ELSEVIER

Linking online niche sales to offline brand conditions

Jungmin Son [a], Jikyung (Jeanne) Kim [b], Jeonghye Choi [c,*], Mingyung Kim [d]

[a] Yonsei Business Research Institute, Yonsei University, School of Business, Seoul, Korea
[b] IE University, Spain
[c] Yonsei University, School of Business, Seoul, Korea
[d] University of California, Berkeley, Department of Statistics, Berkeley, CA 94720, USA

ARTICLE INFO

ABSTRACT

With the dramatic growth in the online marketplace, online retailers are keen to understand and leverage the interplay between offline environment and online sales. This study examines the influence of offline brand conditions on online sales of niche brands. Specifically, we investigate the proximity to the leading brand's headquarters, *city of origin*, and the extent of its offline distribution, *offline brand availability*. We also examine the moderating effect of offline affinity for niche attributes, *offline niche affinity*. Using sales data of niche brands, we find that brand share is higher in regions closer to the city of origin and where brand availability is limited. The category sales benefit from proximity to the city of origin and increased offline brand availability. This positive impact of favorable offline brand conditions on category sales is more prominent in regions with lower niche affinity. Finally we offer managerial insights for marketing practice.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Online retailers generally offer the same product assortment in every geography at the same prices; however, sales performance varies substantially across geographies (Bronnenberg, Dhar, & Dubé, 2009; Brynjolfsson, Hu, & Rahman, 2009; Choi, Hui, & Bell, 2010). Online companies are aware of the role that geography plays in such regional variation, and take into account local conditions when monitoring or planning online activities. For instance, Amazon.com keeps track of buyer locations to monitor local demand for its products (Banker, 2014). Zappos.com, an online shop specializing in shoes and clothes, went a step further and opened a showroom near its headquarters in Las Vegas. It was a measure not only to complement overall online operations, but also to offset the advantages of local competitors (Fox, 2014). Overstock.com, another online retailer in Utah that sells surplus merchandise at a discount, initially established its market presence by capitalizing on its proximity to large markets on the West Coast. It later expanded its influence to the East Coast by building a logistic center in Cincinnati (Demery, 2013). With the increasing importance of the online marketplace, companies are keen to understand and leverage the interplay between offline conditions and online sales performance.

Academic literature to date in economics and marketing demonstrates the importance of this area of research. The research has established that local conditions, such as target demographics, play a key role in explaining geographical variations of online performance (e.g., Bell & Song, 2007; Chintagunta, Chu, & Cebollada, 2012; Choi & Bell, 2011; Forman, Ghose, & Goldfarb, 2009). We contribute to the literature by expanding extant knowledge of how offline factors influences online performance. Specifically, we focus on three offline conditions, the proximity to the brand's headquarters, *city of origin*, offline brand distribution, *brand availability*, and offline affinity for a niche attribute, *niche affinity*, and investigate their joint impact on online sales performance.

First, city of origin of a company is a well-explored topic in economics. Bronnenberg et al. (2009), for instance, show that a brand enjoys a market share advantage in the region close to its city of origin; this effect diminishes with increasing distance. However, this finding has received little attention in multichannel studies, despite its potential contribution and easily accessible data. Second, the offline accessibility of brands is another topic well studied. Some studies find evidence for demand substitution between offline and online channels (Brynjolfsson et al., 2009; Forman et al., 2009), whereas others demonstrate channel synergy, where greater offline accessibility enhances online performance (Avery, Steenburgh, Deighton, & Caravella, 2012; Bell, Gallino, & Moreno, 2015). We examine which of these are more likely to be at work in our research setting. Finally, we investigate whether the two factors, city of origin and offline brand availability, are moderated by a third offline factor, local taste for a prominent category attribute.

* Corresponding author.
E-mail addresses: sonjm81@yonsei.ac.kr (J. Son), jeanne.kim@ie.edu (J.(J.) Kim), jeonghye@yonsei.ac.kr (J. Choi), mingyung_kim@berkeley.edu (M. Kim).

A strong liking for some attributes may intervene in the process of city of origin and availability of a brand influencing online sales at the regional level; that is, it can either intensify or mitigate the main effects.

We choose a research setting in which the category attribute is known to induce a highly polarized preference at the individual level (i.e., organic; Schifferstein & Ophuis, 1998). Moreover, there is a large variation across regions in the observed preference. The sales data for a specialty niche category (in our case, organic disposable diapers) is not only ideal for testing our hypotheses, but also interesting in other aspects. First, a recent trend in the consumer packaged goods (CPG) industry shows a proliferation of specialty products designed for micro-segments, and continuing growth in e-commerce for such products (Wall Street Journal, 2015). The trend seems to be in line with recent studies demonstrating that online shoppers are relatively wealthier, better educated (Smith, 2015), and willing to pay more (Lee, 2011). Thus, specialty niche categories deserve attention in their own right. Second, niche brands might benefit from a significant growth and change in contrast to relatively established mainstream markets dominated by mass-market brands. This market situation allows probing for answers to questions such as "how do markets (niche categories) grow?" while most brand managers ask "how do brands grow?" (often at the expense of competing brands) (Sharp, 2010).

We measure the market performance of specialty brands using category sales and brand share to reflect the market situation in the niche category, and investigate two outcome variables in a model that interlinks the two processes. The empirical results indicate that the main effects of the city of origin and brand availability significantly affect online brand performance. Specifically, proximity to the city of origin improves both brand share and sales of the category as a whole; greater offline accessibility of the focal brand increases category sales, but reduces brand share. Interestingly, the city of origin effect is not limited to offline retailing but transcends to the online sphere. Additionally, greater offline accessibility of the focal brand benefits other niche brands in the same category, and thus significantly contributes to the growth of the niche category itself.

Furthermore, category-level offline affinity for the niche attribute, that is, organic, moderates the effect of the two offline brand conditions on category sales, whereas it exerts no influence on relative brand share. Greater proximity to headquarters increases category sales, and this positive effect of the city of origin is mitigated by high local affinity for the attribute. In addition, a larger number of offline stores selling the focal brand leads to higher category sales because the stores function as showrooms for this lesser-known niche category; this positive impact becomes smaller when local markets have a strong preference for the niche attribute. These findings add interesting insight to the literature: the beneficial influence of offline conditions on the online niche category is more prominent in regions with less existing affinity for the niche attribute.

The rest of the paper is organized as follows. First, we discuss the conceptual framework and the related literature, and provide hypotheses. We then introduce data and describe the empirical model. Next, we present the results from the hypotheses testing. Finally, we discuss the contributions of our study to the literature, as well as the managerial implications for both online retailers and managers of niche brands.

2. Literature and hypotheses

Our study adds to the growing body of literature that provides an understanding of the relationship between the local environment and online sales. While online marketing actions influencing online brand sales are a well-researched area, cross-channel influences are an on-going area of investigation. In particular, offline influence on online sales of smaller brands has largely been overlooked. We contribute to this literature by focusing on the under-researched topic of niche brands.

We focus on specialty niche brands in particular. The term "niche" has been used laxly in practice, sometimes referring to any brands that have low market share (for instance, see Anderson, 2006). We follow the concept of niche used by Kahn, Kalwani, and Morrison (1988, p. 384); niche brand is the kind of goods that a small segment of the market requires due to its refined and more clearly defined needs. This kind of niche brands are well characterized by a distinct attribute (e.g., cavity-prevention focused toothpaste, Greek yogurt within the overall yogurt category), and often form their own niche market in which several brands of a similar core benefit compete. Brands within this niche market are considered niche brands because they possess niche characteristics, not necessarily because they have low market share as compared to the mainstream brands (i.e., products that appeal to a larger group of customers and enjoy greater market share).

Our study adds to the understanding in the following fields of study by developing and testing hypotheses: 1) the city of origin effect of niche brands and online sales performance, 2) the effect of offline brand availability, and 3) the moderating role of offline niche taste (affinity for niche attribute). Online performance is operationalized in two dimensions: niche category sales and niche brand shares. In developing our hypotheses, we first discuss brand share, as this topic has more related theories and evidence, and then category sales. Fig. 1 presents the framework for the hypotheses proffered in the following sections, and Table 1 discusses the related literature and our contributions.

2.1. City of origin of niche brands

Previous studies on the city of origin show that regions closer to the brand headquarters benefit from greater brand performance. Bronnenberg et al. (2009) show that the share advantage of a brand (defined as the share difference relative to the most distant market) is greater in regions closer to its city of origin. This share advantage is attributed to the early entry effect and the consequent improvement in brand quality perception. Kalnins and Lafontaine (2013) also demonstrate that the longevity of a business is negatively proportional to the distance to its headquarters. They propose that ease of monitoring and local information asymmetry are the underlying drivers. Similarly, Choi, Hong, and Jeon (2013) investigate sales data in the liquor market and show that the city of origin effect is present, and enhanced by a stronger local identity. These studies improve our understanding of the city of origin effect in offline retailing, but do not extend the scope of their research to online retailing, particularly for niche brands.

Unlike mainstream brands, niche brands generally have small offline sales revenues, and in turn, limited offline presence and influence. However, they serve customers who have clearly defined preferences and benefit expectations (Kahn et al., 1988). Due to the strong appeal of the value proposition of such niche brands, there is a demand-side pull that compensates for the limited physical influence. Thus, we postulate that the city of origin effect is not limited to mass-market brands but can be applicable to niche brands as well.

Studies on social influence through physical proximity provide insights on how the city of origin effect in physical domain manifests online. Physical proximity leads to imitative behavior for offline purchasing among neighboring households (Conley & Topa, 2002; Grinblatt, Keloharju, & Ikäheimo, 2008; Yang & Allenby, 2003). However, the neighbor effect is not limited to offline buying; imitative behavior due to physical proximity manifests in online buying behavior, as evidenced in previous studies for online sales of consumer packaged goods (Bell & Song, 2007; Choi & Bell, 2011; Choi et al., 2010). In a similar vein, physical proximity to the city of origin may foster social interactions among target consumers who shop online, subsequently raising brand awareness, enhancing quality perceptions, and ultimately, improving online brand performance. Accordingly, city of origin effect transcends physical boundaries and affects online market performance.
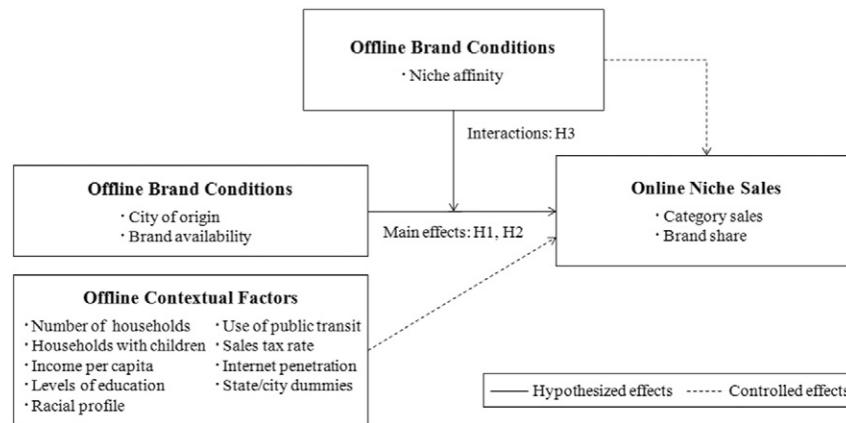
Fig. 1. Research framework for the relationship between offline brand conditions and online niche sales, and the moderating role of niche affinity.

We hypothesize that the focal brand's online market share is greater in regions closer to its city of origin.

Previous studies on the city of origin effect mainly examine its effect on brand share (Bronnenberg et al., 2009; Choi et al., 2013; Kalnins & Lafontaine, 2013), but knowing the effect on the overall market is also of great importance to marketers. In particular, retailers are more interested in overall category sales rather than the status of a single brand. Everything else being equal, the absolute demand for the brand is greater in regions closer to its city of origin (Bronnenberg et al., 2009; Choi et al., 2013). What is not clear is whether the additional brand sales are due to a greater primary demand for the category (category growth), or at the expense of the competing niche brands (competitive substitution). There are few theories to support either assumption; however, the literature on the effect of marketing activities may provide a basis for conjecture. Specifically, when marketing activities such as promotions are executed, brand switching is more pronounced in established categories, whereas greater category demand is more likely in growing categories (Bell, Iyer, & Padmanabhan, 2002; Van Heerde, Leeflang, & Wittink, 2004). We draw an analogy from this literature and hypothesize that the city of origin effect leads to an increase in overall category sales. This is because niche categories generally have low penetration and awareness, which in turn allows flexibility in the growth of the overall market. Following the arguments discussed above, the two hypotheses regarding the effect of the city of origin on category sales and brand share are as follows:

H1a. The online niche category sales are greater in the regions closer to the city of origin.

H1b. The online niche brand share is larger in the regions closer to its city of origin.

2.2. Offline brand availability of niche brands

Offline brand availability is another important geographical factor that determines online performance of niche brands. The studies in this stream of literature find two distinct mechanisms: channel competition and channel synergy. The competition effect, or demand substitution, is observed when greater accessibility to offline stores lowers

Table 1
Literature review.

Article	Research topics (contributions)	Offline brand conditions			Online niche brands	Cross-channel relationship	Performance measure
		City of origin	Brand availability	Niche affinity			
Bronnenberg et al. (2009)	The effect of the city of origin and brand market share	✓	✓				Brand share
Kalnins and Lafontaine (2013)	Distance from a headquarter to establishments driving revenue	✓	✓				Acquisition, Revenue
Choi et al. (2013)	Relationship between local identity and brand share	✓					Brand share
Forman et al. (2009)	The effect of offline environment on channel competition		✓	✓	✓	✓	Sales rank
Choi and Bell (2011)	The role of preference minority and online retailer performance		✓	✓	✓	✓	Category sales, Brand share
Brynjolfsson et al. (2009)	Niche vs. mainstream product performances		✓	✓	✓	✓	# of selling items
Chintagunta et al. (2012)	The influence of transaction cost on online-offline competition		✓			✓	Channel choice, # of selling items
Avery et al. (2012)	Cannibalization and synergy among channels		✓			✓	Popular share, Brand sales
Zentner et al. (2013)	Niche vs. mainstream product performances in channel switch		✓	✓	✓	✓	Channel share
Singh et al. (2005)	Measuring and evaluating attribute preference that drives brand choice			✓			Brand choice
Sridhar et al. (2012)	Modeling and demonstrating the cross-category learning effect			✓			Brand choice
Our study		✓	✓	✓	✓	✓	Category sales, Brand share

online sales. Forman et al. (2009), for example, show that when a new offline store opens, consumers substitute away from shopping online to offline due to the lowered transaction cost of buying offline. Similarly, Choi, Bell, and Lodish (2012) find that consumers show higher online demand in regions underserved by offline retailers. Mechanisms driving the competition effect are well documented in the literature. Specifically, online channels impose no physical limit on product variety, and provide tools that allow easy information search and that foster new product discovery (Brynjolfsson et al., 2009; Chintagunta et al., 2012). On the other hand, offline channels provide greater trust in both stores and products and impose little delay in having the product (Bell et al., 2015). These channel-specific competitive advantages and their fit with products and local consumers result in regional patterns of demand allocation between online and offline channels.

Channel synergy, or the complementary effect, emerges when companies make use of multiple channels and benefit from the synergy through improved performance. Bell et al. (2015) highlight the role of offline stores as showrooms for brands sold online because physical brand experience through touch and feel interactions advances awareness, branding, and credibility, facilitating purchases online. Avery et al. (2012) provide similar findings that offline stores of a pure online catalogue clothing retailer raise brand awareness (i.e., billboard effects) and reduce uncertainty about purchasing, thereby increasing online sales in the long run. Bell et al. (2015) investigate the buy-online and pick-up offline strategy and its impact on increasing overall sales aggregated over multiple channels.

Prior studies in multichannel retailing focus mostly on mainstream brands and offer limited insights into niche brands by comparing them with mainstream brands. Brynjolfsson et al. (2009) find that demand substitution is less pronounced for less popular product categories using multichannel sales data in fashion apparel, whereas Choi and Bell (2011) demonstrate that locally underserved consumers of disposable diapers who prefer niche brands buy online to a greater degree. In fact, it is somewhat surprising that niche brands receive little attention despite their growing importance in online retailing. We contribute to the literature by investigating niche brands with specialty attributes and the role of local brand availability.

We suggest that, for niche brands, the channel competition effect is apparent online in terms of brand share, while channel synergy manifests online in terms of overall category sales. When a niche brand is relatively well distributed across offline stores, its brand share of online sales will be lower due to demand substitution. That is, all else being equal, consumers in regions with more offline stores incur lower offline transaction costs (Zentner, Smith, & Kaya, 2013), and this in turn leads to the demand shift from online to offline. Thus, greater offline accessibility of the focal brand will have a negative effect on its online share. These offline stores, on the other hand, function as showrooms or billboards for relatively unknown niche brands, benefitting not only the brand but also its competitors. In fact, when a competing brand is similar to the focal brand, there is a positive perception spillover among competing brands, as is the case with organic-labeled brands in the same category (Janakiraman, Sismeiro, & Dutta, 2009). Thus, greater offline accessibility of a brand will improve the overall category performance online.

To recapitulate, greater offline accessibility of a brand will reduce its online brand share, as it harms its sales in relation to competitors, everything else being equal. We further conjecture that a synergistic effect occurs in terms of the absolute overall category sales, as the market benefits from the showroom and billboard effects of offline stores. Our hypotheses regarding brand availability are as follows.

H2a. The online niche category sales are greater in regions with a greater number of offline stores selling the niche brand.

H2b. The online niche brand share is smaller in regions with a greater number of offline stores selling the brand.

2.3. Offline niche affinity for niche brands

We can gain a better understanding of the city of origin and offline brand availability effects on online performance by examining contextual factors that moderate the relationship. Of note is the fact that prior studies of niche categories/brands focus on the online channel features that give large differential advantages over offline channels such as limitless inventory and easy product discovery (Anderson, 2006; Brynjolfsson, Hu, & Simester, 2011; Zentner et al., 2013). We complement this niche brand literature by focusing on product attributes that appeal to market segments that value differentiated benefits (Kahn et al., 1988).

Our choice of the particular research setting provides a unique opportunity to investigate the category-level offline affinity for a niche attribute, that is, organic. Prior studies demonstrate that the preference for an attribute in one category can be transferred to other categories possessing the same attribute. Singh, Hansen, and Gupta (2005), for instance, show that there are high correlations among the sales of products that share attributes such as brand, size, and fat content. Additionally, Sridhar, Bezawada, and Trivedi (2012) find attribute-based correlations across categories at the regional level. That is, regional demand for niche categories with a certain attribute can be inferred by the offline affinity for the same attribute in other categories. The niche attribute of organic is common for all brands in this niche category, and thus we conjecture that the regional shares of the brands are relatively immune to the level of local affinity to the attribute. Therefore, we focus on the category sales in investigating the moderating role of offline niche taste in the relationship between offline conditions and online performance. In our context, we study the local demand for organic brands using the local demand for organic foods.

We conjecture that offline affinity for the niche attribute affects the interplay between the offline brand condition and online category sales. Offline affinity for the niche attribute measures the average level of regional affinity toward the product category sharing the same niche attribute. Regions with a higher preference are likely to have larger populations who have greater experience, greater liking, less uncertainty, and higher awareness of the products with the attribute (Seetharaman, Ainslie, & Chintagunta, 1999). In other words, the regions with a greater offline niche affinity are more established in terms of that niche category, which leads to less room for offline brand clout functioning as a tool to educate local population about the product category.

Specifically, we hypothesize that the positive relationship between the proximity to the city of origin and better online category performance weakens as the offline affinity for the niche attribute becomes stronger. In regions presenting strong offline affinity for the niche attribute, niche categories are relatively well established and customers have developed familiarity and affinity for the niche attribute. This leaves little room to attract potential customers through the city of origin effect. On the other hand, regions with low offline affinity for the niche attribute may experience low familiarity, high quality uncertainty, and low physical distribution of the niche brands; the city of origin influence helps regional customers overcome these obstacles. When the consumers in these regions choose the niche brand, thereby buying into the category, this constitutes niche category expansion. This reasoning is in line with the findings from the studies on marketing actions influencing sales: category expansion is expected in growing markets where the niche preference is under-developed and more non-niche buyers are influenced by the city of origin, whereas brand share competition is more prevalent in a non-growing market where the niche preference is established and the proximity to city of origin mainly affects brand choices for many niche buyers (Van Heerde et al., 2004). Therefore, we hypothesize that the offline affinity for the niche attribute mitigates the effect of category expansion induced by the city of origin effect.

In terms of brand availability, we conjecture that the category-level offline affinity for the niche attribute moderates the local brand's accessibility influence on overall category sales. We previously hypothesized that a greater number of local stores has a positive impact on market size of the niche category through channel synergy. The showroom effect is pronounced when product categories are characterized by high uncertainty, high perception of risk, and low awareness (Avery et al., 2012; Bell et al., 2015; Kushwaha & Shankar, 2013). When the level of offline niche affinity is high, the population has greater familiarity with the salient attribute and the role of offline stores in resolving uncertainty and increasing credibility is not as impactful as for a population with little familiarity. On the other hand, because a significant proportion of the population is already buying into the category, having greater offline accessibility results in online buyers substituting away to offline channels (Forman et al., 2009). Thus, higher offline niche affinity mitigates the channel synergy between the offline shops and online sales. Following the above reasoning, we formalize our hypotheses as follows.

H3a. As offline affinity for a niche attribute becomes greater, the positive impact of the proximity to the city of origin on the online niche category sales decreases.

H3b. As offline affinity for a niche attribute becomes greater, the positive impact of offline brand availability on online niche category sales decreases.

3. Data

We obtained sales data for disposable organic diapers from January 2008 through April 2010 from the Internet retailer, OrganicKids.com. Organic diaper brands constitute a healthy market niche, representing about 3% of total sales of the entire disposable baby diaper category. The niche brands Seventh Generation and Nature account for 71% and 24%, respectively, of total segment sales during the period of data collection. We study the sales of these two dominant brands to understand the local demand for this online niche market. The sales records capture the order date and shipping zip code for each transaction. To test our hypotheses of local online demand for niche brands, we consider zip code-level sales after aggregating temporally.

The category of organic diapers is a particularly good fit for our study for the following reasons. First, disposable baby diapers are a frequently bought product with a relatively high buyer involvement. Therefore, we can reasonably expect the offline brand-level factors to exert substantial influence on the online brand-level outcomes. Second, baby diaper products are standardized; that is, the national brands sold on OrganicKids.com are no different from those sold offline in terms of product features. This makes the dataset suitable for investigating multichannel influences. Third, organic products represent about 4% of total U.S. retail revenue (Greene, 2013), demonstrating typical specialty niche tendencies, that is, their appeal to a small segment of a larger market. Hence, the results of this study can readily be generalized to other niche categories with different prominent attributes.

We obtained additional datasets to complement the sales data at OrganicKids.com. Regarding headquarters location data, we choose Seventh Generation as the focal brand, identifying its headquarters location from the company website. City of origin effect can only be reliably observed for Seventh Generation, since its headquarters is located in the U.S. in Burlington, Vermont, whereas Nature is a European-based company. During the data collection period, in terms of offline store data, Seventh Generation was sold mainly in supermarkets, whereas Nature was hardly found offline. From the Seventh Generation company website, we collected a list of stores that sold its diapers offline. We found that Seventh Generation was mostly sold in specialty supermarkets such as Whole Foods Market. The distribution was manually double-checked by calling each store and confirming brand availability. Of note is the fact that the asymmetric coverage of offline stores enables the comparison between the focal and the competing niche brands.

Next, we purchased the dataset, *2011 Health and Beauty Market Potential* from ESRI, a data provider specializing in geo-demographic information, to understand offline affinity for organic niche categories. We also purchased the *2011 Electronics and Internet Market Potential* data from ESRI to account for mobile Internet penetration. We chose mobile Internet data instead of the broadband Internet to better capture tech-savviness variation at the zip-code level. Finally, we include information for the overall local environments using the *2010 Census* data and *2009 ACS* (American Community Survey) data. We also account for the price advantage that online stores have over their offline counterparts in terms of local sales tax on disposable diapers. Since online purchases can be tax-exempt whereas offline purchases are always taxed locally, local sales tax reflects an online-offline price discrepancy (Brynjolfsson et al., 2011; Choi & Bell, 2011).

4. Measures and model

4.1. Measures

4.1.1. Category sales and brand share

Our hypotheses are based on niche brand performance measured in two dimensions with two dependent variables: the category-level sales and the focal brand share. Category sales in zip code z are computed as the sum of the sales of two brands, Seventh Generation and Nature, and the focal niche brand share in zip code z is calculated by dividing the sales of Seventh Generation by category sales.

$$\text{Category sales}_z = \text{Sales SeventhGeneration}_z + \text{Sales Nature}_z \quad (1)$$

$$\text{Brand share}_z = \frac{\text{Sales SeventhGeneration}_z}{\text{Category sales}_z} \quad (2)$$

This two-dimensional approach allows for an understanding of product performance from different viewpoints. Brand managers often focus on brand performance (Sharp, 2010), and are less inclined to inquire how *markets* grow. However, brand performance is constrained by the category (Kim, 2012). Moreover, for retailers who sell multiple brands, overall market performance is of greater interest. Thus, understanding both the brand- and the category-level performance would provide additional insight for brand managers and retailers alike.

4.1.2. City of origin

Following Bronnenberg et al. (2009), we construct the zip code-level distance to the city of origin of Seventh Generation by measuring the Euclidean distance between its headquarters and the centroid of each zip code in log form.

4.1.3. Offline brand availability

Using the store locations retrieved from the official website of Seventh Generation, we count the number of stores selling Seventh Generation diapers in each zip code. As mentioned earlier, during the data period Seventh Generation was selectively distributed in specialty supermarkets, whereas Nature was hardly found offline.

4.1.4. Offline niche affinity

The category-level offline affinity for niche attributes is the offline context variable that moderates the offline-online relationship; we focus here on the organic attribute. All products by Seventh Generation and Nature sold at OrganicKids.com are indicated as organic category in the instruction manuals, on labels, packaging, and advertisements; we measure the offline affinity for the organic attribute using the organic food market potential index available in the *Health and Beauty Market Potential* dataset. This is appropriate for the following two reasons. First,

prior studies show that multi-category choices are highly correlated when sharing the same attributes (Singh et al., 2005; Sridhar et al., 2012), and thus we can measure the degree of offline affinity for organic using demand for organic foods. Second, while the organic industry itself is a niche segment accounting for 5.5% of the overall retail industry in 2010, the organic food category represents 97% of the organic industry revenue ($27 billion out of $29 billion) in 2010 (Organic Trade Association, 2011), and consumers relate the organic attribute with the food category (Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007).

4.1.5. Controls

Consistent with prior research, we include the set of regional variables to control for the effect of the local environment. Regional sales of diapers are determined by the demand for baby products. Therefore, the target customer size is controlled by the number of households and the proportion of children younger than five years old in the zip code. On average, organic product categories have higher prices than regular ones, and we include income per capita to reflect levels of affluence. The percentage of the population with a college education and the percentage of the population that is white are also included as demographic controls. A greater usage of public transport leads to a higher online demand due to increased travel inconvenience (Forman et al., 2009), which is captured by the proportion of population using public transport.

Prior research on online retailing finds that price-related incentives on the Internet are major factors that attract online demand away from offline stores (Forman et al., 2009), and thus we incorporate the online price advantage using local sales tax rates (Brynjolfsson et al., 2009; Choi & Bell, 2011). High-speed Internet penetration makes online shopping more attractive by removing temporal and spatial constraints (Choi et al., 2012). We include the mobile Internet penetration since it better reflects the market trend and provides sizeable variation across regions.

Following prior studies in marketing and urban economics, we include two geographic dummies, one for cities with top global connectivity, and the other for the state of California. Local responses to geographical conditions can vary by the extent of global connectivity, and thus we include a dummy for the 11 most globally connected cities (Sassen, 2001; Taylor, Catalano, & Walker, 2002). In urban studies, the global city hypothesis suggests that the top-performing cities based on connectivity, the number of multinational corporations hosted, and the proliferation of industry outputs are qualitatively different from the others (Sassen, 2001; Taylor et al., 2002). We expect local responses to geographical conditions to be impacted by global connectivity, and thus include a dummy for the top U.S. cities with a global connectivity index of above 0.3, following prior studies. The list of cities is as follows: New York (over 0.9), San Francisco, LA, Chicago (0.5–0.89), Washington DC, Atlanta, Miami (0.4–0.49), Boston, Seattle, Dallas, and Houston (0.3–0.39). This is also in line with marketing studies including city dummies to incorporate the city-wise unobserved difference in behavior (Iyengar, Van den Bulte, & Valente, 2011; Kalnins & Lafontaine, 2013; Xu, Forman, & Hu, 2014). Residents of California consume more than one third of all the national organic production (Hills, 2011). In addition, the West Coast is often singled out as the most health conscious area (Dill, 2015); thus, we include an indicator variable for the state of California.

4.1.6. Final data

We limit our attention to zip codes in metropolitan areas where there are a sufficient number of offline stores selling the niche category of our interest (i.e., organic disposable diapers) and a sizeable demand for them. Table 2 shows the descriptive statistics of all the zip code-level variables. The first column shows figures for the full set of data (13,930 zip codes), which is used for the online category sales analysis. The second column is a subset of the data in zip codes where there are greater than zero sales in the category (9022 zip codes); this dataset is used for online

Table 2
Descriptive statistics.

	Category sales		Brand share	
	Mean	S.D.	Mean	S.D.
Dependent variables (online niche sales)				
Sales of the top two niche brands (in dollar)	2528.46	9110.12		
Share of the leading brand (%)			72.52	31.95
Independent variables (offline brand conditions)				
City of origin: distance to the headquarters (in miles)	6.65	.83	6.63	.89
Brand availability: number of stores selling Seventh Generation	.86	1.38	1.17	1.52
Niche affinity: organic food market potential index	99.28	35.60	111.22	33.59
Control variables				
Number of households	6740.93	6048.19	8674.66	6198.55
Percentage of children aged less than five years	.01	.00	.01	.00
Income per capita (in dollar)	26,556.32	13,886.94	28,844.58	15,404.04
Percentage with college education	.28	.16	.33	.17
Percentage of whites	.78	.21	.77	.10
Percentage of commuters by public transit	.04	.08	.05	.09
Online price advantage: local sales tax rate (%)	6.68	1.44	6.66	1.50
Mobile Internet penetration index	98.19	39.04	110.98	37.13
State dummy: California state	.09	.28	.11	.31
City dummy: top cities by global connectivity	.03	.18	.05	.21

Note: The niche market includes the top two niche brands, Seventh Generation and Nature, and they collectively account for 95% of the total niche market. Seventh Generation is the number one brand with the market share of 71% (including all brands), and we measure the brand share focusing on this leading brand. The models of category sales and brand share use 13,930 and 9022 zip codes, respectively, in the metropolitan statistical areas.

brand share analysis. The organic market potential and mobile Internet penetration are indexed against the national average which is set to 100.

Fig. 2 shows the geographical distribution of the key variables in the state of Vermont, where the headquarters of the focal brand is located. Panel (A) depicts online category sales (i.e., sales of Seventh Generation and Nature) and (B), online brand share (i.e., proportion of Seventh Generation sales). Panels (C) and (D) depict the offline market conditions, including the location of the city of origin, level of offline affinity for the niche attribute (measured as the organic food market potential index), and offline brand availability (measured as the number of stores selling Seventh Generation). A preliminary look at the raw data suggests that there are significant variations across zip codes for all the key variables. In addition, category sales (a) and brand share (b) show sufficiently different patterns.[1] Therefore, we can speculate that the outcomes are determined by different processes. A slight co-movement between category sales (a) and offline niche affinity (c) can also be seen. We test these relationships observed here and described in the hypotheses in the subsequent analyses.

4.2. Model

Our two-dimensional empirical analysis approach uses a bivariate model with two equations with correlated errors (Bronnenberg et al., 2009). The first part of the model investigates the factors influencing the regional variation in category sales, and the second part models the brand share of Seventh Generation. As sales revenues are highly skewed to the right, we perform log-transformation on the regional category sales after adding one to them (Austin, Tu, Daly, & Alter, 2005; Manning & Mullahy, 2001). Brand share varies between 0 and 1,

---

[1] The correlation between the two quantities, category sales (a) and brand share (b), in the state of Vermont, is 0.08 excluding zip codes of zero category sales.

Online Niche Sales

(A) Category sales	(B) Brand share

(C) City of origin and niche affinity	(D) Brand availability

Offline Brand Conditions
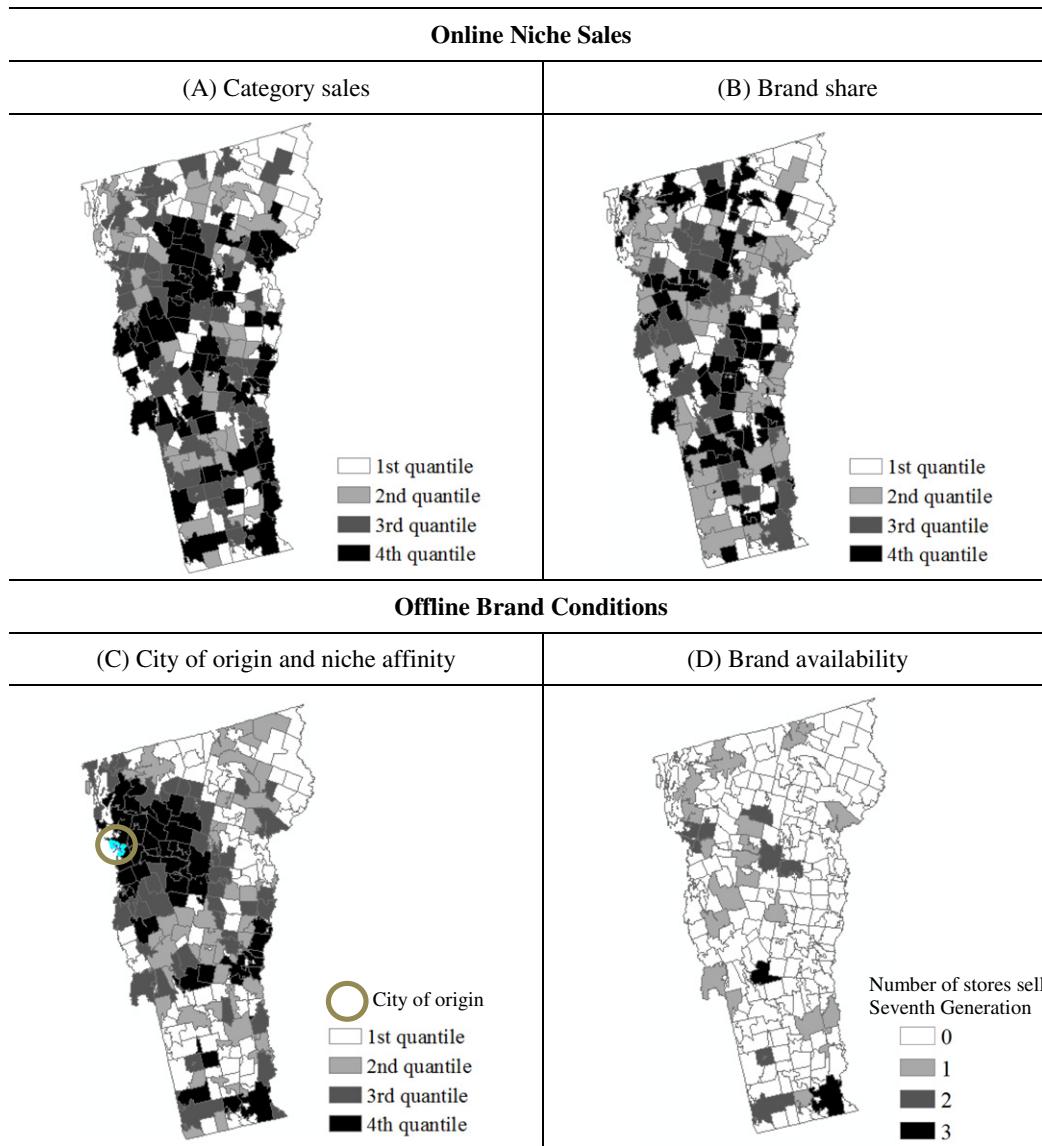
Fig. 2. Correlation between online niche sales and offline brand conditions in Vermont.

and thus, we apply a logit transformation (Johnson, 1949; Lesaffre, Rizopoulos, & Tsonaka, 2007). Both dependent variables are modeled using the same set of offline environment variables:

For all zip codes,

$$
\begin{aligned}
\log(Category\ sales_z) = {} & \beta_{1,1} \cdot City\ of\ origin_z + \beta_{1,2} \cdot Brand\ availability_z + \\
& \beta_{1,3} \cdot City\ of\ origin_z \cdot Niche\ affinity_z + \\
& \beta_{1,4} \cdot Brand\ availability_z \cdot Niche\ affinity_z + \\
& \beta_{1,0} + \boldsymbol{\gamma}_1 \times \boldsymbol{Controls_z} + \varepsilon_{1,z}
\end{aligned}
\tag{3}
$$

If $Category\ sales_z > 0$,

$$
\begin{aligned}
\text{logit}(Brand\ share_z) = {} & \beta_{2,1} \cdot City\ of\ origin_z + \beta_{2,2} \cdot Brand\ availability_z + \\
& \beta_{2,3} \cdot City\ of\ origin_z \cdot Niche\ affinity_z + \\
& \beta_{2,4} \cdot Brand\ availability_z \cdot Niche\ affinity_z + \\
& \beta_{2,0} + \boldsymbol{\gamma}_2 \times \boldsymbol{Controls_z} + \varepsilon_{2,z}
\end{aligned}
\tag{4}
$$

The effects of proximity to the city of origin ($City\ of\ origin_z$) are captured by $\beta_{1,1}$ and $\beta_{2,1}$, and the effects of local distribution ($Brand\ availability_z$) are captured by $\beta_{1,2}$ and $\beta_{2,2}$. The moderating effects of

$Niche\ affinity_z$ on $City\ of\ origin_z$ and $Brand\ availability_z$ are measured by $\beta_{1,3}$, $\beta_{1,4}$, $\beta_{2,3}$, and $\beta_{2,4}$, respectively. In the model, $City\ of\ origin_z$ and $Brand\ availability_z$ are mean-centered, so the effects of $Niche\ affinity_z$ pertain to the average consumer. A vector of standardized control variables is expressed as $\boldsymbol{Controls_z}$, and its corresponding coefficient vectors, $\boldsymbol{\gamma}_1$ and $\boldsymbol{\gamma}_2$. Since there may remain unobserved correlations between the two dependent variables, we model the error terms ($\varepsilon_{1,z}$, $\varepsilon_{2,z}$) to follow a bivariate normal distribution as follows:

$$
\begin{pmatrix} \varepsilon_{1,z} \\ \varepsilon_{2,z} \end{pmatrix} \sim BVN \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_1^2 & \rho\sigma_1\sigma_2 \\ \rho\sigma_1\sigma_2 & \sigma_2^2 \end{pmatrix} \right)
\tag{5}
$$

5. Empirical findings

Table 3 shows the results of both Model 1, which does not include moderating effects, and Model 2, with the full set of variables. We present Model 1 to provide a clear understanding of the average effects of city of origin and brand availability, without interactions. Model 2 then separates the moderating role of offline niche affinity from the main effects of both brand-related variables; the control variables are

Table 3
Parameter estimates.

	Model 1				Model 2			
	Category sales		Brand share		Category sales		Brand share	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Main variables (offline brand conditions)								
City of origin	−.21**	.03	−.28**		−.22**	.03	−.25*	.10
Brand availability	.06*	.03	−.16	.10	.10**	.03	−.20*	.10
City of origin × niche affinity					.09**	.02	−.05	.08
Brand availability × niche affinity					−.13**	.03	.09	.09
Niche affinity	.56**	.06	−.08	.22	.52**	.06	−.07	.22
Control variables								
Constant	4.36**	.02	66.58**	.15	4.40**	.03	66.58**	.15
Number of households	1.43**	.03	.36**	.12	1.41**	.03	.37**	.12
Percentage of children aged less than five years	.07**	.03	−.21*	.09	.07**	.03	−.21*	.09
Income per capita (in dollar)	−.07*	.03	−.09	.10	−.07*	.03	−.09	.10
Percentage with college education	1.18**	.05	.30	.16	.20**	.05	.29	.16
Percentage of whites	.25**	.03	−.01	.11	.26**	.03	−.02	.11
Percentage of commuters by public transit	.18**	.03	−.04	.09	.20**	.03	−.05	.09
Online price advantage: local sales tax rate (%)	−.19**	.03	−.00	.10	−.20**	.03	.00	.10
Mobile Internet penetration index	−.00	.06	.22	.22	−.01	.06	.22	.22
State dummy: California state	1.07**	.12	.21	.40	.02**	.12	.23	.41
City dummy: top cities by global connectivity	−.07	.12	.01	.40	−.05	.12	−.01	.40
Variance								
σ_1, σ_2	2.51**	.01	7.29*	.06	2.51**	.02	7.29**	.06
ρ			.05*				.02	
LL	−63,286				−63,270			

* Indicates significance at $p < 0.05$.
** Indicates significance at $p < 0.01$.

discussed in this model as well. Our hypotheses testing results are based on the results of Model 2.

5.1. The effect of city of origin and brand availability (Model 1)

The estimation results of the category sales model show that there is a strong city of origin effect ($\beta_{1,1} = -0.21$, $p < 0.01$) and also a significant positive influence of brand availability ($\beta_{1,2} = 0.06$, $p < 0.05$). Proximity to the city of origin positively impacts the overall niche category sales, presumably due to category expansion through better performance of the focal brand. Greater offline brand distribution also enhances overall category sales, because by resolving uncertainty, channel synergy (showroom effect) encourages consumers to buy online. In terms of brand share, there is a strong city of origin influence ($\beta_{2,1} = -0.28$, $p < 0.01$) and no significant brand availability effect ($\beta_{2,2} = -0.16$, $p = 0.06$). That is, the closer a region is to the city of origin, on average, the greater the brand share in that region. The number of stores in the region does not significantly affect brand share.

The main effect of offline niche affinity is not significant on the brand share. Unsurprisingly, preference for the organic attribute does not discriminate among the niche brands since all possess this attribute. However, it has a significant and positive relationship with the overall niche category sales ($p < 0.01$). This provides the empirical evidence supporting the premise that preference for the niche attribute in one category (i.e., food) is predictive of the choice in another category (i.e., diapers) sharing the same attribute.

5.2. Adding the moderating role of the offline niche affinity (Model 2)

We investigate the moderating effect of offline niche affinity in addition to the main effects of city of origin and brand availability. We have established that the two key brand-related variables are mean-centered, therefore the linear effects of the moderating variable relate to the average consumer. Regarding the overall online category sales, proximity to the city of origin leads to greater category sales ($\beta_{1,1} = -0.22$, $p < 0.01$), supporting H1a and in congruence with Model 1. Indeed, the city of origin effect does contribute to category expansion because niche categories have growth potential. With regard to the online share of the focal brand, the city of origin effect remains strong and significant ($\beta_{2,1} = -0.25$, $p < 0.02$), supporting H1b. Thus, we find that as with mass-market brands, niche brands also achieve advantages from proximity to their city of origins. Moreover, this city of origin effect is not limited to offline retailing but exerts influence on online performance.

In terms of brand availability, the main effect of greater offline distribution is positive on the amount of online category sales ($\beta_{1,2} = 0.10$, $p < 0.01$), as with Model 1 and in accordance with H2a. However, the effect is larger and the coefficient is significant at a lower significance level (1% as opposed to 5%). In other words, after controlling for the interaction effect, channel synergy (i.e., showroom effect) becomes more pronounced. This empirically shows that, indeed, channel synergy dominates demand substitution at the overall market level, and there is a competitive spillover that results in better online performance of a competing brand.

A larger number of offline stores selling the focal niche brand leads to lower online brand share ($\beta_{2,2} = -0.20$, $p < 0.05$), which supports H2b. That is, after controlling for the interaction term, the demand substitution effect at the brand level emerges as significant. With regards to the interaction term, the level of offline affinity for the niche attribute does not moderate the offline brand factor influencing online brand share. In other words, how much the local population as a whole prefers the niche attribute (i.e., organic) does not intervene in the manner in which offline brand conditions influence online brand performance.

Next, we explain the results concerning the moderating role of offline affinity for the niche attribute. In terms of category sales, the interaction term with the city of origin indicates that the category expansion due to the proximity to city of origin is not pronounced among regions with a strong preference for the niche attribute. When offline niche affinity is high, the category effect is mitigated ($\beta_{1,3} = 0.09$, $p < 0.01$); this supports H3a on the moderating role of offline niche affinity. The implication is that in high preference regions, the proximity to the city of origin actively undermines the market performance of the competing brands in absolute measure. Meanwhile,

the interaction term with brand availability is negative and significant ($\beta_{1,4} = -0.13$, $p < 0.01$), supporting H3b; regions with higher offline niche affinity do not display strong channel synergies at the market level. On the flip side, for regions with low overall niche preference, the showroom effect is significant, and the competitive spillover is particularly pronounced. In summary, regions with high offline affinity for the niche attribute benefit less from the positive influence of offline brand clout in terms of overall category sales, in accordance with our hypotheses. Regarding the moderating role of offline niche affinity between offline brand conditions and online brand share, the effects are not significant, as expected. That is, the level of offline niche affinity does not change how proximity to the city of origin or the extent of local brand distribution affect online brand share.

Control variables have limited influence on brand share with only two variables, number of households and proportion of household with babies, emerging as significant. The number of households is directly related to the size of local population and has a positive effect. Larger markets may result in more online demand, for example through offline word of mouth (Sinai and Waldfogel, 2004). On the other hand, the percentage of children less than five years old reflects the size of the target market among the local population, and it has a negative correlation with the focal brand share. Choi and Bell (2011) show that those markets in which the target households (in this case, households with babies) are minorities tend to prefer leading brands (in this case, Seventh Generation) to reduce risk. In other words, markets with a greater proportion of diaper consumers will choose minor brands relatively more.

Many more control variables have significant effects on category sales, and are mostly intuitive. Specifically, the main effect of offline niche affinity on online category sales is positive and significant. Category sales are greater in regions with larger local populations and a higher proportion of the target baby segment among the local population. Income per capita contributes to the decision of how much to buy in the niche category online. Additionally, the variables of preference for niche attributes (i.e., education, racial profile), and channel preference (i.e., public transportation usage) determine the niche category demand collectively. Interestingly, the coefficient of local tax rates is negative and significant, indicating that a higher tax rate is associated with lower online sales. In addition to the offline-online price difference, the variable might be associated with unobserved drivers that attract a local population to shop less online. For example, a higher tax rate may be connected to certain lifestyles, which induce marketers to promote niche brands more intensely offline. The California dummy has a positive and significant effect on online category sales, meaning that the residents of California purchase the category significantly more compared to other states. The residents of top connected cities do not differ significantly compared to other places in terms of category buying.

5.3. The economic impact of offline brand conditions on online niche sales

We illustrate the economic impact of the key variables by translating their estimates in terms of brand share and U.S. dollars, based on the full model estimation results (Model 2). To this end, we hold all the variables at their means while varying the values of the key variables across hypothetical regions. For an easy comparison, we define two hypothetical regions, one very low in the key variables at the bottom 10%, and one very high at the top 10%.

Per the proximity to the city of origin, online category sales differ in gross sales about $52 ($111 versus $59) between the near and far zip codes. In terms of online brand share, the leading brand's share is 3.2% higher (70.6% versus 67.4%). Regarding brand availability, online category sales in dollar terms is $94 when brand availability is low, and $71 when high. On the other hand, online brand share of the leading brand is 2.5% greater when offline brand availability is limited. In sum, the economic impact of the city of origin is greater for both brand share and category sales given the range of variation in the empirical data.

Next, we investigate the economic impact of the moderating effect of offline niche affinity on online category sales. In panel (A) of Fig. 3, we compare two regions with high and low offline affinity for the niche attribute. The darker bar to the left indicates category sales in the region near the city of origin of the leading brand, and the light bar to the right, the region far away from the city of origin. When offline niche affinity is high, the near region achieves sales of $184 while the farther region $136, equating to a 26.1% drop from near to far. When offline niche affinity is low, the corresponding sales figures are $68 and $27, respectively; as a percentage, the difference amounts to 60.8%. That is, higher offline niche affinity results in greater absolute category sales, but the city of origin effect is relatively smaller. Panel (B) provides a similar comparison, but for the effects of the local distribution of the leading brand on online niche category sales. When offline niche affinity is high, low offline brand availability results in $164 worth of sales online, whereas greater access leads to $143. In the low offline niche affinity scenario, the online sales number is $36 for low access versus $63 for greater access. In other words, when offline niche affinity is high, demand substitution is observed, whereas when it is low, the channel synergy effect manifests. It is interesting to note that in the average zip code, the offline niche affinity determines whether greater brand availability leads to demand substitution or channel synergy.

5.4. Robustness checks

We perform various robustness checks by changing the set of control variables and using a different definition for a major construct. First, we tested the full model with only the major offline constructs and no offline environmental variables, and the main effects remained
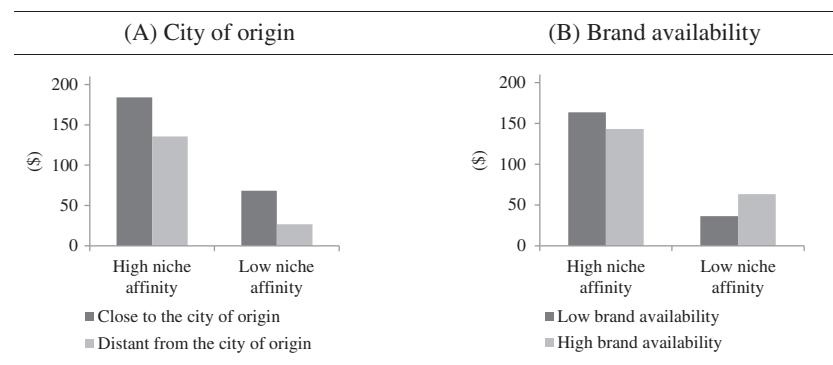

Fig. 3. The economic impact of offline brand conditions on online category sales.

qualitatively equivalent. The only significant difference is that the main effect of demand substitution on brand share has been weakened ($\beta_{1,2} = -0.001$, $p > 0.10$), indicating a possible multicollinearity among variables. However, variance inflation factors (VIF) indicate that there is no serious multicollinearity as the maximum VIF is 8.63. In fact, once we include the number of households, the empirical results are qualitatively the same as the full model.

Next, we tested the model sensitivity to the existence of geographic dummies. Exclusion of the top city dummy did not result in a notable difference, while exclusion of the California dummy resulted in a somewhat smaller (but still highly significant) main effect of city of origin on online category sales. This is due to the fact that consumers in the state of California buy significantly more organic diapers compared to the other states (4.16 times as much, on average), and is, incidentally, the farthest region from the city of origin of Seventh Generation. Thus, this unobserved state effect dampens the main effect of the city of origin. However, even without controlling for California the qualitative conclusion following the analysis remains unchanged.

We also change the factor, brand availability, to see the sensitivity of the model to the definition of offline distribution. The study uses zero-order physical contiguity, which is the number of shops in the focal zip code. We consider zero-order approach reasonable, since, on average, U.S. consumers travel about six miles for shopping trips (U.S. Department of Transportation, 2011) and the length of the average zip code region is about 11 miles. We test for using an extended measurement to include the first-order physical contiguity; that is, counting the number of stores not only in the immediate region but also in the neighboring zip codes, as has been done in the Bell and Song (2007) study. The result is consistent with the original; other coefficients are practically identical, and the main effects of the brand availability remain qualitatively the same with the original operationalization.

6. Discussion and conclusion

This study is important and relevant in the context of the increasing use of multiple offline and online purchase channels, and businesses' need to coordinate and optimize the strategies across channels. The findings offer a contribution to extant literature concerning the interaction between offline and online channels, particularly with regards to the effect of distribution intensity offline on the growth of category sales online and of a specific brand's online market share while examining a set of previously overlooked but critical offline brand conditions. To the best of our knowledge, this is the first work that empirically shows that the city of origin effect, an offline condition, manifests online. Offline affinity for a certain product attribute is another factor that the study newly introduces in this context. Our empirical setting also provides unique contribution; niche brands have often been investigated in either offline or online context, but not in terms of the offline-online interaction. Considering the growing importance of specialty niche brands, we believe our study is timely and relevant.

Specifically, we show that the city of origin effect exists for specialty niche brands, and that its influence transcends the physical market and manifests online. Prior studies demonstrate the effect of city of origin on offline market outcomes (Bronnenberg et al., 2009; Kalnins & Lafontaine, 2013). By showing that a general offline condition can have such a robust impact on online sales, we have added a previously overlooked but powerful measure to the list of evidence establishing that the Internet is subject to general conditions of geography.

The influence of local brand availability (or physical distributions of a brand) on online brand performance has been a well-researched topic (Chintagunta et al., 2012; Forman et al., 2009). We enrich this area of literature by clarifying the conditions under which channel competition or channel synergy effects dominate. Better offline brand distribution always undermines relative online *brand* performance (i.e., the channel competitive effect), but enhances online *category* performance (i.e., the channel synergy effect). Finally, we investigate the moderating role of

offline affinity for a niche attribute using the organic attribute. We find that the positive influence of favorable offline brand conditions on online category sales is mitigated by greater offline affinity for the niche attribute. When regions have a high offline niche affinity, the brand conditions in the physical marketplace exert less influence on category sales. In other words, in regions where niche demand is substantial, offline brand conditions only affect online brand share, as is expected with any other mass-market product categories.

6.1. Managerial insights

Our findings provide practical insights both to the online retailers selling niche brands and to the manufacturers of these brands. Niche brand strategy has been an important part of online retailing, since it is one of the factors that provide a competitive advantage over offline stores (Bell et al., 2015; Roggio, 2015). Thus far, there have been only limited attempts to understand the offline environment niche brands face and how it affects online sales. Our study provides the insight that niche brands operating mostly online are still susceptible to geographical conditions. Having understood the nature of the relationship, even a pure online player should consider using geographical influences to its advantage.

Specifically, online retailers can practice geo-targeting to expand business with greater speed and less cost. Online retailers can make use of headquarters locations of the niche brands, easily obtained from official websites, and promote sales to those nearby geographic markets for brands that as of yet do not have significant sales in the category. In particular, regions that are underdeveloped in terms of the niche category can benefit more from the proximity to the city of origin. Concerning competition from offline sellers, online retailers should understand that offline stores selling a similar niche brand can actually help engender online niche demand by providing product information, particularly when consumers do not know the niche category well.

Finally, the managers of niche brands should also execute geo-targeting strategies when possible. Our study suggests that regions proximal to the city of origin are always advantageous markets for the brand, regardless of the context. Having offline stores selling the brand may curtail online brand performance; however, it may matter less to the brand, since its incentive is to maximize the overall brand sales across channels. As for the follower brands, there are opportunities for them to make use of the offline clout of the competing brand. If they are to choose regions to invest, being close to the headquarters of other brands helps faster diffusion when the market is underdeveloped. This insight is also in line with the findings in geographical clustering literature, in which local clusters of related businesses are found to enjoy competitive advantages (Porter, 2000; Tallman, Jenkins, Henry, & Pinch, 2004). Regarding offline stores selling other brands, regions with a larger number of such stores are favorable for follower brands, regardless of the context.

6.2. Limitations and direction for future research

This study investigates the role of offline factors on online outcomes for a niche category at the regional level. While region-level analysis is common and theoretically sound, an individual-level analysis may provide additional insights. For instance, a future study may identify the precise mechanism that connects offline influence and online sales through the learning effect at a consumer level (Mehta & Ma, 2012). Furthermore, the study does not preclude the possibility that the findings may apply in general settings in which there are regional variations in the level of market development. Future research can examine various contexts, that is, (i) when the prominent attributes are not necessarily of a niche nature, but show sufficient regional variations, and (ii) for other product categories. For instance, our study tests the effects of the city of origin and offline brand availability on the major brands in the niche category, and future study may test these effects

on smaller brands in the mainstream category to verify that they hold for non-market leaders. Finally, a dataset spanning over a longer period of time can be useful in verifying the persistency of the offline contexts and uncovering any temporal patterns that may exist. The city of origin effect relies on a prolonged interaction between the brand and consumers; at some point, however, this effect may wear-in or wear-out (Dubé, Hitsch, & Rossi, 2010). Further, the number of offline stores can change in the long run, and this variation in data can provide insights into the mechanism behind the phenomena.

References

Anderson, C. (2006). *The long tail: Why the future of business is selling more for less.* New York: Hyperion.

Austin, P. C., Tu, J. V., Daly, P. A., & Alter, D. A. (2005). The use of quantile regression in health care research: A case study examining gender differences in the timeliness of thrombolytic therapy. *Statistics in Medicine*, 24(5), 791–816.

Avery, J., Steenburgh, T. J., Deighton, J., & Caravella, M. (2012). Adding bricks to clicks: Predicting the patterns of cross-channel elasticities over time. *Journal of Marketing*, 76(3), 96–111.

Banker, S. (2014). Amazon and anticipatory shipping: A dubious patent? Retrieved September 2015 from http://www.forbes.com/sites/stevebanker/2014/01/24/amazon-and-anticipatory-shipping-a-dubious-patent/

Bell, D. R., & Song, S. (2007). Neighborhood effects and trial on the internet: Evidence from online grocery retailing. *Quantitative Marketing and Economics*, 5(4), 361–400.

Bell, D. R., Gallino, S., & Moreno, A. (2015). Showrooms and information provision in omni-channel retail. *Production and Operations Management*, 24(3), 360–362.

Bell, D. R., Iyer, G., & Padmanabhan, V. (2002). Price competition under stockpiling and flexible consumption. *Journal of Marketing Research*, 39(3), 292–303.

Bronnenberg, B. J., Dhar, S. K., & Dubé, J. P. H. (2009). Brand history, geography, and the persistence of brand shares. *Journal of Political Economy*, 117(1), 87–115.

Brynjolfsson, E., Hu, Y., & Rahman, M. S. (2009). Battle of the retail channels: How product selection and geography drive cross-channel competition. *Management Science*, 55(11), 1755–1765.

Brynjolfsson, E., Hu, Y., & Simester, D. (2011). Goodbye Pareto principle, hello long tail: The effect of search costs on the concentration of product sales. *Management Science*, 57(8), 1373–1386.

Chintagunta, P. K., Chu, J., & Cebollada, J. (2012). Quantifying transaction costs in online/off-line grocery channel choice. *Marketing Science*, 31(1), 96–114.

Choi, J., & Bell, D. R. (2011). Preference minorities and the Internet. *Journal of Marketing Research*, 48(4), 670–682.

Choi, J., Bell, D. R., & Lodish, L. M. (2012). Traditional and IS-enabled customer acquisition on the Internet. *Management Science*, 58(4), 754–769.

Choi, J. P., Hong, S. H., & Jeon, S. (2013). Local identity and persistent leadership in market share dynamics: Evidence from deregulation in the Korean soju industry. *The Korean Economic Review*, 29(2), 267–304.

Choi, J., Hui, S. K., & Bell, D. R. (2010). Spatiotemporal analysis of imitation behavior across new buyers at an online grocery retailer. *Journal of Marketing Research*, 47(1), 75–89.

Conley, T. G., & Topa, G. (2002). Socio-economic distance and spatial patterns in unemployment. *Journal of Applied Econometrics*, 17(4), 303–327.

Demery, P. (2013). Overstock looks east with a new warehouse near Cincinnati. Retrieved August 2015 from http://www.internetretailer.com/2013/03/07/overstock-looks-east-new-warehouse-near-cincinnati

Dill, K. (2015). The healthiest cities in the U.S. *Forbes*. Retrieved August 2015 from http://www.forbes.com/sites/kathryndill/2015/01/08/the-healthiest-cities-in-the-u-s

Dubé, J. P., Hitsch, G. J., & Rossi, P. E. (2010). State dependence and alternative explanations for consumer inertia. *The Rand Journal of Economics*, 41(3), 417–445.

Forman, C., Ghose, A., & Goldfarb, A. (2009). Competition between local and electronic markets: How the benefit of buying online depends on where you live. *Management Science*, 55(1), 47–57.

Fox, M. (2014). *Zappos sending message with pop-up store: CEO. CNBC.* Retrieved September 2015 from http://www.cnbc.com/2014/12/01/zappos-pop-up-store-online-retailer-sells-clothes-too.html

Greene, C. (2013). *Growth patterns in the US organic industry.* US Department of Agriculture, Economic Research Service.

Grinblatt, M., Keloharju, M., & Ikäheimo, S. (2008). Social influence and consumption: Evidence from the automobile purchases of neighbors. *The Review of Economics and Statistics*, 90(4), 735–753.

Hills, S. (2011). California is organic land of opportunity. Retrieved August 2015 from http://www.foodnavigator-usa.com/Suppliers2/California-is-organic-land-of-opportunity

Hughner, R. S., McDonagh, P., Prothero, A., Shultz, C. J., & Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour*, 6(2–3), 94.

Iyengar, R., Van den Bulte, C., & Valente, T. W. (2011). Opinion leadership and social contagion in new product diffusion. *Marketing Science*, 30(2), 195–212.

Janakiraman, R., Sismeiro, C., & Dutta, S. (2009). Perception spillovers across competing brands: A disaggregate model of how and when. *Journal of Marketing Research*, 46(4), 467–481.

Johnson, N. L. (1949). Systems of frequency curves generated by methods of translation. *Biometrika*, 36(1–2), 149–176.

Kahn, B. E., Kalwani, M. U., & Morrison, D. G. (1988). Niching versus change-of-pace brands: Using purchase frequencies and penetration rates to infer brand positionings. *Journal of Marketing Research*, 384–390.

Kalnins, A., & Lafontaine, F. (2013). Too far away? The effect of distance to headquarters on business establishment performance. *American Economic Journal: Microeconomics*, 5(3), 157–179.

Kim, J. (2012). An analysis of the concentration of consumer purchasing in FMCG markets. *Doctoral dissertation.* Department of Marketing, London Business School.

Kushwaha, T., & Shankar, V. (2013). Are multichannel customers really more valuable? The moderating role of product category characteristics. *Journal of Marketing*, 77(4), 67–85.

Lee, K. (2011). People are increasingly spending more money online. Retrieved March 2015 from http://blog.sumall.com/journal/people-are-increasingly-spending-more-money-online-2.html

Lesaffre, E., Rizopoulos, D., & Tsonaka, R. (2007). The logistic transform for bounded outcome scores. *Biostatistics*, 8(1), 72–85.

Manning, W. G., & Mullahy, J. (2001). Estimating log models: To transform or not to transform? *Journal of Health Economics*, 20(4), 461–494.

Mehta, N., & Ma, Y. (2012). A multicategory model of consumers' purchase incidence, quantity, and brand choice decisions: Methodological issues and implications on promotional spending. *Journal of Marketing Research*, 49(4), 435–451.

Organic Trade Association (2011). *U.S. organic industry overview.* (Retrieved January 2014 from) http://www.ota.com/pics/documents/2011OrganicIndustrySurvey.pdf

Porter, M. E. (2000). Location, competition, and economic development: Local clusters in a global economy. *Economic Development Quarterly*, 14(1), 15–34.

Roggio, A. (2015). Shoppers turn to small online retailers for unique, hard-to-find items. (Retrieved August 2015 from) http://www.practicalecommerce.com/articles/90583-Shoppers-Turn-to-Small-Online-Retailers-for-Unique-Hard-to-find-Items

Sassen, S. (2001). *The Global City: New York. London, Tokyo,* Princeton: Princeton University Press.

Schifferstein, H. N., & Ophuis, P. A. O. (1998). Health-related determinants of organic food consumption in the Netherlands. *Food Quality and Preference*, 9(3), 119–133.

Seetharaman, P. B., Ainslie, A., & Chintagunta, P. K. (1999). Investigating household state dependence effects across categories. *Journal of Marketing Research*, 488–500.

Sharp, B. (2010). *How brands grow: What marketers don't know.* South Melbourne: Oxford University Press.

Sinai, T., & Waldfogel, J. (2004). Geography and the Internet: Is the Internet a substitute or a complement for cities? *Journal of Urban Economics*, 56(1), 1–24.

Singh, V. P., Hansen, K. T., & Gupta, S. (2005). Modeling preferences for common attributes in multicategory brand choice. *Journal of Marketing Research*, 42(2), 195–209.

Smith, C. (2015). The surprising facts about who shops online and on mobile. Retrieved March 2015 from http://www.businessinsider.com/the-surprising-demographics-of-who-shops-online-and-on-mobile-2014-6#ixzz3TvtBVL3O

Sridhar, K., Bezawada, R., & Trivedi, M. (2012). Investigating the drivers of consumer cross-category learning for new products using multiple data sets. *Marketing Science*, 31(4), 668–688.

Tallman, S., Jenkins, M., Henry, N., & Pinch, S. (2004). Knowledge, clusters, and competitive advantage. *Academy of Management Review*, 29(2), 258–271.

Taylor, P. J., Catalano, G., & Walker, D. R. (2002). Exploratory analysis of the world city network. *Urban Studies*, 39(13), 2377–2394.

U.S. Department of Transportation (2011). 2009 National Household Travel Survey. Retrieved August 2015 from http://nhts.ornl.gov/2009/pub/stt.pdf.

Van Heerde, H. J., Leeflang, P. S., & Wittink, D. R. (2004). Decomposing the sales promotion bump with store data. *Marketing Science*, 23(3), 317–334.

Wall Street Journal (2015). 2015 consumer products industry outlook. Retrieved March 2015 from http://deloitte.wsj.com/cio/2015/01/08/2015-consumer-products-industry-outlook/

Xu, J. T., Forman, C., & Hu, Y. J. (2014). Fixed-line and mobile Internet: Complements or substitutes? *Working paper* Retrieved August 2015 from http://misrc.umn.edu/wise/2014_Papers/46.pdf

Yang, S., & Allenby, G. M. (2003). Modeling interdependent consumer preferences. *Journal of Marketing Research*, 40(3), 282–294.

Zentner, A., Smith, M., & Kaya, C. (2013). How video rental patterns change as consumers move online. *Management Science*, 59(11), 2622–2634.