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How Online Consumer Segments Differ in Long-term Marketing Effectiveness

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Abstract

Online commerce gives companies not only a growing global sales platform, but also powerful consumers enjoying 24/7 availability, choice proliferation and the power to opt in and out permission-based communication. Unfortunately, our knowledge is limited on long-term marketing effectiveness in this space and on how it differs across customer segments. Managers appear overwhelmed by the combination of rich online data on hundreds of thousands of customers and the typical aggregate-level data on offline marketing spending.

This paper is the first to investigate the long-term impact of coupon promotions, TV, radio, print, and Internet advertising across customer segments for a major digital music provider with over 500,000 customers. We first segment customers and subsequently analyze how these segments respond in the long run to different marketing activities when purchasing music downloads. Our findings reveal that the effectiveness of marketing differs across segments, while standard segmentation approaches fail to identify the most valuable catches in a sea of consumers. In contrast to empirical generalizations on consumer packaged goods, heavy users of digital music products are least sensitive to price and most sensitive to TV advertising and to multiple touch points. Light users, the majority of consumers, are price sensitive and tend to opt out of targeted communication. Our research enables managers in the digital media space to target high-value customer segments with the most effective actions.

Keywords: Long-term effectiveness; Segments; Digital music; Online; Synergy; Advertising; Latent-class segmentation; Vector autoregression

Introduction

The analysis of advertising and price promotion effectiveness as part of the marketing mix has been one of the central quantitative marketing research priorities, and the field has amassed a wealth of knowledge concerning the short-term and long-term effects of the marketing mix across product categories (Hanssens 2009; Tellis 2009). Still, the majority of this research focuses on consumer packaged goods, raising questions as to whether the empirical generalizations apply to the new businesses of the 21st century (Sharp and Wind 2009). Nowadays, online commerce gives consumers 24/7 availability, one-click price comparison and the power to opt in and out of permission-based communication. Media fragmentation and choice proliferation invite consumers on a decision journey unlike the classic purchase funnel: they 'seize control of the marketing process and actively "pull" information helpful to them' (McKinsey 2009, p 5). What is the long-term effect of marketing actions and their interactions (i.e., multiple touch points) in this context?

We investigate short-run and long-run marketing mix effectiveness for different segments in the digital media space. A key sector of digital media is music[1] with firms such as iTunes, Amazon's Kindle store, or zune.net. This new space

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[1] Music, the focus of our empirical analysis, is only one of the many media categories that can be digitized and made available to consumers via download. Other examples include books, movies, games and ringtones. For the remainder of the paper we will refer to digital music instead of digital music downloads for the ease of exposition. Note that our approach can easily be applied to other categories of digital media products.

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brings unique challenges with respect to available data. Firms typically collect Customer Relationship Management (CRM) type data on millions of customers and their transaction records. Marketing activity is captured in two ways: traditional aggregate-level data on "push" mass media (e.g., TV, radio, print, banner ads) and customer-level data on what was "pulled" by the customer to enable purchase (e.g., permission-based communication, coupons claimed, newsletter emails). This combination should allow companies to profile customers based on their responsiveness to push marketing as well as their pull behavior. Potentially, short- and long-term effects of marketing actions in isolation and combination (multiple touch points) can differ substantially across customer segments. If so, a segmentation analysis can generate actionable insights for marketing budget allocation. Unfortunately, realizing this potential is complicated by the sheer size of the customer base and the lack of a modeling framework combining response-based segmentation with long-term effect estimation. This paper introduces a modeling approach that enables managers to quantify marketing effectiveness based on *all* available data. Our approach combines existing "best practice" methods of segmentation and long-run effects modeling to investigate marketing mix effectiveness. Ultimately, we aim to generate new insights into which marketing actions yield long-term benefits for the most valuable customer segments in the digital media space.

We use our framework to study marketing mix effectiveness in the digital music space. Our data come from the leading digital media provider in a large European country.[2] Our contribution is threefold. First, we show how online consumer segments, based on their short-term marketing response, have substantially different sizes and profiles. Second, we quantify for each segment the long-term effects of coupons and advertising media as well as their interactions. In contrast to empirical generalizations from consumer packaged goods, heavy users of digital music are less price sensitive than light users and more responsive to advertising. Third, we show how marketing actions with insignificant direct sales impact (print) may still be worthwhile due to their synergy with effective marketing actions (TV and Internet marketing). The remainder of this paper is organized as follows. First, we discuss how previous literature on CRM and long-term marketing effectiveness may apply differently to digital media products. Next, we present our data and propose a modeling approach that allows combining customer-level purchase data using the whole customer base and customer-level and aggregate-level marketing mix data. The first modeling step involves segmenting customers based on observed purchase behavior while accounting for unobserved heterogeneity using a latent-class approach. The second step involves persistence modeling to investigate the short- and long-run effects of marketing in each segment. We report our results and show that segmenting instead by an ad hoc approach (such as median or quartile splits) does not allow uncovering the marketing response of the most valuable customers. Finally, we discuss how our findings translate into tailored marketing strategies for the digital music space.

[2] The company wishes to remain anonymous.

Research Background

Three literature streams are directly relevant to our research: (1) studies on Customer Relationship Management (CRM), characterized by individual-level data being rich in own-customer but poor in non-customer information, (2) studies of long-term marketing effectiveness in brick-and-mortar settings and (3) studies on online consumer behavior.

First, CRM studies share a focus on customer-specific revenues with our research and also use individual customer behavior to capture heterogeneity. But most CRM literature focuses on forecasting customer purchases and/or quantifying customer lifetime value (e.g., Fader and Hardie 2009; Reinartz and Kumar 2000). Marketing-mix information rich enough to permit the study of marketing communication effectiveness is typically lacking. CRM studies that focus on marketing effectiveness have considered the short-term effects of direct marketing activities such as coupon and price promotions, direct mailing campaigns, loyalty programs, or recommendation systems (Bodapati 2008; Simester, Sun, and Tsitsiklis 2006; Zhang and Wedel 2009). Common performance measures are the revenue of the campaign or the purchase probability at the customer-level. While our dependent variable (weekly revenues per customer) is similar to that in many CRM studies, we add to this research stream by incorporating rich information on marketing mix actions on both individual and aggregate level, and by demonstrating how customers may be segmented and how long-term marketing effectiveness can be quantified on a segment-level.

Second, the long-term effectiveness of the marketing mix has been analyzed by several authors using scanner panel data across CPG categories (Hanssens 2009; Tellis 2009). With respect to the relative order of effectiveness, five findings stand out:

(1) Price incentives create a large short-term sales boost, but few, if any, long-term benefits (Nijs et al. 2001; Pauwels, Hanssens, and Siddarth 2002).
(2) Heavy users are more price sensitive than light users (Lim, Currim, and Andrews 2005; Neslin, Henderson, and Quelch 1985).
(3) Price incentives have a larger sales elasticity than advertising (Tellis 2009).
(4) TV advertising has a larger sales elasticity than either radio or print advertising (Jamhouri and Winiarz 2009; Rubinson 2009; Sharp, Beal, and Collins 2009).
(5) Interaction effects are substantial and exist among radio and print (Jagpal 1981), TV and radio (Edell and Keller 1989), and TV and print advertising (Naik and Raman 2003).

Specific research on quantifying elasticities in traditional (physical media) music sales is scarce and considered the effects of radio play and billboard lists but not of price (Moe and Fader 2001). Thus, we see no reason why the empirical