

## **The Marketing Effect of the Price on Consumers' Preferences to Private Label Organic Food**

Yating Tian (School of Management, Technical University of Munich, Germany)

The purpose of this paper is to explore the issue of the price effect on choice probability of private label organic food. As retailers' marketing strategy, introducing organic food labels to get more profit will not only affect the choice probability of consumers, also can compete with traditional food brands. The main aim of this study is to identify reaction to different alternatives when consumers face to different prices, price promotion of retailers, and investigate if any unobserved heterogeneity from consumers in varying with those attributes, thus it can provide insight into retailers marketing strategies. The nested logit model has been used as the theoretical framework for understanding the brands competition and choice probability among organic and non-organic food categories. The result shows that price and purchase habit strongly and significantly affects purchase decisions on private label organic food. Household-specific variables are interactive with price promotion diversely. This research helps to understanding the role of price and purchase habit as well as price promotion when retailers introduced their organic labels to draw the consumers' attention, target the organic group and rival the competitors.

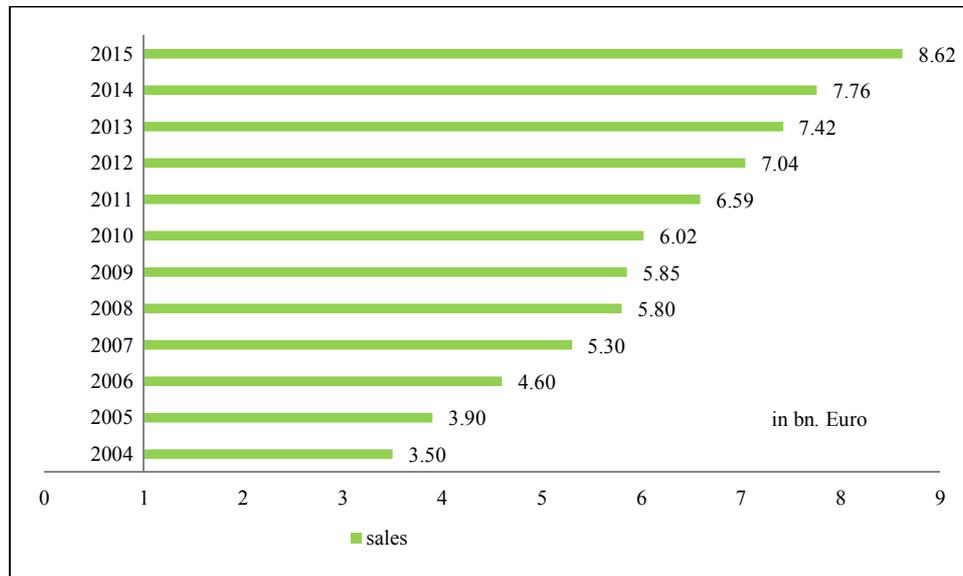
Key words: private label, organic food, marketing strategy, brand choice

### **1. Introduction**

According to different purposes, Private label Brands (PLs or PLBs), also named store brands (SBs) in some literature, own labels or distributor-owned brands (Kumar and Steenkamp, 2007) are those merchandised products and sold under retailers, that a label can be a brand name exclusively by the retailers for their own business purpose or the chain's own name, which are not well-known. Private labeling is a powerful element of a retailer strategy because it caters to value-conscious consumers and offers an alternative to national brands (NBs), also manufacturer brands. According to Kumar and Steenkamp (2007), the market share of PLs increased from 10% to 34% globally over the past 30 years. By 2010, PLs held a market share 40% in Germany (PLMA, 2010) and the organic food market has also won the incredible sales with 6% to €7.04 billion (BÖLW, 2013). Organic assortments are introduced more and more in global market, especially in food retail industry. In the United States organic food retail sales held a record of \$35.9 billion in 2014 according to the report of Organic Trade Association (OTA, 2015). With quality focus and competitive prices private labeled organic foods account for a considerable sales percentage in contrast with organic and non-organic NBs in the traditional supermarkets and discounters. This research will investigate the effect of premium price of Private Label organic (PL organic) food, and explain the relationship between preferences of consumers on organic food and the role of the price for organic assortment manipulated by retailers. The research applies the theory of utility maximization and analyzes the choice probability of these assortment alternatives.

The marketing competition between brands, e.g. PLs and NBs in food retailing industry may more and more depend on their diversified assortment, which retailers introduced, as well as their pricing differentiation. PLs are not simply retail brands, but the mixed ranges, they experienced the stages of own-branded, jointly branded and integrated branded under the retailer house, the positioning of them in the market and their development are different (Burt, 2000). To develop market power, retailers introduce multi-tiered PLs, manage multiple names among their PL products, enrich shopping experience (Fiore and Kim, 2007; Spina et al. 2012), and improve their position in value-added categories (e.g., premium or strong brands). In Germany, Aldi offers more than 10 PL branded yoghurt. Penny "Naturgut" was launched to attract organic shoppers. Edeka, one of the two leading full-line distributors, labels its organic products "Bio Wertkost" and "EDEKA Bio". According to a

survey BÖLW (2012) from Germany, sales of organic products in 2011 reached €6.9 billion, 3.7% of it PL. Figure 1 shows organic food sales of 2004-2015.



Data Source: BÖLW (from 2005 to 2016)<sup>1</sup>

**Figure 1. Sales of Organic Food in Germany from 2004 to 2015**

Figure 1 shows organic food sales over last 12 years in Germany. The average yearly growth rate is 8.2%. From 2006 to 2010 German spend from 56€ to 73.6€ per person for organic food, namely 30% increased (Köpke and Küpper, 2013). BÖLN (2012) investigated consumers' purchases of organic foods and showed that 84% buy from supermarkets, 63% from discounters, 57% from farmers markets, and 47% from organic shops. Traditional retailers account for 54% of organic food sales. How consumers make their choice decision is paid highly attention in consumer behavior research, especially from different brands with similar price but in the same store. The basic purpose of this research is to assess probability of choice when consumers face to different alternatives, PL and NB organic as well as non-organic category, and if price marketing helps the organic assortment of retailers, and intensifies the competition further lead to new segmenting of the targeting group of retailers. The aim is to understand the motivation behind the consumers' choice and its effect on future retailers' long-term marketing strategies.

## **2. Literature Review**

There are numerous prior studies about the uprising market of private labels and how retailers handle the competition from NBs. Early work by Bellizzi et al. (1981) demonstrated that PLs are not viewed as lesser-quality and supported from later researches (Hoch, 1996; Garretson et al., 2002; Lupton et al., 2010). Burton et al. (1998) found the perception of promotional offers plays a role on the perception of consumers. González-Hernández and Orozco-Gómez (2012) stated the retailers develop strategies to attract the customers, including level of price, promotion programs, and improved quality. Also retailers began to enrich certain product categories to enhance their image, which show the availability and vast options to meet the needs of consumers (Richardson et al., 1994). Manzur et al. (2011) and Sinha and Batra (1999) identified main reason of private label development is: price

<sup>1</sup> BÖLW is the abbreviation of "Bund Ökologische Lebensmittelwirtschaft" - Federation of the Organic Food Industry. Figure 1 is a summarized result according to its annual report "Zahlen·Daten·Fakten - Die Bio-Branche" from 2005 to 2016.

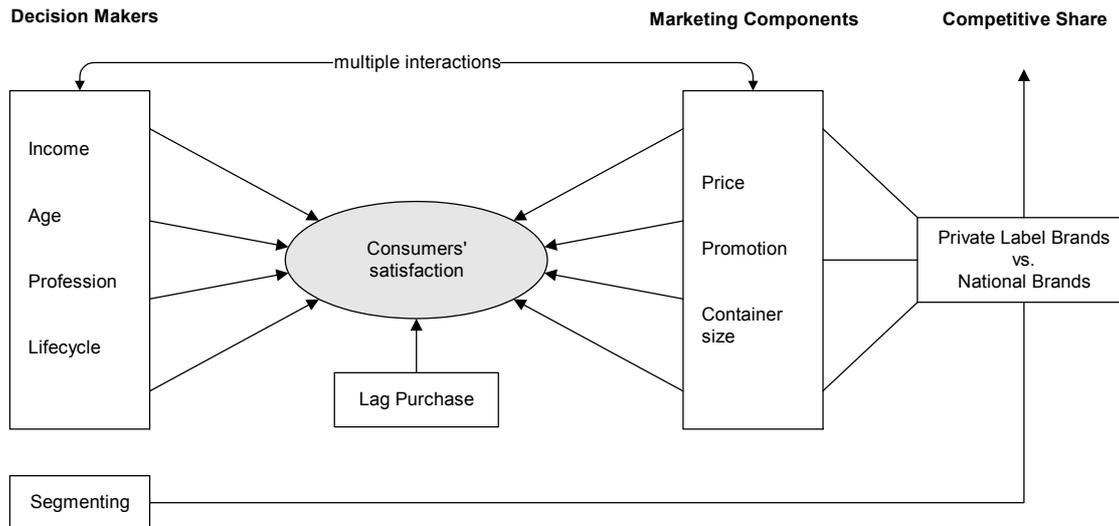
consciousness of consumers and the role of product categories, which are fully used by private label marketers. Gázquez-Abad and Sánchez-Pérez (2009) argue that PL promotions are more effective than NB promotions. Ailawadi et al. (2003) suggested that consumers abandon NBs for PLs because of perceived price savings. Some researches focused on the perceptions on different brands. Richardson (1997) has proven that PLs with premium quality through active diversification like promotion and unique brand names differentiate themselves to show customers – PLs are just regarded as other brands as NBs. Retailers are good at selling. How to position different PLs should according to the certain situations and structures of NBs, for example, profitable way for retailers is to target its PLs as the leading NBs (Sayman et al., 2002). By introducing new and extending the existing premium organic categories and products bearing their own brand name, retailers become less dependent on upstream suppliers and NBs. Moreover, to set off the low-quality image, the value-added categories, premium products accelerate the steps of getting rid of this image, and the quality gap between NBs and PLs has narrowed and even for certain categories are very innovative superior to NBs (Quelch and Harding, 1996). Some exclusivity, which are uniquely carried and sold in a certain retailer and under its name, make retailers achieve the necessary economies of scale. Thus the threat to the NBs is closer and closer even it is necessary to think PLs as other NBs (Hoch, 1996).

To compete with PLs, NBs apply pricing strategy (Steenkamp et al., 2010; Carpenter and Moore, 2006; Bonfrer and Chintagunta, 2004). However, Glaser and Thompson (2000) argue that price changes of NBs or PLs do not significantly affect their demand, but price of NBs affect purchase of organic foods much more than the PLs. Martínez-Ruiz and Mollá-Descals (2008) investigate influences of the retail price promotion, which lead to increase of brand sales. In fact, growing turnover of organic food between 2009 and 2010 was preceded by price decreases during the previous years (Schaack, 2011). A report Shopper Trends from Nielsen (2010) shows 43% of shoppers seldom shift the store, where they shop. Moreover, 21% shop in different stores to take advantage of promotions and 21% buy different brands when they are on promotion. Previous researches showed that price promotions have little effect on sales volume from a long-term perspective. However, Srinivasan et al. (2002) proved that short-to-medium term effect should be paid more attention, although price promotions are not identified between new introduced assortments. In addition, retailers create the perception of brand depth (Allender and Richards, 2009) by enlarging their assortment of organic foods, although the research has not widely discussed whether consumers' attention is diluted if PLs are over extended. Can PLs better compete with NBs from extension of organic categories, can premium organic categories of PLs substitute similar categories from NBs? What is the marketing effect to the future? The following part will describe how this research fills the gap of current research.

### **3. Research Question**

The literatures discuss competition between PLs and NBs only with reliance on the general scope instead of substitution relationship and effect of their sub-brands – if there is unobserved heterogeneity in vary of performance of price and price promotion to the change of choice probability between organic branded of PL and NB, and non-organic of them, the interactive effect with demographic factors of those as well. This study is to investigate how consumers respond to the organic food which is presented from PLs and NBs, when the PL organic food as premium categories of retailers' assortment with premium price counter the NB organic food. Accordingly, two research questions are: do the price and purchase habit of PL organic food lead to the lower choice probability of NB organic food and non-organic food of those, if the unobserved heterogeneity among alternatives in PLs, and demographic factors of consumers are interactive with price promotion?

The study investigates consumers' choices between NB and PL organic and non-organic yoghurt sold by supermarkets and discounters, which account for 54% of Germany's organic food sales (Schaack, 2011). The basic framework in this research is showed in Figure 2.



**Figure 2. The Relationship of Decision Makers and Marketing Strategy**

Through modeling the brand choice as a condition to observe the further choice of organic and non-organic categories among consumers, this research provides satisfaction of consumers based on the utility maximized theoretic explanation for branding level of retailers. The consequent empirical framework is, therefore, proposed to test the prognoses and investigate the relationship between price, promotion, container size and consumers' characteristics. The contribution of this study is to extend the breadth of literature concerning assortment and branding strategy of retailers as well as segmenting and positioning according to preferences of consumers.

#### **4. Data and Methods**

Data are from a consumer panel conducted by Gesellschaft für Konsumforschung (GfK or Association for Consumer Research) to investigate household purchases of 160 yoghurt brands among 28 retailer groups from 2004 to 2008 in Germany. Available data include purchase dates, prices, promotions, quantities and weights, and stores at which the products were purchased. Package size can be derived from quantities and weight. Further, information such as household size, age of household head, employment of primary wage earner, and income are included. Frequency of purchase is recorded by year. To organise monthly panel data, datasets for the five sampled years are merged. The records of households that bought yoghurt more than 12 times each year are selected. Therefore, the minimum and maximum frequencies of purchase are 12 and 155 times, respectively, in finalized data. Refined data include 4,425 households. The GfK panel reports only the price of the brand actually purchased at a specific moment but not the price of alternate brands at that moment. To include the price of rejected alternatives, a complete panel of price is required. Monthly average price is used as a proxy for consumers' responsiveness to price of alternative products.

#### **4.1 Descriptive Statistics**

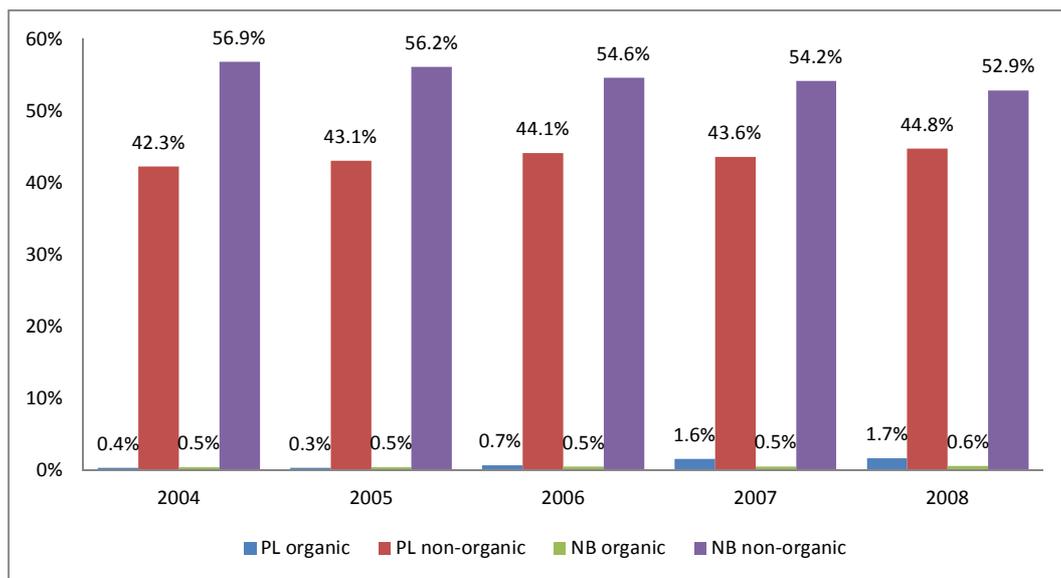
Two categories, organic and non-organic (to avoid confusion between PLs and NBs) are extracted as assortments of PLs and NBs from the dataset. The variables and their abbreviations are described in Table A1. The four alternatives are PL organic, PL non-organic, NB organic, and NB non-organic yoghurts. Total sales of each appear in Table 1. On a five-year average, sales growth of PL organic yoghurt exceeds that of NBs organic yoghurt. The situation is the opposite for sales of non-organic

yoghurt: sales of PL yoghurt are less than sales of NB yoghurt. Sales of PL organic yoghurt lagged behind sales of NB organic yoghurt before 2006 and surpassed them from 2006 to 2008.

**Table 1 Total Yoghurt Sales 2004-2008 (€ Millions)**

	2004	2005	2006	2007	2008
PL organic	0.178	0.189	0.483	1.130	1.295
PL non-organic	20.025	24.823	29.541	30.397	34.118
NB organic	0.216	0.260	0.330	0.432	0.457
NB non-organic	26.910	32.376	36.558	37.699	40.287

Table 1 shows the sales of yoghurt over 5 years in the data. The average growth rate of PL organic sales is 40%, of PL non-organic sales is 11%, of NB organic sales is 15% and of NB non-organic sales is 8%. The sale of PL organic yoghurt since 2006 is rapidly increased in comparing with NB organic yoghurt. This may attribute to the enlargement of PL organic assortments and the consumers buy it more than others as Figure 3 below shows that consumers purchase frequency on NB organic yoghurt is reduced.



**Figure 3. Frequency of Yoghurt Purchase (Percent) by Category (2004-2008)**

Figure 3 displays frequency of yoghurt purchases (percentages) for each of the five years sampled. It also explains the frequency of purchase for each of the four alternatives. On average, purchase frequency of NB non-organic yoghurt decreases 1.7% over the five years, of NB organic yoghurt decreases 8%, and of PL organic yoghurt increases 0.58%. Average purchase frequency of PL non-organic and organic yoghurts rise faster than those of NB yoghurts.

**Table 2 Means and Standard Deviations of Prices**

Category	Price	2004	2005	2006	2007	2008
PL organic	<i>Mean</i>	20.94	21.72	21.79	22.31	22.47
	<i>SD</i>	3.93	3.42	3.88	4.40	4.16
PL non-organic	<i>Mean</i>	13.05	12.88	13.09	13.32	15.04
	<i>SD</i>	4.42	4.50	4.84	5.04	4.98
NB organic	<i>Mean</i>	24.18	25.87	26.49	27.16	29.22
	<i>SD</i>	7.84	7.71	8.49	8.33	9.67
NB non-organic	<i>Mean</i>	21.28	21.49	21.71	22.50	25.09
	<i>SD</i>	8.53	8.47	8.37	8.98	9.46

*Note: Price is paid in cent of Euros per weight unit (100 grams).*

On average, the price of all alternatives increase year-on-year for each sampled year as in Table 2. Obviously, PL organic yoghurts have premium prices, some of them even higher than those of NBs. Prices of NB organic and non-organic yoghurts are more variable than prices of PL yoghurt. The price of PL organic yoghurt shows greater variance than that of PL non-organic yoghurt. However, price variation of NB non-organic yoghurts in contrast to NB organic yoghurts differ year to year.

To compare annual quantities purchased (grams) and sales (euro), the total weight of yoghurt sold in containers of varying sizes is aggregated and transposed the total into percentage shares by category (Figures A1 and A2). From 2007 to 2008, quantity consumed and sales of PL organic yoghurts dramatically grew in contrast to NB organic yoghurts. That result does not hold for non-organic yoghurt: PLs sales increase and NBs sales decline.

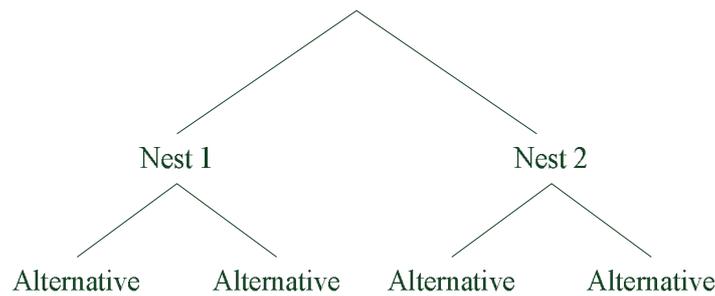
Besides calculating quantity consumed, variations in the frequency of consumption of organic and non-organic yoghurt are determined. Yoghurt containers in the data ranged from 38 to 6,480 grams. The principal size for both PL and NB yoghurts was 150 grams, with a value share up to 40%. Containers of 500 grams are frequently purchased, with a value share ranging from 12% to 20%. Container size is relevant for PL retailers that adopt a “me-too” strategy by standardizing their container design and volume to coincide with NBs. For instance, when containers are 2.5 kg to 3.0 kg, consumers buy PL non-organic yoghurt more frequently than NB non-organic yoghurt. When it is 0.15 to 0.3 kg, consumers buy both PL and NB yoghurt more frequently. Clearly, consumers choose smaller containers of organic and larger containers of non-organic yoghurt.

Household characteristics as socio-demographic factors affecting purchases are examined. Table A2 presents percentages of market share by household cohorts grouped by income, age, and occupation. Among all households, the share of PL organic yoghurts is nearly double that of NB organic yoghurts, except for households engaged in free occupation show slightly less interest in PL organic yoghurt.

There is a large discrepancy between market shares for both PL and NB organic and non-organic yoghurt. Shares of PL non-organic and NB non-organic yoghurts differ slightly from each other.

#### 4.2 The Nested Logit Model

Discrete choice models are feasible in determining the circumstances of brand choice when consumers are assumed to maximize utility in choosing among a finite set of alternatives. The nested logit (NL) model is to solve the problem of multidimensional choice sets (Ben-Akiva and Lerman, 1985). Compared to multinomial and conditional models, NL models relax the assumption of independence from irrelevant alternatives (IIA) (McFadden, 2000; Train, 2009). Numerous marketing researchers have employed this model, particularly when investigating brand choice (Baltas et al., 1997; Guadagni and Little, 1998; Ailawadi and Neslin, 1998; Sun et al., 2003). It is consistent with theory of random utility maximization in that it analyzes a structured consumer choice. The utilities of alternatives are determined by attributes of the available alternatives and characteristics of decision-makers. Building a NL model requires a nesting structure that holds alternatives divaricately. The ratio of probabilities for any two alternatives in the same nest is independent of the characteristics of all other alternatives, but not of characteristics for alternatives in different nests. A hierarchical tree structure demonstrates this essential feature (Figure 4).



**Figure 4. Tree Structure Nested Logit Model (two levels)**

The general form of the utility of an alternative is decomposed into a deterministic and random component following the principle of random utility maximization. The deterministic component consists of a function of brand attributes, and the random component represents factors that affect preferences (Baltas et al., 1997). Therefore, the utility that household  $n$  obtains from choosing alternative  $j$  ( $j = 1 \dots J$ ) at time  $t$  ( $t = 1 \dots T$ ) is

$$U_{njt} = V_{njt} + \varepsilon_{njt} \quad (1)$$

where  $V_{njt}$  is the observed deterministic component, and  $\varepsilon_{njt}$  is the random component and unobserved. An additive linear function embedded in  $V_{njt}$  is as follows,

$$V_{njt} = ASC_j + \beta_{jt}X'_{nj} + \gamma_{jt}z'_n + \theta_{njt}I_{njt}. \quad (2)$$

$ASC_j$  is alternative-specific constant for all alternatives that capture probabilities in relation to the reference alternative (one of those is set as a reference alternative).  $X$  is a vector of variables (e.g., price) that vary with  $j$  and  $n$ .  $z$  is a vector of variables of household-specific characteristics, and  $I_{njt}$  is their interaction with alternative-specific attributes varying with  $n$ .  $\beta$ ,  $\gamma$  and  $\theta$  are their respective coefficients. It assumes that the vector of unobserved utility,  $\varepsilon_{njt}$ , is distributed as Gumbel's

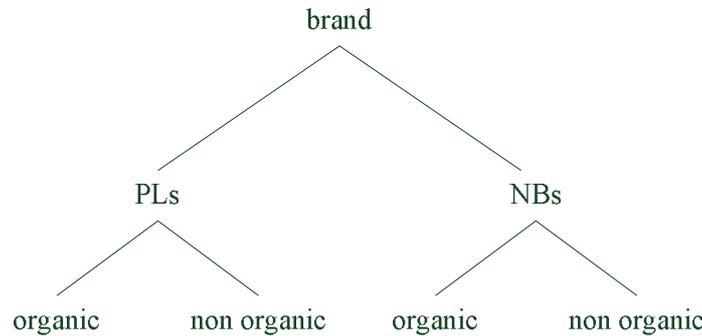
multivariate extreme-value distribution (Ben-Akiva and Lerman, 1985). For the alternatives in a nest,  $\varepsilon$ 's correlated to each other but not in different nests. It catches the variability of consumer perception and experiences with the attribute levels of organic food brands. The choice probability consists of two parts: the probability of choosing the nest and the probability of choices within each nest. Therefore, the probability of choosing alternative  $j$  can be expressed as a product of two probabilities:

$$P_j = P_{j|B_k} P_{B_k}, \quad (3)$$

where it excluded the household subscript  $n$  for conciseness.  $j \in B_k$ ,  $k = 1 \dots K$ ,  $B_k$  means the nest, given that  $j$  is chosen (Train, 2009).  $P_{j|B_k}$  is a probability conditional on the nest.  $P_{B_k}$  is the probability of choosing this nest. Therefore, it is

$$P(j, B_k) = \frac{e^{\frac{V_j}{\tau(j)}}}{e^{I(j)}} \times \frac{e^{\tau(j)I(j)}}{\sum_{m=1}^M e^{\tau_m I_m}}, \quad (4)$$

where  $m$  is nests from 1 to  $M$ ,  $\tau_m$  represents the degree of independence among the random component for alternatives in each nest.  $\tau_m = 1$  indicates complete independence in the nest (Train, 2009). The lower the value of  $\tau_m$ , the more correlated are the alternatives. It is restricted  $0 \leq \tau_m \leq 1$  such that it is consistent with random utility theory (Cameron and Trivedi, 2010).  $I$  is a quantity called the inclusive value and it equals  $\ln \sum_{k \in B_m} e^{V_k/\tau_m}$ .  $\tau_m I_m$  interprets the expected utility that household  $n$  receives from its choice among alternatives in the particular nest. In this case, PLs and NBs are structured into a choice set at level 1 (Nests 1 and 2). Two more categories - organic and non-organic - are grouped under level 2 (Figure 5).



**Figure 5. Tree Structure of Brand Choice**

This model presumes that unobserved utilities are correlated in the nest. Subsequently, among organic and non-organic categories, there is proportional substitution within NBs and PLs but not across NBs and PLs. Additionally, the choice of category follows the sequence among NBs and PLs. This is because retailers have many point-of-purchase options for promoting their PLs among different categories, whereas consumers may face a limited selection of NBs. So consumers' choice of organic and non-organic within brands (nests) is an important clue for retailers who want to introduce and extend organic products in their PLs to garner market shares. The next section elaborates how the model is estimated and the choice structure is performed in terms of NBs and PLs.

## 5. Estimates and Findings

Price and the lag choice enter the model as generic coefficients to test unobserved heterogeneity in relation to maximizing utility. Other demographic variables are income, occupation, age, and interactions between them, and promotion and container size. The price is what consumers paid for a specified alternative. Log price is used to improve fitness of the model (Krishnamurthi and Raj, 1988).

Model parameters are estimated by maximum likelihood (ML). The ML estimate of coefficients gives the greatest likelihood. The likelihood ratio (LR) is used to test the NL model against the null hypothesis that all variables have no effect on brand choice. The coefficients of explanatory variables have the expected signs and are highly significant. The dissimilarity parameters are lower than 1 ( $\tau_{PL}$  is 0.51 and  $\tau_{NB}$  is 0.41), which indicates that organic and non-organic categories in each brand nest are correlated to each other; however, the degree of correlation among categories of PL is higher than that among categories of NB. To measure goodness of fit Pseudo- $R^2$  is adopted, a statistic that Train (2009) calls the likelihood ratio index. It measures how well the model performs compared to the model in which all parameters are zero. Its formula is  $\tilde{R}^2 = 1 - \ln L_{nl} / \ln L_0$ , where  $\ln L_{nl}$  is the log likelihood of the NL model and  $\ln L_0$  is the log likelihood of the null model. Based on the hypotheses, two null models are constructed, one of which computes using only alternative-specific constants, the other of which computes using only the first two variables from household characteristics, which are supposedly the same. Results of these two null models indicate that the null hypotheses can be rejected. Under the LR index formula, the  $\tilde{R}^2$  of 0.3 falls within the range of 0 to 1 and fits the data. The likelihood ratio chi-squared test statistic is 1331.19 and highly significant (df = 2, p<0.001). Thus, the NL model is accepted. Estimation results including the sign coefficients and standard errors appear in Table 3. NB non-organic is chosen to be as the base category and set all its coefficients to zero.

**Table 3 Estimated Coefficients and Standard Error**

Nested Logit Model		
Variable	Coefficient	Std. Err.
price	-0.59***	0.01
lag choice	0.58***	0.001
Alternative-specific constants		
plo	-1.28***	0.19
pln	-0.57***	0.09
nbo	-0.95***	0.15
nbn	base category	-
Alternative-specific interactions		
prom × inc1_plo	0.53*	0.22
prom × old2_plo	0.66*	0.31
prom × empd_plo	-2.29***	0.32
prom × sempd_plo	-2.37***	0.34
prom × free_plo	-2.20***	0.44
prom × inc1_pln	0.26**	0.12
prom × old2_pln	0.48***	0.14
prom × empd_pln	-2.51***	0.15
prom × sempd_pln	-2.50***	0.16
prom × free_pln	-2.48***	0.24

prom × inc3_nbo	0.27***	0.08
prom × middle_nbo	-0.32**	0.12
prom × old2_nbo	0.28*	0.13
prom × free_nbo	-0.63*	0.25
<hr/>		
Household specific		
inc3_plo	0.28**	0.10
inc4_plo	0.30**	0.11
old2_plo	0.23**	0.11
middle_pln	0.13**	0.04
inc2_pln	0.1**	0.04
inc3_pln	-0.09**	0.04
inc4_pln	0.10**	0.05
old1_pln	0.19***	0.04
old2_pln	0.15**	0.04
empd_nbo	-0.48***	0.09
sempd_nbo	-0.59***	0.10

Note: \*\*\*, \*\*, and \* indicate 1%, 5%, and 10% significance, respectively. Values that are not significant are omitted.

Coefficients for interaction of container size with socio-demographic variables smaller than 0.01 are neglected.

Abbreviations plo, pln, nbo, and nbn refer to PL organic, PL non-organic, NB organic, and NB non-organic, respectively.

The coefficient of price is negative and statistically significant, indicating a negative probability that consumers choose a category from a brand nest because of the average marginal price increase in this category. On the one hand, the higher the price, the less the sub-brands choice probability, and it holds more for organic than non-organic categories. On the other hand, a lower pricing strategy, or rather to say, a lower percent of average price increase in 5 years (Table 1) gives a relatively high level of expected utility. Correspondingly like Table A3 shows, as the average percentage change in demand for the base category, follows a 1% change in its price and price of alternatives. The own effect of price reflects that changes in average price of the chosen category have relatively little effect on the quantity demanded of that category. For example, the own price effect of PL organic yoghurt means that an average 1% increase in its price decreases the probability that it will be chosen by 2%. The cross effect of PL non-organic yoghurt and NB non-organic yoghurt means that a 1% increase in the price of PL non-organic yoghurt increases by 11% the probability of choosing NB non-organic yoghurts. As expected, a price increase for one alternative reduces its probability of being chosen and increases the probability that alternatives are chosen.

The lag choice variable in the result shows the strong purchase habits that purchasing private label organic category during the previous period affirmatively affects current purchase behavior, implying habit persistence in consumption of both organic and non-organic yoghurt. The level of positive significance is almost same to the negative significance of the price. It refers that consumers prefer more to purchase the PL organic yoghurts offered by retailers than the NB organic yoghurts. It can be explained that unobserved heterogeneity from price effects among alternatives is captured by the model. The NB organic yoghurts increase their prices with a higher percent in 5 years has a contrastive effect of price promotion of PL organic yoghurts that can be amplified through the purchase of last period. Although some researches argued that brand choice probability declines and consumers do not repurchase after promotion of the brands end (Kahn and Louie, 1990). However, it could be also because of frequent visiting and purchase experience, which make consumers know better and more details of the PL organic yoghurts. It updated the expected utility of consumers. It shows that repeated purchases benefit the private label organic categories available from retailers. Results indicate that a reinforced purchase behavior may push retailers to decide to expand their offerings of organic products and improve sales. It is important to identify the substitution relationship, which indicates if organic and non-organic food of PL can be substitutional, or likewise, organic and non-organic food of

NB can substitute each other when consumers face to choices. It implies that if retailers provide organic alternatives alongside non-organic ones, there is a probability that consumers choose organic foods. The results suggest there are many more differences in preference between categories within PLs, as organic and non-organic categories are not highly correlated to each other compared with both NB categories.

In addition, price promotions interact strongly with groups of low-income and retired consumers in choices among all alternatives. It should be noticed that the price effect here is based on the comparative choice probability of both PL organic and non-organic yoghurts to the NB. It reflects the aim of research to identify if price plays an important role in the competition of sub-brands of PL to NB and its substitution probability rises when the price from sub-brands of PL decreases. The effects of household-specific characteristics are also explained. Relative to the probability of choosing from the NB non-organic category, an increase in consumer income increases the probability of consumers choosing NB organic and PL organic yoghurt. As household income increases, so does the likelihood that consumers choose NB organic compared with non-organic of NB, and they prefer PL organic and non-organic to NB non-organic. The older the head of household, the more likely are consumers to choose categories of PLs compared to non-organic NBs, especially if households are headed by someone older than 65. Higher income consumers prefer PLs organic yoghurt over both organic and NB non-organic. Interaction effects suggest that promotional activities most influence the choice between alternatives of consumers who earn less than €1,000 monthly and retired consumers older than 65. As household income increases, so does the probability of buying larger sizes of PL organic and non-organic yoghurt compared to NBs. Although Bergès-Sennou et al. (2007) highlight that socio-demographic characteristic does not play a role in perceptions of PLs (Monier et al. 2009; Diallo et al. 2013). Martinez and Montaner (2008) proves that socio-demographic factors affect consumers' choice on PLs.

## **6. Conclusion**

This research has used the framework of nested logit model based on maximize utility theory to examine the effectiveness of premium price, purchase habit and price promotions as retailers introducing and extending their sub-branded organic assortments. By holding correlated errors among alternatives, it determined the aspect of price - likely to have the effect on choice probability of PL organic food compare to NB organic food. Also there is unobserved heterogeneity in vary with price and purchase habit to alternatives. The model suggests that consumers respond differently to changes in organic alternative attributes depending on whether it belongs to PL or NB. By controlling correlations with brands, it establishes distinct correlations over households based on their characteristics. The study not only stresses on how consumers react to the price change of alternatives, but also the necessity of understanding how organic assortment as important extension strategy of retailers are perceived by consumers in realizing their maximized utility. Thus, several facts and consequent marketing effects are summarized.

Firstly, the price has a strong impact on the categories cross brand nest. The price changing can lead to the unexpected choice probability change of the sub-brands from other master brand. The hierarchical path of consumers' choice in the NL model suggests that price is likely to have the most influence on the choice of PL and NB organic assortments. The model accommodates strategic responses in both prices and the organic yoghurt offered by retailers, thus solving the basic empirical issue. There is a relatively greater negative effect of price increase of NB organic food to those of PL than the non-organic of both brands. The price increase of NB organic category is lower than that PL organic category. The average effect of a price change of NB non-organic on the choice of NB organic is relatively higher than that on the PL organic choice. It is consistent with the forecast that retailers organize the PL organic categories to compete directly with NB non-organic category. Retailers could apply multi-tier prices as a competitive tool in rivalry with NBs. The correlation between NB organic and non-organic in a category is lower than that for PL. Consumers are likely to switch from organic

to non-organic products and vice versa if both are NBs. However, consumers who choose PL organic yoghurts are unlikely to shift to NB organic yoghurts.

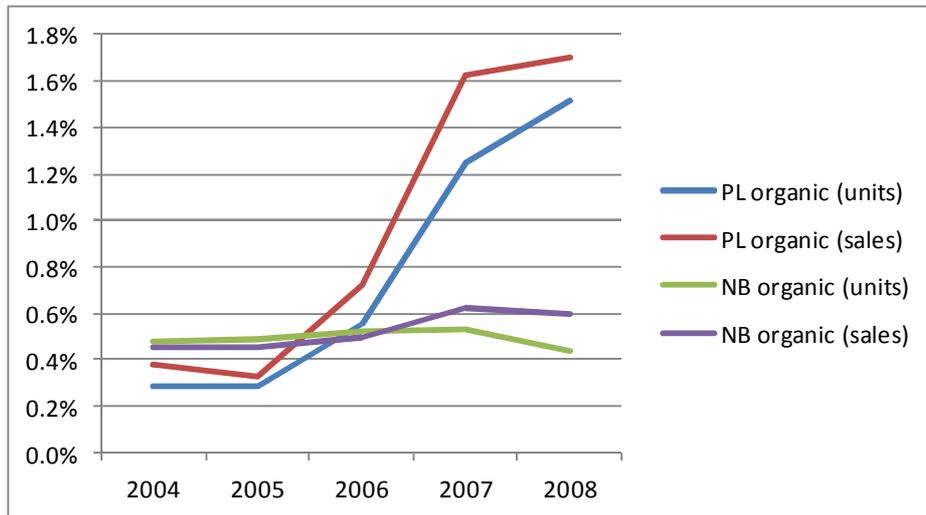
Secondly, unobserved preference to attribute of organic brands varying with price and purchase habit may encourage marketers apply the strategy of differentiation with premium price to explore and segment the consumers. With respect to unobserved heterogeneity among alternatives, it found that elasticity of substitution among non-organic PLs and NBs is greater than that of substitution among the PL and NB organic food categories. The consolidate purchase habit may leave messages of often visits contribute the better knowledge of PL organic assortments though it is not observed. It suggests that organic categories within brands fulfill various consumer demands. It has a less probability of consumers switching from PL organic to non-organic products. Consumers view the two different. Retailers may build their organic categories independent of their core categories. For example, in addition to the traditional department with extended organic categories inside supermarkets Rewe group developed even its own organic supermarkets like "Temma". With differentiation strategies retailers try to mitigate the price and price promotion effect from rivalries. Otherwise, ambiguity of brands' breadth degrades the PL brand's depth due to change of alternatives' attributes, and both market shares are not reinforced because the choice of an organic category can be affected variously by marketing campaigns of other categories.

Thirdly, extension of organic assortment by retailers should consider new targeting group and bring about the marketing repositioning. The findings have implications for retailers extending their PL organic food or enlarging organic assortments. It can hurt the sales of NB organic categories. This is line with Amaldoss and Shin (2015) that explained retailer will offer multitier store brands, which have almost no quality difference compared with NBs. This study found that category extension attracts consumers to all products bearing the retailer's name and part of other private labels, that is, only if consumers have very strong preferences between PLs and NBs. In general, to a degree of purchase preference, depth of NBs is still deeper than PLs to consumers. PLs seek for brand breadth to develop potential consumers and build their power from a wide set of categories. It proved that price promotion has strong interactive effects with different income group, which may include the non-organic food consumers who tried usage of it in last purchase period, in which the brands' special attributes were caught. Therefore, retailers can build new relationship with "new consumers" on its branded and other PL organic category. It is possible to develop horizontal extension with pricing differentiation and price promotion to set off the NBs depth of brands strategy. To avoid the further proliferation of PL organic, NBs are trying to supply the equivalent private labels food categories to retailers under retailers' brands. Organic assortments may cause the marketing repositioning of NBs, and PLs as well.

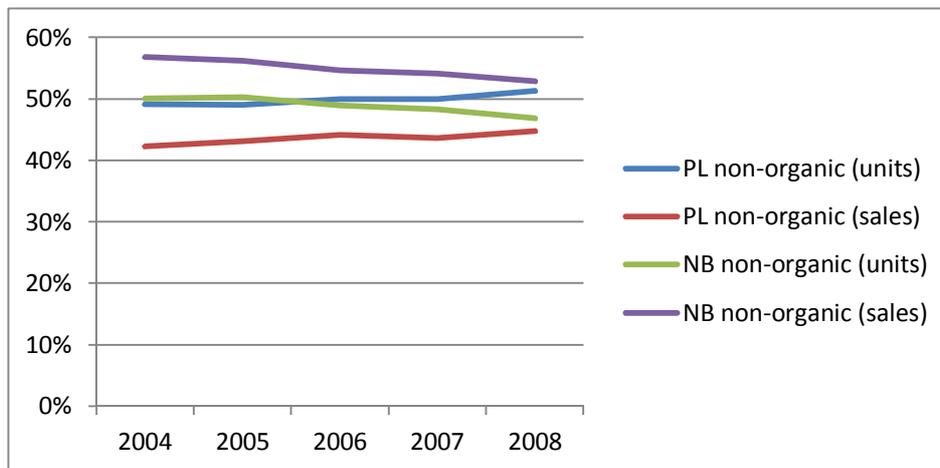
Therefore it remains a lot to further research, for instance, the method analysis was based on a sequent hierarchical structure of consumers' choices of brands between nests (PLs and NBs) and organic and non-organic within nests. The further research can also investigate the probability that consumers first choose an organic or non-organic category and then select PLs and NBs. Extensive research objects may in the area of retailer sub-branding strategy, the effect of motivation of consumers purchasing organic food, and brand knowledge transferring between retailers and its sub-branded organic products are expected in future.

## Appendix

**Figure A1. Comparison of Quantities and Sales Percentages (Organic Yoghurt)**



**Figure A2. Comparison of Quantities and Sales Percentages (Non-organic Yoghurt)**



**Table A1 Description of Variables**

Variable Description	
Variable name	Definition
price	price of brands selected by households
lag choice	1 if the latest purchase was an alternative, zero otherwise
inc1	income level 1, 1 if the monthly maximum income is €999, zero otherwise
inc2	income level 2, 1 if the monthly income is €1000-1999, zero otherwise
inc3	income level 3, 1 if the monthly income is €2000-3999, zero otherwise
inc4	income level 4, 1 if the monthly income $\geq 4000$ , zero otherwise
young	maximum age of household head, 29 years old: 1 if young, zero otherwise
middle	age of household head, 30-49 years old, 1 if middle-aged, zero otherwise
old1	age of household head, 50-64 years old, 1 if old1, zero otherwise
old2	age of household head, over 65 years old, 1 if old2, zero otherwise
empd	occupation: employed by government and company
sempd	occupation: self-employed including farmers
free	occupation: free profession
prom $\times$ inc (1-4)	interactions item: promotion $\times$ income variables
prom $\times$ age (1-4)	promotion $\times$ age variables
prom $\times$ occu (1-3)	promotion $\times$ occupations variables
pack $\times$ inc (1-4)	package size $\times$ income variables
pack $\times$ age (1-4)	package size $\times$ age variables
pack $\times$ occu (1-3)	package size $\times$ occupation variables

**Table A2 Market Share of Yoghurt by Household Groups (5-year average)**

	Private Labels (%)		National Brands (%)		Sum
	Organic	Non organic	Organic	Non organic	
Total	1.91	47.94	1.04	49.11	100
Market shares by income group					
inc1	1.22	49.48	0.66	48.64	100
inc2	1.66	49.27	0.87	48.21	100
inc3	2.03	47.44	1.09	49.44	100
inc4	2.92	43.29	1.90	51.89	100
Market shares by age					
young	1.56	46.74	0.92	50.78	100
middle	1.94	46.87	1.18	50.01	100
old1	2.01	48.25	1.06	48.68	100
old2	1.79	49.76	0.76	47.69	100
Market shares by occupation					
empd	1.99	46.93	1.15	49.93	100
sempd	1.78	49.47	0.81	47.74	100

free	2.93	45.00	3.39	48.68	100
------	------	-------	------	-------	-----

**Table A3 Average Marginal Effect**

	plo	pln	nbo	nbn
Plo	-0.02	0.013	0	0.01
Pln	0.013	-0.13	0.003	0.11
Nbo	0	0.003	-0.13	0.01
Nbn	0.01	0.11	0.01	-0.13

*Note: Abbreviations plo, pln, nbo, and nbn stand for PL organic, PL non-organic, NB organic, and NB non-organic, respectively.*

## **Bibliography**

Ailawadi, K., and Neslin, S. (1998). The Effect of Promotion on Consumption: Buying More and Consuming It Faster. *Journal of Marketing Research*, 35(3), 390-98.

Ailawadi, K. L., Gedenk, K., and Neslin, S. A. (2003). Understanding Competition Between Retailers and Manufacturers: an Integrated Analysis of Store Brand and National Brand Deal Usage, Tuck Business School Working Paper No. 03-16, Dartmouth.

Allender, W. J., and Richards, T. J. (2009). Measures of Brand Loyalty. Selected paper prepared for presentation at the Agricultural and Applied Economics Association. AAEA and ACCI Joint Annual Meeting, Milwaukee, Wisconsin (July 26-29, 2009).

Amaldoss, W. and Shin W. (2015). Multitier Store Brands and Channel Profits. *Journal of Marketing Research*, 52 (6), 754-767.

Baltas, G., Doyle, P., and Dyson, P. (1997). A Model of Consumer Choice for National vs Private Label Brands, *Journal of the Operational Research Society*, 48(10), 988-95.

Bellizzi, J. A., Hamilton, J. R., Krueckeberg, H. F., and Warren S. M. (1981). Consumer Perception of National, Private, and Generic Brands. *Journal of Retailing*, 57(4), 56-71.

Ben-Akiva, M., and Lerman, S. (1985). *Discrete Choice Analysis: Theory and Application to Travel Demand*, Massachusetts Institute of Technology. Cambridge. The MIT Press.

Bergès-Sennou, F., Hassan, D., Monier-Dilhan, S., and Raynal, H. (2007). Consumers' Decision Between Private Labels and National Brands in a Retailer's Store: A Mixed Multinomial Logit Application. Paper prepared for presentation at the I Mediterranean Conference of Agro-Food Social Scientists. 103rd EAAE Seminar: Adding Value to the Agro-Food Supply Chain in the Future Euromediterranean Space. Barcelona, Spain (April 23-25, 2007).

BÖLN (2012). *Ökobarometer 2012. Repräsentative Bevölkerungsbefragung im Auftrag des Bundesministeriums für Ernährung, Landwirtschaft und Verbraucherschutz (BMELV)*. Bundesprogramm Ökologischer Landbau und andere Formen nachhaltiger Landwirtschaft (Representative Census on Behalf of Federal Ministry of Food, Agriculture and Consumer Protection)

BÖLW (2013). *Zahlen·Daten·Fakten - Die Bio-Branche 2013*, Bund Ökologische Lebensmittelwirtschaft.

BÖLW (2012). *Zahlen·Daten·Fakten - Die Bio-Branche 2012*, Bund Ökologische Lebensmittelwirtschaft.

Bonfrer, A., and Chintagunta, P. K. (2004). Store Brands: Who Buys Them and What Happens to Retail Prices When They Are Introduced? *Review of Industrial Organization*, 24 (2), 195-218.

Burt, S. (2000). The Strategic Role of Retail Brands in British Grocery Retailing. *European Journal of Marketing*, 34 (8), 875-890.

Burton, S., Lichtenstein, D. R., Netemeyer, R. G., and Garretson, J. A. (1998). A Scale for Measuring Attitude Toward Private Label Products and an Examination of Its Psychological and Behavioral Correlates. *Journal of the Academy of Marketing Science*, 26 (4), 293-306.

Cameron, A. C. and Trivedi, P. K. (2010). *Microeconometrics Using Stata*. Stata Press.

- Carpenter, J.M. and Moore, M.(2006). Consumer Demographics, Store Attributes, and Retail Format Choice in the US Grocery Market. *International Journal of Retail & Distribution Management*, 34(6), 434-452.
- Diallo, M. F., Chandon, J-L., Cliquet, G. and Philippe, J. (2013). Factors Influencing Consumer Behavior Towards Store Brands: Evidence from The French Market. *International Journal of Retail & Distribution Management*, 41(6), 423-41.
- Fiore, A. and Kim, J. (2007). An Integrative Framework Capturing Experiential and Utilitarian Shopping Experience. *International Journal of Retail & Distribution Management*, 35(6), 421-42.
- Garretson, J. A., Fisher, D., and Burton, S. (2002). Antecedents of Private Label Attitude and National Brand Promotion Attitude: Similarities and Differences. *Journal of Retailing*, 78 (2), 91-99.
- Gázquez-Abad, J. C., and Sánchez-Pérez, M. (2009). How Store Flyers Affect Consumer Choice Behavior: National Brands vs. Store Brands. *European Retail Research*, 23 (1), 1-20.
- Glaser, L. K., and Thompson, G. D (2000). Demand for Organic and Conventional Beverage Milk. Paper presented at the Western Agricultural Economics Association, Annual Meetings, Vancouver, British Columbia (June 29-July 1, 2000)
- González-Hernández and Orozco-Gómez (2012). A Segmentation Study of Mexican Consumers Based on Shopping Centre Attractiveness. *International Journal of Retail & Distribution Management*, 40(10), 759 - 777.
- Guadagni, P., and Little, J. D. C. (1998). When and What to Buy: A Nested Logit Model of Coffee Purchase. *Journal of Forecasting*, 17(3-4), 303-26.
- Hoch, S. J. (1996). How Should National Brands Think about Private Labels? *Sloan Management Review*, 37(2), 89-102.
- Kahn, B. E. and Louie, T. A. (1990). Effects of Retraction of Price Promotions on Brand Choice Behavior for Variety-Seeking and Last-Purchase-Loyal Consumers. *Journal of Marketing Research*, 27 (3), 279-289.
- Köpke & Küpper (2013). Marktanteile im Segment Bio-Lebensmittel. Folgen und Folgerungen. [http://www.umweltbundesamt.de/sites/default/files/medien/378/dokumente/fuer\\_umweltfreundlichere\\_lebensmittel\\_handlungsempfehlungen\\_uba\\_vzbv.pdf](http://www.umweltbundesamt.de/sites/default/files/medien/378/dokumente/fuer_umweltfreundlichere_lebensmittel_handlungsempfehlungen_uba_vzbv.pdf) (accessed on 03.02.2015)
- Krishnamurthi, L., and Raj, S. P. (1988). A Model of Brand Choice and Purchase Quantity Price Sensitivities. *Marketing Science*, 7(1), 1-20.
- Kumar, N., and Steenkamp, J.-B. E. M. (2007). Private Label Strategy: How to Meet the Store Brand Challenge. Boston. Harvard Business School Press.
- Lupton, R. A., Rawlinson, D. R., and Braunstein, L. A. (2010). Private Label Branding in China: What Do US and Chinese Students Think? *Journal of Consumer Marketing*, 27(2), 104-113.
- Manzur, E., Olavarrieta, S., Hidalgo, P., Fariás, P., and Uribe, R. (2011). Store Brand and National Brand Promotion Attitudes Antecedents. *Journal of Business Research*, 64(3), 286-91.
- Martinez, E. and Montaner, T. (2008). Characterisation Of Spanish Store Brand Consumers. *International Journal of Retail & Distribution Management*, 36(6), 477-93.

- Martínez-Ruiz, M. P. and Mollá-Descals, A. (2008), Retail Price Promotion Influences for Product Varieties In Grocery Stores: Evidence From Spain. *International Journal of Retail & Distribution Management*, 36(6), 494-517.
- McFadden, D. (2000). Mixed MNL Models For Discrete Response. *Journal of Applied Econometrics*, 15( 5), 447-70.
- Monier, C., Hassan, D., Nichèle, V., and Simioni, M. (2009). Organic Food Consumption Patterns, *Food Industrial Organization*, 7(2), Special Issue.
- OTA (2015). Organic Trade Association. <https://ota.com/news/press-releases/18061>. (accessed on April 15, 2015)
- PLMA (2010). Private Label Manufacturers Association.  
[http://www.plmainternational.com/en/private\\_label\\_en.htm](http://www.plmainternational.com/en/private_label_en.htm) (accessed on October 10, 2010)
- Quelch, J. A. & Harding, D. (1996). Brands Versus Private Labels: Fighting to Win. *Harvard Business Review*, 74 (1), 99-109.
- Richardson, P., Dick, A. & Jain, A. (1994). Extrinsic and Intrinsic Cue Effects on Perceptions of Store Brand Quality. *Journal of Marketing*, 58(4), 28-36.
- Sayman, S., Hoch, S.J. & Raju, J.S. (2002). Positioning of Store Brands. *Marketing Science*, 21 (4), 378-397.
- Schaack, D. (2011). The German Organic Market 2010. AMI - Agrarian Market Information Company.
- Sinha, I., and Batra, R. (1999). The Effect of Consumer Price Consciousness on Private Label Purchase. *International Journal of Research in Marketing*, 16 (3), 237-51.
- Spena, T. R., Caridà, A., Colurcio, M. and Melia, M. (2012). Store Experience and Co-Creation: The Case of Temporary Shop. *International Journal of Retail & Distribution Management*, 40(1), 21-40.
- Srinivasan, s., Pauwels, K., Hanssens, D. M. and Dekimpe, M. (2002). Who Benefits from Price Promotions. *Harvard Business Review*, September, 22-3.
- Steenkamp, J. -B. E. M., van Heerde, H. J., and Geyskens, I. (2010). What Makes Consumers Willing to Pay a Price Premium for National Brands Over Private Labels? *Journal of Marketing Research*, 47(6), 1011-24.
- Sun, B., Neslin, S. A., and Srinivasan, K. (2003). Measuring the Impact of Promotions on Brand Switching When Consumers Are Forward Looking. *Journal of Marketing Research*, 40 (4), 389-405.
- Train, K. (2009). *Discrete Choice Methods with Simulation* (2nd Ed.) Cambridge. Cambridge University Press.

