

When and why do magazines go online?[§]

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Abstract: The determinants of website-launching by German women's magazines are analyzed using a semi-parametric duration model. Main results are (???)

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1 Introduction

Many magazines recently started to produce an at least potentially perfect substitute to their initial product by launching magazine websites. Given the facts that (i) website access is, at least in Europe, for free in most cases and (ii) magazines put very similar information on the internet that is also contained in the print version, the question “why do magazines launch a website” immediately arises.

This paper provides some answers to this question that are based on microeconomic analysis. A semiparametric duration model, an ordered logit model for duration data, is estimated on quarterly data for German women’s magazines observed between I/1996 and IV/2001. Duration models are used to not only analyze the determinants of the binary decision of going online but to also gain insights into the timing of website launching.

Main results are that the following variables have a significantly positive effect on early website launching: (i) the semi-own-price elasticity of magazine demand (a measure of magazines’ hazard to lose customers to the free online version), (ii) the number of advertising pages per magazine issue (a measure of a magazine’s ability to sell internet advertising), (iii) the share of entertainment pages per print issue (a measure of time-criticalness of the information contained in the print version), (iv) the share of magazine readers that is online (a measure of demand-pull effects of website launching), (v) magazine age (younger magazines launch websites earlier than older competitors) and (vi) the number of magazines from the same magazine group that already is online (a measure of bandwagon effects). By contrast, the total number of women’s magazines does not play a significant role in the website launching decision. Moreover, the number of magazine subscribers (another measure of magazines’ hazard to lose customers to the online version) does not have a significant effect on website launching.

Interestingly, the importance of the share of readers that is online as a deter-

minant of website launching declines with time. This is somewhat in contrast to continuously increasing growth rates of internet penetration among the magazines' readers and suggests that the website-launching decisions depends more on a critical mass of readers reachable online rather than on the absolute share.

2 Determinants of going online

This section establishes the hypotheses that are tested empirically in Section ???. Each of the eight hypotheses is very intuitive so that there is no need for going into great detail here.

2.1 Factors that influence website launching: hypotheses

1. Semi-own price elasticity: *The lower a magazine's price elasticity of demand is, the more likely it is that it launches a website early.* Intuition: magazines with a low price elasticity of demand are to a less extent at risk of losing consumers to the internet than magazines with a high price elasticity. The own-price elasticity of demand is calculated from estimating a 'nested logit' model for differentiated products demand (Berry 1994). Details are provided in Appendix A.

2. Number of subscribers: *The larger the number of subscribers is, the more likely it is that magazines launch a website early.* Intuition: subscribers are less likely to switch to the internet than casual buyers (non-subscribers) of the magazine.

3. Number of titles published by own publisher: *The more titles a magazine's own publishing house publishes, the more likely it is that a magazine launches a website.* Intuition: publishers can use the same technology, the same frames and the same advertising distribution channels for other website-

launches as well. It also makes website-launching more attractive by opening up additional cross-selling opportunities in advertising.

4. Advertising pages: *The more advertising pages a magazine comes with per issue, the more likely it is that it launches a website early.* Intuition: the number of advertising pages in the print edition should be highly correlated with online advertising opportunities. In the absence of information on online advertising, print advertising sales might hence be a good proxy variable.

5. Bandwagon effect: *The more magazines from the own magazine group are online already, the more likely it is that a magazines launches a website early.* Intuition: Magazines are afraid of being the last to go online which would indicate ‘old-fashionedness’ relative to the competing magazines that are already online to the magazine consumers.

6. Magazine age: *Older magazines are less likely to launch a website early than younger magazines.* Intuition: Older magazines might be more reluctant towards the adoption of new technologies than younger ones.

7. Magazine content: *Magazines with a large content share of entertainment pages are more likely to launch a website early than magazines that come with a large share of information pages.* Intuition: If magazines go online that to a large extent provide current information, they are at larger risk of losing consumers to the online version than those magazine that concentrate on entertainment.

8. Consumer structure: *The larger the share of a magazine’s consumers is online, the more likely it is that a magazine launches a website early.* Intuition: If a magazine has a very internet-affluent readership, it’s readers are likely to demand that the magazine goes online.

Table 2 in Subsection ?? summarizes the eight hypotheses and contrasts them to the empirical findings.

2.2 Who went online when?

Table 1 shows when the 14 magazines that launched a website went online. A total of 40 magazines has been active in the German women’s magazines market in IV/2001. The table gives information about the subsegments the magazines are active in. Industry sources (Jahreszeitenverlag 1996–2002) classify the women’s magazines market into six distinct subgroups: (i) ‘monthly high priced’, (ii) ‘monthly medium priced’, (iii) ‘biweekly classical’, (iv) ‘weekly advice-giving’, (v) ‘weekly entertaining’ and (vi) ‘girl’s’ magazines.

Table 1 suggests that there are distinct patterns of website entry exist. The first magazine that launched a website was ‘Allegra’ in January 1996. One year after, ‘Amica’, a close competitor of ‘Allegra’, also went online. Another year later, ‘Cosmopolitan’ launched a website. These magazines all belong to the same magazine group, which is termed ‘Monthly medium-priced magazines’. Similar patterns are present for the other magazine groups as well, suggesting that once one competitor launched a website, this induces the other magazines to follow so that not wanting to be the last to go online (Hypothesis 8) in fact appears to be a valid argument for website launching. The only group where no magazine has launched as website are the weekly entertaining magazines. Some of them have,¹ however, have reserved URL addresses so that it is to be expected that these magazines have a non-zero chance of launch a website in the near future.

¹None of these magazines was online in March 2003, however. ‘neue Woche’, just like ‘Madame’, maintains a website for advertising clients only). The information on domain name reservations were obtained from www.denic.de, the primary nameserver for the top-level domain ‘de’. The following magazines from the ‘weekly entertaining’ group have reserved domain names (domain name and last information update date in parenthesis): Das Goldene Blatt (www.dasgoldeneblatt.de, Aug. 10, 2001), Das Neue (www.dasneue.de, October 05, 1999), DAS NEUE BLATT (www.dasneueblatt.de, 14.02.2003), Frau im Spiegel (www.frauimspiegel.de, May 04, 2000), Neue Post (www.neuepost.de, Feb. 20, 2003), neue Woche (www.neuewoche.de, July 14, 2000).

Table 1: Timing of website launching

Group 1: monthly high priced magazines	
Elle	I/1996
Vogue	III/2000
Group 2: monthly medium priced magazines	
Allegra	I/1996
Amica	I/1997
Cosmopolitan	I/1998
Petra	III/2000
Group 3: biweekly classical magazines	
Brigitte	IV/1997
Freundin	I/1996
Für Sie	I/2001
Journal für die Frau	I/2001
Group 4: weekly advice-giving magazines	
Bild der Frau	II/2001
Group 6: girl's magazines	
Bravo Girl	II/2001
Brigitte Young Miss	II/1999
Joy	IV/2000

Note: None of the magazines in the ‘weekly entertaining’ group has been online until IV/2001.

3 Data

Most of the information used in this study is publicly available and some of the data can even be downloaded from the internet.

The data spans the period I/1996 to IV/2001. Since the first magazines that went online, ‘Allegra’, ‘Elle’ and ‘Freundin’, launched their websites in I/1996, none of the observations is left-censored: I observe the entire online-history of each magazine until IV/2001.² All magazines that are still online in IV/2001 are right-censored. The econometric model used in this paper adequately takes this

²There might be an issue of left-truncation here. However, given the fact that the internet was still in his baby shoes in Germany (for example the nameserver denic.de was founded in Dec. 1996 only), left-truncation does not seem to be a particularly important issue.

into account. The accurateness with which the website-launching date was reported differs markedly across the magazines. Only three magazine were able to report the exact website launching date while the rest of the magazines provided information ranging between “in early 1997” and “in the second quarter of 1998”. These differences in reporting lead to the econometric problem of discrete durations (quarters in this case) since it appears saved to use the respective quarters of website launching as the relevant ‘failure’ date.

The date of website launching was assembled from email and telephone inquiries. The share of magazines having an own website per magazine group can easily be calculated based on this information.

Variables used to estimate magazine’s own-price elasticity include magazine circulation, cover prices, magazine age, the number of editorial pages, the share of advertising pages and content share variables (see Appendix A). Data on circulation, cover prices, the number of advertising pages and the number of editorial pages is downloaded from the internet at <http://medialine.focus.de>. This source also provides information on the number of magazine subscribers, the identity of the publishing house and magazine age. This data is available on a quarterly basis and spans the period I/1971 to IV/2001. The original source of this information is ‘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.

Information on the share of online readers was provided to me from ‘Burda Advertising Centre’. This data was originally collected by the ‘Association Media Analysis’ (‘Arbeitsgemeinschaft Media-Analyse’, AG.MA), an association of the German advertising industry for the research of mass communication. The purpose of the AG.MA is to gather and to supply data for media audience measurement. AG.MA closely cooperates with IVW.

Magazine content information was obtained from Jahreszeitenverlag (1996–2001).

Jahreszeitenverlag is a major German magazine publisher which made its annual publication ‘Function–analysis: fact book of magazine contents and portraits’ (‘Funktions–Analyse: Factbook für Inhalte und Portraits von Zeitschriften’) related to the period 1996–2001 available to me upon request. It contains content information taken from the respective year’s first issue. Jahreszeitenverlag differentiates between 21 topics and provides data on the share of each of these topics in the total number of pages per issue. While the estimation of the semi–own price elasticities condenses this detailed information to sixteen topics (see Appendix A), the analysis only uses the share of entertainment pages as explanatory variable to save degrees of freedom. The definition of the share of entertainment pages follows industry convention and is defined as the sum of the following topic shares: politics and economics; science, nature and technology; the arts and cultural events; sensational entertainment; VIPS, artists and royalties; fiction, riddles and humor; sex as entertainment; TV guide; service pages of the editors. The number of magazines that are published by the magazines’ publishing houses are also assembled by email and telephone inquiries. They are available on an annual basis.

Descriptive statistics of the variables involved in the estimation are presented in Appendix B.

4 Econometrics

The facts that (i) the website–launching date is accurately observed only on a quarterly basis, (ii) that some magazines launch websites in the very same quarter (e.g. ‘ties’ as it is called in econometrics) and (iii) there are relatively few magazines that go online (e.g. there are few ‘failures’) make the Han and Hausman (1990) ‘ordered logit’ model an attractive econometric instrument for the present estimation problem. By contrast, the data features (ii) and (iii) make

the Cox partial likelihood model particularly unattractive while fully parametric approaches such as the popular Weibull model a priori impose restrictions that the data might not meet so that following this path is not attractive either.

The ordered logit model for duration data is semi-parametric since the baseline hazard — the failure rate at time τ conditional upon survival to time t (in the present context: the probability of going online at time τ conditional on not being online at time $t < \tau$ — is nonparametric while the estimation of the model parameters requires the assumption of exponentially distributed error terms. Another advantage is that unobserved heterogeneity can easily be introduced since the log-likelihood function takes on a closed form. The ordered logit model with unobserved heterogeneity following a Gamma-distribution never converged, however. Iterations were aborted with an estimated value of the variance of the Gamma-distribution close to zero. Trying alternative starting values for the variance-parameter was unsuccessful, leaning evidence that there is no unobserved heterogeneity of Gamma-form in the data.

The ordered logit model also conveniently allows for time-varying covariates since it only requires them to interact them with time dummies.³ The share of magazines that are online in a magazine’s own magazine group and the share of magazine readers that is only are such time-varying covariates that are hence interacted with time. Almost all other variables also change their values over time. They do not follow a trend, however, so that they are not considered as time-varying covariates.

The baseline idea of the ordered logit model is that the discrete dependent variable takes on a specific value if an unobserved ‘latent’ variable is in between two threshold parameters. In the present example, magazines go online in period t if the latent variable is in between the two threshold parameters δ_t and δ_{t-1} , where t denotes the period in which magazines can go online. The latent variable is a lin-

³I tested for time-dependency by regressing all explanatory variables involved in the estimation on a set of quarter dummies as well as on a linear and quadratic time trend.

ear combination (a ‘linear index’) of a vector of factors that influence magazines j ’s website launching decision, \mathbf{z}_{jt} , a corresponding parameter vector, $\boldsymbol{\gamma}$, and an unobserved factor that is denoted by ε_{jt} . The econometric model is described in some detail in Appendix C.

5 Specification and results

5.1 Specification

The empirical specification of the model follows the hypotheses listed in Subsection 2.1 so that the list of explanatory variables includes (1.) the natural logarithm of magazines’ semi-own price elasticity, calculated by a ‘nested logit’ model (see Appendix C), (2.) the natural logarithm of magazine total number of subscribers, (3.) the natural logarithm of the number of magazines published by the own publishing house, (4.) the natural logarithm of the number of advertising pages per issue, (5.) the share of magazines in the own magazine group that is online at time t and the total number of women’s magazines that is online — both variables capture ‘bandwagon’ effects —, (6.) three dummy variables for magazines below 12 years of age, between 12 and 22 years and between 23 and 49 years, with magazines older than 49 years as base category,⁴ (7.) the share of entertainment pages per issue and (8.) the natural logarithm of the share of magazine readers that is online. The specification also includes all linear time trend to pick up shocks to the website launching decision that are common to all magazines.

The two variables representing the ‘bandwagon effect’ and the share of magazine readers that is online are time-variant covariates. The ‘bandwagon effect’ covariate vary whenever another magazine launches a website. There are nine

⁴The thresholds represent that 25 per cent quantiles of the magazine age distribution.

distinct time period in which the number of websites differ: I/1996–IV/1996, I/1997–III/1997, IV/1997, I/1998–I/1999, II/1999–II/2000, III/2000, IV/2000, I/2001, II/2001–IV/2001 (see Table 1). Consequently, both ‘bandwagon effect’ variables are interacted with dummy variables for each of the nine time periods. The share of magazine readers that is online varies quarterly so that this variable is interacted by a full set of time period dummy variables.

5.2 Results

Ordered logit model estimation results are presented in Table ???. The durations are ordered from shortest duration to longest duration so that a negative coefficient indicates negative effects on late website launching (it indicates positive effects on early website launching). Except for the number of magazine subscribers which has an insignificant effect on the timing of website launching, all time-invariant variables carry the expected sign and are highly significant.

The coefficient estimates presented in Table ??? do not directly translate to marginal effects as in the linear regression model so that the coefficients are not informative with respect to the magnitude of the economic effects. Although marginal effects can easily be calculated and the associated standard errors, presenting them is not particularly appealing since they (i) differ between observations (which is why they are usually presented as evaluated at the means of the explanatory variables) and (ii) are different for different survival times (a table displaying marginal effects would have ten columns — one for each survival time). Table ??? therefore presents the change in the estimated latent variable, $z_{jt}\hat{\gamma}$, that is caused by a unit-change in the explanatory variables (the ‘semi-elasticity’) and the percentage change in the latent variable due to a one per cent change in one of the covariates (the elasticity). This semi-elasticity of the latent variable with

respect to the explanatory variables is given by

$$\psi_{z_{jt}\hat{\gamma}, z_{jt}^k} = \frac{\partial z_{jt}\hat{\gamma}}{\partial z_{jt}^k} \frac{1}{z_{jt}\hat{\gamma}} = \frac{\hat{\gamma}_k}{z_{jt}\hat{\gamma}}$$

where z_{jt}^k denotes the k th element of the vector of covariates of magazine j at time t and $\hat{\gamma}_k$ denotes the estimated coefficient corresponding to z_{jt}^k . The semi-elasticities vary across observations (and time) so that Table ?? displays the 5, 10, 50, 90 and 95 percentile of the semi-elasticities. Attention is also restricted to those magazines that have not launched a website in the analysis period since the semi-elasticities of those magazines that went online by construction carry the inverse sign of those magazines that are offline (the latent variable, z_{jt} , is negative for the early website launchers; see Appendix C).

The semi-elasticities presented in Table ?? replicate findings of Table ?? qualitatively. In addition, they give some guidance related to the numerical effect of the covariates on the timing of website launching. For example, if the number of advertising pages per issue increases by 200, the mean effect on the latent variable is $200 \cdot -0.0295 = -5.9094$: the latent variable decreases by -2.95. Since the mean of the latent variable is 8.5424, its mean value drops to 2.633. This relates to the threshold parameters, the δ 's, of Table ??: 2.633 lies in the interval 2.506 (δ_4) and 3.4755 (δ_5) so that the mean magazine would have gone online — all else being equal — in III/2000 if its number of advertising pages had increased by 200.

The percentage changes in the latent variable cause by a one per cent change in the covariates are

The time-variant variables are more difficult to interpret since the magnitude of the coefficients and their significance varies markedly over the time period. One clear results is, however, that the total number of women's magazines that is online does not have a significant effect on the timing of website launching — the coefficients are both separately and jointly insignificantly different from zero. The coefficients related to the share of magazines from the own magazine

group that is online are also jointly insignificant but five out of the nine coefficients are individually significantly different from zero. All of these coefficients carry a negative sign, thus indicating that an increase in the share of magazines from the same group with a website increases the probability of early website launching. The coefficient related to the within group online–share variables are also large quantitatively. The coefficient on the interaction between the within group online–share and period 1 is -4.3793 which implies that if all magazines with the own magazine group would have been online in this earliest time period, the latent variable had dropped by -4.3793, thereby inducing a large increase in the probability of early website launching.

In order to

Since the share of magazines in the own group that have a website is time–varying, it is instructive to look at

This implies that ‘bandwagon effect’ play an important role in a magazine’s decision to launch a website.

Table 2: Hypotheses and empirical findings

#	Variable	Expected effect	Actual effect
1.	Semi own-price elasticity of demand	—	—
2.	Magazine subscribers	+	insignificant
3.	Titles published by own publisher	+	+
4.	Advertising pages	+	+
5.	Bandwagon effect	+	+
6.	Magazine age	—	—
7.	Share entertainment	+	+
8.	Share readers online	+	+

Note: Table 2 summarizes the hypotheses derived in Subsection 2.1. A ‘—’ indicates a negative effect of the corresponding variable on early website launching, a ‘+’ indicates positive impact. significance at the one, five and ten per cent significance level respectively. For brevity, standard errors are displayed for the structural form equation only. F -tests show that the instruments are jointly insignificant in the reduced form demand equation and that they are jointly significant in the pricing and within-group market share equations.