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Magazines and their Companion Websites: Competing Outlet Channels?

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Abstract

This paper provides empirical evidence for the widespread belief that a magazine's companion website induces channel competition on its print version. The analysis is based on aggregated quarterly magazine-specific data on circulation, a broad variety of magazine characteristics, consumer characteristics and information on a magazine's website presence.

The data spans the period I/1996 to IV/2004. Nested logit-type models of demand for differentiated products are used in the empirical analysis. A main result of this paper is that magazines that run an online companion on average lose 4.2 percent of their potential consumers. This effect varies substantially across different consumer age groups and across time.

KEYWORDS: differentiated product demand models, magazines, GMM, consumer characteristics

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1. Introduction

It is widely believed among industry participants that the internet is cannibalistic to print media. Despite that fear, many magazines have recently started to launch companion websites that make some, but not all, of the print version content available online. That led an analyst at J.P. Morgan, cited in "The New York Times", to claim that "Newspapers are cannibalizing themselves."[1] In April 2005, "Der Spiegel", Germany's leading news magazine, published a very sceptical article about the future of print media — ironically on its companion website — with the suggestive title "Too much to die, too little to survive". Pessimistic views on the relationship between magazines and the internet are quite time invariant. Already in 1997, Hickey (1997, p. 38) cites the Vice President of the media consultancy Jupiter Media Metrix who is reported to have said: "Seize the day! Either you are going to cannibalize yourself or somebody else is going to cannibalize you."

This paper analyzes whether such a "channel competition" or "channel conflict" between the virtual and the real product exists.[2] Going beyond existing research, I study to what extent companion websites matter in what particular readership segments. I use quarterly aggregated data on German women's magazines market observed between 1995 and 2004 to draw inference about of the effects of companion websites on circulation. My data is unique in the sense that it contains information on both magazines characteristics, like total circulation, magazine contents or price, and information on consumer characteristics, in particular consumer age. Nested–logit type models for the demand for differentiated products are employed in the analysis. A magazine's circulation relative to total market is the dependent variable which is related to observed magazine characteristics like price and website presence.

Magazines are, at least in principle, ideal goods that can be distributed online. Their online distribution is associated with a low outlay and they are frequently purchased. Shapiro and Varian (1999) point out that channel competition might indeed be more imminent when information products are delivered online. Magazines — and even more so women's magazine — are, however, presumably consumed for hedonic rather than information reasons, while newspapers clearly come closer to being an information product.

While the expert evidence cited above is pessimistic about the way websites affect print media demand, there are at least two main ways in which companion websites could actually have a positive effect on magazine demand:

[1] Cited by Seelye (2005).

[2] See Alba et al. (1997), Brynjolfsson and Smith (2000), Coughlan et al. (2001) and Peterson et al. (1997) for more detailed discussions of channel competition between the Internet and real markets.

(i) *"awareness"* and (ii) *additional service*. Companion websites generate *awareness* for the print version by allowing consumers to "sample", i.e. to get an idea about a magazine free of charge. Websites may, for example, attract a more technology savvy readership than the print version (Barsh et al. 2001; Joukhadar 2004; Matlick 2005; Nicholson 2001). All magazines in my data offer a preview or at least a table of contents of the current or forthcoming print version, so that prospective consumers can learn about the current print edition.[3] Existing studies, like Barsh et al. (1999) and Silk et al. (1999), point out that a key factor determining the relationship between "real" and "virtual" versions of a print medium is the *additional service* that companion websites can provide. All women's magazine websites, for example, allow for "community building" through online discussion groups and online chats, an issue that has recently been underscored by a Wall Street Journal article about a particular niche magazine (Matlick 2005). Such service clearly complements the hard copy version of the magazines as discussed by Peterson et al. (1997) in a general context and by Pauwels and Dans (2001) for the case of print media. One obviously important kind of additional service is online subscription as discussed by Capell (2004) and Barsh et al. (2001).[4]

If the companion website, by contrast, just contains "shovelware", e.g. print contents are turned into online content without further editing, substitutablity problems are more likely to arise.[5]

This paper restricts attention to German women's magazines. It does so because German media data is particularly rich in content and externally audited. The women's magazine market is the hardest fought market segment in Germany.[6] My data covers the entire German women's magazine market. The first German women's magazine went online as early as in the spring of 1996. Two directly competing magazines followed the same year. By the end of 2004, 15 women's magazines out of a total of 41 magazines active in the market

[3] Such sampling effects are at the core of an analysis of record sales and music downloads by Oberholzer–Gee and Strumpf (2004).

[4]The importance of online subscription is also underscored by Bernd Ziesemer, editor–in–chief of "Handelsblatt", a German daily specialized on economics and business matters, who argued during a round–table discussion hosted by the German Federal Ministry of Education and Research that "most websites are run at a loss. In certain areas, for example in online subscription, website provision actually pays off."

[5]Note that I, unlike the existing studies by Deleersnyder et al. (2002), Pauwels and Dans (2001) and Simon (2005), do not observe the companion websites' characteristics. There is no data archive in Germany that allows me to track websites back to their launching date.

[6]In 2004, 41 women's magazines titles were published, more than twice as many as in the second most densely populated segment, TV magazines. Market concentration, as measured by the Hirshman–Herfindahl index, is much lower in women's magazines than in any other segment, and this is true both in the magazine demand dimension and in the advertising demand dimension.

maintain their own website. Access to the companion websites considered is free of charge.

The German womens's magazine market is quite relevant on a global scale: it is the second largest women's magazine market in the world according to FIPP (2004), just as the German magazine market is the world's second largest. Five out of the magazines I study are ranked in FIPP's worldwide Top 50 for women's magazines.

My estimation results show that the effect of companion websites on circulation varies substantially across time and readership age. The average effect of companion website on on market shares is -4.2 percent (standard error 1.4 percent). This finding is consistent with existing studies by Filistrucchi (2005) for Italian newspapers, who finds a market share decrease of 3.2 percent, and Simon (2005) for US magazines, who finds a cannibalization effect of 2.5 percent.

My estimation results indicate that the cannibalization effect is largest for readers between 40 and 49 years of age as well as for readers between 50 and 59 (6.1 percent and 6.3 percent, respectively), followed by readers aged 14 to 19 years (5.2 percent) and readers in the age range of 30 to 39 years (3.5 percent). There are are no significant companion website effects for the other age groups.[7]

Even though the average website effect is negative, there is substantial variation across time. Cannibalization effects were largest in 2001, when the growth rate of the share of magazine readers that regularly use the internet peaked. It lost momentum since then. There are no statistically significant average effects of companion websites on market shares in 2004. For some age groups, in particular for the 20 to 29 years old, the 30 to 39 years old and the 60 to 69 years old, the website effect for 2004 is even positive and statistically significant. It is statistically negative, but smaller than in 2001, for the age group 40 to 49 years. The overall effect of companion websites on magazine sales hence hinges upon the consumer structure and when a companion website is launched.

My estimation results also provide evidence for dynamic effects of companion website on circulation: even though the contemporaneous effect of having a website is negative in all specifications, lagged effects are either negative but smaller in magnitude or even positive. This indicates that the longer a website is maintained, the smaller the negative effect of channel competition is.

[7]The estimation results in fact indicate a 23.7 percent market share increase for consumers above 70 years of age which is unreasonable. The specification for the above 70 years old is implausible in general, since the estimation results also indicate a *positive* effect of cover prices on market shares. This is why results for the oldest age group are not discussed hereafter. Corresponding estimation results are, however, presented for completeness in the results tables. One reason for these implausible results may be that individuals in the oldest age groups are particularly heterogeneous with respect to, for example work status, health, income and internet adoption, while my empirical model does not properly account for such heterogeneity.

A final interesting finding is that there are statistically highly significant negative effects of *competitor's* website presence on own market shares. This implies that there are not only channel competition effects between virtual and real products of the same magazine but also between virtual and real products of competing magazines.

2. Existing studies

There are two groups of existing empirical studies that deal with outlet competition on print media markets. The first group uses time series econometric methods. The second group uses structural microeconometric models.

To start with the former type of approaches, Deleersnyder et al. (2002) test for structural breaks in monthly circulation time series of 67 daily newspapers from Great Britain, observed between January 1990 and June 2001. The authors find that few newspapers experience a drop in circulation due to the existence of a companion website. The effects are, however, disperse and economically fairly small.

Similarly, Pauwels and Dans (2001) analyze twelve Spanish newspapers using tests for unit roots and cointegration. Their data covers the period 1997 to 1999. The main finding of that paper is that circulation increases digital visits. The author do, however, omit to analyze reverse causality.
Table 1 summarizes the approaches and results of existing studies.

Table 1. Summary of existing studies

Study	Period	Market	Empirical approach	Finding
Delersnyder et al.	1990--2001	newspapers from UK and the Netherlands	time--series; tests for structural breaks	neg. effects of web--sites on circulation
Filistrucchi	1976--2001	Four leading Italian national newspapers	microeconometric; structural demand model	neg. and large effects of online companion on circulation
Gentzkow	2000--2003	Washington Post and Washington Times	microeconometric; structural demand model	neg. but small effects of online companion on circulation
Pauwels and Dans	1997--1999	Spanish newspapers	time serires; tests for unit roots and co--integration	pos. Effects of circulation on website traffic
Simon	1996--2001	US consumer magazines	microeconometric; lienar demand model	neg. and large effects of online companion on circulation

Substantial differences exist between microeconometric studies, both with respect to methodology and results. Gentzkow (2003) uses consumer survey and media consumption data for 16,171 adults from Washington D.C. and the period 2000 to 2003. His main finding for the "Washington Post" and the "Washington Times" is that print and online editions of the same newspaper are weak substitutes.

Highly significant and negative effects of 3.2 percent of website presence on the demand for Italian national newspapers observed between 1976 and 2001 are found by Filistrucchi (2005). He uses a logit–type demand model and

measures the effect of website provision by a dummy variable.

Evidence for the US magazine market and the time period 1996 to 2001 is provided by Simon (2005), who applies a simple linear demand model to analyze the effects of website presence and content overlap between the print version and the companion website. His results suggest that a magazine's print circulation on average declines by 2.5 percent when it offers a website. This effect decreases with decreasing overlap between online content and print content.

3. Magazine characteristics

Table 2 displays which magazines from which magazine segments went online at what point in time. The grouping of the magazines follows industry convention, for example Jahreszeitenverlag (1995–2004). It also contains information on the share of readers that regularly use the internet at launching date and in 2004 as well as the share of readers in different age groups.

Table 2 indicates that there are two distinct entry cohorts: the first entry wave was around 1996/1997, the second one more recently around 2000/2001. There is one women's magazines companion website, that of "Maxi", a "classical" magazine, that is not included since it was launched after the end of my observation period.

The table shows that the early companion websites reached a fairly small potential online audience with internet penetration rates among readers of below five percent. Magazines that launched websites early are, however, also those that have a readership with particularly high internet penetration rates in 2004. Early entrants may have anticipated a coming surge in internet penetration and used the early launch to experiment with an optimal positioning relative to the print version.

Table 2 also shows that all magazines, even the "girl's" magazines, reach consumers of quite widely dispersed ages so that an internet strategy that for example drives in additional consumers in a specific age group may cannibalize consumers of other age groups (and vice versa) so that it appears important to quantify the companion website effects for each age group separately.

Table 2 also shows that there are substantial differences between readers of magazines that maintain a companion website and those that do not. Magazines with a companion website tend to enjoy a statistically significantly higher circulation as tests for identity of means and medians show — at least uncontrolled for magazine groups. Once it is controlled for magazine groups affiliation, these differences disappear.

Magazines with and without companion websites also differ significantly with respect to age and online adoption of readers: magazines with companion websites have readers that are both younger and more internet–affine than magazines without an online companion.

Table 2. Magazines' online history

	Online since	Share readers online (in %) Launch date	2004	Share readers in different age groups (in %) 14–19	20–29	30–39	40–49	50–59	60–69	> 70
Group 1: classical magazines										
Freundin	I/1996	1	43	6	19	24	21	13	9	8
Brigitte	IV/1997	3	41	5	14	22	21	18	11	8
Journal für die Frau	I/2001	17	31	2	10	18	20	19	16	14
Für Sie	I/2001	16	34	4	10	20	21	19	14	11
Woman	IV/2002	43	53	9	21	26	20	12	8	4
Group 2: girl's magazines										
Joy	IV/2000	27	69	38	34	16	7	4	1	0
Bravo Girl	II/2001	39	67	38						
Mädchen	I/2001	37	69	65	11	11	10	2	1	0
Brigitte Young Miss	II/1999	10	65	53	20	12	9	3	2	1
Group 3: fashion magazines										
Elle	I/1996	1	50	8	12	29	17	18	9	7
Madame	I/2003	40	42	5	10	18	20	24	14	8
MarieClaire	II/2002	32	46	6	23	23	19	15	10	6
Vogue	III/2000	24	61	9	22	21	19	16	9	4
Group 4: lifestyle magazines										
Petra	III/2000	9	44	7	19	25	19	14	8	7
Allegra	I/1997	2	61	10	32	32	15	5	2	4
Cosmopolita	I/1998	6	60	13	26	26	18	12	4	1
Amica	I/1998	5	70	21	37	22	13	3	2	1
Group 5: "yellow" magazines										
no companion websites										
Group 6: weekly advise giving magazines										
Bild der Frau	II/2002	7	26	4	9	18	20	18	17	15

Table 2 shows the time period when the respective magazine launched its website, the share of readers that were online at the launching date and in 2004 as well as the share of readers in seven different age groups.

These differences in magazine readership may suggest that a magazine's decision to launch a website is endogenous. For example, it may be the case that magazines with a very internet–affluent readership decides to launch late or not at all since it is afraid to loose consumers to the online companion. Apart from the fact that such an argument does not hold true given the descriptive evidence from Table 2, there are a few other argument that speak against endogeneity.

First, at least in my data, website launching appears to be a decision that is reached by the publisher, not by the magazines themselves. Publishers provide a common platform and a fairly homogeneous website design. Second, the early website launches in the German women's magazines market were driven by the ambition to set up shopping portals. These shopping portals were closed down shortly after they had been established. Given that there may not be a direct link

between online shopping and magazine sales, this does not provide evidence for website launching to be endogenous to magazine circulation.

An earlier version of this paper applied econometric tests for website endogeneity by using reader's internet adoption as an instrument for companion website launch. There were no statistically significant evidence for website endogeneity, at least based on the instrument choice of that paper.

4. Empirical specification

4.1. Basic model

Discrete–choice models of product differentiation for aggregated data (Anderson et al. 1990; Berry 1994) constitute my framework for studying the determinants of demand for women's magazines. Internet provision is considered as a quality characteristic in a "Nested Logit" model of product differentiation. My exposition follows Berry (1994).

The nested logit model is a popular choice among empirical researchers. Its main idea is to place the set of choices a consumer faces into G subset (or "nests") from which consumers eventually choose a particular product. Consumer choice is based on utility maximization: they choose a product that maximizes their utility. Heterogeneity of consumers is obviously important. The nested logit model allows for unobserved consumer heterogeneity of a simple and specific form. The nested logit model places "random coefficients" on dummy variables for each of the product groups, i.e. consumer's choice of a specific product group is stochastic. Consumer utility is assumed to depend on observed characteristics of each product j observed at time t, x_{jt}, prices, p_{jt}, website effects, w_{jt}, demand shocks common to all magazine, τ_t,[8] an unobserved (to the econometrician) magazine specific fixed effect, ν_j, and the sum of an i.i.d. extreme value distributed error term, ξ_{ijt} that is the sum of an interaction between a consumer–specific random utility component, ζ_{ig} and nest–specific dummy variables, D_{jg} which is coded 1 if magazine j is in magazine group g and 0 otherwise. The time–invariant magazine–specific effect, ν_j, can be thought of as capturing magazine style, publisher ability (none of the magazines switches its publishers), publisher's attitude towards new technology or periodicity (none of the magazines changes its periodicity either). The time–variant magazine–specific error component ε_{jt} may reflect the editor's lucky or unlucky choice of leaders,

[8] I use year dummies and quarter dummies to take them into account.

her choice of cover pages or her choice of editorial staff.

Consumer utility in a nested logit–type model of product demand is:

$$u_{ijt} = x_{jt}\beta + \alpha p_{jt} + \kappa w_{jt} + \tau_t + \nu_j + \varepsilon_{jt} + \sum_{g=1}^{G} D_{jg}\zeta_{ig} + \xi_{ijt}. \quad (1)$$

The extreme value assumptions on $D_{jg}\zeta_{ig} + \xi_{ijt}$ leads to a closed–form expression for the aggregation of consumer–specific choices to market shares, Equation (2), which makes estimation based on aggregated product–level data feasible.

My definition of product groups follows the one already applied in Table 2 since my magazines are very much alike *within groups* if one compares, for example, the number of content pages, the number of advertising pages and magazine content shares (the share of e.g. beauty, fashion, wellness pages etc.). By contrast, for example a fashion page of a magazine from the "fashion" magazine category looks very different from a fashion page of a magazine from the "lifestyle" magazine category. This suggests that being a member of one of the six magazine groups is an important quality characteristic of a magazine which is why it appears straightforward to group the magazines that way.

The nested logit demand equation I estimate is

$$ln(s_{jt}/s_{0t}) = x_{jt}\beta + \alpha p_{jt} + \sigma ln(\overline{s}_{jt|g}) + \kappa w_{jt} + \tau_t + \nu_j + \varepsilon_{jt}, \quad (2)$$

where $ln(\overline{s})_{jt|g}$ denotes the natural logarithm of the market share of product j in product group g at time t. The dependent variable of my model is the market share of product j at time t, relative to the market share of the "outside good", good 0, observed at time t. The outside good, which is is needed in order to identify the model, is defined as the total market size at time t, M_t, minus the circulation sum of the N "inside goods", q_{jt}, relative to total market size: $s_{0t} = (M_t - \sum_{j=1}^{N} q_{jt})/M_t$ (likewise $s_{jt} = q_{jt}/M_t$). In accordance to industry practice (AG.MA 2001), I define total market size as the the number of women aged 14 years and above who live in Germany.

A practical problem with the implementation of such a model in a magazine context is that magazines came with different periodicities (weekly, biweekly and monthly), and consumers may purchase more than one magazine per time unit, a phenomenon called "multihoming". Like Nevo (2001), who converts the package size of cereals into daily servings, I try to get around both problems by converting biweekly and monthly circulation into weekly circulation. Multihoming in a logit–demand type problem is not a problem per se but if the consumer and magazine specific utilities ε_{jt} are correlated (e.g. non i.i.d.), the

model assumption no longer hold. Fortunately, as Dewenter and Kaiser (forthcoming) as well as Kaiser and Wright (2006) document, there is little evidence for consumers purchasing multiple magazines from the same magazine group. Kaiser and Wright, in a Hotelling game context, construct correction factors for their demand for advertising equation. These correction factors do not affect their estimation results much.

The parameter σ measures the degree of product substitution within product groups. If $\sigma = 1$, products within product groups are perfect substitutes, and if $\sigma = 0$, products are symmetric and the "simple logit" model without random coefficients is obtained. The substitution parameter maps the market share of magazine j in group g (i.e. in one of the six magazine groups) at time t, $\overline{s}_{j|gt}$, to total relative market shares.

Elements of the vector of observed magazine characteristics, x_{jt}, are the natural logarithm of the number of magazine content pages, the ratio of advertising pages to the total number of pages, 21 magazine content shares (i.e. the share of fashion pages compared to the total number of pages)[9] and the Hirschman–Herfindahl index of content concentration (the sum of the squared 21 content shares).[10]

The term κw_{jt} represents my measures of website effects. I estimate three different specifications that are supposed to capture the effect of having a website. In the first and most simple specification — which is also considered by Filistrucchi (2005) and Simon (2005)[11] —, the website effect is represented by a dummy variable, denoted by $website_{jt}$. It is coded one for each period in time that magazine j runs a website (and zero otherwise). This specification ignores the fact that website effects may vary across time, for example through changes in internet penetration. My second specification, hence, contains website dummies for each year.[12] In my third specification I include both dummy variables for

[9] These 21 content shares are fashion for purchase, self–crafted fashion, cosmetics, cooking, interior design, handicraft, children, partnership, society, vacation, counselling, hobby, cars, politics, science, the arts, sensational journalism, TV, fiction, sexuality, VIPs and service pages of the editors (Table of Contents etc.) with health being the comparison content share that is dropped to avoid perfect collinearity with the constant term.

[10] Dummy variables for weekly, biweekly or monthly periodicity are omitted since they are time–invariant.

[11] Both papers draw quite substantially on an earlier version of this paper, Kaiser (2002).

[12] I also experimented with various specifications that allowed magazine readers' internet use to directly affect magazine demand. The coefficients corresponding to internet use turned mostly out to be significantly positive which is counter–intuitive. My explanation for this finding is that readers' internet use captures other (time–variant) aspects of magazine characteristics that my specification does not account for like for example "stylishness".

current website presence and lagged website presence. The intuition behind this is that there may be both instantaneous and lagged effects of companion websites on magazine demand. For example, the instantaneous effect may be negative but lagged effects could be insignificant or even positive.

My specifications of the website effect on magazine demand are the following:

$$\kappa w_{jt} = k_0 \, website_{jt}$$
$$\kappa w_{jt} = \sum_{year=1996}^{2004} k_{year} \, website_{year}$$
$$\kappa w_{jt} = \sum_{k=0}^{4} k_k \, website_{jt-k}.$$

Since the dependent variable, relative markets share, s_{jt}/s_{0t}, is in natural logarithms, and since all three specifications consider website dummy variables, the coefficient estimates κ directly translate into percentage changes in relative market shares due to companion websites.

My specifications also include the share of other magazines of the same magazine group that maintain a website to study whether competing magazines' website presence increases own demand (for example due to sampling effects) or whether it decreases it (for example due to substitution effects).

4.2 Extended model

The model outlined above largely ignores consumer heterogeneity. My data does, however, contain information on the age structure of readers. It seems likely that consumers' valuation of companion websites differs for consumers of different ages. While Equation (2) estimates the average effect of magazine characteristics across all consumer age groups, my model extension estimates the effects of magazine characteristics on consumers of different age. I differentiate between six different age groups, readers aged 14–19, 20–29, 30–39, 40–49, 50–59 and 60–69 years. One additional age groups exist, consumers above 70 years of age. As already discussed in Footnote 1, the estimation results for this age group are implausible which is why I do not discuss them hereafter. My estimation equation is:

$$ln(s^a_{jt}/s^a_{0t}) = x_{jt}\beta^a + \alpha^a p_{jt} + \sigma^a ln(\overline{s}^a_{j|gt}) + \kappa^a w_{jt} + \tau^a_t + \nu^a_j + \varepsilon^a_{jt}, \quad (3)$$

where the superscript a denotes the ath age group. Total market size now is the number of women in age group a with residence in Germany. The term s^a_{jt} measures circulation of magazine j at time t for consumers in age group a relative to all consumer in age group a. For example, for the 14 to 19 year old,

s_{jt}^{a} is defined as magazine j's sales to consumers aged 14–19 years, q_{jt}^{14-19} relative to the number of women in that age range, M_t^{14-19}: $s_{jt}^{14-19} = q_{jt}^{14-19}/M_t^{14-19}$.

The consumer–age specific magazine demand equation, Equation (3), is estimated separately for each of the seven consumer age groups.

Given that younger consumers tend to be more internet–affluent, it would be desirable to relate the website effects to Internet penetration. My data does, however, only contain information on Internet use for each magazine and is not further differentiated into consumer age groups.

4.3 Identification

Equation (2) and Equation (3) could, in principle, be estimated by OLS. Since both consumers and producers know the unobserved (to the econometrician) magazine quality component, ε_{jt}, producers take its value into account in its pricing decision which, in turn, induces a positive correlation between ε_{jt} and magazine cover price p_{jt}. This leads to a downward bias in the parameter estimates that correspond to the price coefficients, α, calling for an instrumentation of cover prices. By the same token, within group market shares need to be instrumented as well.

Appendix A discusses my identification strategy in much detail. The appendix also contains estimation results for models without instrumentation. The most important finding of the appendix is that my instruments are both highly correlated with cover price and within group market share, the variables to be instrumented, and uncorrelated with the time–variant error terms of Equation (2) and Equation (3), ε_{it} and ε_{it}^{a}. The two conditions for instruments validity are hence fulfilled.

5. Data

My data set consists of quarterly information about German women's magazines that existed between the first quarter of 1995 and the second quarter of 2004. The minimum number of magazines per period is 30, the maximum is 44. A total of 1,575 observations is used in the estimation. Data on circulation, cover prices, editorial pages and advertising pages was downloaded from the internet at http://medialine.focus.de. This data has been updated quarterly since 1972 and is continuously recorded. The original source of this information is the "Information Association for the Determination of the Spread of Advertising Media" ("Informationsgemeinschaft zur Feststellung der Verbreitung von Werbeträgern e.V", IVW). IVW ascertains, monitors and publishes circulation and magazine dissemination information.

This data is supplemented by annual information on magazine contents that I received from the publishing house Jahreszeitenverlag (Jahreszeitenverlag 1995–2004).

Information on magazine reader characteristics that was provided to me by the "Arbeitsgemeinschaft Media–Analyse" (AG.MA), an association of the German advertising industry for research on mass communication, and is added to my data. AG.MA is the German equivalent to the US Audit Bureau of Circulation. The purpose of AG.MA is to gather and supply data for media audience measurement. The original source of the AG.MA data is a consumer survey that is annually collected by the "Institut für Demoskopie, Allensbach", Germany. Around 20,000 interviews are realized annually.[13] AG.MA also provided me with data on the share of readers in the seven different age groups and with data on the share of readers that regularly uses the internet. More detailed data on internet use is unfortunately not available.

All data sets employed in this study come with unique magazine–specific identifiers so that there is an exact match between all three pieces of information.

A final piece of information is website presence. The date on which a magazine launched a website was assembled by myself via email and telephone inquiries at the editorial staff of the magazines.

Descriptive statistics of the variables involved in the estimations are shown in Appendix B.

6. Estimation results

Table 3 displays estimation results for the coefficients of main interest for both the specification for all age groups as in Equation (2) and for the seven separate age groups as in Equation (3). Appendix C displays the entire estimation results.

Website dummy only

The average effect of a companion website across all periods and all age groups ("basic" specification) is -4.2 percent, an effect that is statistically highly significant given a standard error of 1.4 percent. There are fairly sizeable differences across age groups. The companion website effect is -6.3 percent (standard error 3.2 percent) for the 50 to 59 years old, -6.1 percent (standard error 1.7 percent) for the 40 to 49 years old, -5.1 percent (standard error 3 percent) and -3.5 percent (standard error 2 percent) for the 30 to 39 years old. There are no statistically significant effects for the age groups 20–29 years and 60 to 69 years, where substitution effects and complementarity effect balance out one another.

Website presence of magazines from the same segment, i.e. direct competitors, also has a negative effect on a magazine's relative market demand.

[13] For more information on this data, see http://www.awa-online.de/.

The point estimate for the model without age differentiation is -12.4 percent (standard error 4.5 percent) which implies a decrease in a magazine's market share by the same amount if all competing magazines are online. The only other existing paper that considers competition effects from other market participants' website presence is Filistrucchi (2005), who includes the number of competitors maintaining a website in his specification. His corresponding point estimate is -1.6 percent with a standard error of 0.9 percent.

The explanation for the negative competition effect is that consumers become aware of the two competing products, the print version and the online version, and substitute away. There may, however, also be positive sampling effects that crowd in additional consumers.

A disaggregation of the competition effects shows that competition effects are mainly an issue for the age group 40 to 49 years, the largest consumer group, where the point estimate is -16.2 (standard error 4.6). Competition effects are positive and statistically significant for the age group 60 to 69 years, where positive sampling effects dominate.

Website dummy and lagged effects

The dynamic specification that considers lagged website effects also finds on average negative effects of companion websites on relative magazine demand. Lags 1 to 3 tend to be negative which means that cannibalization effects increase in time. Lag 4 is, however, positive which means that the decline in market shares due to companion websites is dampened after one year. This pattern is found in the basic specification and also in the age–specific estimations.

An additional specification, that is not part of the paper, considered a dummy variable that was coded one in the period in which the companion website was launched along with its lags and a website dummy variable for all periods when a companion website existed. The additional dummy variables measure the deviation from the average website effect for the exact period when the website was launched and the first to fourth period after the launch. The coefficient estimates indicate that the cannibalization effect is largest in the first period after the launch and that it fades out thereafter. These effects are, however, statistically insignificant which is very likely due to the fact that the initial website dummies take on the value 1 for only 1.1 percent of the observations. They are, hence, not well identified by the data.

Even though cannibalization effects decrease after one year of website presence, the results for the basic specification still indicate weakly significant cannibalization effects of 2.7 percent, as indicated by the sum of the contemporaneous and lagged effects as well as the corresponding test of statistical significance ("Website + sum lag 1–4" in Table 3). Negative effects persist also for the age group 40 to 49 years while they become insignificant for the 14 to 19

years old, the 30 to 39 years old and the 50 to 59 years old. Companion website effects even turn positive for the 20 to 29 and the 60 to 69 years old, where magazines with those age groups as targets are particularly successful in optimizing their Internet appearances.

Table 3. Estimates for coefficients of main interest

	All ages		14–19		20–29		30–39		40–49		50–59		60–69	
	Coeff.	Std.	Coeff.	Std.	Coeff.	Std.	Coeff.	Std.	Coeff.	Std.	Coeff.	Std.	Coeff.	Std.
Dummy only														
Share comp. onl. $_{it}$	-0.1243 ***	0.0454	0.0584	0.0674	0.0976	0.1015	-0.0640	0.0650	-0.1616 ***	0.0455	0.0281	0.0681	0.1531 **	0.0743
Website $_{it}$	-0.0421 ***	0.0136	-0.0519 *	0.0297	-0.0076	0.0242	-0.0348 *	0.0202	-0.0606 ***	0.0166	-0.0629 **	0.0323	0.0477	0.0310
Dummy with lags														
Share comp. onl. $_{it}$	-0.1321 ***	0.0449	0.0405	0.0691	0.0774	0.0552	-0.1529 **	0.0685	-0.1650 *	0.0420	-0.0213	0.0689	0.12 *	0.071
Website $_{it}$	-0.0690 **	0.0315	-0.1008 *	0.0619	-0.1090 ***	0.0418	-0.1184 ***	0.0439	-0.0626 *	0.0383	-0.1636 ***	0.0628	-0.01	0.056
Website $_{it-1}$	0.0083	0.0364	0.0378	0.0714	0.0152	0.0457	0.0126	0.0473	-0.0051	0.0399	0.0371	0.0625	0.02	0.052
Website $_{it-2}$	-0.0124	0.0293	-0.0030	0.0603	-0.0101	0.0408	-0.0228	0.0384	-0.0158	0.0346	-0.0098	0.0495	0.01	0.052
Website $_{it-3}$	-0.0002	0.0267	0.0392	0.0538	0.0259	0.0414	-0.0101	0.0379	-0.0140	0.0365	0.0034	0.0504	-0.07	0.078
Website $_{it-4}$	0.0464	0.0201	0.0444	0.0466	0.1173 ***	0.0316	0.1504 ***	0.0297	0.0461 *	0.0260	0.0958 ***	0.0391	0.12 **	0.061
Website + lag 1	-0.0607 ***	5.9500	-0.0630	0.2207	-0.0938 ***	8.1200	-0.1058 ***	11.1300	-0.0677 **	4.9500	-0.1265 ***	11.9700	0.0086	0.03
Website + sum lag 1–2	-0.0731 ***	11.0400	-0.0660	0.1861	-0.1039 ***	8.3300	-0.1286 ***	16.2000	-0.0835 ***	7.3900	-0.1363 ***	9.9400	0.0168	0.110
Website + sum lag 1–3	-0.0733 ***	11.3800	-0.0268	0.2300	-0.0780 **	4.6900	-0.1387 ***	18.0900	-0.0975 ***	12.9200	-0.1329 ***	10.5400	-0.0512	0.780
Website + sum lag 1-4	-0.0269 *	3.2200	0.0176	0.0400	0.0393 *	2.8700	0.0117	0.2400	-0.0514 ***	7.8400	-0.0371	0.9000	0.0703 **	5,700
Dummies and lags														
Share comp. onl. $_{it}$	-0.0864 **	0.0386	0.0595	0.0930	0.0009	0.0817	-0.1372 **	0.0606	-0.1510 ***	0.0372	0.0287	0.06	0.0419	0.0670
Website 1996	-0.0490 **	0.0207	-0.0510	0.0582	-0.0271	0.0411	-0.0456 *	0.0265	-0.0742 ***	0.0221	-0.0973 *	0.06	-0.0178	0.0573
Website 1997	-0.0054	0.0182	0.0489	0.0386	-0.0457	0.0365	-0.1232 ***	0.0303	0.0502	0.0514	0.0205	0.03	-0.0492	0.0352
Website 1998	-0.0414 ***	0.0163	-0.0971 **	0.0474	-0.0480 *	0.0256	-0.0957 ***	0.0226	-0.0755 ***	0.0222	-0.1013 ***	0.03	-0.0341	0.0324
Website 1999	-0.0152	0.0194	0.0038	0.0288	0.0653 **	0.0316	-0.0210	0.0311	-0.0787 *	0.0410	-0.1010 ***	0.04	-0.0688	0.0485
Website 2000	-0.0299 *	0.0181	-0.1479 ***	0.0332	-0.0019	0.0312	-0.0077	0.0391	-0.0928 ***	0.0188	-0.0888 *	0.05	0.0245	0.0516
Website 2001	-0.0770 ***	0.0176	-0.0619	0.0478	-0.0291	0.0571	-0.1097 ***	0.0267	-0.0419 *	0.0239	-0.1789 ***	0.04	0.0710	0.0500
Website 2002	-0.0420 *	0.0250	-0.1346 **	0.0652	-0.0828 *	0.0433	-0.0365	0.0354	-0.0304	0.0272	-0.0209	0.05	0.0511	0.0520
Website 2003	-0.1059 ***	0.0395	0.1100	0.0791	-0.0680	0.0633	-0.0337	0.0523	-0.0851 *	0.0451	-0.0940 *	0.05	0.0793	0.0501
Website 2004	0.0138	0.0230	0.1563	0.1448	0.2320 ***	0.0394	0.1018 ***	0.0311	-0.0584 *	0.0312	0.0119	0.04	0.1875 ***	0.0398
Test for joint significance (*p*- value)														
Website dummies	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Note: The table displays GMM estimation results for the coefficients corresponding to the website variables. The full set of estimation results is shown in Appendix C.

Website dummies for each year

The effects of companion websites not only differ across age groups but also across time. Cannibalization effects tend to be largest in 2001 for both the basic specification and the age–specific specification. 2001 is the year where the growth rates (not the level) of internet penetration was largest for the readers of women's magazines. Cannibalization effects have declined since 2001 and even moved into the neutral region in 2004 for the basic specification and for the age groups 14 to 19 years old and 50 to 59 years old. For some age groups, in particular for the 20 to 29 years old, the initial cannibalization turned into a complementarity effect as indicated by a companion website effect of 23.2 percent (standard error 3.9 percent). Complementarity effects are also found for age groups 30 to 39 years old and the 60 to 69 years old.

7. Summary and conclusions

Print media representatives and observers of the print media market often argue that magazine's companion websites lead to "channel competition" between the online and offline outlet. This paper tests this assertion on fairly detailed data on magazine and consumer characteristics for the German women's magazine market that spans the period I/1995 to IV/2004.

The results indicate that there is indeed channel competition, at least if no differentiation is made with respect to time and consumer age groups. Cannibalization effects are estimated to be -4.2 percent on average (standard error 1.4 percent). Statistically significant evidence for the presence of online cannibalization is also provided for consumer age groups of 14 to 19 years, 30 to 39 years, 40 to 49 years and 50 to 59 years.

Companion website effects vary, however, across time. Cannibalistic effects were most severe in 2001 and have been declining thereafter, an observation that holds both in general and for specific consumer age groups. The average website effect for 2004 is positive but statistically insignificant. For 2004, positive and statistically significant effects of companion websites are found for consumers aged 20 to 29 years, 30 to 39 years and 60 to 69 years while there are statistically insignificant effects for the other age groups. Hence, magazine managers need to consider the age profile of their readers before launching a website. Launching now is less likely to affect print sales than before 2001.

The estimation results provide evidence for dynamic effects of companion websites on demand: companion website effects on print media sales are initially negative, but flattened out with time which is consistent with publishers learning how to optimally position their website relative to the print version. If the explanation for the dynamic effects indeed is learning or if it is related to other factors remains, however, an issue for future research.

Another issue for further research is the differential effect of companion

website on subscription and kiosk sales. Preliminary evidence on a selective sample of German magazines by Kaiser and Kongsted (2006) suggests substitutive effects between website visits and kiosk sales but a positive relationship between website visits and subscriptions which indicates that loyal readers appreciate the printed magazine/companion website bundle while casual kiosk purchasers substitute away.

My econometric analysis also provides evidence for business stealing effects of competing magazines' website presence.

To sum up, this study offers a differentiated look — differentiated by reader age and timing — on the effects of companion websites on magazine demand. It finds that industry participants' view on the Internet are overly pessimistic and that cannibalization effects have declined in magnitude since 2001.

Appendix A: identification

My construction of the cover price instruments is based on the idea that cost shocks occurring to magazines other than magazine j will be correlated with cost shocks occurring to magazine j, and, hence — to the extent that cost shocks are carried over to cover prices —, prices of magazines other than magazine j will be correlated with magazine j.[14] They will, however, be uncorrelated with unobserved quality characteristics ε_{jt}. I construct three different instrument sets based on this idea: (1) the average cover price across all magazines published in Germany, (2) the average cover price across all women's magazines and (3) the average cover price across magazines in the same publishing group. Instruments (2) and (3) were rejected by tests for overidentifying restrictions in almost all specifications so that only instruments set (1) is used in the empirical analysis. I will henceforth call it the "main cover price instrument" although I use additional variables as instruments for price.

It is well documented that (functions of) other products' (other magazines) characteristics are valid instruments for prices and within group market shares since the pricing equation associated with differentiated product demand models depend on the characteristics of the other products. Existing studies have used the means of the characteristics of other products as instruments for product prices and the means of the characteristics of products from the own product group as instruments for within group market shares (e.g. Verboven, 1996). I follow this approach and use the following variables as instruments for cover prices and within group market shares: the ratio of own advertising pages to the total number

[14] This assumption is related to Hausman (1996) and Nevo (2001), although my setup differs substantially.

of advertising pages in the women's magazine market, the ratio of own advertising pages to the total number of advertising pages in the own group, the ratio of own content pages to the total number of advertising pages in the women's magazine market, the ratio of own content pages to the total number of advertising pages in the own group, the ratio of own pages to the total number of advertising pages in the women's magazine market and the ratio of own pages to the total number of advertising pages in the own group. As additional cost–side instruments I consider the total number of pages produced by the own publisher in the respective quarter (cost may decline due to returns to scale in production), the total number of titles produced by the own publisher and total number of titles produced by the own publisher (cost may decline due to returns to scope in production). All three instruments exclude the respective own magazine in their calculations.

Tests of orthogonality of these instruments show that some of the instruments cannot be accepted for some specifications which is why I use different sets of instruments in the different estimations. Since contemporaneous orthogonality of some instruments cannot be accepted either, I lag the instruments by four periods. Note that this does not lead to a loss in the number of observations since my information on the instruments goes back to 1972.

For an instrument to be valid it has to have two properties: (i) there must be a high correlation between the instruments and the variable to be instrumented and (ii) the instruments and the residual of the estimation equation of interest must be uncorrelated. In order to check the first property I have run auxiliary OLS regressions of the instruments and the exogenous variables on cover prices and within group market shares (a so–called "first stage reduced form estimation"). The corresponding estimation results are displayed blow. The results show that the instruments are jointly highly statistically significant, indicating a high correlation between the instruments and the variables to be instrumented. The second property, the non–correlation between the residuals and the instruments, is analyzed by tests for overidentifying restrictions ("J–tests") as shown in the result tables in the main body text. These tests cannot reject that the instruments are also orthogonal to the residual of the equation of interest.

Estimation results for specification that do not use instruments are shown below as well.

Another table attached to this appendix displays estimation results for the magazine demand equations when there is no instrumentation for prices and within group market shares.

Auxiliary regressions

Within group market shares														
	All ages		**14–19**		**20–29**		**30–39**		**40–49**		**50–59**		**60–69**	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
ln(content pages)	0.2220	0.0840	0.2133	0.1900	0.1970	0.0927	0.2012	0.0908	0.3263	0.1080	0.1472	0.0921	0.1419	0.2295
Advertising share	0.1906	0.1453	0.7652	0.3718	-0.3576	0.2066	0.1998	0.1900	0.2871	0.1906	-0.2858	0.2006	1.0883	0.6889
Content conc.	0.5624	1.6384	2.7180	1.5840	2.8555	1.6980	2.4932	1.8641	0.3765	1.7055	0.7278	1.7645	-0.6296	2.5359
Share comp. onl. $_{it}$	-0.0840	0.0389	-0.0250	0.1145	-0.1285	0.0574	-0.0900	0.0565	0.0018	0.0529	-0.0374	0.0564	0.4003	0.2151
Website $_{it}$	0.0284	0.0206	0.2000	0.0592	0.0849	0.0285	0.0306	0.0284	0.0245	0.0254	-0.0382	0.0300		
Constant	-3.1159	0.5658	-3.9105	2.8360	-4.1463	0.8201	-4.3088	0.7821	-3.6569	0.7393	-3.5118	0.7979	-0.0321	0.0222
All specifications also include 21 contents share variables, quarter dummy variables and year dummy variables														
Main price instr.	0.0941	0.1106	0.0533	0.6422	0.3357	0.1490	0.2510	0.1440	0.1224	0.1402	0.2181	0.1290	0.1991	0.0914
Rel. adpages	0.0325	0.0167	0.2367	0.0859	0.0590	0.0262	0.0670	0.0225	-0.0206	0.0225	0.0415	0.0247	0.1327	0.3441
Rel. adpages within group			-0.3263	0.1270					0.0654	0.0333				
Rel. total pages			-0.4397	0.1865										
Rel. total pages within group			0.5979	0.2526										
ln(# titles by same publisher)	-0.0526	0.0828			-0.0263	0.0697	-0.0429	0.0738	0.0018	0.0919	-0.0793	0.0685		
ln(total # pages by same publisher)	0.0110	0.0063	0.0187	0.0091					0.0093	0.0080			-0.0830	0.0658
ln(total # pages by same publisher in same segment)	-0.0070	0.0029							-0.0047	0.0035			0.0000	0.0002
Pulp & paper index	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	-0.0145	0.0082
***F*–tests for joint significance**														
Instruments	3.74	0.0011	2.11	0.0395	2.83	0.0237	3.54	0.0070	0.94	0.4557	2.55	0.0377	1.5	0.1861
Whole specification	29.04	0.0000	9.05	0.0000	25.96	0.0000	28.76	0.0000	20.08	0.0000	14.12	0.0000	5.04	0.0000
Adj. R^2	0.2171		0.2287		0.3588		0.2753		0.2249		0.1678		0.1971	

Cover prices														
	All ages		**14–19**		**20–29**		**30–39 and 40–49**		**50–59**		**60–69**		**>70**	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
ln(content pages)	0.2371	0.1287	0.1344	0.1389	0.2289	0.1277	0.1773	0.1272	0.2289	0.1277	0.2310	0.1289	0.2371	0.1287
Advertising share	1.4959	0.3409	1.3105	0.3480	1.5002	0.3392	1.3608	0.3494	1.5002	0.3392	1.4779	0.3411	1.4959	0.3409
Content conc.	0.3016	1.0531	0.3691	1.0336	0.1063	1.0559	0.2871	1.0425	0.1063	1.0559	0.4908	1.0446	0.3016	1.0531
Share comp. onl. $_{it}$	-0.6085	0.0898	-0.5639	0.0930	-0.6201	0.0905	-0.5654	0.0943	-0.6201	0.0905	-0.6018	0.0893	-0.6085	0.0898
Website $_{it}$	-0.2065	0.0512	-0.1958	0.0507	-0.2092	0.0511	-0.2036	0.0511	-0.2092	0.0511	-0.2090	0.0510	-0.2065	0.0512
Constant	6.5890	1.2314	7.1517	1.2306	6.9088	1.2411	6.6230	1.2177	6.9088	1.2411	6.8844	1.2382	6.5890	1.2314
All specifications also include 21 contents share variables, quarter dummy variables and year dummy variables														
Main price instr.	-1.2703	0.1943	-1.2462	0.1927	-1.3335	0.1932	-1.2085	0.1948	-1.3335	0.1932	-1.3070	0.1931	-1.2703	0.1943
Rel. adpages	-0.0220	0.0503	-0.1255	0.0893	-0.0321	0.0495	-0.0701	0.0541	-0.0321	0.0495	-0.0176	0.0504	-0.0220	0.0503
Rel. adpages within group			0.1736	0.0681			0.1394	0.0621						
Rel. total pages			0.1705	0.2235			0.0954	0.0673	0.0440	0.0664				
Rel. total pages within group	0.1169	0.0675			0.0440	0.0664	-0.0211	0.0164					0.1169	0.0675
ln(# titles by same publisher)			-0.1017	0.1736			0.0093	0.0029						
ln(total # pages by same publisher)	-0.0202	0.0162	-0.0142	0.0147							-0.0109	0.0146	-0.0202	0.0162
ln(total # pages by same publisher in same segment)	0.0090	0.0030									0.0098	0.0029	0.0090	0.0030
Pulp & paper index	-0.0001	0.0001	-0.0001	0.0001	-0.0001	0.0001	-0.0001	0.0001	-0.0001	0.0001	-0.0001	0.0001	-0.0001	0.0001
F*–tests for joint significance (** ***p **value)**														
Instruments	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Whole specification	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Linear fixed effects estimation results for equation of interest without instrumentation

	All ages		**14–19**		**20–29**		**30–39**		**40–49**		**50–59**		**60–69**	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Cover price	-0.0356	0.0068	-0.0136	0.0146	-0.0442	0.0133	-0.0566	0.0113	-0.0394	0.0072	-0.0894	0.0127	-0.0616	0.0112
Within group market share	0.9231	0.0503	0.9644	0.0094	0.8467	0.0637	0.9122	0.0464	0.9521	0.0235	0.8892	0.0492	1.0002	0.0079
ln(content pages)	0.0203	0.0245	-0.0587	0.0526	0.0526	0.0417	0.0605	0.0421	0.0133	0.0261	0.1252	0.0466	0.0547	0.0402
Advertising share	0.1269	0.0609	0.1002	0.1176	0.1487	0.0997	0.2347	0.0989	0.1337	0.0673	0.2932	0.1120	0.1358	0.1006
Content conc.	-1.0944	0.2476	-1.0762	0.4210	-2.4120	0.5422	-1.3207	0.3904	-1.0248	0.2446	-1.0432	0.4338	-1.1503	0.3319
Share comp. onl. $_{it}$	0.0164	0.0196	0.1985	0.0338	0.2046	0.0374	-0.0051	0.0367	-0.0768	0.0236	0.1048	0.0423	0.1801	0.0376
Website $_{it}$	-0.0248	0.0093	-0.0201	0.0185	0.0063	0.0171	-0.0243	0.0186	-0.0437	0.0123	-0.0357	0.0189	0.0477	0.0189
Constant	-3.7113	0.2374	-3.7378	0.3276	-2.9407	0.3906	-3.4784	0.3462	-4.0140	0.2023	-4.6069	0.3586	-3.4426	0.2595
All specifications include 21 contents share variables, quarter dummy variables and year dummy variables														
Adj.R^2	0.9393		0.959		0.9102		0.8984		0.9378		0.859		0.9778	

Appendix B: descriptive statistics

Variable	Mean	Std. Dev.
Dependent variables		
$ln(s_{jt}/s_{0t})$	-6.3909	0.7580
$ln(s_{it}/s_{0t})^{14-19}$	-6.9586	1.6731
$ln(s_{it}/s_{0t})^{20-29}$	-6.5553	1.1759
$ln(s_{it}/s_{0t})^{30-39}$	-6.0302	0.9467
$ln(s_{it}/s_{0t})^{40-49}$	-6.5745	0.8720
$ln(s_{it}/s_{0t})^{50-59}$	-6.4833	0.8770
$ln(s_{it}/s_{0t})^{60-69}$	-6.8792	1.4991
$ln(s_{it}/s_{0t})^{>70}$	-7.6225	2.4852
Endogenous variables		
$ln(s_{jt}\|g)$	-2.0886	0.8354
Cover price	3.7178	2.2710
Explanatory variables		
ln(content pages)	4.4616	0.3791
Advertising share	0.2672	0.1261
Fashion for purchase	0.0099	0.0279
Self-crafted fashion	0.0558	0.0349
Cosmetics cooking	0.0801	0.0590
Interior design	0.0351	0.0242
Handicraft	0.0162	0.0179
Children	0.0108	0.0121
Partnership	0.0721	0.0288
Society	0.0412	0.0381
Vacation	0.0523	0.0223
Counselling	0.0217	0.0160
Hobby	0.0073	0.0061
Cars	0.0038	0.0044
Politics	0.0060	0.0084
Science	0.0283	0.0227
The arts	0.0290	0.0298
Sensational journalism	0.0094	0.0109
TV	0.1980	0.1367
Fiction	0.1156	0.0855
Sexuality	0.0017	0.0050
VIPs and	0.0093	0.0191
Service pages	0.0545	0.0186
Content conc.	0.1511	0.0503
Dummy 1st quarter	0.2505	0.4334
Dummy 2nd quarter	0.2498	0.4331
Dummy 3rd quarter	0.2498	0.4331
Dummy 1995	0.0742	0.2622
Dummy 1996	0.0786	0.2692
Dummy 1997	0.0837	0.2770
Dummy 1998	0.0913	0.2881
Dummy 1999	0.0913	0.2881
Dummy 2000	0.0964	0.2952
Dummy 2001	0.0989	0.2987
Dummy 2002	0.1015	0.3020
Dummy 2003	0.1065	0.3086
Dummy 2004	0.1040	0.3054
Share comp. onl.$_{it}$	0.1771	0.2631
Website$_{it}$	0.2251	0.4178
Instruments		
Main price instr.	3.5733	0.3422
Rel. adpages	1.1014	1.0967
Rel. adpages within group	1.0975	0.5242
Rel. total pages	1.0425	0.6181
Rel. total pages within group	1.0305	0.2565
ln(# titles by same publisher)	2.2668	1.0922
ln(total # pages by same publisher)	7.4644	4.9713
ln(total # pages by same publisher in same segment)	-2.9121	8.1937
Pulp & paper index	565.7619	165.4399

Appendix C: full set of estimation results

	All ages		**14–19**		**20–29**		**30–39**		**40–49**		**50–59**		**60–69**	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
$ln(s_{j\|g})$	0.3190	0.1533	0.8445	0.0999	0.7011	0.3057	0.8266	0.2096	0.4697	0.2565	0.7414	0.2986	0.8017	0.1167
Cover price	-0.1948	0.0477	-0.2588	0.0853	-0.1811	0.0973	-0.1384	0.0627	-0.1746	0.0557	-0.1976	0.0736	-0.2173	0.0690
ln(content pages)	0.2286	0.0715	0.0141	0.0649	0.1167	0.1015	0.1044	0.0828	0.2341	0.1193	0.1741	0.0810	0.1075	0.0562
Advertising share	0.5575	0.1294	0.5587	0.2138	0.3156	0.1369	0.3941	0.1946	0.4984	0.1827	0.4269	0.1337	0.5179	0.2024
Content conc.	-0.6278	0.4117	-0.6169	0.6232	-1.8210	1.0065	-0.8832	0.6402	-0.7390	0.5534	-0.9287	0.4926	-1.2315	0.5714
Share comp. onl.$_{it}$	-0.1243	0.0454	0.0584	0.0674	0.0976	0.1015	-0.0640	0.0650	-0.1616	0.0455	0.0281	0.0681	0.1531	0.0743
Website$_{it}$	-0.0421	0.0136	-0.0519	0.0297	-0.0076	0.0242	-0.0348	0.0202	-0.0606	0.0166	-0.0629	0.0323	0.0477	0.0310
Constant	-5.3273	0.4911	-3.7366	0.4645	-3.2062	0.8354	-3.7355	0.7408	0.7826	0.8861	-4.8602	0.7670	-4.1404	0.6101
Pseudo R^2	0.6926		0.9371		0.8908		0.8892		0.7826		0.8369		0.9462	
All specifications include 21 contents share variables, quarter dummy variables and year dummy variables														
***J* test for overidentifying restriction and *p* –value**														
J	3,375	0.50	7.0860	0.21	0.1420	0.93	1.5160	0.47	1.2570	0.87	0.1100	0.9463	3,257	0.354

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