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Price Promotions: Enablers or Obstacles for Brand-Led Innovation Adoption—A Double-Hurdle Approach

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Abstract

Innovative new products and a strong brand are essential assets to sustain and expand a company's competitive position in the marketplace. Separate research in the innovation and marketing field has found that marketing instruments, such as price promotions, can influence both new product diffusion and brand image. However, a holistic, brand-oriented investigation of marketing drivers' effects on new product diffusion is missing. This study aims to address this gap by investigating the effect of price promotions on new product diffusion from a brand manager's perspective. The analytic basis is a large-scale panel data set that covers four established fast-moving consumer goods categories and the innovation activities of 177 brands across four years. A double-hurdle model is applied to separately explore the effects of price promotions on consumers' decisions to try and to repurchase (i.e., adopt) a new product. The results show that price promotions' impact depends on the stage of the diffusion process: while frequent price discounts foster new product trial, they hinder the persistent adoption of new product launches. In addition, the findings reveal that a strong brand name fulfills a supporting (risk-reducing) function at the trial stage but becomes less important for persistent adoption. This study contributes to extant literature by enhancing understanding of the linkages between innovation and brand management. Furthermore, it advances methodology by applying a double-hurdle model that accounts for the two-step process of consumers' adoption decisions. Finally, it extends current knowledge on price promotion and innovation adoption by revealing opposite effects in the two innovation stages. The findings imply that managers need to handle price promotions carefully: although discounts encourage initial product trial, they should be used sparingly in later diffusion stages.

Keywords: new product introduction, brand management, price promotion, double-hurdle model

Introduction

New product introductions bear great potential to strengthen a company's competitive advantage (Banbury and Mitchell, 1995) because they increase consumers' purchase probability and willingness to pay by creating additional utility (Steenkamp, Van Heerde, and Geyskens, 2010). Therefore, new product development is a top priority on marketing managers' agendas (Srinivasan, Pauwels, Silva-Risso, and Hanssens, 2009). However, introducing new products carries substantial business risk because development costs may fail to amortize if the products are not successfully adopted in the market (Sorescu and Spanjol, 2008).

Introducing a new product under an established, well-reputed brand name can mitigate this risk (Kerin, Kalyanaram, and Howard, 1996): consumers transfer their perceptions of and attitudes toward the well-known brand to the new product (Aaker and Keller, 1990), which adds credibility and legitimacy, enhances visibility, and supports communication (Aaker 1997). Furthermore, relying on strong brands can increase consumers' willingness to try and to recommend new products, which results in a faster diffusion in the market (Shocker, Srivastava, and Ruekert 1994).

Thus, brand and innovation management are strongly interrelated, and adopting a holistic brand-oriented perspective rather than a single product-level view is important (Beverland, Napoli, and Farrelly, 2010; Brexendorf, Bayus, and Keller, 2015). Therefore, a brand manager should be granted a key role in the innovation process (Shocker et al., 1994) because his or her strategic focus is to optimize the entire brand rather than single products. Neglecting existing linkages between brand and innovation management may not only hurt a brand (Buil, de Chernatony, and Hem, 2009; Gürhan-Canli and Maheswaran, 1998) but also result in overlooking important drivers of success or failure of new product introductions (Aaker, 1997;

Hultink, 2010). Despite this apparent need for integration, in their literature review Brexendorf et al. (2015) find that the interface between innovation and brand management is still under-researched, as most scientific investigations are conducted separately in the respective fields.

Temporary price reductions are an essential instrument for both brand and innovation management because they not only affect marketing measures, such as brand sales (e.g., Pauwels, Hanssens, and Siddarth, 2002), brand profits (e.g., Jedidi, Mela, and Gupta, 1999), and brand equity (e.g., Yoo, Donthu, and Lee, 2000), but also exert a significant influence on consumers' pretrial propensity and adoption of new product introductions (e.g., Raghurir and Corfman, 1999; Song and Parry, 2009). Despite their relevance for both research fields, price promotions related to new product adoption have, to the best of our knowledge, not been subject to an integrated investigation.

Recognizing this research need, this study aims to combine the brand and innovation management perspective by investigating, from a brand manager's viewpoint, the impact of price promotions on the adoption of new product introductions under an existing brand name. To approach this task, this study applies a double-hurdle model to analyze German panel data from 2009 to 2012 that capture the innovation and price promotion activities of 177 national brands in four different product categories.

This study makes important theoretical and methodological contributions: for theory, it provides a holistic examination of price promotions' effect on new product introductions by adding the brand manager's perspective to the theoretical framework. Adding this perspective is important because, in many markets, the majority of new products are launched under an existing brand name and their introductions are likely to affect the entire brand (Brexendorf et al., 2015). Methodologically, the study advances innovation-adoption modeling by using a double-hurdle

approach, which separates consumers' trial and adoption decisions. Although innovation-adoption theory has strongly advocated this two-stage approach (Gatignon and Robertson, 1991; Kalish, 1985; Mittelstaedt, Grossbart, Curtis, and Devere, 1976), only a few economics studies (e.g., Dimara and Skuras, 2003; Martínez-Ros and Labeaga, 2002; Nakamura and Odagiri, 2005) have applied it in the context of innovation. The approach's main advantage is that it allows consumers' consecutive decisions to try and to adopt new products to be determined by different sets of parameters, which may adequately reflect real decision making.

The study's results provide valuable implications for researchers and practitioners. The findings show that price promotions can have opposite effects on innovation adoption. At product launch, shallow but frequent price reductions can induce product trials because they create awareness of the brand and the new product and spark consumers' interests by providing substantial deal value. After the critical hurdle of product trial is surpassed, however, price promotions can hinder adoption of new launches because their positive effect on deal value vanishes and promotions' negative effect on brand evaluations reduces repurchases of the new product.

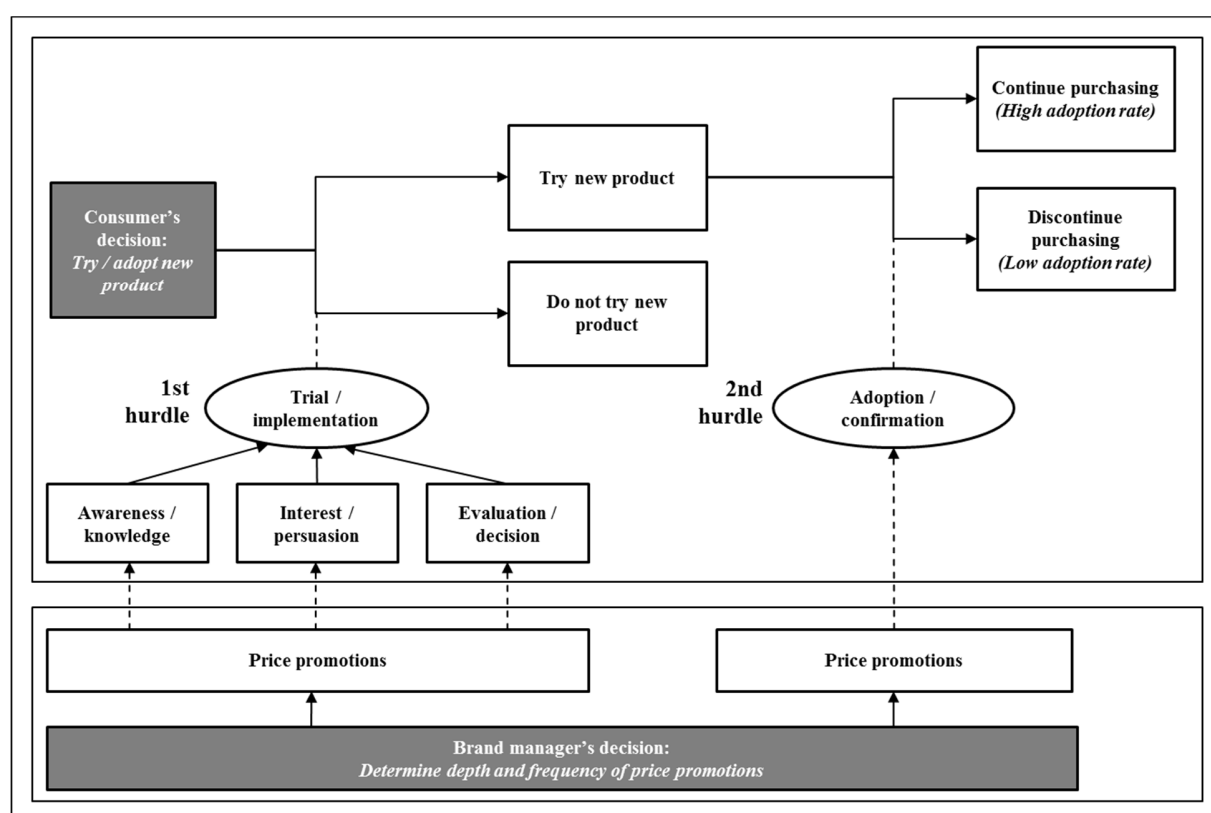
The remainder of this paper proceeds as follows: the next section describes the theoretical framework and research questions. Thereafter, we describe the methodology and data to approach the research questions. Then, we present the results and discuss their managerial implications. The paper concludes with potential limitations and future research avenues.

Theoretical Framework

This study adopts the brand manager's perspective of new product introductions under an established brand name. Specifically, it investigates the brand manager's decision on an appropriate price promotion strategy to influence consumers' adoption of new product launches.

To achieve this goal, the brand manager needs to anticipate consumers' reactions to price promotional activities and their consequences for new product adoption. Therefore, the conceptual framework (Figure 1) describes consumers' generic innovation-adoption process to derive specific hypotheses on brand managers' promotional decisions and their impact on (successful) new product diffusion.

Figure 1: Theoretical Framework



Consumers' Innovation-Decision Process

Rogers (1983, p. 21) characterizes consumers' innovation-decision process as "an information-seeking and information-processing activity in which an individual obtains information in order to decrease uncertainty about the innovation." According to Rogers's (1962, 1983) initial work and subsequent investigations (e.g., Nabih, Bloem, and Poiesz, 1997; Rogers

and Shoemaker, 1971), consumers' innovation adoption is characterized by a five-step process that contains the stages of awareness (or knowledge), interest (or persuasion), evaluation (or decision), trial (or implementation), and adoption (or confirmation). The first three steps take place in consumers' minds and reflect their awareness of and interest in a new product to evaluate its utility. If consumers mentally decided that the new product is worth testing, they engage in the physical action of product trial (Rogers, 1983; Rogers and Shoemaker, 1971). On gaining product experience during their first product trials, they continue to seek confirming evidence for their decision. If exposed to information that contradicts their evaluation at the trial stage, consumers may eventually reverse their initial decision and discontinue purchasing the new product (Rogers, 1983).

In an effort to further advance the depicted innovation-adoption model, Gatignon and Robertson (1991, p. 325) argue that "in any conceptualization of the adoption process, it is essential to separate trial and adoption." Thus, in accordance with this view and other established research in the field (e.g., Hahn, Park, Krishnamurthi, and Zoltners, 1995; Kalish, 1985; Mittelstaedt et al., 1976), we assign Rogers's (1962, 1983) five-steps to two stages. First, consumers decide whether to try a new product (Steps 1–4). Second, after trial, they decide whether to continue or discontinue purchasing (i.e., adopting) the new product (Step 5). If consumers choose not to engage in trial, the new product is not adopted. After consumers opt for product trial, their subsequent decision entails how much of the new product they should continue purchasing. In other words, the first hurdle for a new product to be adopted is consumers' willingness to try the product, and the second hurdle is their willingness to repurchase the product.

In the current context, this insight implies that a brand manager needs to provide incentives to encourage consumers to surpass both the first hurdle of trial and the second hurdle of adoption. However, the impact of adoption incentives, such as price promotions, may differ depending on the diffusion stage in which they are provided. Thus, theory requires the empirical model to separate the trial and adoption stages and to allow for potentially different influences of the independent variables in these two stages.

Brand Manager's Promotional Decisions

Anticipating the depicted innovation-adoption process, the brand manager's task is to provide consumers with the right incentives to surpass both the trial and adoption hurdle to foster the successful diffusion of new products into the market. Drawing from existing research findings and theories, we derive hypotheses that account for price promotions' potential impact on the steps of innovation adoption (Rogers, 1962, 1983).

Awareness. Creating awareness and knowledge of a new product is a necessary condition for trial (Rogers, 1983). Price promotions can enhance consumers' awareness and knowledge by providing exploration and convenience benefits (Chandon, Wansink, and Laurent, 2000). Specifically, price promotions meet consumers' needs for exploration and information because they attract attention and create a continuously changing shopping environment (Kahn and Louie, 1990; Kahn and Raju, 1991). Furthermore, several studies (e.g., Bawa and Shoemaker, 1989; Dickson and Sawyer, 1990) have shown that price promotions reduce search costs because they signal a brand's availability and direct consumers' attention to new, potentially interesting products (i.e., advertising effect). In addition, price promotions reduce decision costs by offering an easy decision heuristic to purchase a new product (e.g., Wansink, Kent, and Hoch, 1998). The reduction of both search and decision costs provides consumers with a substantial convenience

benefit (Chandon et al., 2000). Consequently, in the context of brand management, price promotions can increase brand awareness because they induce brand switching and product trial (Huang and Sarigöllü, 2012) and confer product experience (Keller, 2008).

Interest. A new product must provide some kind of advantage (i.e., utility) to spark consumers' interests in trying it (Rogers, 1983). Premised on transaction utility theory (Thaler, 1985), prior research (e.g., Darke and Chung, 2005; Grewal, Monroe, and Krishnan, 1998) has shown that price promotions enable consumers to acquire a product at reduced cost (acquisition utility) and gain psychological satisfaction beyond economic utility because consumers believe that they made a purchase at favorable financial terms (transaction utility). These advantageous effects of promotions can increase product interest, which in turn increases the probability of store visits and product trials (Song and Parry, 2009).

Evaluation. When consumers are aware of and interested in a new product, they conduct an evaluation of whether the new product is worth trying (Mittelstaedt et al., 1976; Rogers and Shoemaker, 1971). When making their (mental) trial decisions, they seek information about overall product performance to mitigate the perceived uncertainty about a new product (Rogers, 1983). In this context, a brand and its image are important cues to influence consumers' evaluations of new product performance (Richardson, Dick, and Jain, 1994). That is, strong brands (i.e., high-equity brands) may encourage the trial decision because they lower perceived uncertainty, while weak brands (i.e., low-equity brands) may even prevent product trial (Beverland et al., 2010; Page and Herr, 2002). Drawing on price–quality theory (Dodds and Monroe, 1985; Zeithaml, 1988), a wealth of scientific studies (e.g., Jedidi et al., 1999; Yoo et al., 2000) have shown that price promotions can negatively influence brand evaluations because they lower perceived product quality and brand associations. As a result, price promotions can have a

negative effect on consumers' willingness to try a new brand extension (Raghubir and Corfman, 1999).

This discussion indicates that price promotions can have both a positive and a negative effect on product trial. However, we expect that at the pretrial stage, the positive effects on awareness and interest will outweigh the negative effects on brand evaluation because the latter effects are less likely to occur in the short run but rather need time to manifest during repeat product experience (Alba and Hutchinson, 1987; Yoo et al., 2000). The findings of Song and Parry's (2009) study confirm this assumption. Thus, on the basis of the outlined theoretical consideration and the presented empirical evidence, we derive the following hypothesis:

H1: Price promotions increase the likelihood of successful new product trial.

In addition, we expect that a brand's strength, which reflects consumers' evaluations of the brand under which the product is launched, will have a positive effect on product trial because of its trust-creating and risk-mitigating function. Therefore, the second hypothesis is as follows:

H2: Brand strength increases the likelihood of successful new product trial.

According to our theoretical framework (Figure 1), the first stage of product trial is followed by the second stage of innovation adoption. As mentioned previously, in the adoption stage (second hurdle), consumers have already engaged in product trial. Therefore, the relevant question is how price promotions affect consumers' adoption rate—that is, the amount of repeat purchases after initial trial.

Adoption. After initial trial, price promotions' ability to create a relative advantage (in terms of acquisition and transaction value) vanishes for two reasons. First, according to reference-price theory (e.g., Lattin and Bucklin, 1989), consumers lower their internal reference price after a promotional offer, which reduces the overall deal value (i.e., acquisition and transaction utility)

of a subsequent discount. Second, self-perception theory (Dodson, Tybout, and Sternthal, 1978; Scott and Yalch, 1980) and attribution theory (Sawyer and Dickson, 1984) suggest that consumers' repurchase probability decreases if they purchased a product in response to a promotional offer (Raghubir and Corfman, 1999). The underlying reason is that consumers tend to attribute their initial purchase to an external cause (i.e., the price promotion) instead of an intrinsic motivation (e.g., product quality), which lowers the probability that their purchasing of the new product will persist (Darke and Chung, 2005). In addition, price promotions' negative effect on brand evaluation (i.e., brand strength) may be even stronger after initial trial because brand associations are more established after repeated experience or exposure to communication instruments, such as price promotions (Alba and Hutchinson 1987; Yoo et al., 2000). This negative effect can be reinforced by the depicted attribution effect, because consumers may reason that they primarily bought the new product because it was discounted rather than because of its superior features or quality, thus leading to even lower quality perceptions (Darke and Chung, 2005). On the basis of the outlined theoretical arguments and the presented empirical evidence, we derive the following hypotheses:

H3: Price promotions negatively affect the adoption rate of new products.

H4: Brand strength positively affects the adoption rate of new products.

Methodology

Sample

This study uses German panel data from 2009 to 2012 to investigate the research hypotheses. In the context of this study, using panel data has several benefits (see Baltagi, 2005; Hsiao, 2003; Klevmarken, 1989). First, analyzing a large number of entities (e.g., brands) over several points in time allows controlling for individual heterogeneity (Klevmarken, 1989). That is, unobserved

or unmeasured entity-specific characteristics, such as brand heritage or corporate strategy, can be accounted for, thus mitigating the omitted variable bias, which is an inherent problem in cross-section or time-series data (Hsiao, 2003). Second, panels provide a larger information base, offer more degrees of freedom, enhance estimation efficiency, and alleviate collinearity issues among the variables (Baltagi, 2005; Hsiao, 2003). Finally, panel data can identify and measure effects that are not detectable in cross-section or time-series data because they include both entity- and time-related information (Baltagi, 2005). Therefore, many scientific studies successfully apply panel data models to investigate research questions related to new product introductions and innovation (e.g., Benner, 2009; Leten, Belderbos, and van Looy, 2007; Talay, Seggie, and Cavusgil, 2009).

The current data set, provided by the “Society for Consumption Research” (GfK), entails information on approximately 30,000 participating households that scan their daily purchases in all major fast-moving consumer goods (FMCG) categories. To strengthen the generalizability of findings, we selected the established product categories “chocolate bars,” “ground coffee,” “shower gel,” and “yogurt” for this analysis because they contain a great variety of different brands and represent different types of product categories (see Slotegraaf and Pauwels, 2008).

We streamlined the database in three steps. First, we included only brands that reported positive sales in each of the four years. This cleaning procedure is common in panel data analysis (see Benner, 2009; Leten et al., 2007) because it counteracts the attrition bias (Baltagi, 2005) and enhances data quality by preventing rarely purchased niche brands from distorting the results (Jedidi et al., 1999). Second, private labels served as a reference basis to calculate brand strength but were otherwise removed from the analyses (see Steenkamp et al., 2010). Finally, the analysis database entails only the national brands that introduced at least one new product within the

current time frame. Following Kim and Sullivan (1998), we excluded brands that did not generate any new products because, logically, a diffusion process of new product introductions cannot be investigated for them. This streamlining process resulted in the final analysis database, which contains 177 national brands accounting for approximately 70% of total sales (99% of national brand sales) and 65% of all new product introductions (90% of national brand new launches) in their respective product categories.

Measures

Dependent variables. The empirical model contains two dependent variables to distinguish consumers' decisions on new product trial (first stage) and adoption (second stage). In line with common practice in analyzing FMCG markets (Steenkamp and Gielens, 2003), a period of one year (half a year of trial period and half a year of adoption period) determines the trial and adoption success of a new product introduction after launch. We deem a new product introduction as successfully tried if it was purchased in both the first and second quarter year after launch (trial period). After trial, we define a new product as adopted if it successfully remains on the market, which is attested by two criteria: first, the product is purchased during the entire adoption period (two subsequent quarter years following the trial period), and second, the sales in the adoption period are higher than or equal to the sales in the trial period.

From a brand manager's perspective, the units of analysis are brands rather than single products, which require deriving aggregated measures of new product trial and adoption. Therefore, product data are aggregated at the brand and year level. For each brand, we counted the number of all new products, the number of tried new products, and the number of adopted new products. Table 1 provides an overview of each category's brands' new product

introductions, trial, and adoption activities. The table shows that, on average, a brand introduced 4.72 products per year, 39% of which were successfully tried and 15% successfully adopted.

Table 1. New Product Introductions, Trial, and Adoption Rates by Product Category

Product category	Number of brands	Average number of NPI per brand and year	Average trial rate per brand and year	Average adoption rate per brand and year in
Chocolate bars	54	5.36	37%	10%
Grounded coffee	22	1.15	26%	12%
Shower gel	45	7.86	38%	13%
Yogurt	56	3.00	47%	22%
Total	177	4.72	39%	15%

NPI = New product introduction

In a final step, we calculated the trial and adoption variables at the brand level from the aggregated data. The dependent variable in the first decision stage is binary and relates to the trial probability (TRY) of a brand's new product introductions (see Steenkamp and Gielens, 2003). Successful trial (TRY = 1) is confirmed if a brand's average trial rate (the number of tried products divided by the total number of new product introductions) is higher than or equal to the average trial rate of the product category to which it belongs. The dependent variable in the second decision stage is continuous and measures the adoption rate (ADOPT) of a brand's new product introductions (see Rogers, 1983). We calculate ADOPT by dividing each brand's number of adopted products by its total number of new product introductions. Thus, the higher the adoption rate, the more successful is a brand in encouraging consumers' new product adoption.

Independent variables. A brand's price promotion intensity is the key explanatory variable in this study's model. We define two separate measures in accordance with research in the price promotion field (e.g., Jedidi et al., 1999; Nijs, Dekimpe, Steenkamp, and Hanssens, 2001). First, promotional depth (PDPT) is the price reduction in percentage of the normal price and measures

how much a brand discounts its price on average. Second, promotional frequency (PFREQ) is the number of weeks a brand is sold at a reduced price divided by the total number of weeks the brand is sold in the market. This relative measure reflects how often a brand discounts its price on average. We include both promotional measures because their effects on innovation adoption may be different. As with the dependent variables, we first calculated PDPT and PFREQ at the product level and then aggregated the measures at the brand level using quantity-weighted averages (see Slotegraaf and Pauwels, 2010).

Control variables. This study's model incorporates a brand's strength (i.e., brand equity) as a covariate to capture the effect of the parent brand on new product introductions' trial and adoption success. Following Buil et al. (2009), we decompose brand strength in its attitudinal and behavioral dimensions.

We capture the attitudinal dimension through the widely acknowledged summary measure revenue premium (RPREM), which indicates how much additional revenue a national brand (NB) can gain compared with an otherwise equivalent private label (PL) (Ailawadi, Lehmann, and Neslin, 2003). A major advantage of RPREM as a measure of brand strength is that it relies on actual market data rather than hypothetical buying situations or subjective evaluations (Ailawadi et al., 2003; Christodoulides and de Chernatony, 2010). Furthermore, it is the most complete measure of brand strength because it captures both the volume and price advantage achieved through the brand name (Slotegraaf and Pauwels, 2008). We adapt Ailawadi et al.'s (2003) operationalization by calculating the RPREM as a relative (percentage) measure: $RPREM = ([Price_{NB} \times Quantity_{NB}] - [Price_{PL} \times Quantity_{PL}]) / (Price_{PL} \times Quantity_{PL})$. We use the leading Aldi brand in each product category as the private label benchmark for RPREM calculations. In German FMCG markets, Aldi is the leading discount store whose assortment primarily consists

of private labels, which, due their dominant market position, serve as a price and volume benchmark for the other market participants (Blank, 2004).

The behavioral dimension of brand strength is captured by a brand loyalty measure. According to Oliver (1999, p. 34), brand loyalty reflects “a deeply held commitment to rebuy or re-patronize a preferred product or service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing.” With this definition, we operationalize brand loyalty as a brand’s first-choice-buyer share (FCBS). A first-choice buyer of a brand is a household that meets the majority of its demand with that brand (Hoegl and Hupp, 2007; Twardawa and Hupp, 2000). To obtain an aggregated measure at the brand level, we calculated the FCBS by dividing the sum of a brand’s first-choice-buyer purchases by the brand’s total sum of purchases. As a result, the higher a brand’s FCBS, the larger is its loyal customer base. At the brand level, the FCBS concept is similar to the well-known concept of the most preferred brand (see Jacoby and Kyner, 1973; Punj and Hillyer, 2004).

Finally, we introduce a set of technical control variables to account for category- and time-related differences in new product trial and adoption. Product category dummies indicate whether a brand belongs to the chocolate bars (CHOC), coffee (COF), shower gel (SHOW), or yogurt (YOG) category. These variables control for the categories’ different innovation levels, possible endogenous sector changes, and potentially heterogeneous brand behavior because of their membership in a specific category (Martínez-Ros and Labeaga, 2002). In addition, time dummies (i.e., 2009, 2010, 2011, and 2012) capture potential macroeconomic influences that vary over time but equally affect all brands (Benner, 2009).

Econometric Model

Our econometric model is based on the previously outlined presumption that consumers' adoption decisions follow a two-stage process that incorporates product trial (first stage) as an antecedent of product adoption (second stage). A class of models that allows for such a two-stage analysis is double-hurdle models, also called two-tiered models (Wooldridge, 2002). Double-hurdle models divide a decision process into two stages (i.e., hurdles), allow the outcomes of the two stages to depend on different parameters, and account for the presence of a disproportionately high number of zero values (Cragg, 1971). Specifically, these models are designed for situations in which two hurdles must be crossed before a desired outcome can occur (Cragg, 1971; Moffatt, 2005). In the current context, new product introductions must cross both the trial and adoption hurdles to successfully diffuse into the market. In the first hurdle, a probit model explains the decision to participate in an activity (e.g., trial or no trial), while in the second hurdle, a truncated-normal model predicts the intensity of participation (e.g., rate of adoption) (Cragg, 1971).

The characteristics of the double-hurdle model make it more suitable to investigate this study's theoretical framework than, for example, the widely applied Tobit model (Tobin, 1958). Although the latter model also adequately accounts for corner-solution problems, it does not allow separating the trial and adoption decisions and, consequently, cannot estimate different sets of parameters for different decision stages (Blundell and Meghir, 1987). Econometric studies have applied Cragg's (1971) double-hurdle model and empirically shown its superiority to the Tobit approach (e.g., Nakamura and Odagiri, 2005; Ricker-Gilbert, Jayne, and Chirwa, 2011).

The exact specification of the double-hurdle model involves several steps. First, the variables to include in the first and the second hurdle need to be defined. As our theoretical framework

does not provide *ex-ante* justification for specifying a different set of variables for the trial and adoption decisions, our double-hurdle model uses the same set of variables for both hurdles (see Cameron and Trivedi, 2009; Su and Yen, 1996).

A second specification decision involves the distributional assumption for the dependent variable. Following Cameron and Trivedi (2009) and Jones and Yen (2000), we performed a Box–Cox regression, which rejected the adequacy of a logarithmic transformation (i.e., theta-value of 0 was soundly rejected at $p < .00$). In addition, as Hsu and Liu (2008) and Wooldridge (2002) suggest, we conducted a Vuong (1989) test to compare the log-likelihoods of the normal and the lognormal specification. The normal double-hurdle model remains the preferred choice, as this test rejects the null hypothesis of a lognormal specification in the current model ($p < .00$).

Finally, we adapt the double-hurdle model to the panel structure of the data. As Burke (2009) suggests, we used a clustered sandwich estimator to obtain standard errors robust to autocorrelation (i.e., intragroup correlation). In addition, we included time and category dummies to control for unobserved heterogeneity across years and product categories. Consistent with the model selection and specification process outlined, this study applies a panel-data-adjusted version of Cragg’s (1971) double-hurdle model implemented by the Stata command *craggit* developed by Burke (2009).

Results

Summary Statistics of Variables

Table 2 provides descriptions and summary statistics of the double-hurdle model’s variables. The table shows that the average brand’s adoption rate (ADOPT) amounts to 15%. Furthermore, the average frequency by which brands granted price discounts (PFREQ) is approximately 15 of 52 weeks (29%). During these promotional weeks, the average price reduction (PDPT) amounted

to 10%. The average brand's revenue premium (RPREM) is negative (-42%). According to Ailawadi et al. (2003), this observation is common and indicates that private labels' volume advantage outweighs the price surplus of national brands. This situation applies to most German FMCG markets and reflects the strong competitive position of private labels (Nielsen, 2014). Finally, 27% of the average brand's purchases come from loyal customers, which indicates relatively low brand loyalty (FCBS) in the considered product categories.

Table 2. Descriptive Statistics of Variables

Variable	Description	Mean	SD
<i>Dependent variables</i>			
TRY	Product trial: 1 = Successful product trial, 0 = Unsuccessful product trial	.45	.50
ADOPT	Adoption rate: # of adopted new products / # of all new products	.15	.29
<i>Independent variables</i>			
PDPT	Promotion depth: promotional price reduction in % of normal price	.10	.09
PFREQ	Promotion frequency: # promotional weeks / # all weeks	.29	.27
<i>Control variables</i>			
RPREM	Revenue premium: $([Price_{NB} \times Quantity_{NB}] - [Price_{PL} \times Quantity_{PL}]) / (Price_{PL} \times Quantity_{PL})$	-.42	1.65
FCBS	First-choice-buyer share: purchase acts by first-choice buyers / all purchase acts	.27	.21
CHOC	Dummy: 1 if brand belongs to chocolate category, 0 otherwise.	.31	.46
COF	Dummy: 1 if brand belongs to coffee category, 0 otherwise.	.12	.33
SHOW	Dummy: 1 if brand belongs to shower gel category, 0 otherwise.	.25	.44
YOG	Dummy: 1 if brand belongs to yogurt category, 0 otherwise.	.32	.47
2009	Dummy: 1 if year = 2009, 0 otherwise.	.25	.43
2010	Dummy: 1 if year = 2010, 0 otherwise.	.25	.43
2011	Dummy: 1 if year = 2011, 0 otherwise.	.25	.43
2012	Dummy: 1 if year = 2012, 0 otherwise.	.25	.43

NB=National brand; PL=Private label

Table 3 displays the pairwise correlations among the variables of interest. Because we observe several significant correlations among these independent variables, we conduct a collinearity analysis, which we present in Table 4. As all collinearity diagnostics are substantially below commonly applied thresholds, we conclude that multicollinearity is not an issue in the model.

Table 3. Pairwise Correlation of Variables

	TRY	ADOPT	PDPT	PFREQ	RPREM	FCBS
TRY	1.00					
ADOPT	.55*	1.00				
PDPT	.16*	.12*	1.00			
PFREQ	.35*	.18*	.57*	1.00		
RPREM	.30*	.12*	.12*	.44*	1.00	
FCBS	.11*	.10*	.07	.35*	.36*	1.00

* $p < .05$.

Table 4. Collinearity Diagnostics of Independent Variables

Variable	Variance inflation factor (VIF)	Eigenvalue	Condition Index	R-Square
PDPT	1.56	1.99	1.00	.36
PFREQ	2.01	1.05	1.38	.50
RPREM	1.35	.63	1.77	.26
FCBS	1.24	.32	2.49	.19
Mean VIF	1.54			
Determinant of corr. matrix	.42			

Double-Hurdle Model

We apply the previously specified double-hurdle model to assess the stated research hypotheses. Table 5 shows the estimation results for the independent variables' effects on TRY (first hurdle) and ADOPT (second hurdle).

Table 5. Cragg's Double-Hurdle Model

Model estimates				
Variable	<i>First hurdle: DV=TRY (binary variable)</i>		<i>Second hurdle: DV=ADOPT (continuous variable)</i>	
	Coeff. (β)	Std. Error	Coeff. (β)	Std. Error
PDPT	-.46	(.75)	.43	(.69)
PFREQ	1.18***	(.35)	-.60***	(.21)
RPREM	.28***	(.11)	-.05	(.03)
FCBS	.79**	(.35)	-.09	(.23)
CHOC	.13	(.17)	-.49***	(.10)
COF	-.74***	(.24)	.01	(.11)
SHOW	.16	(.19)	-.43***	(.11)
2009	.35**	(.15)	-.08	(.08)
2010	.33**	(.13)	-.08	(.07)
2011	-.05	(.15)	-.01	(.08)
Constant	-1.13***	(.23)	.96***	(.13)
Log-likelihood	-342.39			

*** $p < .01$, ** $p < .05$, * $p < .1$; DV = dependent variable.

H1 predicts that price promotions increase product trial by creating awareness of and interest in new products. The empirical results confirm this hypothesis with regard to PFREQ but do not support it for PDPT. The PDPT coefficient is not significant in the first equation of the double-hurdle model, which implies that deep price promotions are not an effective instrument to encourage product trial. A potential reason is that regular prices of new products are not yet known by consumers (Dickson and Sawyer, 1990), which makes a high discount ineffective because consumers have no comparison (i.e., reference price) to evaluate the attractiveness of the deal offered (Raghubir, 1998). In other words, deep price cuts fail to create sufficient acquisition value because no cost reduction is perceived if a price benchmark is missing. In contrast, frequent price promotions positively influence consumers' willingness to try new products ($\beta = 1.18, p < .01$). Although deep price promotions may fail to create acquisition value during the trial period of new launches, the mere presence of price advantages can create substantial transaction value, not necessarily from cost savings but from the pleasure of receiving a good deal (Grewal et al., 1998). Thus, offering discounts frequently at the trial stage is likely to create transaction value for a broad target group, increasing awareness of and interest in the new product.

H2 posits that brand strength encourages product trial because strong brands create trust and reduce the perceived risk associated with new product introductions. The results confirm this supposition; both the RPREM ($\beta = .28, p < .01$) and the FCBS ($\beta = .79, p < .05$) exert a significant, positive influence on TRY.

In summary, the first-stage results of the double-hurdle model show that, consistent with the theoretical framework's predictions, price promotions and brand strength are significant enablers

of new product trial. In a next step, we investigate these variables' influence on consumers' adoption of new launches (second hurdle).

H3 predicts that price promotions hinder new product adoption because they decrease repurchase probability and lower quality perceptions. Empirical evidence confirms this hypothesis for PFREQ but does not support it with regard to PDPT. As in the trial stage, the coefficient of PDPT is not significant in the second equation of the double-hurdle model, indicating that the size of a discount does not substantially influence consumers' adoption behavior. Instead, the frequency of discounts matters: offering frequent price cuts adversely affects new product adoption, as indicated by the significant, negative impact of PFREQ on ADOPT ($\beta = -.60, p < .01$).

Finally, H4 postulates that a strong brand fosters new product adoption by enhancing perceived product quality. The empirical results do not support this hypothesis because neither RPREM nor FCBS exert a significant effect on ADOPT. The underlying reason could be that a brand's function as a risk-reducing and quality-signaling cue is primarily important in the first (trial) stage, in which consumers' uncertainty is highest and product experience is virtually nonexistent. After successful trial, however, a brand's signaling function becomes less important because consumers have already gained use experience and familiarized themselves with the new product.

From a methodological perspective, the empirical results reveal a key strength of the double-hurdle model: not only does it allow the coefficients' size to vary across the two hurdles, but it also allows them to assume opposite directions. In the current context, the double-hurdle model reveals reversed signs of PFREQ in the first and second stages of new product diffusion, thus requiring brand and innovation managers to thoroughly consider the use of price promotions

depending on the diffusion stage of a new product. A one-tier model, such as the Tobit model, could not have uncovered such findings and may even have led to incorrect or incomplete practical implications.

Average Partial Effects

Following common practice in double-hurdle modeling (e.g., Papke and Wooldridge, 2008; Ricker-Gilbert et al., 2011), we estimate the independent variables' average partial effects to facilitate the interpretation of the model's estimated coefficients. We obtain the average partial effects in Table 6 by calculating the actual partial effects for each entity in the sample and then taking the average of these individual effects. The main advantage of average partial effects is that their calculation is based on actual values in the data set rather than on unobserved and often unrepresentative values, such as averages (Papke and Wooldridge, 2008; Wooldridge, 2002). We calculate average partial effects using Burke's (2009) supplementary Stata code supplied along with the *craggit* command. We obtain standard errors by bootstrapping at 100 repetitions, as Burke (2009) suggests.

Table 6. Average Partial Effects of Double-Hurdle Model

Cragg's double-hurdle model: Average partial effects (APE)				
Variable	<i>First hurdle: DV=TRY</i>		<i>Second hurdle: DV=ADOPT</i>	
	APE	Std. Error	APE	Std. Error
PDPT	-.13	(.20)	.33	(.71)
PFREQ	.32***	(.10)	-.46***	(.16)
RPREM	.08**	(.03)	-.04	(.02)
FCBS	.22***	(.08)	-.07	(.15)
CHOC	.04	(.04)	-.37***	(.06)
COF	-.20***	(.06)	.01	(.08)
SHOW	.04	(.04)	-.32***	(.06)
2009	.10**	(.04)	-.06	(.07)
2010	.09**	(.04)	-.06	(.05)
2011	-.01	(.05)	-.01	(.07)

*** $p < .01$, ** $p < .05$, * $p < .1$; DV = dependent variable.

Table 6 reveals that, in the first hurdle (probit model), increasing PFREQ by 1% increases TRY by 32%. Furthermore, increasing RPREM by 1% raises TRY by 8%, while a 1% increase of FCBS lifts TRY by 22%. The second hurdle results (truncated normal model) show that increasing PFREQ by 1% lowers ADOPT by 46%.

Discussion

This study's purpose was to investigate whether price promotions enable or hinder the adoption of new products introduced under an existing brand name. Empirical results reveal that the answer depends on the diffusion stage of the new product.

At the trial stage, we found that frequent price promotions increased new products' trial probability through their potential to create awareness and interest among consumers. Specifically, discounts increase awareness because they provide exploration and convenience benefits by raising consumers' attention to new products, by creating an exciting shopping environment, and by reducing search and decision costs. In addition, discounts may spark interest in new products because they offer substantial transaction utility (i.e., pleasure of making a good deal), which lowers the hurdle to engage in new product trial.

At the adoption stage, after successful product trial, empirical results show that frequent price cuts lower new products' adoption rates because they negatively affect repurchase probabilities and brand evaluations. Specifically, after repeated price cuts, consumers may lower their internal reference price, which reduces deal value and, thus, repurchase probabilities. Repeat purchases are further suppressed because discounts offer an extrinsic incentive that replaces intrinsic motivation to purchase the new product again. Furthermore, brand evaluations may be lowered because price promotions evoke negative quality perceptions and brand associations, an effect that increases after consumers gain use experience with new product.

The study's findings also indicate that a strong brand is an enabler of product trial, possibly because a well-reputed brand name creates trust and reduces consumers' natural skepticism toward new products. However, this work's empirical findings provide no evidence that this positive effect persists in the adoption stage. Although a brand name's trust-creating function seems particularly important for encouraging product trial, enhanced use experience and familiarity with the new product make the brand's signaling function less relevant for after-trial purchase decisions.

These results substantiate and extend prior research findings on price promotions' role in new product diffusion. They affirm Song and Parry's (2009) finding that price promotions encourage new product trial because of their informational and economic benefits. These positive effects are likely to outweigh potential detrimental effects on brand evaluation at the trial stage (Raghubir and Corfman, 1999). In addition, our results are in accordance with research on brand innovation (e.g., Beverland et al., 2010; Page and Herr, 2002) that shows that a strong brand may increase trial probability by lowering consumers' uncertainty about new product introduction.

This work's findings extend existing research by revealing that price promotions' positive effects during the trial stage do not persist in the adoption stage of new product introductions. Rather, frequent discounts may even hinder adoption rates because, by lowering quality perceptions and brand evaluations, they can convey disconfirming evidence for consumers' initial purchase decision, which is likely to reduce repurchase probabilities and adoption rates. As a result, this work shows that price promotions' effect on adoption is not positive per se, but rather depends on the stage of the diffusion process. In addition, the analysis reveals that while a strong brand is crucial for new product trial, it is less effective in spurring repurchase rates and

new product adoption, possibly because its risk-reducing function becomes less relevant after consumers gain use experience.

Implications

This study's findings provide important implications for brand and innovation management. When new products are introduced under an existing brand name, the brand's strength is an important cue for consumers' trial decisions: capitalizing on the parent brand's image fosters new product adoption, but at the same time, inappropriate marketing activities may endanger brand evaluations and, in turn, create negative feedback also for the new product. Therefore, innovation and brand managers need to align efforts to successfully promote new products while preserving the parent brand's strength.

Price promotions can be an effective marketing instrument to encourage product trial, but they need to be employed with care because their excessive use may hinder product adoption, due to the negative effect on consumers' brand evaluations and intrinsic purchase motivations. Thus, the brand manager's task is to balance the positive and negative effects of discounts during the adoption process. This study's analytic results suggest using price promotions during the trial stage to create awareness and interest. After successful trial, price promotions should be applied sparingly to avoid a negative impact on brand evaluations. Even during the trial phase, price promotions should be employed with care because they might lower price expectations, which can result in low repeat purchases during the adoption phase. One way to address this challenge is to provide relevant price information (e.g., reference prices) to anchor consumers' price expectations and to avoid negative quality inferences at later adoption stages (Raghubir, 1998).

Limitations and Future Research Areas

As with every empirical investigation, this study is subject to several limitations that provide avenues for future research. First, the use of secondary data required the use of proxy variables. Although the applied measures seem to reasonably represent the true variables of interest, some impreciseness inherent to secondary data remains. Thus, verifying the results with alternative measures gained from primary data may enhance the validity of findings. Second, due to limited data availability, we could incorporate only a limited number of control variables to examine price promotions' impact on innovation. Future research endeavors might integrate additional variables that affect trial probability and adoption rates. Finally, the underlying data set is limited to the FMCG industry in Germany. Transferring this study's research questions to different industries and countries would enhance the generalizability of the results.

Despite its limitations, this study contributes to scientific literature in several meaningful ways. First, it provides new insights into the interface between brand and innovation management by adopting a brand manager's perspective on innovation adoption. Second, it advances current understanding of price promotions' role in the context of brand-led new product adoption by uncovering their different influences during the different stages of innovation diffusion. Third, this investigation applied a new approach in the context of innovation adoption (i.e., the double-hurdle model) and, in doing so, revealed different effects of price promotions on the trial and adoption decision.

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