HOW TO PREVENT CONSUMER SWITCHING TO PRIVATE LABELS: AN EMPIRICAL ANALYSIS.

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ABSTRACT

Increasing importance of private labels has lead national brands to adopt several strategies to hold private labels growth. We empirically test which marketing initiatives implemented by national brands are more efficient to prevent consumers switching to private labels. We use a Hazard model to determine whether there exist any effects due to innovation, promotion, and price on consumer switching and how strong those are. We find that as expected innovation, promotion and price exert a negative effect on the consumer likelihood to switch to private labels. However we find the strongest effect on promotion suggesting the importance of understanding how consumers perceive value in the national brands offer.

Keywords:

Private labels, innovation, promotion, price, switching.

1. Introduction

The relationship between manufacturers and retailers and between national brands and private labels has been approached from different perspectives in the literature. Understanding this interaction is becoming more important for manufacturers as private labels are consistently outgrowing national brands having achieved a market share between 20% in the US and 35% in Europe (PLMA , 2009).

Several papers identify the market, product , national brands and consumer dynamics that drive private label growth. Another set of research analyze how national brands are influenced by private label growth and how can they deffend from and hold private label share growth. However, the efficiency of the national brands activity on price, promotion, advertising, and innovation have been studied generally in isolation, thus not considering the combined effects nor comparing the sizes of the different effects of these marketing tools on holding private label growth.

Concerning the price some papers state the asymmetric impact of pricing decisions between national brands and private label (Blattberg, 89) as price discounts on higher price brands can steal share from comparable brands and also from low tier brands like private labels, but not the other way around. Also, the price gap between national brands and private labels exerts an important positive influence on private label performance (Dhar & Hoch,1997).

A common response to private labels by manufacturers has been to increase promotional investment in attempts to halt the migration of value concious consumers (Garretson, Fisher and Burton, 2002). Some studies indicate that promotions can be an efficient way to detter private label penetration (Sethuraman & Mittelstaedt, 92; Blattberg, 89) but others indicate that significant and frequent promotional activity can erode brad loyalty (Gedenk & Neslin, 99).

With regard the introduction of new products by CPG manufacturers , those make them less vulnerable to the entry of private labels (Pauwels & Srinivasan, 2004). Pauwels and Srinivasan state that when private labels enter a category, a defensive strategy of investing in product innovations can enhance national brand's competitive advantage and provide a basis for a sustainable price premium over private labels. In fact, research shows that national brands have mainly focused on increasing their distance from private labels through innovation and advertising in order to provide a superior value to the consumers compared to private labels (Verhoef et al., 2002). Despite the high interest of these subjects there is no research by the best of our knowledge that considers and compare the effects of price, promotion and new product innovation all together. We believe this gap is important to fulfill as it will enable the comparison on how efficient these tools are to influence consumer behavior towards private labels.

The objective of this research is to better understand which marketing efforts are more efficient to prevent consumers switching towards private labels. Thus, we empirically test the effect of promotion, price and innovation on consumer likelihood to switch to private labels. We believe that better understanding the effect of these marketing tools will have important implications for manufacturers and retailers in their battle for this target market.

2. Method and Data

We test our hypothesis using a hazard model specification in a Nielsen consumer panel data. We model the impact of a set of covariates on the probability of a discrete response variable, and account for censoring and the temporal nature of the data. Hazard models have been widely used in marketing, but mainly focused in studying interpurchase time (Helsen & Schmittlein, 1993; Jain & Vilcassim, 1991; Seetharaman & Chintagunta, 2003; Van den Poel, 2004).

Hazards models can address an extended variety of situations, with terminology varying by discipline. In our research context, the use of consumer panel data requires to address several issues in order to estimate the final model specification. First, multiple purchase occasions per household leads to a recurrent event specification, where might be household-specific variability due to unobserved factors. Secondly, there may be some within-household correlation due to unobserved factors and/or buyer choice inertia (i.e. events may have some kind of relation, and consumer choice in time t, can influence choice in time t+1).

There are specific treatments of hazard models that account for all these issues. We use the shared frailty models or more specifically the Weibull proportional hazard gamma distributed shared frailty model[1] (Clayton & Cuzick, 1985; Sahu, Dey, Aslanidou, & Sinha, 1997; Vaupel, Manton, & Stallard, 1979).

In the shared frailty model, the observations are clustered by household and each cluster shares the same level of frailty. If there are *n* individuals with the *i*th individual comprised of n_i purchase occasions $(i = 1,\ldots,n)$, equation (2) would be:

$$h_{ij}\left(t\middle|\alpha_i\right) = \alpha_i h_{ij}\left(t\right) \quad (1)$$

for $j = 1,\ldots,n_i$ with $h_{ij}\left(t\right) = h\left(t\middle|\mathbf{x}_{ij}\right)$. In Weibull regression, the conditional hazard is given by:

$$h_{ij}\left(t\middle|\alpha_i\right) = \alpha_i h_{ij}\left(t\right) = \alpha_i \exp\left(\mathbf{x}_{ij}\beta\right) pt^{p-1} \quad (2)$$

On the other hand, the conditional survival function is:

$$S_{ij}\left(t\middle|\alpha_i\right) = \exp\left\{-\alpha_i \exp\left(\mathbf{x}_{ij}\beta\right)t^p\right\} \quad (3)$$

When *g*() is the probability function of the frailty, and the frailties follow a gamma distribution, the likelihood can be expressed as:

$$L_i = \left[\prod_{j=1}^{n_i}\left\{h_{ij}\left(t_{ij}\right)\right\}^{d_{ij}}\right]\frac{\Gamma\left(1/\theta + D_i\right)}{\Gamma\left(1/\theta\right)}\theta^{D_i}\left\{1 - \theta\sum_{j=1}^{n_i}\ln\frac{S_{ij}\left(t_{ij}\right)}{S_{ij}\left(t_{0ij}\right)}\right\}^{-1/\theta - D_i} \quad (4)$$

By maximizing the overall log-likelihood, regression parameters and frailty variance θ can be estimated.

We treat consumer choice as the dependent variable (national or private label purchase decision), and then we analyze the impact of brand innovation, promotion and price in such a decision context, when controlling the rest of the covariates. We consider buying private label as the "failure" situation, and national brand has been coded as the reference category[2].

2.2 Data source and variables description

We test this model in a two year (2006 & 2007) household panel data from Nielsen in two different market categories, detergents and breakfast cereals. For each category, household daily purchase occasion is the minimum information unit. Detergents database include 1,945 households and 17,925 purchase occasions, and the cereals category contains 2,366 households and 41,480 purchase occasions. The exposure variable of interest is household purchase behavior (STBR), which was coded as 1 for private label purchase and 0 for national brand purchase.

Table 1 shows the variables in the database, abbreviations used in the model and types of measures.

[1] Although other several distributions can be used, gamma and inverse Gaussian are the most common ones, and in our analysis both yields similar results.

[2] We have used the term "failure" to maintain the standard terminology used in this approach.

TABLE 1

Variables and their characteristics

Variable	Type of measure	Unit
Purchase at time t (start)	Continuous	Days
Purchase at time t+1 (end)	Continuous	Days
Private label/National brand	Dichotomous	Presence /absence
Innovation	Dichotomous	Presence/absence
Promotion	Dichotomous	Presence/absence
Price	Continuous	Euros per Equivalent Unit
Size	Continuous	Persons per household
Age	Ordinal	Age of buyer

For every purchase occasion, we record initial and ending time (i.e. interpurchase time), consumer choice (national or private label), whether the purchased good is a new product (innovation), whether the product is purchased on promotion and the price in equivalent units of each product purchased. We also control for two demographic variables, size of the household and age.

3. Results

The proportional hazard models assume that the hazard ratio of two different specifications of predictors is constant over time. There are several different tests for assessing the proportional hazard assumption. In this case we use Schoenfeld residual test which is widely accepted. Our results suggest that all variables satisfy the proportional hazard assumption (Kleinbaum, n.d.; Kumar, 1996).

The estimation of the frailty shared model for each of the two CPG categories, shows a good overall fit. Wald test for detergent category yields a chi-square value of 4946.71, which is significant at the $p < .01$ level. For the breakfast cereals category, similar results were obtained, with a chi-square value of 3251.92, which is also significant at the $p < .01$ level. However, the estimates for control covariate "age" are statistically nonsignificant in this particular category. Table 3 shows the estimated coefficients and the corresponding hazard ratios (HR) for both categories.

The addition of the frailty specification in both categories also yields a statistically significant p-value of 0.000 for theta (θ), suggesting that there is some kind of within household correlation (i.e. purchase occasions interdependence). The Weibull parameter is 1.185 for detergents and 1.092 for breakfast cereals, suggesting an increasing hazard over time $(p > 1)$, and Wald test yields a significant p-value of 0.000.

TABLE 3

Relative Risks of Private label Choice among Households (2006 through 2007). Frailty Shared Model Estimation

Detergent category					
Covariate	Est. (β)	HR $(\exp(\beta))$	(SE)	p-value	(95% CI)
Innovation	-0.77	0.46	0.079	0.000	(-0.93, -0.61)
Price	-1.72	0.18	0.038	0.000	(-1.80, -1.65)
Promotion	-3.80	0.02	0.195	0.000	(-4.19, -3.42)
Size	0.12	1.13	0.022	0.000	(0.08, 0.17)
Age (35-54)	0.23	1.26	0.095	0.017	(0.04, 0.42)
Age (>54)	0.22	1.25	0.094	0.018	(0.04, 0.41)
Constant	-4.11		0.149	0.000	(-4.40, -3.82)
Likelihood-ratio test for theta=0; p-value = 0.000 Weibull shape parameter p = 1.185; p-value = 0.000					

Breakfast Cereals category					
Covariate	Est. (β)	HR $(\exp(\beta))$	(SE)	p-value	(95% CI)
Innovation	-0.25	0.78	0.062	0.000	(-0.34, -0.16)
Price	-0.25	0.78	0.008	0.000	(-0.26, -0.24)
Promotion	-1.06	0.35	0.187	0.045	(-2.24, -1.01)
Size	0.10	1.10	0.025	0.000	(0.05, 0.15)
Age (35-54)	0.13	1.14	0.096	0.151	(-0.05, 0.30)
Age (>54)	-0.08	0.93	0.097	0.409	(-0.25, 0.10)
Constant	-4.36		0.123	0.000	(-4.60, -4.13)
Likelihood-ratio test for theta=0; p-value = 0.000 Weibull shape parameter p = 1.092; p-value = 0.000					

As expected we observe a negative relationship between innovation, $(\beta_{detergent} = -0.77; \beta_{cereals} = -0.25)$, price (βdetergent = -1,72; βcereals = -0,25) and promotion $(\beta_{detergent} = -3.80; \beta_{cereals} = -1.06)$ and private label choice in both categories, meaning that all of these three variables have some effect on preventing households switching to private labels.

The reported estimates show that, all other covariates equal (including the frailty), innovation, price and promotion decreases the likelihood of purchasing private labels. All effects are significant $(p < .01)$ and in the hypothesized direction.

The hazard ratio for innovation is 0.46 for detergent category, which implies that at any given time, the presence of innovation decreases the chance of purchasing private labels 0.46 times. Breakfast cereals category yields similar results, with a hazard ratio equal to 0.78. As a graphic example Figure 2 shows the shape and differences on private label purchase behavior, with and without innovation effect.

However it is very interesting to observe the absolute effect of the three variables. The promotion variable has for both categories the biggest effect on diminishing the likelihood of purchasing private labels. Price is the next most important tool in the detergent category followed by new product innovation, while in cereals innovation and price seems to have the same effect. These results lead us to some interesting thoughts, regarding to the innovation, promotion and price effect and its relation with household store/national brand choice behavior.

3.1. Model robustness.

Weibull and exponential model specifications yield similar results in both CPG categories. However, we conduct two more model robustness checks. First, we perform a bootstrap analysis, with no asymptotic refinement, to provide a consistent estimate of the standard errors of the estimators (Ac & Dv, 1997; Kim, Kim, & Schmidt, 2007; Neeley, 2009). Then, we also conduct a standard procedure for assessing the predictive validity of model specification, using a holdout or validation sample (Aboulnasr, Narasimhan, Blair, & Chandy, 2008; Srinivasan, Lilien, & Rangaswamy, 2006).

The output for the bootstrapping procedure shows little variation in standard errors, validating the proposed model estimation in both categories.

Regarding predictive validity of the model the confusion matrix for the holdout period (25% of households) achieve around 90% in both categories confirming the robustness of the results

4. Conclusions and Managerial implications

The objective of this research was to better understand the effects of national brands activity on innovation, price and promotion to hold private labels growth. We find that as expected these three marketing tools negatively affect the likelihood of a household switching to a private label in the two categories studied.

We find that the impact of promotion on preventing this switching is larger than that of innovation and price suggesting that the value perceived by consumers in promotions could be more relevant that that perceived on new product offers and price in this context.

These results suggest the need for national brands to carefully choose the most appropriate tool to fight private labels. We hypothesize that this decision will probably depend on the product category characteristics and the level of price gap and innovation intensity existing in the category.

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