Tilburg University

How cannibalistic is the internet channel? A study of the newspaper industry in the United Kingdom and the Netherlands

Deleersnyder, B.; Geyskens, I.; Gielens, K.J.P.; Dekimpe, M.G.

Published in:
International Journal of Research in Marketing

Publication date:
2002

Citation for published version (APA):
Deleersnyder, B., Geyskens, I., Gielens, K. J. P., & Dekimpe, M. G. (2002). How cannibalistic is the internet channel? A study of the newspaper industry in the United Kingdom and the Netherlands. *International Journal of Research in Marketing*, *19*(4), 337-348.

HOW CANNIBALISTIC IS THE INTERNET CHANNEL? A STUDY OF THE NEWSPAPER INDUSTRY IN THE UNITED KINGDOM AND THE NETHERLANDS

Barbara Deleersnyder[1]

Inge Geyskens[2]

Katrijn Gielens[3]

Marnik G. Dekimpe[4]

April 2, 2002

[1] Doctoral Candidate in Marketing, Catholic University of Leuven, Naamsestraat 69, 3000 Leuven, Belgium (E-mail: Barbara.Deleersnyder@econ.kuleuven.ac.be; Tel: +32-16-326 942; Fax: +32-16-326 732).

[2] Assistant Professor of Marketing, Tilburg University, Warandelaan 2, 5000 LE Tilburg, the Netherlands (E-mail: I.Geyskens@kub.nl; Tel: +31-13-466 80 83; Fax: +31-13-466 28 75).

[3] Assistant Professor of Marketing, Tilburg University, Warandelaan 2, 5000 LE Tilburg, the Netherlands (E-mail: K.Gielens@kub.nl; Tel: +31-13-466 20 55; Fax: +31-13-466 28 75).

[4] Professor of Marketing, Catholic University of Leuven, Naamsestraat 69, 3000 Leuven, Belgium (E-mail: Marnik.Dekimpe@econ.kuleuven.ac.be; Tel: +32-16-326 957; Fax: +32-16-326 732), and Professor of Marketing Management, Erasmus University Rotterdam, the Netherlands.

HOW CANNIBALISTIC IS THE INTERNET CHANNEL? A STUDY OF THE NEWSPAPER INDUSTRY IN THE UNITED KINGDOM AND THE NETHERLANDS

ABSTRACT

During the past decade, irrational exuberance has turned into a possibly equally irrational pessimism about what the Internet can accomplish. The fear of getting ruined through cannibalization losses has recently deterred many firms from deploying the Internet as a distribution channel. But do Internet channels really cannibalize firms' entrenched channels, or is this widely held assumption exaggerated? To answer this question, we apply recent structural-break time-series econometrics to quantify the impact of an Internet channel addition on the long-run performance evolution of a firm's established channels. Using a database of 85 Internet channel additions over the last ten years in the newspaper industries of the U.K. and the Netherlands, we find that the often-cited cannibalization fears have, at least in this information-goods industry, been largely overstated. The Internet therefore need not be disruptive to established companies and channels. This does, however, not imply that firms enjoy free play in setting up Internet channels. In cases where the newly established Internet channel too closely mimics the entrenched channels, substantial cannibalization is more likely to take place.

Keywords: Internet channel, Cannibalization, Structural-break time-series analysis

1. INTRODUCTION

For decades, the increasingly diverse needs of an ever more fragmented market have compelled firms to increase their product variety. Recently, firms are also turning to a second strategy to better address these diverse consumer needs: they increase their channel variety. Both strategies are risky, however, in that a new product or channel may cannibalize the sales of existing products and channels. While many marketers consider cannibalization when assessing the (potential) success of new product introductions (e.g., Mason & Milne, 1994; Reddy, Holak & Bhat, 1994), there is hardly any knowledge about channel cannibalization. This may explain why Frazier (1999, p. 232) recently observed that "the ultimate effect [of increasing channel variety] on … product sales is … unclear". This lack of research on channel cannibalization is surprising, especially since the issue has become so pertinent through the recent frenzy surrounding Internet channel additions. Specifically, absent scientific research, and after the first Internet euphoria settled down, practitioners now "widely *assume* that the Internet is cannibalistic [and] will replace all conventional ways of doing business" (Porter, 2001, p. 73, italics added).

This fear that the Internet is cannibalistic has rapidly pervaded the trade press, and is shared by both resellers and manufacturers. Resellers take the stance that the manufacturer who disintermediates by going online is stealing sales that are rightfully theirs. They regard the Internet as a disruptive force that will cannibalize their business, even to the extent that they are made obsolete. In turn, resellers' cannibalization fears have alarmed manufacturers, many of whom now view Internet channels as a significant source of channel conflict that may cause resellers to provide lower support for the manufacturer's products, or even to discontinue their distribution (Frazier, 1999). In a recent large-scale survey of Belgian firms, Konings and Roodhooft (2000) find that of all firms that have access to the Internet, only 15% use that site as an additional channel to actually sell products online. In the U.S., recent estimates indicate that over 40% of all businesses do not yet sell online (www.nua.com/surveys), a number that increases to over 70% when excluding the largest businesses (Washington Post, 2001). The fear of upsetting their entrenched channels through cannibalization has deterred many of these firms from deploying the Internet as a distribution channel (Gilbert & Bacheldor, 2000). Other manufacturers have taken their fear one step further. Levi Strauss, for example, already withdrew its Internet channel after one year, mainly because of backlash from resellers and out of fear of getting ruined through cannibalization losses (Dugan, 1999).

In sum, many assume that the Internet is cannibalistic and will eventually replace conventional ways of doing business. Is this widely held assumption correct or exaggerated? Moreover, if cannibalization exists, is the downturn in performance of a permanent nature? These questions, in essence, are the focus of the current study. To answer these questions, we propose recent structural-break time-series econometrics to quantify the impact of an Internet channel addition on the long-run performance evolution of the firm's established channels. Our subsequent empirical application is situated in the newspaper industry. Based on a careful investigation of the cannibalization effects for 85 Internet channel additions over the last ten years in the British and Dutch newspaper industries, we attempt to provide empirical generalizations as to the magnitude and nature (permanent vs. temporary) of online cannibalization effects. The newspaper industry offers an interesting setting to test the validity of the cannibalization assumption because publishers have taken the lead in exploiting the Internet as a new distribution channel. As such, the publishing industry tends to "act as the pacesetter for the information society" (European Commission, 1996, p. 1), and may foreshadow trends that will occur more slowly in other industries.

2. LITERATURE REVIEW

Although there is surprisingly limited empirical work on channel cannibalization, several researchers have expressed their concern about the cannibalization hazards companies face when they add an Internet channel to their entrenched channels (e.g., Alba et al., 1997; Brynjolfsson & Smith, 2000; Coughlan, Anderson, Stern, & El-Ansary, 2001). Both the academic and the trade press typically proclaim cannibalization effects to be present, as is reflected in the following quotes:

> *"Established businesses that over decades have carefully built brands and physical distribution relationships risk damaging all they have created when they pursue commerce in cyberspace."* (Ghosh, Harvard Business Review, 1998, p. 126)

> *"Call it survival by suicide. … Today's corporate leaders are building separate new e-enterprises designed to compete head-on with the mother company."* (Useem, Fortune, 1999, p. 121)

The fear for online channel cannibalization is nourished by four observations. First, sales may shift from the entrenched channels to the new Internet channel when the latter provides more appealing features to the target audience, such as a quasi-unlimited amount of information on product attributes, increased customization, time savings, etc. (Alba et al., 1997). Second, the Internet is likely to increase the power of the consumer, as price comparisons across firms can be performed quickly and easily. The resulting increase in price competition may explain why online prices for homogenous products are often found to be lower than those in conventional outlets (Brynjolfsson & Smith, 2000), which may cause sales to shift even further. Third, total sales may also decrease when consumers buy less through the new channel than through their old channel, e.g. when there are less impulse purchases through the Internet (Machlis, 1998). Fourth, existing channels may view the new Internet channel as unwelcome competition. When this happens, the firm's entrenched channels may lose motivation, and can reduce their support for the firm's products or even discontinue their distribution. This may, in turn, result in more brand switching towards the firm's competitors, and hence decreased total sales (Coughlan et al., 2001).

Unfortunately, in spite of the above theoretical observations, and at a time when there is much debate about Internet channel additions in the popular press, empirical evidence on the performance effects of Internet channel additions is still lacking, with the exception of Geyskens, Gielens and Dekimpe (2002) and Ward and Morganosky (2000). However, the former application, which is also situated in the pace-setting newspaper industry, focuses on the total value implications of Internet channel additions (as measured by stock market returns), while the separate revenue impact of cannibalization is not explicitly considered nor quantified. In the multiple-industry study by Ward and Morganosky (2000), cannibalization is proxied by relating consumers' self-reported channel usage to information search in particular product categories. Specifically, consumers were asked to check whether or not they (a) bought and (b) searched for information on the product within the past six months from online outlets, catalogs, and/or retail stores. Since online product information search generated offline sales but not vice versa, the authors conclude that online channels do not cannibalize offline sales. Unfortunately, their cannibalization measure is very crude and makes abstraction of the *magnitude* of the cannibalization effect. Moreover, the above two studies approach cannibalization solely as a short-run phenomenon, a characteristic they share with the empirical *product* cannibalization literature. This short-term focus of existing studies is likely to contribute to managerial myopia (Dekimpe & Hanssens, 1999). Clearly, if shortsightedness is to be avoided, empirical studies that derive the long-run impact of (Internet) channel additions are essential. Or, as Frazier pointedly put it: "models need to be developed to help determine when multiple channels need to be relied on [since] the *ultimate* effect on *long-term* product sales is […] unclear" (1999, p. 232, italics added).

To this extent, we examine whether the long-run evolution of the incumbent channels' revenues is affected. Specifically, recent advances in time-series econometrics will be used to determine whether the Internet channel addition caused *either* a persistent growth slowdown *or*, in the absence of any growth impact, a sustained level drop in the company's traditional revenue streams.

3. METHODOLOGY

Over the last few years, time-series concepts such as unit-root and cointegration tests, error-correction models, and impulse-response and persistence estimates have become popular in the marketing literature to quantify the long-run impact of price promotions (Nijs, Dekimpe, Steenkamp, & Hanssens, 2001; Srinivasan, Popkowski Leszczyc, & Bass, 2000), advertising expenditures (Dekimpe & Hanssens, 1995), and distribution changes (Bronnenberg, Mahajan, & Vanhonacker, 2000). All of these studies, however, look at the over-time performance implications of *regular, small* shocks, such as an unexpected one-cent price reduction, a one-unit/one-period increase in advertising spending, or a gradual increase in distribution coverage. *All these small shocks are assumed not to change the underlying data-generating process* (Pesaran & Samiei, 1991).

The marketing event we consider, i.e. the addition of an Internet channel, is not quantifiable in a similar, continuous way. Yet, its impact on performance may well be substantial (Hanssens, Parsons, & Schultz, 2001, p. 293), and can even change the underlying data-generating process. Dekimpe and Hanssens (2000, p. 191), for example, point out that "the constant parameter assumption in many persistence-based models may no longer be appropriate to test the long–run implications of Internet-related decisions". We therefore extend the aforementioned studies to explicitly account for the fact that the event of interest may represent a different kind of shock to the system, in that it is (a) large, (b) infrequent, and (c) may structurally alter the long-run properties of the time-series (Balke & Fomby, 1991), causing a different steady-state growth (or decline) path to emerge (Ben-David & Papell, 1995, 1998).

Specifically, we start our testing procedure with the structural-break unit-root test, as described in Perron (1989, 1994):

$$Y_t = \alpha + \beta T + \left[\theta DU_t + \gamma DT_t + \delta D(TB)_t\right] + \rho Y_{t-1} + \sum_{i=1}^{k} c_i \Delta Y_{t-i} + \sum_{s=2}^{S} \eta_s SD_{st} + \varepsilon_t \qquad (1)$$

with Y_t the log-transform of the performance measure of interest,[1] T a deterministic trend variable, SD_{st} a set of seasonal dummy variables, ε_t a series of white-noise residuals, and DU_t, DT_t and $D(TB)_t$ three structural-break dummy variables, discussed in more detail below. Making abstraction of the terms between square brackets, Eq. (1) becomes the well-known Augmented Dickey-Fuller (ADF) test.[2] The lagged first differences are added to ensure that the residual series is indeed white noise, while the parameter ρ is the key parameter of interest to separate (level or trend) stationary ($\rho < 1$) from evolving, unit-root ($\rho = 1$) series.[3]

---

[1] This transformation is common practice in time-series analyses, as it allows reducing potential heteroskedasticy in the data. Moreover, the first difference of the log-transformed series provides a good measure for the growth rate of the original series (Franses & Koop, 1998).

[2] See Enders (1995) for a general discussion, and Nijs et al. (2001) for a recent marketing application.

[3] Following Perron (1989, 1994), a general to specific recursive procedure is used for selecting the truncation lag parameter *k*. Starting with *k* equal to 8, it is successively reduced until a model is found where the last lag is significant, while the one-higher lag is no longer significant. If no lags are significant, *k* is set to zero. Following common practice (Perron, 1989; Zivot & Andrews, 1992), the criterion for testing the significance on the last lag is set to 1.60.

We extend the standard ADF test with three dummy variables to allow the exogenous event of interest, i.e. the Internet channel addition, to cause a structural change in the growth rate and/or level of the conventional channel's performance. As is common in the structural-break literature (see e.g. Ben-David & Papell, 1995, 1998), we allow for a structural change in the trend function of the data-generating process, and do not account for changes in e.g. the model's autoregressive parameters or error variance. This approach is completely in line with the intervention-analysis approach of Box and Tiao (1975),[4] in that extraordinary events are separated from the regular noise function, and modeled as a change (intervention) in the deterministic part of the time-series model (Perron, 1994). Denoting *TB* as the potential break date, the dummy variable DT_t takes the value of $t\text{-}TB+1$ when $t \geq TB$, and zero otherwise. As such, it allows for a change in the growth rate of the trend curve at the time of the channel addition. DU_t, which is a step dummy variable that takes on the value of one when $t \geq TB$ and zero otherwise, is used to allow for a level shift at the time of the introduction, while $D(TB)_t$ is a pulse dummy taking the value of one when $t = TB$ and zero otherwise. This third dummy variable is only added to ensure that the test statistic on ρ remains invariant in finite samples to the value of the change in the intercept under the null hypothesis of a unit root (Perron, 1994), but has no substantial interpretation in our context.

When $\rho < 1$, the unit-root null-hypothesis is rejected and hypotheses tests concerning the other parameters can be carried out using conventional *t* and/or *F* tests (Holden & Perman, 1994; Perron, 1994). When γ is significant and negative, the introduction of the new Internet channel has a cannibalizing effect in that it initiates a decline (when β was equal to zero) in the performance evolution of the conventional channel, slows down its growth (in case $\beta > 0$), or accelerates an already ongoing decline (for $\beta < 0$). The most dramatic change occurs if

[4] See e.g. Leone (1987) for a marketing application.

$|\gamma| > |\beta|$ with $\beta > 0$ and $\gamma < 0$, in which case the sign of the growth path would be reversed after the Internet channel addition, a situation referred to as a growth meltdown (rather than a mere slowdown) by Ben-David and Papell (1998).

The coefficient γ, however, measures only the *immediate* impact on the series' growth rate. To quantify the full, *long-run* growth impact, we rewrite Eq. (1) as:

$$Y_t = \alpha + \beta T + \theta DU_t + \gamma DT_t + \delta D(TB)_t + \sum_{i=1}^{k+1} a_i Y_{t-i} + \sum_{s=2}^{S} \eta_s SD_{st} + \varepsilon_t \tag{2}$$

and compute the difference between the long-run growth (ΔY_{LR}) of this autoregressive series before and after the Internet-channel addition:

$$\Delta_{\text{LR, after}}\, Y - \Delta_{\text{LR, before}}\, Y = \frac{\beta + \gamma}{1 - \sum a_i} - \frac{\beta}{1 - \sum a_i} \tag{3}$$

The long-run, or *steady-state,* growth rate of a series is time-subscript independent, and is obtained as $\lim_{t \to \infty} \Delta Y_t$. Assume, for ease of exposition, the following first-order autoregressive process with normal starting conditions $Y_0 = 0$ and with the error term omitted:

$$Y_t = \alpha + \beta T + a_1 Y_{t-1} \tag{4}$$

In this stylised example, it is easy to show that ΔY_1, ΔY_2, ΔY_3, … equal $[\alpha + \beta]$, $[a_1 \alpha + (1 + a_1)\beta]$, $[a_1^2 \alpha + (1 + a_1 + a_1^2)\beta]$, … Looking in steady state, i.e. letting $t \to \infty$, a long-run growth rate of $\beta/(1 - a_1)$ is obtained. When working with higher-order autoregressive models, this expression for long-run steady-state growth generalizes to $\beta/(1 - \sum a_i)$ (see Ben-David & Papell, 1995 for a formal treatment). Similarly, once the trend break dummy DT_t in Eq. (2) becomes effective, the 'new' steady-state growth rate becomes $(\beta + \gamma)/(1 - \sum a_i)$. Standard errors on (the difference in) these steady-state growth rates can subsequently be derived using the well-known delta-method.

When $\gamma/(1-\sum a_i)$ is not significant, the traditional channel does not experience a long-run growth slowdown because of the Internet channel addition, but its level may be reduced permanently. To assess whether, in the absence of a growth change, cannibalization effects show up in the form of a level drop, we re-analyze Eqs. (1) and (2) without DT_t, and test for the significance of θ. Depending on the value of the autoregressive parameters a_i (i = 1, …, k + 1) in Eq. (2), part of this initial loss may either become persistent, or the initial loss may even be intensified in subsequent periods. Using a similar logic as before, this long-run effect can be shown to equal $\theta/(1-\sum a_i)$.

<u>When $\rho = 1$</u>, the unit-root null hypothesis is not rejected, causing t_θ and t_γ to no longer be asymptotically normally distributed (Holden & Perman, 1994; Perron, 1994). We therefore follow Ben-David and Papell (1998) and Franses (1998), in that we first impose the unit root found through Eq. (1), and estimate the following equation in first differences:

$$\Delta Y_t = \alpha + [\gamma DU_t + \theta D(TB)_t] + \sum_{i=1}^{k} a_i \Delta Y_{t-i} + \sum_{s=2}^{S} \eta_s SD_{st} + \varepsilon_t \tag{5}$$

The γ parameter associated with the step dummy DU_t then gives the immediate impact on the growth rate, while the θ parameter associated with the pulse dummy $D(TB)_t$ quantifies immediate level shifts (see also Balke & Fomby, 1991). The corresponding long-run effect on the steady-state growth rate can then be shown to equal $\gamma/(1-\sum a_i)$ (Ben-David & Papell, 1998). In the absence of any growth impact, we again impose a common slope for the trend function before and after the Internet channel introduction, i.e. we re-analyze Eq. (1) and Eq. (5) without DU_t, and test for the significance of $\theta/(1-\sum a_i)$. This parameter allows testing whether cannibalization effects show up in the form of a persistent level drop.

In sum, long-run cannibalization effects will be quantified through the decline in the traditional channels' steady-state *growth rate*, or, in the absence of any growth impact, through the size of the persistent reduction in their performance *level*.

4. DATA DESCRIPTION

Our empirical application is situated in the newspaper industry. This industry offers an interesting setting to test the validity of the cannibalization assumption for two reasons. First, cannibalization is particularly imminent when *information* products are delivered online (Shapiro & Varian, 1999). Speed of delivery, easy search facilities, and customization options tend to increase the value of the information product in the online channel over existing offerings through traditional channels. Second, whereas the newspaper industry shares the above characteristic with other information goods industries, it has the additional cannibalization-prone characteristic that most publishers are still reluctant to charge for their online editions. As such, any switching between conventional and online channels should negatively affect circulation revenue. Moreover, the newspaper industry represents an old and mature industry, where competition is mostly a zero-sum game (Abbring & Van Ours, 1994). Cannibalization fears when going online are therefore even more realistic (see e.g. U.S. Department of Commerce, 1998).

Cannibalization losses may be reflected in a net reduction in either one of the newspaper's existing income streams: circulation revenue obtained from the number of copies sold and advertising income (Abbring & Van Ours, 1994). With respect to circulation, Mitchell (2001) reports that 50% of all publishers fear that their Internet operations may inflict long-run harm on their print business. Gilbert (2001), on the other hand, argues that, if positioned correctly, print and online versions may actually operate in a complementary way, in that the latter may attract new readers not currently subscribing to the print edition. A similar uncertainty exists on the extent of cannibalization that will arise in the advertising arena. First, newspapers' advertising incomes are positively correlated with the size of their subscription base, for which the impact is (as argued before) still unclear. Second, Silk, Klein and Berndt (1999) argue that newspapers are a potentially vulnerable medium to lose their advertisers to the Internet, even though the extent of this loss will again depend on the relative positioning of both media.

Data were collected for 85 online newspaper introductions in two European countries, the U.K. and the Netherlands. Information on the online introduction dates were gathered by contacting each individual newspaper, and extensively validated through both newspaper archive searches and the Dow Jones Interactive Publication Library. The earliest launch dates were November 1994 and July 1995, whereas the latest launches took place in October 1999 and April 2000 for the U.K. and the Netherlands, respectively.

Circulation data were collected for 67 daily U.K. newspapers that went online within the available data period. Circulation is expressed as the average number of copies sold daily. The data are obtained from the 'Audit Bureau of Circulations' (ABC). We have 138 monthly observations for 12 national and 55 regional publications (January 1990 until June 2001). On average, 42 (minimum = 20; maximum = 79) observations are available after the introduction date of the online version.

Advertising revenues from the traditional paper edition were obtained from 18 Dutch newspapers that introduced an online version of their paper within the considered time period. The data are expressed in constant guilders and were provided by the 'Bureau voor Budgetten Controle' (BBC). For both national (nine) and regional newspapers (nine), we have 130 monthly observations (January 1990 until October 2000). On average 41 (minimum = 6; maximum = 63) observations are available after the introduction date of the online version.

5. EMPIRICAL RESULTS

Cannibalization losses may be reflected in a net reduction in one (or both) of the newspapers' two existing income streams: circulation and advertising income. We first discuss findings on the circulation data (Section 5.1), followed by the results for advertising (Section 5.2). Section 5.3 provides several robustness checks on our main findings.

5.1. Circulation results

The unit-root null hypothesis is rejected in 14 instances based on the regular ADF test (using the conventional 5% significance level), and in five additional cases when allowing for a structural break at the time of the Internet channel addition. This confirms prior simulation evidence in Perron (1989) that a failure to account for a major exogenous event tends to bias regular unit-tests towards non-rejection of the null hypothesis.

Long-run, steady-state, growth rates are summarized in column 2 of Table 1, and were derived based on the parameter estimates in Eq. (2) for the 19 level/trend stationary series, while Eq. (5) was used for the 48 unit-root series. Given our interest in the presence of cannibalization, directional (one-sided) tests are used.[5]

Insert Table 1 about here

Steady-state growth rates showed a significant decline after the Internet channel introduction in only five series (i.e. a mere 7% of cases). Even though our main interest lies in cannibalization, it is worth noting that in ten instances a positive steady-state growth-rate change was observed ($t > 1.64$). Interestingly, the newspaper with the largest positive significant break is the Financial Times, the only English newspaper focusing almost exclusively on economic issues. This finding is in line with Pauwels and Dans (2001), who argue that economically-oriented newspapers are likely to experience positive spillover

---

[5] Note that we also need one-sided *p*-values as input for our subsequent meta-analysis (Rosenthal, 1991).

effects from an online channel addition. The average long-run growth impact across all 67 newspapers indicates a small but positive effect, obtained from about an equal number of negative (35) and positive (32) changes that are also approximately equal in absolute value (-.0014 and .0018).[6]

One could argue that the power of each of the individual tests may not be excessively high. Yet, we concur with Dekimpe, Hanssens and Silva-Risso (1999, p. 280) that the *combined* evidence of no growth slowdown in more than 90 % of the instances is very strong evidence. On the other hand, one might still object, based on analyses of the parameter sign, that even though there are only 5 significant growth slowdowns, the number of negative changes is quite substantial (35). We therefore conducted a meta-analysis to test for the presence of cannibalization using the one-sided *p*-values associated with the change in the long-run growth rate after the Internet channel introduction, using the method of adding weighted *Z*'s (Rosenthal, 1991). This offers a stronger test for the presence of cannibalization than the significance of the individual impact estimates. Indeed, when the impact on many newspapers is weak (e.g. $p < .20$) but in the same direction, case-by-case tests would not reveal any significant cannibalization impact to worry about. Still, the *collective* evidence, as reflected in the meta-analysis, would suggest a highly significant effect (see Rosenthal, 1991 for technical details, or Dekimpe, Steenkamp, Mellens, & Vanden Abeele, 1997 for a marketing application). However, also the collective evidence showed no support for the

---

[6] Interestingly, most of the circulation series showed a negative evolution, both before and after the Internet channel addition, supporting common wisdom that the newspaper industry is an industry in decline (Abbring & Van Ours, 1994). A significant negative trend break in such series indicates that the introduction of a new Internet channel accelerates an already ongoing decline (rather than slowing down its growth).

presence of a significant cannibalization threat in the newspapers' circulation-revenue growth (p = .94).

Cannibalization may not only result in a *growth* slowdown, however. It may also show up in a *level* drop. The 52 series where the |t-statistic| on γ was smaller than 1.64 in Eq. (2), were therefore re-analyzed after imposing a common pre and post growth-rate (i.e. we deleted DT_t from Eq. 2 and DU_t from Eq. 5), and we tested for the significance of $\theta/(1-\sum a_i)$ (column 3, Table 1). Four significant negative level shifts were found. When focusing on the average level impact across all 52 series, a pattern quite similar to that of the growth rate change can be observed. Again, a very small average positive effect is found, based on an equal number of negative (26) and positive (26) values that are also almost equal in absolute size (-.0128 and .0130). Moreover, the Rosenthal test did, once more, not reveal a significant level drop (p = .58).

5.2. Advertising results

As with the circulation data, most advertising series are classified as having a unit root: based on the structural-break (regular) test, the unit-root null hypothesis was rejected in 4 (3) instances. Long-run, steady-state, growth rates are summarized in column 4 of Table 1. Of the 18 cases examined, only one experienced a significant reduction in steady-state growth rate ($\gamma/(1-\sum a_i)$ = -.0051; t = -2.27).[7] Even though only one newspaper experiences a significant long-run growth slowdown, the number of negative long-run growth-rate changes is substantial (11). Moreover, the average growth impact across *all* 18 observations is negative

---

[7] For one newspaper, a marginally significant growth *increase* is observed ($\gamma/(1-\sum a_i)$ = .0066; t = 1.67). Again, this is the most economically oriented newspaper of our sample, offering further support to the aforementioned conjecture of Pauwels and& Dans (2001).

(-.0030). However, as with the circulation data, also the collective evidence from the Rosenthal test did not reveal a significant cannibalization effect (p = .13).

The 16 newspapers with a |t-statistic| for γ less than 1.64 in Eq. (2), i.e. whose long-run growth was not affected by the Internet channel addition, were subsequently re-analyzed after imposing a common slope. None of the newspapers experienced a significant reduction in their steady-state performance level because of the Internet channel addition (column 5, Table 1). Also the meta-analysis did not reveal such an effect (p = .98).

5.3. Robustness checks

Based on this individual and collective evidence, we can conclude that the fear for cannibalization in terms of the newspapers' circulation and advertising income appears to be overrated. To assess the robustness of this substantive conclusion, we conducted a number of validation checks. Specifically, we (1) assessed the sensitivity of our results to the level of temporal aggregation in the data, (2) tested whether the finding of no cannibalization was driven by the lack of sufficient post-event data, and (3) correlated the growth and/or level changes with the stock-market reactions reported in Geyskens et al. (2002).

5.3.1. Sensitivity to the level of temporal aggregation

Prior research has demonstrated that both unit-root tests (Pierse & Snell, 1995) and inferences about the autoregressive parameters (Rossana & Seater, 1995) may be sensitive to the level of temporal aggregation in the data. Following Nijs et al. (2001), we doubled our temporal aggregation level from a monthly to a bi-monthly level.

Our substantive results were not affected. In terms of the circulation data, the same outcome was obtained for the structural-break unit-root tests in more than 80% of the cases. Seven newspapers were found to have a significant negative growth-rate change in the bi-monthly series (as opposed to five when working with monthly data), and the collective evidence was again very similar: the average change in steady-state growth is approximately twice as large as for the monthly analysis (-.0029 versus -.0014 for the negative changes, and .0036 versus .0018 for the positive changes), while the Rosenthal test, in accordance with the monthly analyses, showed no significant impact, neither for the trend breaks (p = .99) nor for the level shifts (p = .89).

For the advertising data, none of the unit-root test outcomes was affected. In terms of their long-run growth rate, a significant growth slowdown was found for the same newspaper, with the change in its steady-state growth rate (-.0089) about twice the change in its monthly growth rate (-.0051). As before, the average change in growth rate across all 18 observations is approximately twice as large as for the monthly analysis (-.0111 versus -.0065 for the negative changes, and .0085 versus .0030 for the positive changes), and the meta-analytic Rosenthal test continued to show no significant impact (p = .24). As for the level shifts in advertising income, we again found none of the individual level shifts to be significantly negative, and the meta-analytic test result was again not significant (p = .97).

5.3.2. Sensitivity to the timing of the Internet channel introduction

One could argue that for the more recent Internet channel additions, insufficient post-event data points were available to detect cannibalization. As indicated before, on average, 42 post-event circulation observations (minimum = 20; maximum = 79) were available, and 41 post-event advertising observations (minimum = 6; maximum = 63). If the argument above would be valid, however, we would expect more evidence of cannibalization in those series that experienced the Internet channel addition earlier. Two test procedures for this contention were implemented, a regression of the long-run growth-rate/level changes against the introduction time of the Internet edition, and a split-half analysis.[8]

For the circulation series, we first ran a regression of, respectively, the change in long-run, steady-state, *growth* rate (using all 67 observations) and of the change in long-run *level* (based on the 52 observations mentioned earlier) on the time of the Internet channel introduction. No significant relationship was found (β = -2.53*10^{-6}, p = .89 and β = -1.96 *10^{-4}, p = .36). Second, the Rosenthal test was conducted on two subsamples, constructed according to a median split on the entry-timing variable. Again, in none of the analyses, any collective evidence of cannibalization was found, neither in terms of a growth slowdown (p = .99 for early entrants, and p = .49 for late entrants) nor in terms of a level reduction (p = .72 for early entrants, and p = .63 for late entrants).

In terms of the newspapers' advertising figures, the same two test procedures were applied. The regression against the time of entry did not find any positive relationship between the timing of the Internet channel introduction and the change in either long-run growth (based on 18 observations) or long-run level (based on 16 observations). Rather, the slope coefficient for the long-run growth rate turned out to be negative rather than positive (β = -2.62*10^{-4}, p = .014) and the long-run level shifts showed again no relation (β = 7.39*10^{-5}, p = .95). Similarly, the Rosenthal test on the subsamples of early, respectively, late entrants was never significant, neither in terms of their steady-state growth rate (p = .18 for early entrants, and p = .26 for late entrants), nor in terms of their long-run level (p = .69 for early entrants, and p = .99 for late entrants).

---

[8] No heteroscedasticity was found using the White test. We therefore applied OLS instead of WLS (see Nijs et al., 2001 for a similar approach).

5.3. Linkage with the stock-market reaction to the Internet channel introduction?

Geyskens et al. (2002) argue that Internet channel additions may have value-enhancing (e.g. demand expansion, higher prices, and lower physical-distribution and/or transaction costs), as well as value-destroying (e.g. *cannibalization*, lower prices, and higher costs) effects. They test their framework in the same industry through a financial event study. Arguing that financial markets are efficient and therefore should reflect all relevant information about these various factors, they report (a) a positive average stock-market reaction around the event date, as reflected in a cumulative average abnormal return (CAAR) around the event day of .71%,[9] and (b) a mixture of both positive and negative CAARs when looking at the individual newspapers.

Across the two countries considered in our study, 44 newspapers also appeared in the Geyskens et al. (2002) sample. Based on those 44 observations, a significant positive correlation is found between these newspapers' CAARs and their change in steady-state growth rate (Pearson correlation coefficient = .33, p = .029). Of the newspapers that received a positive (negative) stock-market reaction, 64 % (63%) were characterized by a positive (negative) change in their steady-state growth. This result is encouraging, especially when considering that the cannibalization threat is just one of the many value enhancing/destroying factors identified in the conceptual framework of Geyskens et al. (2002), all of which are supposedly reflected in the ultimate stock-market reaction. The relationship between the CAARs and the level shifts is weaker, resulting in an insignificant correlation (p = .41).

[9] The event window considered was [0,1] days.

6. DISCUSSION

During the past decade, irrational exuberance has turned into a possibly equally irrational pessimism about what the Internet can accomplish. The fear of getting ruined through cannibalization losses has recently deterred many firms from deploying the Internet as a distribution channel. Caught up in this general fervor, others have already withdrawn their Internet channels only shortly after having established them. But do Internet channels really cannibalize firms' entrenched channels? Or is this widely held assumption exaggerated and are practitioners making fundamental mistakes by shying away from this new channel? Unfortunately, this issue of high managerial importance has barely been touched on in empirical research. The time has come to move away from jumping to the presumption that the Internet is automatically cannibalistic and see the Internet for what it is.

Using a database of 85 Internet channel additions over the last ten years in the British and Dutch newspaper industries, we find that the often-cited cannibalization fear has been largely overstated. Relatively few newspapers in our sample experience a significant drop in their circulation or advertising revenues. This result may imply that there is only little overlap between customers using the traditional channel and those preferring the online channel. Indeed, a number of researchers have recently argued that the readership profile of online newspapers tends to be younger, higher educated, mainly male and more technology oriented than the majority of the print readers (e.g., Nicholson, 2001; Pauwels & Dans, 2001). Similarly, the overwhelming majority of online advertisers are not print advertisers. Key advertising customers in print are local department stores, grocery chains, and retail clients, whereas most Internet advertising is placed by sellers of computer-related products and services (Gilbert, 2001; Silk, Klein & Berndt, 2001).

Still, this does not imply that firms have free play in setting up Internet channels. An appropriate positioning is still called for, as recently argued by, among others, Gilbert (2001) and Silk et al. (2001). Indeed, when the new channel is positioned as too close a copy (substitute) to its traditional counterpart, cannibalization will more likely take place. Support for this contention is found when comparing newspapers that experienced significant cannibalization losses in their circulation revenues (9) with those that did not (58) in terms of product similarity (overlap) between the online and print version of the product. Data on product similarity were obtained by contacting the newspapers' webmasters, and asking them to indicate the percentage overlap between the online and print version of the newspaper at the time the Internet edition was first launched, an operationalization also adopted in Gilbert (2001). A *t*-test on the difference in mean similarity across both groups strongly indicates that newspapers' circulation revenues are more likely to get cannibalized when there is a high overlap between their online and offline versions (mean similarity is 78% for cannibalized newspapers versus 45% for non-cannibalized newspapers; $p = .0008$).

In sum, our conclusions are encouraging. The threat of cannibalization appears to be considerably lower than widely assumed. The Internet rarely cannibalizes traditional channels. The Internet therefore need not necessarily be disruptive to established companies and channels. Too often, change is confused with disruption. Disruption means invalidating or making substantially less important the advantages of incumbents (Bower & Christensen, 1995). The Internet does not invalidate the importance of entrenched distribution channels. Firms can have both together, and can even create some synergies from a diverse, yet well positioned, channel portfolio.

Limitations and further research. The present study has various limitations, which offer immediate avenues for future research. First, we treated the potential break date as exogenous, i.e. we made full use of prior (managerial) knowledge on the timing of the event. This practice has been criticized as it would allow the researcher to "cherry-pick" the most convenient location of a potential break (see e.g. Christiano, 1992). In our case, however, the managerial information on the timing of the event came from a truly exogenous source, and is objectively known in the market. As such, it was by no means a "convenient", ex post (e.g. after a visual data inspection) choice on the part of the authors (see Perron, 1994 for an extensive discussion on the topic). Still, one could let the data suggest endogenously the most likely break date (as advocated, for example, in Vogelsang, 1997 or Zivot & Andrews, 1992), and see whether the Internet channel introduction coincides with (or is located closely to) this break point. Second, even though no significant relationship was found between the occurrence of cannibalization and the length of the time period after the event, care should be exerted when extrapolating our findings too far outside the sample range. Specifically, our conclusions are based on the assumption that no other, not yet anticipated, technological discontinuity will take place, while the constant-parameter assumption for the autoregressive parameters of the model does not take into consideration that, as multiple years pass by, both on- and offline readerships may eventually start to become closer (Silk et al., 2001). Third, there is the issue of external validity. We conjecture that in the absence of cannibalization effects in the cannibalization-prone newspaper industry, the widely claimed cannibalization threat would also appear to be overrated for other, less vulnerable, industries. Yet, we do fully acknowledge that our sample is limited to firms from a single industry. Given that this industry may have some peculiarities, such as the possibility to consume the product (information) in bits and pieces "without destroying" the original physical piece, we strongly suggest for future research to explore to what extent our results are generalizable to other industries. Fourth, the non-availability of data on both revenue streams for the same set of newspapers prevented us from analyzing the interaction that is to be expected between circulation and advertising (Abbring & Van Ours, 1994). Finally, given that cannibalization effects are largely absent, future research could analyze how firms can achieve positive spillover effects from an Internet channel edition, as was obtained in our sample for the more economically-oriented newspapers.

Acknowledgements

The second author gratefully acknowledges support from the Dutch National Science Foundation (NWO) under grant No. PPS-490-00-245.

References

Abbring, J.H., & Van Ours, J.C. (1994). Selling news and advertising space: The economics of Dutch newspapers. *De Economist, 142* (2), 151-170.

Alba, J., Lynch, J., Weitz, B., Janiszewski, C., Lutz, R., Sawyer, A., & Wood, S. (1997). Interactive home shopping: Consumer, retailer, and manufacturer incentives to participate in electronic marketplaces. *Journal of Marketing, 61* (July), 38-53.

Balke, N.S., & Fomby, T.B. (1991). Shifting trends, segmented trends and infrequent permanent shocks. *Journal of Monetary Economics, 28* (1), 61-85.

Ben-David, D., & Papell, D.H. (1995). The great wars, the great crash, and steady state growth: Some new evidence about an old stylized fact. *Journal of Monetary Economics, 36* (3), 453-475.

Ben-David, D., & Papell, D.H. (1998). Slowdowns and meltdowns: Postwar growth evidence from 74 countries. *Review of Economics and Statistics, 80* (4), 561-571.

Ben-David, D., & Papell, D.H. (2000). Some evidence on the continuity of the growth process among the G7 countries. *Economic Inquiry, 38* (2), 320-330.

Bower, J.L., & Christensen, C.M. (1995). Disruptive technologies: Catching the wave. *Harvard Business Review, 73* (1), 43-53.

Box, G.E.P., & Tiao, G.C. (1975). Intervention analysis with applications to economic and environment problems. *Journal of the American Statistical Association, 70* (349), 70-79.

Bronnenberg, B.J., Mahajan, V., & Vanhonacker, W.R. (2000). The emergence of market structure in new repeat-purchase categories: The interplay of market share and retailer distribution. *Journal of Marketing Research, 37* (February), 16-31.

Brynjolfsson, E., & Smith, M.D. (2000). Frictionless commerce? A comparison of Internet and conventional retailers. *Management Science, 46* (4), 563-585.

Christiano, L.J. (1992). Searching for a break in GNP. *Journal of Business and Economic Statistics, 10* (3), 237-250.

Coughlan, A.T., Anderson, E., Stern, L.W., & El-Ansary, A.I. (2001). *Marketing channels*. New Jersey: Prentice Hall.

Dekimpe, M.G., & Hanssens, D.M. (1995). The persistence of marketing effects on sales. *Marketing Science, 14* (1), 1-21.

Dekimpe, M.G., & Hanssens, D.M. (1999). Sustained spending and persistent response: A new look at long-term marketing profitability. *Journal of Marketing Research, 36* (November), 397-412.

Dekimpe, M.G., & Hanssens, D.M. (2000). Time-series models in marketing: Past, present and future. *International Journal of Research in Marketing, 17* (2/3), 183-193.

Dekimpe, M.G., Hanssens, D.M., & Silva-Risso, J.M. (1999). Long-run effects of price promotions in scanner markets. *Journal of Econometrics, 89* (1/2), 269-291.

Dekimpe, M.G., Steenkamp, J-B.E.M., Mellens, M., & Vanden Abeele, P. (1997). Decline and variability in brand loyalty. *International Journal of Research in Marketing, 14* (5), 405-420.

Dugan, S.M. (1999). Levi Strauss & Co. site doesn't pan out, but the rush isn't over yet. *Infoworld, 21* (47), 48-49.

Enders, W. (1995). *Applied econometric time series*. New York: John Wiley.

European Commission (1996). *Strategic developments for the European publishing industry towards the year 2000*.

Franses, P.H. (1998). *Time series models for business and economic forecasting*. Cambridge: Cambridge University Press.

Franses, P.H., & Koop, G. (1998). On the sensitivity of unit root inference to nonlinear data transformations. *Economics Letters, 59* (1), 7-15.

Frazier, G.L. (1999). Organizing and managing channels of distribution. *Journal of the Academy of Marketing Science, 27* (2), 226-240.

Geyskens, I., Gielens, K., & Dekimpe, M.G. (2002). The market valuation of internet channel additions. *Journal of Marketing*, Forthcoming.

Ghosh, S. (1998). Making business sense of the Internet. *Harvard Business Review, 76* (2), 126-135.

Gilbert, A., & Bacheldor, B. (2000). The big squeeze. *Informationweek*, March 27, 47-56.

Gilbert, C. (2001). *A dilemma in response: Beyond resource allocation. Examining the newspaper industry's response to the Internet*. Unpublished doctoral dissertation, Harvard Business School.

Hanssens, D.M., Parsons, L.J., & Schultz R.L. (2001). *Market response models: Econometric and time series research.* Boston: Kluwer Academic Publishers.

Holden, D., & Perman, R. (1994). Unit roots and cointegration for the economist. In B. Bhaskara Rao (ed.), *Cointegration for the applied economist*. New York: St. Martin's Press, 47-112.

Konings, J., & Roodhooft, F. (2000). The effect of E-business on corporate performance: Firm level evidence for Belgium. *Working Paper, Catholic University of Leuven*.

Leone, R.P. (1987). Forecasting the effect of an environmental change on marketing. *International Journal of Forecasting, 3* (3/4), 463-478.

Machlis, S. (1998). Estee Lauder tackles web, channel conflict. *Computerworld, 32* (27), 79.

Mason, C.H., & Milne, G.R. (1994). An approach for identifying cannibalization within product line extensions and multi-brand strategies. *Journal of Business Research, 31* (1/2), 163-170.

Mitchell, G. (2001). The year of living dangerously. *Editor & Publisher, 134* (4), 20-25.

Nicholson, J. (2001). Cannibals on the Web? Don’t you believe it! *Editor & Publisher, 134* (18), 25.

Nijs, V.R., Dekimpe, M.G., Steenkamp, J-B.E.M., & Hanssens, D.M. (2001). The category demand effects of price promotions. *Marketing Science, 20* (1), 1-22.

Pauwels, K., & Dans, E. (2001). Internet marketing the news: Leveraging brand equity from market place to market space. *Journal of Brand Management, 8* (4/5), 303-314.

Perron, P. (1989). The great crash, the oil price shock, and the unit root hypothesis. *Econometrica, 57* (6), 1361-1401.

Perron, P. (1994). Trend, unit root and structural change in macroeconomic time series. In B. Bhaskara Rao (ed.), *Cointegration for the applied economist*. New York, NY: St. Martin’s Press, 113-146.

Pesaran, M.H., & Samiei, H. (1991). Persistence, seasonality and trend in the UK egg production. *Applied Economics, 23* (3), 479-484.

Picard, R.G., & Brody, J.H. (1997). *The newspaper publishing industry*. Boston: Allyn and Bacon.

Pierse, R.G., & Snell, A.J. (1995). Temporal aggregation and the power of tests for a unit root. *Journal of Econometrics, 65* (2), 333-345.

Porter, M.E. (2001). Strategy and the Internet. *Harvard Business Review, 79* (3), 62-79.

Reddy, S.K., Holak, S.L., & Bhat, S. (1994). To extend or not to extend: Success determinants of line extensions. *Journal of Marketing Research, 31* (May), 243-262.

Rosenthal, R. (1991). *Meta-analytic procedures for social research*. Newbury Park, Sage.

Rossana, R., & Seater, J.J. (1995). Temporal aggregation and economic time series. *Journal of Business and Economic Statistics, 13* (4), 441-51.

Shapiro, C., & Varian, H.R. (1999). *Information rules*. Boston: Harvard Business School Press.

Silk, A.J., Klein, L.R., & Berndt, E.R. (1999). Restructuring in the U.S. advertising media industry. *Working paper 99-126, Graduate School of Business Administration, Harvard University*.

Silk, A.J., Klein, L.R., & Berndt, E.R. (2001). The emerging position of the Internet as an advertising medium. *Netnomics, 3* (2), 129-148.

Srinivasan, S., Popkowski Leszczyc, P.T.L., & Bass F.M. (2000). Market share response and competitive interaction: The impact of temporary, evolving and structural changes in prices. *International Journal of Research in Marketing, 17* (4), 281-306.

Useem, J. (1999). Internet defense strategy: Cannibalize yourself. *Fortune*, September 6, 121-134.

U.S. Department of Commerce (1998). *The emerging digital economy*.

Vogelsang, T. (1997). Wald-type tests for detecting breaks in the trend function of a dynamic time series. *Econometric Theory, 13* (6), 818-849.

Washington Post (2001). *Small businesses developing online presence – Study*. February 6.

Ward, M.R., & Morganosky, M. (2000). Online consumer search and purchase in a multiple channel environment. *Working Paper, University of Illinois, Urbana Champaign, Department of Agricultural and Consumer Economics*.

Zivot, E., & Andrews, D.K.W. (1992). Further evidence on the great crash, the oil-price shock, and the unit root hypothesis. *Journal of Business and Economic Statistics, 10* (3), 251-270.

Table 1

Long-run performance implications of an Internet channel introduction

	Circulation		***Advertising***	
	Impact on Steady State Growth	*Impact on Steady State Level*	*Impact on Steady State Growth*	*Impact on Steady State Level*
Sample size (n)	67	52	18	16
# negative impact	35	26	11	7
# significant negative impact (5%)	5	4	1	0
# positive impact	32	26	7	9
Average negative impact	-.0014	-.0128	-.0065	-.0231
Average positive impact	.0018	.0130	.0030	.0671
Overall average	.0002	.0001	-.0030	.0276
Rosenthal test on cannibalization	p = .94	p = .58	p = .13	p = .98