_i} = 1. \quad \text{Since} \quad v_i := n_i + s_i, \quad \text{and thus}$$

$$\frac{\partial v_i}{\partial n_i} = \frac{\partial v_i}{\partial s_i} = 1, \quad \text{conditions (3) and (4) can be combined to yield}$$

$$(5) \quad a + s_i \frac{\partial a}{\partial S} = 0.$$

Let us assume  $\partial p / \partial Q < 0$ ,  $\partial p / \partial V > 0$ ,  $\partial C_i / \partial q_i > 0$  and  $\partial C_i / \partial v_i > 0$  leaving open for the moment the signs of the partial derivatives of  $a$  with respect to  $Q$  and  $S$ . After defining

$$\varepsilon_p := -\frac{p}{Q} \frac{\partial Q}{\partial p} > 0 \quad \text{as the cover price elasticity of readership demand,} \quad m_{qi} := q_i / Q \quad \text{as the}$$

$$\text{individual share in total circulation and} \quad C_q := \frac{\partial C_i}{\partial q_i} \quad \text{as marginal costs of circulation equation}$$

(2) may be reformulated as

$$(6) \quad \frac{p - C_{qi}}{p} = \frac{m_{qi}}{\varepsilon_p} - \frac{s_i}{p} \frac{\partial a}{\partial Q}.$$

The left-hand side of (6) gives the Lerner index of selling the newspaper. However, the publisher's ability to price above marginal cost is not determined solely by the price elasticity of demand but also by the partial impact of total circulation on the price of advertising. To develop this partial derivative a little more we can make use of condition (5). Under Cournot conjectures totally differentiating (5) yields

$$\frac{\partial a}{\partial Q} dq_i + 2 \frac{\partial a}{\partial S} ds_i + s_i \left( \frac{\partial^2 a}{\partial S^2} ds_i + \frac{\partial^2 a}{\partial S \partial Q} dq_i \right) = 0.$$

Assuming that, at given advertising demand, more advertising space can only be sold at a lower price,  $\partial a / \partial S < 0$ , and further, for simplicity, that this relationship is linear, i.e.,  $\partial^2 a \equiv 0$ , we have

$$(7) \quad \frac{\partial a}{\partial Q} = -2 \frac{\partial a}{\partial S} \frac{\partial s_i}{\partial q_i}.$$

Moreover, base prices for advertising space are empirically observed to rise with circulation (see above Sec. 2 and footnote 2), so we may assume  $\partial a / \partial Q > 0$ . Since  $\partial a / \partial Q > 0$  and  $\partial a / \partial S < 0$  by assumption,  $\partial s_i / \partial q_i > 0$  in (7). Let  $\varepsilon_a := -\frac{a}{S} \frac{\partial S}{\partial a} > 0$  denote the price elasticity of advertising demand,  $\eta_i := \frac{q_i}{s_i} \frac{ds_i}{dq_i} > 0$  the circulation-elasticity of advertising demand,  $k_i := as_i / pq_i$  the relation of revenues from selling advertising space to revenues from selling the newspaper and  $m_{si} := s_i / S$  the publisher's share in the advertising market. After inserting (7) and the definitions into (6) simple algebraic manipulation yields

$$(8) \quad \frac{p - C_q}{p} = \frac{m_{qi}}{\varepsilon_p} - 2k_i \eta_i \frac{m_{si}}{\varepsilon_a}.$$

We may assume  $0 < \eta_i < 1$ , i.e., demand for advertising space increases in circulation, but at a decreasing rate.<sup>3</sup> Looking at (8), the first term on the right-hand side represents the standard result of Cournot oligopoly, i.e., the publisher's ability to set the cover price above marginal costs is positively related to his market share and inversely related to the price elasticity of readership demand. The interesting point, however, is that market power in selling the

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<sup>3</sup> Advertising space should increase, because a larger number of readers makes the newspaper more attractive for advertisers so that demand for advertising space rises. However, heterogeneity of readers tends to rise as well with the level of circulation, since profiles and boundaries of target groups for advertisers become increasingly diffuse, generating loss of coverage. Further, competition from other suppliers of advertising space may increase, raising the price elasticity of advertisers (see above Sec. II). Advertising space thus can only be extended at a decreasing rate. This assumption is empirically plausible. Within a simultaneous equations framework Dertouzos and Trautman [1990, p.9, table II]) estimated an elasticity of 0.82. See also Heinrich [1994, pp. 212] for informal evidence.

newspaper is not fully exercised due to the existence of a second source of market power. Without revenues from selling advertising space, the publisher would maximise his profit at

$$(8a) \quad \frac{p - C_q}{p} = \frac{m_{qi}}{\varepsilon_p}.$$

In order to sell advertising space publishers choose a higher circulation which, at given readership demand, can be sold only at a lower cover price, for equation (8) implies

$$\frac{p - C_q}{p} < \frac{m_{qi}}{\varepsilon_p}.$$

The more market power a publisher commands in selling advertising space, the lower cover price will be set, all else equal. Market power in selling advertising space depends on a publisher's market share  $m_{si}$ , price elasticity of advertising demand as well as on  $k$ , the relation of revenues from advertising to revenues from selling the newspaper, and on the circulation-elasticity of advertising demand.<sup>4</sup> The pricing behaviour resulting from our model resembles that of the textbook multi-product firm taking advantage of dependent demands arising with complements (cf. Tirole [1988, p. 70]). In the model presented here the existence of a second source of revenues fulfills the same purpose.<sup>5</sup>

Analogous to the standard one-product case (cf. Cowling and Waterson [1976], Clarke and Davies [1982]) supplier concentration can be integrated into (8) (see Appendix A for details). Assuming, for simplicity, a symmetric Cournot oligopoly as well as  $k$  and  $\eta$  to be identical constants for all  $i$  we obtain

$$(9) \quad \frac{p - C_q}{p} = \frac{H}{\varepsilon_p} - \frac{2k\eta}{\varepsilon_a} K,$$

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<sup>4</sup> In 1990, the share of advertising revenues in total revenues was on average 64.8 percent for daily newspapers, 62.8 percent for current affairs magazines and 42.1 percent for general interest titles (Heinrich [1994, pp 209, 284]).

<sup>5</sup> Note, however, that the two products offered by the publisher are not complements from the readers' or advertisers' point of view.

where  $H := \sum_{i=1}^N m_{qi}^2$  is the standard Herfindahl concentration index with respect to the

readership market and  $K := \sum_{i=1}^N m_{qi}m_{si}$  is sort of a Herfindahl index reflecting market share

distribution across both markets publishers cater to.

Equation (9) describes an equilibrium relationship between a publisher's power to raise cover price above marginal costs and publisher concentration. Let  $\varepsilon_p$ ,  $\varepsilon_a$ ,  $k$  and  $\eta$  in (9) be determined exogenously and independently of  $H$ . How does a change in concentration impact on the individual Lerner index? In spite of the simplifications made, there is no clear-cut answer with respect to changes in  $H$ , since

$$(10a) \quad \frac{\partial \left( \frac{p - C_q}{p} \right)}{\partial H} = \frac{1}{\varepsilon_p} - \frac{2k\eta}{\varepsilon_a} \frac{\partial K}{\partial H}$$

cannot be signed unambiguously. With  $k$ ,  $\eta$  and  $\varepsilon_a$  being positive constants the sign of (10a) depends on  $\partial K / \partial H$  which may be positive or negative due to actual market share constellations in both markets.<sup>6</sup> If  $\partial K / \partial H \leq 0$ , the Lerner index in the readership market is positively related to publisher concentration. For  $\partial K / \partial H > 0$  we may also expect a positive impact if  $k\eta \frac{\partial K}{\partial H} \frac{\varepsilon_p}{\varepsilon_a} < 0.5$ . This condition is satisfied for  $\varepsilon_a$  being sufficiently greater than  $\varepsilon_p$ .<sup>7</sup> However, for  $\varepsilon_a < \varepsilon_p$  we may find a negative concentration-price relationship.

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<sup>6</sup> Suppose duopoly markets. Let the initial market share distribution be (0.5, 0.5) in both the readership market and the advertising market. Correspondingly, we have  $H = 0.5$  and  $K = 0.5$ . Now let shares in the readership market change to (0.7, 0.3) while shares in the advertising market remain unchanged. We then observe that a higher concentration in the readership market, namely  $H=0.58$ , does not change  $K$ . However, if we assume an initial share distribution in the advertising market of (0.4, 0.6) instead of (0.5, 0.5), which gives  $K = 0.5$  as well, we will observe a lower  $K$  (0.46) after  $H$  has changed, all else equal. Contrarily, if we assume (0.6, 0.4) instead of (0.4, 0.6),  $K$  is raised to 0.54 by the assumed change in  $H$ . A still more uneven distribution like (0.8, 0.2) will lead to more than a proportional change of  $K$  when  $H$  changes.

<sup>7</sup> Suppose the following parameter constellation:  $k = 0.648$  and  $\eta = 0.82$ , the empirical values reported in footnotes 4 and 5 above,  $\delta K / \delta H = 1$  and  $\varepsilon_p = 2$ . Under these conditions a slightly higher price elasticity of advertising demand, e.g.  $\varepsilon_a = 2.13$ , will suffice to render (10a) positive.

At given market share distribution in the readership market an increase in  $K$ , due to changes of market shares in the advertising market, has an unambiguously negative impact on the Lerner index in the readership market, since

$$(10b) \quad \frac{\partial \left( \frac{p - C_q}{p} \right)}{\partial K} = -\frac{2k\eta}{\varepsilon_a} < 0.$$

The simple model presented here demonstrates that concentration-price relationships in newspaper and magazine publishing may be far more complex due to what might be called double-product pricing than expected. An empirical model ignoring this issue, i.e., starting from eq. (8a) instead of eq. (9), may entail anomalous results because of misspecification. The concentration index concerning the readership market may then also reflect market power exercised in selling advertising space.

With some additional effort the model might be extended to incorporate demand uncertainty in order to highlight the role of subscriptions. Subscriptions ensure a minimum level of sales so that the publisher is able to plan production with greater certainty.<sup>8</sup> From this perspective, cover prices should be lower under more certainty. However, if publishers compete mainly via subscriptions cover prices might be raised or held at high levels to have leeway for high subscription discounts which may be a good incentive for readers to subscribe or renew a subscription. Moreover, with high subscriptions there is only a relatively small and fluctuating residual readership. High cover prices may then be used as a signalling device for quality of content. For advertisers a larger number of subscribers means a higher opportunity to reach readers. Newspapers or magazines that have a higher subscriber rate should therefore have a higher demand for advertising space and, at a given circulation, a higher advertising rate.

#### 4. Data and empirical results

The discussion in section II and the theoretical model presented in section III leads to the following hypotheses for our empirical investigation.

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<sup>8</sup> See also Glazer and Hazin [1982].

1. Since scale economies are pervasive a higher circulation leads to lower cover prices and advertising rates, (cf. sec. II, Stigler [1964], Rosse [1967, 1970], Dertouzos and Trautman [1990], Reimer [1992])
2. Chain ownership (multi-title publishing) enhances market power and thus raises prices, (cf. sec. II, Ferguson [1983])
3. The impact of concentration, as a measure of oligopolistic market power, on the price of advertising should be positive. The respective influence on cover price may be either positive or negative. It should be positive, however, if double-product pricing is controlled for (cf. model in sec. III).
4. A high (absolute or relative) number of subscriptions raises demand for advertising space and, at a given circulation, the advertising rate. The impact on cover price cannot be signed unambiguously. (cf. sec. III)

To test these hypotheses a data set is used that comprises 222 German newspapers and magazines which have a national coverage and a circulation of 100,000 or more units per issue in 1997.<sup>9</sup> More than half of those titles are published monthly, more than a quarter weekly. Though we identified 72 different publishers, 54.5 percent of all sample titles and 73.2 percent of the total sample circulation are accounted for by only nine publishers. Four of these leading publishers are media giants with diversification into TV and annual revenues of more than DM 1,500 Mio (see Appendix B, Tables A-1 to A-3 for details).

Following the standard classification of the Arbeitsgemeinschaft Media-Analyse (AG Media-Analyse [1993, pp. VIII]) the sample titles can be grouped into 16 homogenous market segments or similar interest categories ranging from daily newspapers, current affairs magazines, sports magazines to women's magazines and special interest titles like home and gardening (cf. Appendix B, Table A-4). It was possible to calculate the cumulated share of the leading three publishers (C3) in total circulation in each of these categories. The concentration ratio is supposed to measure the strength of competition for readership in the respective

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<sup>9</sup> All titles marketed nation-wide with cover price > 0 are included. We did not consider membership magazines, for which we have data on advertising rates, because they are not sold. Individual data on titles with lower circulation and regional distribution were not available.

category. Unfortunately, we do not have any concentration data with respect to the advertising market yet.<sup>10</sup>

To allow for comparability of prices charged for advertising space across the heterogeneous sample we use the price of an ad supplement (ad special with a weight up to 25 gram) per 1,000 units. We will call this variable the advertising rate (ADV). We take the cover price per issue (PRICE) as the relevant price for the readership.<sup>11</sup> Since there are no individual cost data available, we use total circulation per issue (CIRC) as a proxy variable for scale economies assuming that unit costs of production decrease in circulation. Subscriber circulation (SUB) may stand for certainty in planning production as well as for the opportunity of advertisers to reach readers.

Market segmentation and the occupation of niches is a special feature of the market for magazines. We have 16 similar interest categories that differ in part decisively by content, layout, print quality, and price. In principle, we could integrate product differentiation in our empirical model by assigning a binary variable to each group. However, the number of variables would rise considerably reducing the degrees of freedom for estimating parameters of interest. Thus we aggregated the 16 segmentation groups into four groups that may account for differing informational demands of readers (cf. Appendix B, Table A-4). Group 1 (NEWS) represents daily newspapers (like *Frankfurter Allgemeine Zeitung*) and current affairs magazines (like *Der Spiegel*) which cover politics, international affairs etc. Group 2 (KNOW HOW) comprises magazines which require a specific knowledge base (electronics, photography, computers, arts, science, business and finance). Group 3 (WOMEN & LIFESTYLE) includes magazines which have specialized on topics relating to women, teenagers, erotic or lifestyle (like *Playboy*). Each group is represented by a dummy variable

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<sup>10</sup> We are currently collecting more detailed data on each title in the sample concerning space devoted to news and advertising per issue. Aggregating these data in each market segment will give us at least a lower bound of total space devoted to news and advertising so it might be possible to include a concentration index with respect to advertising space in future research.

<sup>11</sup> Cover prices are reported to be very sticky (see the discussion in Round and Bentick [1997]), even over longer stretches of time, but for German newspapers Heinrich [1994, p. 221] shows that cover prices as well as subscriber prices increased in the period 1980-1990 significantly more than the consumer price index. Unfortunately, we have not managed yet to collect comparable subscription rates for the greater part of our sample. Analysis of pricing behavior via offering subscription discounts has to be left for future research.

that takes the value of one if a certain title belongs to the group, otherwise its value is zero. These three groups will be tested against the remaining magazines, our control group (REST), that focus on topics like TV guiding, home and gardening, sports etc.

Chain ownership or multi-title publishing may entail economies of scope resulting from lower overhead costs (due to sharing joint inputs in printing, distribution, newsgathering, management etc.) and lower risk premiums if they are strategically diversified into different market segments. However, occupying different market segments can enhance market power by depriving readership of an independent supplier. We constructed a dummy variable (SCOPE) which takes unit value if the respective title is published by a multi-title publisher, otherwise it has zero value. As multi-title publisher we defined one who operates in more market segments than the median publisher and/or produces more titles. The median publisher in our sample offers six titles in three different market segments. Summary statistics of the defined variables are given in Table I.

**Table I**  
**DATA STATISTICS**

Variable	Mea n	Std.d. ev.	Media n	Max	Min
Advertising Rate (ADV) (in DM)	131.8	41.1	120.0	300.0	56.0
Cover Price (PRICE) (in DM)	5.5	3.3	5.0	20.0	1.1
Circulation (CIRC)	371	489	182	2745	27
	984	316	023	469	611
Subscribers (SUB)	88	167	33	1420	372
	397	547	133	869	
Concentration (C3) (per cent)	61.1	13.4	55.9	88.9	39.1
Titles per Publisher	11.6	11.01	6	30	1
Market Segments per Publisher	4.6	3.6	3	11	1

*Sources:* see Appendix A

In the first part of our regression analysis we estimate the coefficients of the following log-linear base models by OLS

$$(11) \quad \log ADV = a + b_1 \log C3 + b_2 \log CIRC + u,$$



$$(12) \quad \log PRICE = a + b_1 \log C3 + b_2 \log CIRC + u.$$

Taking each equation for its own and ignoring possible double-product pricing the empirical models (11) and (12) can be interpreted as plausible ad hoc specifications implied by the standard structure-performance framework. The base models are extended in further specification trials by the variables log SUB and SCOPE as well as the target group variables NEWS, KNOW HOW and WOMEN & LIFESTYLE. Results are shown in Table II.

**Table II**  
**DETERMINANTS OF COVER PRICE AND ADVERTISING RATE**  
**IGNORING DOUBLE PRODUCT PRICING**

Independent Variable	OLS Estimation			
	<i>Dependent Variable: log ADV</i>	<i>log PRICE</i>	<i>log PRICE</i>	<i>log PRICE</i>
	(i)	(ii)	(iii)	(iv)
log C3	0.218*** (3.12)	0.100* (1.71)	-0.181 (1.07)	- 0.357** (2.55)
log CIRC	- 0.096*** (6.07)	- 0.112*** (5.29)	- 0.350*** (11.85)	- 0.419*** (10.01)
log SUB		0.042*** (3.23)		0.134*** (5.11)
SCOPE		0.094** (2.80)		0.143** (2.14)
NEWS		0.161** (2.12)		- 0.350*** (2.64)
KNOW HOW		0.223*** (4.99)		0.417*** (5.19)
WOMEN & LIFESTYLE		- 0.101** (2.17)		-0.043 (0.58)
<i>Constant</i>	6.124*** (29.18)	5.763*** (27.08)	5.719*** (14.40)	4.985*** (11.69)
adj. R2	0.121	0.334	0.364	0.528

*Heteroscedasticity-consistent absolute t-values (White) in parantheses;*

\* (\*\*, \*\*\*) 90 (95, 99) %-significance level (two-tailed test)

First look at the advertising rate regressions (columns i and ii). As expected from our discussion in section II, we observe a significantly negative impact of circulation on the advertising rate. Scale economies of larger circulation allow for lower advertising rates. The coefficient, which gives the elasticity of the advertising rate with respect to circulation, is clearly smaller than unity, i.e., advertising rates fall at a decreasing rate with increasing circulation.

The coefficient on concentration is significantly positive in each specification. In accordance with oligopoly theory a higher combined market share of the largest three publishers in the respective market segment raises advertising rates. Adding subscriptions, scope and the target group variables improves the fit of the model. The impact of concentration, however, is reduced to more than half. Both scope and subscriptions affect advertising rates positively and significantly. We attribute the price raising effect of chain ownership, also found by Ferguson [1983], to enhanced market power.<sup>12</sup> The positive coefficient on subscriptions supports the hypothesis that the demand for advertising increases in the guaranteed number of readers, since the opportunity to reach readers increases.

Market segmentation leads to discrimination of advertising rates. Compared to our heterogeneous control group REST advertising rates are significantly higher in the NEWS and KNOW HOW groups and significantly lower in WOMEN & LIFESTYLE. NEWS and KNOW HOW groups have a clientele with salient features well-known to advertisers.<sup>13</sup> Titles from these groups are especially attractive for advertisers. For a more precise coverage they are willing to pay higher prices for advertising space. On the contrary, the profile of readers in WOMEN & LIFESTYLE is much more diffuse and losses of coverage are greater.

Now look at the cover price regressions (columns iii and iv) which display the most interesting result in Table II. Concentration is found to have a negative impact on cover price. This effect is highly significant in the extended model specification. Here we meet with the

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<sup>12</sup> Alternatively, we defined SCOPE to be one if the publisher produces more than one title, and to be zero for a single-title publisher. Instead of using a binary variable, we also took the total number of titles produced by each publisher as a proxy for scope. In both cases, the estimated coefficients used to be positive throughout the various regressions without ever reaching conventionally assumed significance levels.

<sup>13</sup> Research by AG Media-Analyse [1993] shows that these groups have a readership with relatively high household income, a high share of white collar workers holding senior positions and a high coverage (readers per page).

sort of anomaly Weiss [1989, p. 270] had wondered about. The other coefficients have the expected signs. A higher circulation allows for lower cover price, whereas a larger number of subscribers raise cover price. Again, as with advertising rates, the coefficient on SCOPE is positive. Cover prices are significantly lower in the NEWS group and significantly higher in the KNOW HOW group than in our control group. This pattern is very plausible when recalling that today's news is old news tomorrow, while information transmitted in the KNOW HOW group has a different quality and does not become obsolete so fast. The fit of the model is relatively good for a cross-section analysis. To get a better picture of the impact of concentration we re-estimated the model for each of the informational segmentation groups and the control group separately. Table III contains these results.

**Table III**  
**SUBSAMPLE REGRESSION RESULTS FOR THE COVER PRICE EQUATION**

<i>Independent Variable</i>	<i>Informational Segmentation Groups</i>			
	NEWS	KNOW HOW	WOMEN & LIFESTYLE	REST
log C3	-0.980 (1.61)	0.416* (1.69)	0.990*** (3.01)	-0.519*** (3.21)
log CIRC	-0.069 (0.34)	-0.046 (0.33)	-0.501*** (7.25)	-0.495*** (11.29)
log SUB	0.038 (0.22)	-0.052 (0.65)	0.184*** (5.48)	0.147*** (4.57)
SCOPE	-0.151 (0.88)	0.355*** (2.77)	0.164 (1.44)	0.074 (0.84)
<i>Constant</i>	-0.567 (0.51)	3.272*** (3.03)	6.165*** (8.34)	5.694*** (12.57)
adj. R2	0.118	0.128	0.430	0.619
F (zero slopes)	1.67	2.43*	12.85***	40.05***
N	22	40	63	97

Heteroscedasticity-consistent absolute t-values (White) in parentheses;

\* (\*\*, \*\*\*) 90 (95, 99) %-significance level (two-tailed test)

Due to the small number of observations coefficient estimations in the NEWS and KNOW HOW group are not very reliable with respect to t-values and F-statistics, whereas the coefficients in WOMEN & LIFESTYLE and in the control group could be estimated very

precisely. Nevertheless, concentration seems to have a totally different impact on cover prices depending on the market segment that is analysed. Cover prices are raised significantly by concentration in WOMEN & LIFESTYLE and also in KNOW HOW. In the NEWS group and in the REST group we find a negative impact that is highly significant in the latter.

The theoretical model presented above highlighted the issue of double-product pricing which entails an interrelated influence of market share distributions in both markets on pricing behaviour in the readership market. To cope with double-product pricing we estimate the following regression model

$$(13) \quad \log PRICE = a + b_1 \log C3 + b_2 \log CIRC + b_3 \log C3 \times \log ADV + u,$$

where the interactive variable  $\log C3 \times \log ADV$  is supposed to control for interrelated market power effects. Partial derivation of (13) with respect to concentration reveals the direct and indirect effects of concentration on cover price

$$(14a) \quad \frac{\partial \log PRICE}{\partial \log C3} = b_1 + b_3 \times \log ADV.$$

The influence of market power in the advertising market on the concentration-cover price relationship is given by the cross partial derivative

$$(14b) \quad \frac{\partial \log PRICE / \partial \log C3}{\partial \log ADV} = b_3.$$

The theoretical model (cf eqs. 9, 10a,b) predicts that at given publisher's market power towards advertisers and given costs (proxied by  $\log CIRC$ ), cover price should be positively related to concentration in the readership market (proxied by  $\log C3$ ). This relationship, however, may be weakened and possibly reversed due to double-product pricing by market power in the advertising market (proxied by  $\log ADV$ ). In case of double-product pricing we would thus expect to find empirically  $b_1 > 0$  and  $b_3 < 0$ . Table 4 presents the results of estimating (13) and its variants. Column (i) gives the results for equation (13) while column (ii) refers to the extended model. To check for possible simultaneity bias in column (iii) we have applied an instrumental variable (IV) approach which treats the advertising rate as

endogenously determined by the set of exogenous variables log C3, log SUB, SCOPE, NEWS, KNOW HOW and WOMEN & LIFESTYLE.<sup>14</sup>

**Table IV**

**DETERMINANTS OF THE COVER PRICE UNDER DOUBLE-PRODUCT PRICING**

OLS and Instrumental Variable (IV) Estimation

<i>Independent Variable</i>	(i) OLS	(ii) OLS	(iii) IV
log C3	5.342*** (6.06)	3.234*** (3.41)	7.664* (1.88)
log CIRC	-0.301*** (10.55)	-0.378*** (8.75)	-0.306*** (4.77)
log C3 × log ADV	-1.171*** (6.34)	-0.754*** (3.74)	-1.682* (1.99)
log SUB		0.115*** (4.04)	0.087** (2.19)
SCOPE		0.101 (1.52)	
NEWS		-0.381*** (2.91)	-0.448*** (3.07)
KNOW HOW		0.353*** (4.29)	0.247** (2.23)
WOMEN & LIFESTYLE		-0.004 (0.05)	
<i>Constant</i>	5.045*** (13.01)	4.672*** (11.10)	4.122*** (7.86)
	adj. R2	0.443	0.555
			-

Heteroscedasticity-consistent absolute t-values (White) in parantheses;

\* (\*\*, \*\*\*) 90 (95, 99) %-significance level (two-tailed test)

The theoretical predictions are fully borne out by the estimation results. Concentration has now a significantly positive impact on cover price throughout. The coefficient of the interaction variable is significantly negative in all specifications. The total partial impact of concentration, given by (14a) is negative in each specification.<sup>15</sup> Sign patterns and

<sup>14</sup> To satisfy the rank order condition for identification SCOPE and WOMEN & LIFESTYLE have been dropped from the cover price equation.

<sup>15</sup> Inserting the estimated coefficients into (14a) and evaluating  $\log ADV$  at its sample mean  $\log 131.8 = 4.88$  yields a combined partial effect of -0.372 in (i), -0.446 in (ii) and -0.544 in (iii).

significance levels of the other coefficients remain unchanged, except for SCOPE which is insignificant now.

## **5. Conclusion**

Leonard Weiss was right. Newspapers are really a special case. The peculiarity of newspaper and magazine publishing lies in the fact that a publisher caters to two different demands simultaneously, i.e., readers' demand for news or entertainment and advertisers' demand for advertising space. Selling news to the readership is intertwined via circulation with selling advertising space to advertisers. As the foregoing research suggests, pricing behaviour is affected by this peculiarity resulting in what we have called double-product pricing.

Under double-product pricing cover prices are influenced by the extent of a publisher's market power in supplying advertising space. Without market power in selling advertising space a publisher's ability to set cover price above marginal costs depends solely on the market structure in the readership market (e.g. concentration, scale economies) and on the price elasticity of readership demand, as predicted by standard oligopoly theory. Market power in selling advertising space opens up the possibility to "subsidize" cover prices. Compared with the one-product case under double-product pricing cover price may be set the lower the more market power the publisher can exercise in the advertising market. Even pricing below marginal costs to drive smaller competitors out of the readership market may be profit maximizing if the share of revenues from selling advertising space in total revenues is comparably large.

If double-product pricing is not controlled for in empirical studies one may find an inverse concentration-price relationship and conclude erroneously that monopolization is beneficial because of lower cover prices. The theoretical and empirical results presented in this paper suggest, however, that the detrimental impact of monopolization may simply arise in the advertising market instead. Advertising rates were found to rise with concentration and also with the extent of multi-title publishing. Moreover, after controlling for double-product pricing a cover price-raising direct impact of concentration turned up as well. Thus by taking account of the double-product peculiarity standard oligopoly theory suffices to solve the puzzle of an inverse concentration-price relationship in newspaper and magazine publishing. Further, our empirical results confirm the findings of Stigler and others regarding the price-reducing impact of scale economies.

## Appendix A

Multiplying both sides of text equation (8) with  $m_{qi}$  and aggregating over  $i$  yields

$$(i) \quad \frac{p-c}{p} = \frac{\sum_{i=1}^N m_{qi}^2}{\varepsilon_p} - \frac{2}{\varepsilon_a} \sum_{i=1}^N k_i \eta_i m_{qi} m_{si},$$

where  $c := \frac{1}{N} \sum_{i=1}^N c_i$  is average marginal cost. For a more compact representation of (i) define

$H := \sum_{i=1}^N m_{qi}^2$  as the Herfindahl index with respect to the readership market and, assuming  $k$  and

$\eta$  to be identical constants for all  $i$ ,  $K := \sum_{i=1}^N m_{qi} m_{si}$  as an index reflecting market share

distribution across both markets publishers cater to. Inserting these definitions into (i) yields

$$(ii) \quad \frac{p-c}{p} = \frac{H}{\varepsilon_p} - \frac{2k\eta}{\varepsilon_a} K.$$

Define the left-hand side of (8) as  $L_i := (p - C_q)/p$  and the left-hand side of (ii) as

$L := (p - c)/p$ . Solve both definitions for  $p$  and eliminate  $p$  by equating to obtain

$$L_i = 1 - (1 - L) \frac{C_q}{c}.$$

Now replace  $L_i$  by  $(p - C_q)/p$  and  $L$  by the right-hand side of (ii) to obtain

$$(iii) \quad \frac{p - C_q}{p} = 1 - \left( 1 - \frac{H}{\varepsilon_p} + \frac{2k\eta}{\varepsilon_a} K \right) \frac{C_q}{c}.$$

Assuming a symmetric Cournot oligopoly,  $C_q = c$ , leads from (iii) to text equation (9).

## Appendix B

### *Data Sources*

Data on advertising rates, total circulation, subscriber circulation, issue frequency and affiliation to similar interest groups (market segmentation) were kindly provided to us by the Deutsche Post AG. Own research was necessary to find out cover price and publisher for each title in the sample as well as concentration in the similar interest groups.

### *Supplementing Tables*

**Table A-1**

**PUBLICATION FREQUENCY – SAMPLE DISTRIBUTION**

Publication frequency	Number	%
daily	7	3.1
weekly	59	26.6
biweekly	20	9.0
monthly	117	52.7
quarterly	18	8.1
biannual	1	0.5
Total	222	100



**Table A-2**  
**SAMPLE TITLES AND PUBLISHERS**

Publisher	Titles (Total=222)	Cumulated Share in Sample Titles	Cumulated Share in Sample Circulation	Different "similar interest categories" (Total=16)
Heinrich Bauer Verlag KG	30	13.5	27.8	9
Gruner + Jahr AG	27	25.6	37.8	11
Axel Springer AG	16	32.8	53.9	7
Verlagsgruppe Burda	12	38.2	62.1	5
Jahreszeiten-Verlag	9	42.3	65.0	5
Motor Press Stuttgart	9	46.4	69.9	2
Mediengesellschaft mbH	7	49.6	69.6	3
Gong Verlag	6	52.3	72.7	3
Verlagsgruppe Milchstraße	5	54.5	73.2	4
8 Publishers	4	67.1	84.3	2*
5 Publishers	3	73.8	87.3	3*
9 Publishers	2	81.9	89.5	2*
41 Publishers	1	100	100	1

\* Median

**Table A-3**  
**THE BIGGEST GERMAN PUBLISHERS OF NEWSPAPER AND MAGAZINES**

Publisher	Relevant Shareholders (shares in percent)	Revenues <sup>1</sup>	
		Advertising	Circulation
Gruner + Jahr AG <sup>2,3</sup>	Bertelsmann 74.9, Jahr-Group 25.1	1,210.8	199.8
Bertelsmann <sup>2,3</sup>	Bertelsmann-Foundation 68.8	988.2	n.a.
Burda Group <sup>2,3</sup>	Dr Hubert Burda	892.1	181.7
Axel Springer AG <sup>2,3</sup>	Kirch-Group 40.05	746.9	124.0
Heinrich Bauer Verlag <sup>2,3</sup>	Bauer (family)	554.3	231.5
Spiegel-Verlag	Gruner + Jahr AG 24.75	441.3	25.1
Jahr-Group	Jahr (family)	347.7	n.a.
Verlagsgruppe Milchstrasse	Burda (via BRV Burda Rizolli 80.0)	321.2	37.1
Vereinigte Motor-Verlage	Vogel Medien-Group 40.0 Gruner + Jahr AG 15.0	276.0	39.0
Kirch-Group	Dr Leo Kirch and family	261.3	n.a.
Holtzbrinck	von Holtzbrinck (family)	181.6	n.a.
Vogel Medien-Group	Vogel (family)	145.1	17.8

<sup>1</sup> from newspapers and magazines only, in Mio. DM

<sup>2</sup> diversification into TV

<sup>3</sup> total revenues in 1996 DM 1,500 Mio and more

Sources: Media & Marketing [1997] (ownership structures, advertising revenues), own calculations (revenues from circulation).

**Table A-4**  
**TITLES AND INFORMATIONAL SEGMENTATION GROUPS**

Group	titles	Homogenous sub-group	titles
NEWS	22	newspapers	10
		current affairs magazines	12
KNOW HOW	40	electronics, foto, video, music	9
		arts, science	8
		computers, software	14
		business & finance	9
WOMEN & LIFESTYLE	63	women	44
		teenage	10
		lifestyle	9
REST (Control Group)	97	TV guides	14
		home & gardening	21
		health	9
		motoring	19
		sports	20
		tourism & travel	7
		animals	7
222		222	

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