Do Private Labels Generate Loyalty?
Empirical Evidence for German Frozen Pizza

Nadine Wettstein[⊕a], Stephan Brosig[b] Thomas Glauben[c], Jon H. Hanf [d], and Jens-Peter Loy[e]

[a] *PhD Student, Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO)*
Theodor-Lieser-Strasse 2, 06120 Halle, Germany

[b] Senior Researcher, *Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO)*
Theodor-Lieser-Strasse 2, 06120 Halle, Germany

[c] Director, *Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO)*
Theodor-Lieser-Strasse 2, 06120 Halle, Germany

[d] Senior *Researcher, Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO)*
Theodor-Lieser-Strasse 2, 06120 Halle, Germany

[e] Professor, *Department of Agricultural Economics, Christian-Albrechts-University of Kiel*
Olshausenstrasse 40, 24118 Kiel, Germany

Abstract

The increase in private labels within the food retailing industry and retailers' high expenditures for establishing them raise a central question: Do consumers really consider private labels "real" brands and do they develop loyalty towards them? We analyse a four-year household panel data set of frozen pizza purchases of 14,000 households in Germany to study differences in consumers' repurchasing behaviour between national brands and private labels. We consider dynamic aspects of repurchase behaviour as well as household characteristics applying a hazard approach. Our results show differences between national brands and private labels.

Keywords: food retailing, private labels, brand loyalty, panel data, hazard analysis

[⊕]Corresponding author: Tel: + 49 345 2928 233
                             Email: wettstein@iamo.de

Other contact information: S. Brosig: Brosig@iamo.de
                             T. Glauben: glauben@iamo.de
                             J.H. Hanf: hanf@iamo.de
                             J.-P. Loy: jploy@ae.uni-kiel.de

Introduction

In most Western economies the retail food industry has been subject to considerable changes in recent decades. During the 1970s, food retailing companies were seen as the vicarious agents of food processors. Over time retailers were able to grow very fast and gained significant market shares (Nieschlag et al. 1994). Today, retailers mostly dominate the agri-food business and the food processors. The cumulative market share of the top ten retailers surveyed in Germany in 2006 is about 87 percent. The same holds for other European countries (Wrigley 2002), such as Sweden, France, Belgium, and Switzerland, where the respective top ten retailers' cumulative market share is more than 90 percent (BVL 2008). This level of concentration indicates that retailers face fierce competition. Due to the rivalry between the top retails, private labels were introduced to be silhouetted against the competitors (Choi and Coughlan 2006; Moore et al. 2000). The key concept is retail branding, i.e. many retail firms establish retail brands (private labels) by converting their shop name to a brand itself (Dhar and Hoch 1997, Sayman et al. 2002). Thus, for some years retailers have been using retail branding more intensively, mirroring a steady increase in the market share of private labels (Cotterill and Putsis 2000). For example in Germany, private labels already account for 40 percent of the market share. As Figure 1 demonstrates, private labels play a major role not only in Germany but in most European countries.
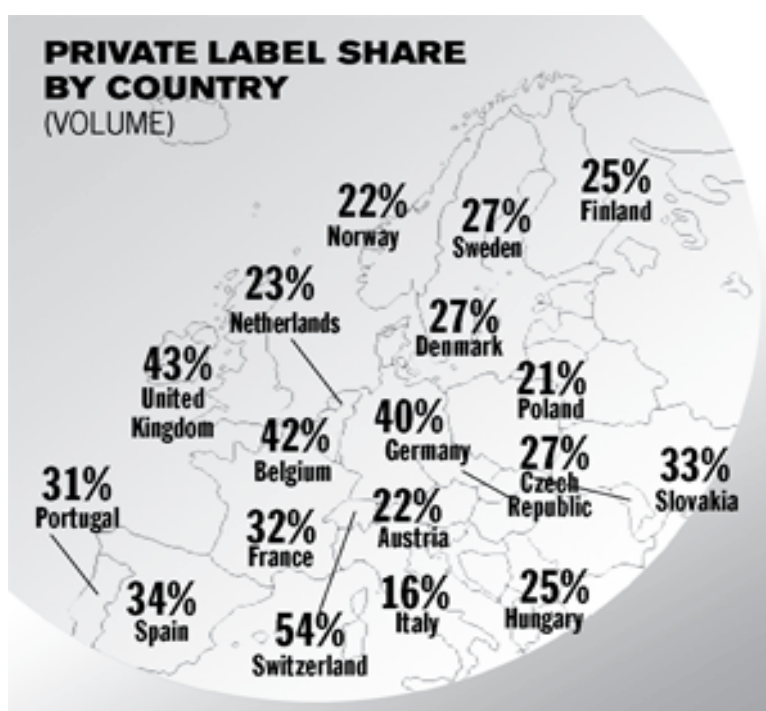

Figure 1. Private labels - share in total sales volume of non-durable goods by country, PLMA 2008

During the past ten years, growth of private labels is observable in the premium market segment. Now German retailers spend several hundred million Euros annually on brand management. One of the aims of branding is to generate customer loyalty. Loyal consumers are less likely to switch

to competitors and are more tolerant to increases in price than non-loyal consumers (Reichheld and Sasser 1990, Reichheld and Teal 1996). In their seminal article, Jacoby and Kyner (1973) show that brand loyalty is a biased (i.e. non-random), behavioural response (i.e. purchase), expressed over time, by some decision-making unit, with respect to one or more alternative brands out of a set of such brands, and a function of psychological (decision-making evaluative) processes. In other words, brand loyalty describes a preference which is manifested in an actual behaviour towards a certain brand out of a set of alternative brands. Hence, for analysing brand loyalty, consumer repurchases of a certain brand over a longer time period is a good proxy. Particularly since Assael (1984) suggests that, "Success depends not on the first purchase but on repurchase."

Creating loyal customer behaviour can be considered one of the success factors of retailers (Grewal and Levy 2007). In this context the question arises whether whether consumers consider private labels to be a "real" brand and therefore, wether retailers are able to generate loyal customers with a repurchase beahaviour comparable to that of national brands. In this paper we address these questions by analysing a panel data set of 14,000 households. We study consumers' repurchase behaviour between strong national brands and private labels. For this study we proceed as follows. First we elaborate on household characteristics and how they influence repeat purchases of private labels as an indicator of brand loyalty. And second we conducted an empirical analysis for the German frozen pizza market regarding brand loyalty. This market has has experienced a dramatic increase in volume over the last ten years. (Deutsches Tiefkühlinstitut 2008). The paper concludes by discussing our results and presenting an outlook for further research.

Consumer Patterns of Loyal Behaviour

In addition to developments observed in the retail sector, changes are also occurring on the consumer side. Gianluigi Zenti, executive director of Academia Barilla, suggests, "In the future the quality of food will split into different directions: there will be one consumer segment that is looking for higher quality and one bigger segment that is looking for lower quality at a lower price. … So overall we are in a situation, where consumers are changing dramatically, because their expectations are changing" (Hartl 2006). These changes in consumer behaviour lead to new markets with specific consumer segments. To capture such a specific consumer segment it will be more and more important to understand the characteristics of such a specific consumer segment and which of these characteristics influence their repurchase behaviour.

Repurchase behaviour is a necessary condition for brand loyalty (e.g. Jacoby 1971; Jacoby and Kyner 1973; Jacoby and Chestnut 1978), and loyal consumers are a central aim of consumer relationship management. The reason is that those consumers who repeatedly buy the same brand are less likely to switch to competitors. Therefore, such behaviour goes along with higher profits and success (Assael 1984). For instance, loyal consumers spread positive word-of-mouth advertising. Also it has been shown that loyal customers are more are more tolerant to price increases than non-loyal consumers, so firms can achieve a price premium (Reichheld and Sasser 1990, Reichheld and Teal 1996).

Several researchers (Allenby and Rossi 1991; Chiang 1991; Gönül and Srinivasan 1997; Gupta and Chintagunta 1994) have incorporated demographic characteristics in brand choice models which were estimated using scanner panel data. The general finding across these studies is that the impact of demographic variables on brand choice is neither strong nor consistent. These findings are puzzling given that one would expect certain demographic variables, such as income, to have some impact on brand choice behaviour. Baltas and Doyle (1998) investigate in their study the effects of several consumer characteristics, preference heterogeneity, and choice dynamics on private label purchasing behaviour. These researchers were the first to examine all these issues using panel data. The empirical identification of permanent inter-individual differences suggests that there exist two market segments of consumers interested in national brands and private labels, respectively. The private label consumer is likely a "switcher" and not a "shopper", with a stable, narrow brand repertoire. Examining the reasons for buying a private label, Baltas and Doyle (1998) note that private label buyers shop more frequently. Furthermore, the lower price of private labels and a lack of advertising create an image that appeals to particular consumers. Baltas and Doyle (1998) have shown that both price and consumer preferences affect choices. Despite the common conjecture that a private label product is purchased solely based its low on price, they find that some consumers buy private labels because they prefer them. This finding reflects the serious quality improvements made by retailers in recent years (e.g. Schulze et al. 2008), as well as the introduction of premium private labels. The study suggests that the private label consumer is a price-cautious but promotion-insensitive consumer.

We test these findings by using German household panel data, which include information on actual consumers' purchase behaviour, as well as information on household characteristics. Hence, as suggested by Richardson et al. (1996), first we are able to employ a behavioural measure so that the results will be approximations of real repurchase behaviour. Thereby, we use data over a period of four years so that we are able to provide some implications based on the observations of former actual behaviour, which is an important extension of previous models. Second, we consider the households' characteristics. This facilitates a classification between specific household segments and the influence of their characteristics on the repurchase behaviour.

Empirical Analysis

Whereas conceptually brand loyalty is clearly defined (e.g. Day 1969; Jacoby 1971; Jacoby and Kyner 1973; Dick and Basu 1994; Oliver 1997; Oliver 1999), there are different ways to measure brand loyalty. Jacoby and Chestnut (1978) reviewed over 100 studies and found 33 different measures of brand loyalty. These approaches are divided by Jacoby and Chesnut (1987) into the following four categories: I) Approaches which only considers the sequence in which different brands are purchased in determining the degree of loyalty (e.g. Tucker 1964). II) Approaches focusing on the proportion of purchase measures (e.g. Copeland 1923; Cunningham 1956). III) Other approaches aim to measure the probability of purchase (e.g. Lipstein 1959; Frank 1962). IV) Synthesis measures (e.g. Massy et al. 1968) which combine sequential, proportional or probability based brand loyalty indices.

More recently, the method of event history analysis (hazard analysis) as a type of probability of purchase measurement is more often implemented to quantify brand loyalty (e.g., Duwors and

Haines 1990; Gould 1997; Boatwright et al. 2003). Strength of this approach is that it is possible to include implications based on the observations of former actual behaviour. Thus, measuring loyalty has been of ongoing concern to both academics and marketing practitioners.

While previous studies have in most cases focused on the interpurchase time (e.g. Gould 1997; Boatwright et al. 2003), in this paper we examine *repurchase periods,* i.e. time periods of repeated purchases of individual brands as approximate indicators of brand loyalty.[1]

After introducing the data, we present our analytical approach, which focuses on the question whether the duration of repurchase periods as well as this duration's determinants differ systematically between private labels and national brands. Results are presented and discussed at the end of the section.

Data

We use a household panel data set (January 2000 to December 2003) reflecting food purchases of 14,000 households in Germany on a daily basis. The data is compiled by GfK market research group (GfK 2008). The 14,000 households in the sample are representative of the German population. The data input took place by hand scanner and manual input. The data reflects actual purchase behaviour of individual households rather than attitudinal statements as often documented by surveys or choice experiments. The data allows us to observe actual repurchase behaviour which is used here to measure brand loyalty. Variables reported are quantities and prices of products and brands bought, information on the store type, display and promotion of brands in the store, and some demographic information on the household such as household size and composition, household income, and the age of the household's head.

Two producers of frozen pizza dominate the German market. In our sample, 53 percent of purchased units carry one of the two major national brands, "Dr. Oetker" or "Wagner", whereas 34 percent of packaging units carry private labels (34 brands owned by supermarket chains and discounters). In our study we compare national brands with private labels, each of these brand types taken as a group.

Per capita demand on average over the households in our sample amounts to 4.8 frozen pizzas per year, of which 3.3 are national brands and 1.5 private labels. The consumption figure and the share of national brands and private labels have remained nearly at the same level over the four years observed. Consumption was well above average in households with heads under 30 years (6.7 pieces per capita) particular in households of young singles (10 pieces) while it was low (3 pieces) among older couples without children and families with small children. The share of private label pizzas was 30 percent on average (70 percent for national brands) and varied in the remarkably narrow range between 26 and 34 percent for a number of quite different household types defined by composition, per capita income, and age. Only households with a monthly per capita net income of less than 500 Euro consumed a higher share (37 percent of all pizzas purchased) of private label pizzas.

---

[1] The number of purchase repetitions (rather than the time span covered by them) can be considered another informative representation of brand loyalty, as suggested by an anonymous referee. To complete the picture of repurchase behaviour this will have to be addressed in further studies.

Our data reveals that this remarkably widespread 30/70 ratio of private labels and national brands is not only due to a mix of different consumer types with constant choice of brand type but also to a large number of households which purchase a mix of brands: 29 percent of all households have indeed chosen only national brands over the whole observation period while 13 percent have purchased no other than private label pizzas. These households are obviously loyal to a brand type, perhaps to individual brands. However, the remaining 52 percent of households have purchased both, private labels and national brands, almost half of them have even mixed both brand types in each individual year. The existence of loyal and brand type switching households suggests to analyse repurchase behaviour as well as factors it is associated with.

Analytical approach

We analyse the length of repurchase periods as measure of brand loyalty. Our definition of a repurchase period can be illustrated by the following example: For each household all daily purchases are considered, i.e. the dates when the household purchases any quantity of frozen pizzas of any brand. A repurchase period for a national brand begins with the day of the first purchase of that brand type and lasts as long as this brand type is repurchased.[2] Hence, as figure 2 illustrates in stylized way for a hypothetical household a repurchase period covers two or more purchases of the same brand type national brand (N) or private label (P).

Our analysis focuses on households that frequently buy frozen pizza[3]. Observed repurchase periods range from one day to nearly the total observation period of four years. Very long periods are rare. Ninety-seven percent of the loyalty spells are less than one year.
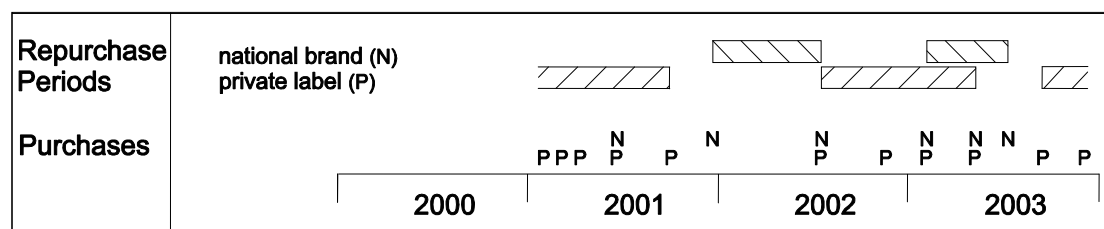

Figure 2. Illustration of the definition of repurchase periods

Statistical analysis of the repurchase periods observed must account for their nature as duration data; their distribution cannot be assumed to be normal, and for many of the periods considered, we do not know their total length because the beginning or the end, or both, could not be observed in the survey period (censored observations). Hence, inference on the distribution of

---

[2] We consider periods of repeated choice of the same brand type as a reasonable proxy for periods of brand loyalty. An alternative definition has been tried referring to terms (of *a* days) in which at least *n* pizzas of the respective brand type were bought, conditional that these purchases represented at least *p* percent of all frozen pizzas purchased during that term. A period of loyalty is then understood as the time span incorporating consecutive terms of loyalty to the same brand type. The definition we choose is superior in terms of clarity.

[3] Households that purchased an average of less than 6 frozen pizzas per quarter during their presence in the panel are excluded from the analysis. This avoids misinterpreting very long periods with no intermittent purchases as periods of particular loyalty.

these duration data based on standard measures of location and distribution (means, percentiles, variance, etc.), as well as regressions using duration as an endogenous variable would yield biased results (e.g., Cleves et al. 2004). Therefore, we use hazard analysis techniques (survival analysis), which are appropriate in this context.[4]

In particular, we estimate hazard functions $h(t,x)$, which express the instantaneous probability of a repurchase period ending after a duration of t, conditional on having lasted for that duration. This conditional probability (hazard rate) is modelled as depending on duration t and a number of household characteristics x, i.e. the covariates. From the information embedded in the hazard function, we derive expected values of the duration of repurchase periods as well as time- (and covariate-) dependent probabilities of switching between brand type. The hazard function provides a convenient definition of duration dependence. In our context we speak of positive duration dependence if $h(t,x)$ increases with the length of the repurchase period ($\partial h(t,\mathbf{x})/\partial t > 0$) and vice versa. For the hazard function $h(t,x)$ we choose the popular specification of

$$1) \quad h(t,\mathbf{x}) = h_0(t)\exp(\mathbf{x}\beta_{\neq 0}),$$

where $h_0(t)$ represents the baseline hazard, i.e. the hazard rate after duration t with the covariates x_j at a reference level, usually their mean.[5] We speak of a proportional hazard model because levels of x carry over to $h()$ proportionally, i.e. independent of t. For the functional form of the baseline hazard, we use the Weibull specification:

$$2) \quad h_0(t) = pe^{\beta_0}t^{p-1}.$$

The shape parameter p indicates duration dependence: A value below (above / equal to) unity indicates negative duration dependence (positive / no duration dependence). The baseline hazard is jointly determined by p and the location parameter β_0.[6]

From the information available in the data source, we have selected six household characteristics x_i to test their impact on repurchase behaviour of a brand type (Table 1).[7]

---

[4] For an exhaustive description of the methodology, see Kalbfleisch and Prentice (2002).

[5] This means that non-binary covariates are scaled to have a mean of zero.

[6] The Weibull specification restricts $h(t,x)$ to follow a path over the total range of t, which is uniformly determined by p and β. In particular, the specification cannot reflect any change from positive to negative duration dependence or vice versa. We find this restriction to be justifiable for our data through comparison with a less restrictive (semiparametric) Cox proportional hazard specification. Visual inspection of the Cox functions plots indicate that the hazards are almost perfectly monotonous (decreasing). Moreover, the covariates' parameters do not differ much between the Cox and Weibull specifications. Approximating a Cox model by the parametric Weibull specification yields a gain in efficiency (provided the distributional assumptions are justified) and facilitates the prediction of durations and hazard rates for the entire domain of t.

[7] Since cardinally-scaled characteristics like net income or the age of the main earner are coded as categories in the data set and not all of these categories have the same width, their use as cardinal variables is inappropriate. We have recoded the strata to binary variables to achieve an appropriate yet parsimonious specification.

Table 1. Household characteristics used as explanatory variables

Characteristic	Variable	Type	Definition
Household size	HSIZE	integer	Number of household members
Per capita monthly net household income	LOWINC	binary	Under 500€per household member
Age of main earner	YOUNG	binary	Under 30 years
Family Type	FAM	binary	Family with adolescent children
	YSINGLE	binary	Household of young single person
Frequency of pizza consumption	PPPQ	continuous	Number of pizzas (packaging units) purchased per quarter

The relative preference for a highly processed convenience product such as frozen pizza is likely dependent upon economies of scale in consumption and on home time available. Hence, the household size (HSIZE) and three variables specifying a household's position in the family life cycle have been included as explanatory variables: the binary variable YOUNG indicates a main earner under 30 years of age, while FAM and YSINGLE indicate specific family types. These variables are used to test the influence of specific household characteristics on repurchase behaviour. Per capita income (LOWINC) is considered a potential determinant of the choice between national brands and the usually lower-priced private labels (e.g. Dölle 2001). Finally, a behavioural characteristic likely to be relevant for brand choice is the frequency of purchase of frozen pizza (PPPQ), which in the sample ranges between the set minimum of six and 80 pizzas per quarter, with a mean of 12. Baltas and Doyle (1998) have found the purchase frequency of tea to be related with the probability of choice of private labels.

We estimate a hazard model using data for purchases of frozen pizza. In order to test for behavioural differences between national brands (Dr. Oetker and Wagner) and private labels we introduce a dummy variable for private labels (RETAIL) and interaction terms of this dummy with the household characteristics, respectively.[8] Our choice of a proportional hazard model implies that hazards at all durations are shifted proportionally by changes in these variables.

Results and Discussion

The overall explanatory power of the model is confirmed by likelihood ratio tests. The null hypothesis of a constant-only alternative is rejected at the 0.1 percent significance level. Results of individual parameters are presented in Table 2(a). The deviation of the parameter p from unity signals the extent of duration dependence, which is significantly negative (0.723 1 = 0.277).[9] We can hence establish negative duration dependence as our first central result: ending a repurchase period, which means switching to the other brand type, becomes less likely the longer a consumer patronizes a brand. Consumers who are loyal to a brand for a long time are likely satisfied with their choice and do not expect any advantage by switching to another brand.

---

[8] For many households the sample contains more than one repurchase spell. The similarity of effects shared by spells for identical households has to be assumed. To infer from this information, we applied a ‚shared frailty' specification (StataCorp 2007: 326).
[9] The parameter p and its standard error is computed from the coefficient of ln(p) and its distribution.

Table 2. Estimation Results

Number of observations (purchases) = 31457				
Parameter estimates (a)				
Variable	**parameter**	**Standard error**	**z**	**P>|z|**
Constant	**-3.115**	0.035	-88.200	0.000
ln(p)	**-0.324**	0.011	-30.080	0.000
p (derived value)	**0.723**	0.008		
RETAIL	**-0.098**	0.038	-2.540	0.011
Characteristics variables				
HSIZE*RETAIL	**-0.076**	0.025	-3.010	0.003
FAM	-0.058	0.045	-1.290	0.198
SINGLE*RETAIL	-0.194	0.163	-1.190	0.232
LOWINC	-0.053	0.081	-0.660	0.509
LOWINC*RETAIL	-0.132	0.123	-1.070	0.284
YOUNG*RETAIL	**0.236**	0.097	2.440	0.015
PPPQ	**0.017**	0.003	5.050	0.000
PPPQ*RETAIL	**0.022**	0.006	3.730	0.000

Predicted hazard function after alternative durations (b)		
	National labels	**Retail labels**
One day	0.0321	0.0291
One week	0.0187	0.0170
One month	0.0128	0.0116
Three months	0.0094	0.0085
Six months	0.0078	0.0071
One year	0.0063	0.0057

Predicted durations (c)

Standard deviations in parentheses

	National labels	**Retail labels**
Median of predicted durations	44	53
	(6.2)	(18.2)
Arithmetic mean of predicted durations	89	107
	(12.6)	(37.0)

Source: Own computations based on GFK Consumer Scan data
Note: Coefficients in bold types are significantly different from zero (from one in the case of *p*) at the 10% level.

From the parameter *p* (and the constant) we can compute the baseline hazard function which indicates the probability that a repurchase period ends after a given duration t conditional on having lasted up to that duration. It refers to baseline or reference conditions in respect of the characteristics variables (covariates) included in the model: the sample mean for the numeric variables (HSIZE and PPPQ) and the value zero for the binary variables (RETAIL, LOWINC, YOUNG, FAM, and YSINGLE). The solid line in Figure 3 shows the baseline hazard function for durations from 1 to 400 days; the baseline hazard function, i.e. the conditional probability of a reference household purchasing national brand pizza to switch to a retail label. The small absolute values are due to the brevity of the time-unit (day) relative to the typical length of repurchase period.

For the continuous variables (HSIZE, PPPQ) coefficients refer to a one-unit change of the variable. The coefficients of the binary variables (RETAIL, LOWINC, YOUNG, FAM, YSINGLE) represent factors shifting the hazard for the particular group relative to the

households/purchases not belonging to this group, i.e. the baseline. For example, the coefficient value of 0.098 for RETAIL indicates that for consumers of private label pizza (RETAIL=1) the hazard of switching to the other brand type is (for any duration) nearly ten percent lower than for households patronising national brands (RETAIL=0).[10] While the statistical significance of the coefficient of RETAIL indicates that the inclination to brand type switching is weaker among private label consumers than among national brand consumers, the difference in hazards is quite small (compare the hazards for selected durations in (Table 2(*b*). As far as we can interpret repurchase behaviour as an indicator of loyalty we can conclude with regard to our research objective that brand type loyalty is very similar for private labels and national brands.

The dashed line in Figure 3 shows the hazard function with all covariates at their baseline value except for RETAIL which takes the value 1 for private labels. We see that for private labels the hazards of brand switching are only slightly lower than for national brands. We can conclude that suppliers of national brand pizzas and private label pizzas can expect their customers to show a similar degree of brand loyalty. Suppliers of private labels have obviously achieved to generate a consumer perception of quality or value-for-money with regard to their product that is similar to the one that national brand consumers have for national brand pizzas.
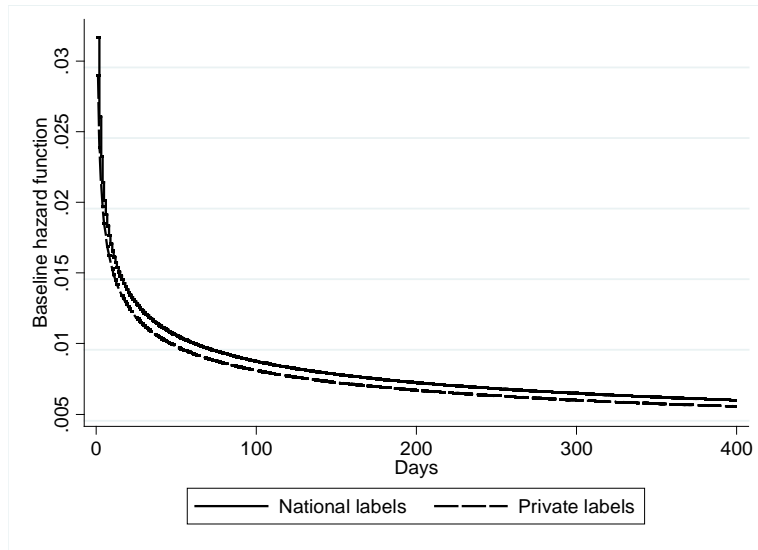

Figure 3. Baseline Hazard Function

Table 2(*c*) lists measures of the expected duration of repurchase periods. The figures, carrying the same parametric information as the hazard function, indicate the approximate length of typical periods of loyalty to a brand type and is computed as median/arithmetic mean (over all spells) of durations predicted by the estimated hazard functions. (Arithmetic means are roughly twice the value of the median because very few long periods exert a strong positive bias. Hence, these means are not values to be typically encountered in the sample.) The expected duration of repurchase periods (median) is 53 days for the private labels and 44 days for the national brands, which reflects the same ranking as the hazard functions. Again we find that median (and mean) predicted durations are shorter for national brands than for private labels.

---

[10] To be exact, in the case of our proportional specification, the hazard ratio hr_i for covariate x_i is $hr_i = d\ln h(x,\beta)/dx_i = \exp(\beta_i)$ and the percentage change in effect of x_i is $(1- hr_i)*100$. $(1-\exp(-0.098))*100=-9.32$ %).

The estimated coefficients of the household characteristics in Table 2 reflect the impact of household characteristics on the repeated purchase behaviour. Coefficients of interaction terms establish whether the characteristics affect repurchase behaviour of national brand and private label customers differently. We can say that the higher a positive (or the less negative) coefficient is, the higher the tendency to switch brands and the lower the loyalty to the brand type originally patronized.

Focusing on the significant findings, we first consider the interaction term with RETAIL for the household size (HSIZE). Larger households consuming private label pizzas are more likely to repeat their choices. This may be connected to the difference in the average price per 350g unit of frozen pizza which was (converted into Euro) 1.17€for private labels and 2.04€for the national brands Dr. Oetker and Wagner. If private label customers perceive a monetary advantage, the budget effect is more pronounced due to the larger quantities consumed to meet the household needs. Our result with regard to HSIZE is consistent with what Baltas and Doyle (1998) found for British tea consumers: larger households have higher repurchase tendencies toward private labels than do smaller households.

For the dummy variable YOUNG we find that private label consumers with household heads under 30 years of age have a considerably higher tendency to switch the brand type than other households.

For the variables indicating specific household types as well as per capita income the estimated coefficients are not significant. With respect to the income variable this is contrary to results of other studies that have found significant income effects on the choice between national brands and private labels. In our estimation such effects may in part be hidden by collinearties between the income dummy variable LOWINC and other household characteristics.

The only behavioral household characteristic considered here is the frequency of frozen pizza purchases (PPPQ). Its impact on repurchase behavior as its interaction term with RETAIL is significant. Each additional pizza per quarter increases the hazard of ending a repurchase period on any given day by about two percent (parameter 0.017) for national brand consumers and by about four percent (1.017*1.022) for private label consumers. Frequent buyers are less loyal. A high purchase frequency reduces the tendency to repurchase brands significantly more for private labels than for national brands.

This last finding suggests implications for management. Particularly for private labels, high frequency buying bears the risk of losing former customers. Product managers can reduce this frequency of choices by offering larger packaging units containing two or more frozen pizzas. The pervasiveness of such packs for private label pizzas indicates attempts of private label owners to retain customers in a highly competitive market.

Summary and Outlook

The increase of private labels in the food market over the last two decades and retailers' high expenditures for establishing them raise some questions. The first question is whether retailers are able to commit customers to their own brands, i.e., whether consumers repurchase retail

branded products. The second question is whether consumers consider private labels to be a "real" brand, i.e., do they compare private labels with strong national brands. In order to test our research questions, we use a panel data analysis of the frozen pizza purchases of 14,000 households in Germany over a four-year period. We use the length of repurchase periods as an indicator of loyalty. Thereby, we focus on repurchase periods as an indicator of brand loyalty because repurchase behaviour is a necessary condition for being a loyal consumer.

As an important extension of previous models we include the dynamic aspect of repurchase behaviour. In addition, we consider household characteristics. This facilitates a classification between specific household segments and the influence of their characteristics on repurchase behaviour.

In sum, we conclude that the endeavours of retailers to establish their brands are successful. Retailers are able to commit customers to their own brands to basically the same degree as national brand suppliers can. We find that in general differences in the repurchase behaviour between national brands and private labels are small though statistically significant. We recommend that retailers' marketing strategies address their target groups more directly. If certain products are known to be typically purchased by certain household types, the knowledge of type-specific differences in repurchase or brand switching tendencies can help to identify successful marketing strategies and pricing considerations.

Considering the term brand loyalty as a source of profit and growth is it perhaps not enough to analyse the length of repurchase periods only? As Jacoby (1971) suggests, repurchase is a necessary condition of brand loyalty. But as defined in the marketing literature, the term brand loyalty is not synonymous with repurchase behaviour. Some researchers (e.g. Day 1969; Jacoby 1971, Jacoby and Kyner 1973, Jacoby and Chestnut 1978; Dick and Basu 1994; Oliver 1997; Oliver 1999) emphasize that brand loyalty is only one source of repeated purchasing behaviour. It is important to consider consumers' purchasing patterns as well as their underlying attitudes. Thus, brand loyalty includes both a behavioural (purchase) component, which results in repeated purchases, and an attitudinal component, which results in a dispositional commitment to a brand and associates a unique value to it. However, this attitudinal component of brand loyalty cannot be observed directly by using panel data. This might be a challenge for further research. Our preliminary thoughts on this subject show that analysing cross-buying effects or consumers' tolerance towards price increases could be a possibility for future research. For example, if a repeat buyer of a particular pizza brand is found to have a significant inclination to becoming a buyer of frozen vegetables of the same brand, this could be interpreted as an indicator of brand loyalty. Likewise, a consumer who repeatedly buys the same brand even though the price has increased and/or the prices of other alternative brands have decreased, can probably be regarded as a loyal consumer as well.

Acknowledgement

References

Allenby, G. M. and Rossi, P. E. "Quality Perceptions and Asymmetric Switching Between Brands." *Marketing Science* 10 (1991): 185-204.

Assael, H. *Consumer behavior and marketing action:* Boston: MA: Kent Publishing Company, 1984.

Baltas, G. and Doyle, P. "An Empirical Analysis of Private Brand Demand Recognising Heterogeneous Preferences and Choice Dynamics". *Journal of the Operational Research Society* 49 (1998): 8, 790-798.

Boatwright, P., Borle, S. and Kadane, J.B. "A Model of the Joint Distribution of Purchase Quantity and Timing" *Journal of the American Statistical Association* 98 (2003): 574-572.

Chiang, J. "A Simultaneous Approach to the Whether, What and How Much to Buy Questions." *Marketing Science* 10 (1991): 297-315.

Choi, S.C. and Coughlan, A.T. "Private label positioning: Quality versus feature differentiation from the national brand" *Journal of Retailing* 82 (2006) :2, 79–93.

Cleves, M., Gould, W., and Gutierrez, R. *An Introduction to Survival Analysis Using STATA – Revised Edition*. Stat Press Publication College Station, Texas, 2004.

Copeland, M.R. "Relation of Consumers' Buying Habits to Marketing Methods." Harvard Business Review, 1 (1923): 282-289.

Cotterill, R.W. and Putsis, W.P. "Market Share and Price Setting Behavior for Private Labels and National Brands" *Review of Industrial Organization* 17 (2000), 17-39.

Cunningham, R.M. "Brand Loyalty – What, Where, How Much?" Havard Business Review, 34 (1956): 116-128.

Day, G.S. "A two-dimensional concept of brand loyalty." *Journal of advertising research* 3 (1969): 29-35.

Dhar, S.K. and Hoch, S.J. "Why Store Brand Penetration Varies by Retailers" *Marketing Science* 16 (1997): 208-227.

Dick, A. S. and Basu, K. "Customer Loyalty: Toward an Integrated Conceptual Framework." *Journal of the Academy of Marketing Science* 22 (1994):2, 99-113.

Dölle, V. *Konzepte und Positionierung der Handelsmarken*. Bruhn, M. (Eds): Handelsmarken. 3. Edition, Stuttgart, 2001.

175

Duwors, R.E., Haines, G.H. "Event History Analysis Measures of Brand Loyalty." Journal of Marketing Research, 27 (1990), 485-493.

Frank, R.E. "Brand Choice as Probability Process." Journal of Business, 35 (1962), 43-56.

GfK Group. Description of the GfK-ConsumerScan panel retrieved from http://www.gfk.com/ps_de/scan/index.en.html retrieved on Sep. 5, 2008.

Gönül, F. F. and Srinivasan, K. "A dynamic model of repeat purchase and brand switching behavior in a consumer products category" *Journal of Retailing and Consumer Services* 4 (1997): 3, 185-191.

Gould, B.W. "Consumer Demand for Butter, Margarine and Blends: The Role of Purchase and Household Characteristics" *Canadian Journal of Agricultural Economics* 45 (1997): 251-266.

Grewal, D. and Levy, M. "Retailing research: Past, present, and Future" *Journal of Retailing* 4 (2007): 4, 447-464.

Gupta, S. and Chintagunta, P. K. "On Using Demographic Variables to Determine Segment Membership in Logit Mixture Models." *Journal of Marketing Research* 31 (1994): 128-136.

Hartl, J. "The Changing Consumer: Demanding but Predictable, International Food and Agribusiness." *Management Review* 9 (2006): 2, 88-93.

Jacoby, J. "A model of multi-brand loyalty." *Journal of Advertising Research* (1971): 25–30.

Jacoby, J. and Chestnut, R. W. *Brand Loyalty Measurement and Management.* John Wiley & Sons, New York, 1978.

Jacoby, J. and Kyner, D.B. "Brand Loyalty vs. Repeat Purchasing Behavior." *Journal of Marketing Research* 1 (1973):1-9.

Kalbfleisch, J.D. and Prentice, R.L. *The statistical analysis of failure time data.* Hoboken, NJ : Wiley, 2002.

Lipstein, B. "Dynamics of Brand Loyalty and Brand Switching." Proceedings of the Fifth Annual Conference of the Advertising Research Foundation 1959, New York.

Massy, W.F.; Frank, R.E.; Lodahl, T.M. "Purchasing Behavior and Personal Attributes." University of Pennsylvania Press 1968, Philadelphia.

Moore, C.M., Fernie, J. and Burt, S.L. "Brands without boundaries: The internationalization of the design retailer's brand" *European Journal of Marketing* 34 (2000): 8, 919-937.

Nieschlag, R., Dichtl, E., and Hörschgen, H. *Marketing*. Berlin: Duncker und Humblot, 1994.

Oliver, R. L. "Whence Consumer Loyalty?" *Journal of Marketing* 63 (1999): 33-44.

Oliver, R. L. *Satisfaction: A Behavioural Perspective on the consumer.* New York: McGraw-Hill International Editions, 1997.

Reichheld, F.F. and Sasser, W.E."Zero Defections: Quality Comes to Services." *Harvard Business Review* (1990): 105-111.

Reichheld, F.F. and Teal, T. *The Loyalty Effect: The Hidden Force Behind Growth*, Boston, Mass.: Harvard Business School Press, 1996.

Richardson, P. S., Jain, A. K., and Dick, A. "Household Store Brand proneness: A Framework." *Journal of Retailing* 72 (1996): 159-185.

Sayman, S., Hoch, S.J., and Raju, J.S. "Positioning of Store Brands" *Marketing Science* 21 (2002): 378-397.

Schulze, H., Spiller, A., Boehm, J. and de Witte, T. "Ist Geiz wirklich geil? Preis-Qualitäts-Relationen von Hersteller- und Handelsmarken im Lebensmittelmarkt" *Agrarwirtschaft* 57 (2008): 299-310.

StataCorp (2007) *Stata Statistical Software*, Release 10: Survival Analysis and Epidemiological Tables. College Station, TX.

Tucker, W.T. "Development of Brand Loyalty." Journal of Marketing Research, 1 (1964), 32-35.

Wrigley, N. "The landscape of Pan-European food retail consolidation". *International Journal Retail and Distribution Management* 30 (2002): 2, 81-91.