Factors Influencing Olive Oil Brand Choice in Spain: An Empirical Analysis Using Scanner Data

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ABSTRACT

Olive oil consumption is growing all around the world as a consequence of the extension of the Mediterranean diet. Because of limited production, pricing, promotions, and consumer-related variables are essential to explain olive oil consumer behavior. As a consequence of this increasing consumption, it is fundamental to analyze the main factors influencing consumers' olive oil choices for both brands and retailers to be able to compete more efficiently and satisfy consumer needs more closely. But, few such studies are concerned with olive oil (although a great many works in the literature analyze the influence of these factors in other product categories). In a sociocultural context like the Spanish market, in which brand awareness is strong and the use of the product is very high, these factors are even more important. Thus, the main objective of this article is to determine and assess how different marketing variables, such as price, price discounts, use of store flyers and loyalty, explain olive oil brand choice. [Econlit citations: M310, Q130]. © 2009 wiley Periodicals, Inc.

1. INTRODUCTION

Olive oil is an important component in the food system in most European markets. Moreover, its consumption is growing, particularly in North Europe, the US, and Canada.

As a consequence of this consumption, there is an increasing number of companies and brands fighting for more shelf space and larger market shares. In addition, olive oil consumption is focused on households (72.32%; Martín, 2004), so understanding the factors influencing olive oil brand choice in the stores could prove a key element in brands' success. Promotion, advertising and special offers are critical to success in today's food retail environment (García, Aragonés, & Poole, 2002). Although a considerable number of works from the literature analyze the influence of these factors on the choice of a wide range of products, very few of them do so for olive oil. In a sociocultural context like the Spanish market, where brand awareness is very strong and the product is used very frequently, these factors are even more important. Thus, this work attempts to add to the literature by analyzing olive oil consumer behavior and investigating how the seller's marketing variables (price, price discounts, ads through store flyers) and consumer behavior (loyalty) explain consumers' olive oil brand choices.

A short description of the Spanish olive oil market and a review of the most relevant literature are presented first, followed by the data and the key explanatory variables. The model is then described, results are reported, and the contributions and limitations of the analysis study are summarized.

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2. SPANISH OLIVE OIL MARKET

Although olive oil is not the most consumed food oil (International Olive Oil Council [IOOC], 2004), its consumption is growing all around the world and is very high in the Mediterranean countries. Spain is the largest olive oil producer in the world, providing 35% of the global production of approximately 2.16 m tons. More than 80% of Spanish production comes from Andalusia, in southern Spain (ASOLIVA).

Spanish olive oil sales increased by only 3% in 2005. The market is led by large groups owning several brands that are fighting for retailer brands' market share by, for example, introducing healthier olive oil types.

Spaniards prefer to buy their oil packaged (more than 90% of total consumption). Olive oil consumption represents about 70% of Spanish per capita oil consumption (15 liters per year), while the consumption of other types of oil such as corn, soya, seed, or dreg is much lower (see Figure 1).

3. DETERMINANTS OF OLIVE OIL CONSUMER CHOICE

3.1. Sale Price: Sensitivity Toward Price and Price Promotions

Olive oil choice is a hierarchical process (García et al., 2002; Martín, 2004). Consumers first decide what type of oil (e.g., soya, olive, sunflower, etc.) they want. In this step, oil price is a function of quantity and production patterns. Then the consumers decide which brand to buy (brand choice behavior). Both the brand and other aspects (e.g., quantity to buy) are influenced by price (and other variables such as promotions, brand value, etc.). The variety of olive oil brands and types has increased consumers' use of price as choice criterion (García et al., 2002). Following Bronnenberg, Dhar, and Dubé (2005) and Simpson (2006), we set forth hypothesis H1a:

H1a: Selling price has a negative impact on consumers' olive oil brand choice.

Periodic price reductions are widely employed by retailers (Pesendorfer, 2002) as they have become one of the main aspects of fast-moving consumer goods (FMCG) management (Lal & Villas-Boas, 1998). As previous literature suggests (e.g., Blattberg & Neslin, 1990; Neslin, 2002; Ward & Davis, 1978), price promotions have both a price and an informational effect. The price effect represents discounts in the regular purchase price, whereas the informational effect yields additional increases in consumption primarily because price promotions (here, the price discount) are a reminder of the availability (during a particular period of time) of a particular product under special price conditions.

As in other FMCG categories, a positive effect of price promotions on olive oil consumption has been revealed, leading to hypothesis H1b:

H1b: Price promotions have a positive effect on the probability an olive oil brand is chosen.

As Blattberg, Briesch, and Fox (1995) suggest, a larger discount has a positive effect on consumer choice behavior. Della Bitta and Monroe (1980) find that a discount of at least 15% is needed to get a positive effect on consumer choice probability, pointing to hypothesis H1c:

H1c: The larger the brand's discount, the more likely it will be chosen.

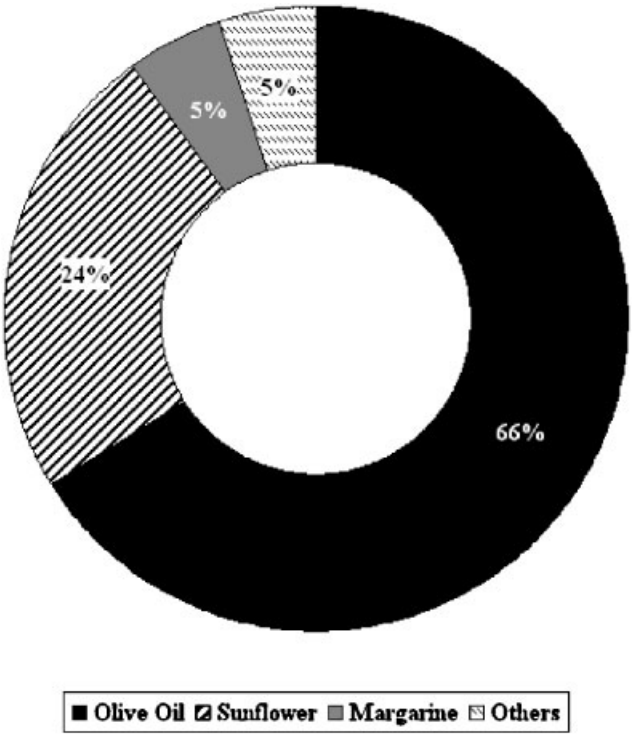

Figure 1 Spanish Oil Consumption (2003). Source: Spanish Ministry Of Agriculture, Fisheries and Food (2004).

3.2. Effect of Store Flyers on Olive Oil Choice Behavior

Advertising promotions are a very important part of retailers' promotional activities, amounting to approximately 50% of the total budget firms allocate to these types of activities (Bodapati, 1999). Van den Poel, Schamphelaere, and Wets (2004), using the transactional database of a large European retailer that contains several product categories (including olive oil), indicate that a brand's presence in a store flyer produces an extraordinary increase in its sales. Therefore, we establish hypothesis H2a:

H2a: An olive oil brand's presence in store flyers increases its probability of being chosen by the consumer.

Various authors (e.g., Kumar & Leone, 1988) have confirmed that using promotional advertising simultaneously with price cuts and other promotional tools (e.g., the use of displays) allows stores to significantly increase their sales, showing a synergistic effect between them. This leads to the following hypotheses:

H2b: The effect of price promotions on the probability an olive oil brand is chosen is greater when the brand appears in store flyers.

H2c: The effect of presence of olive oil brand in store flyers on the probability it is chosen is greater when the brand is also promoted on price.

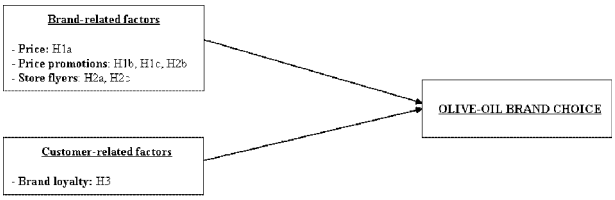

Figure 2 Hypotheses.

3.3. Effect of Customer Loyalty on Olive Oil Choice Behavior

Consumer loyalty orientation has entered the agribusiness sector, in politics as well as in business (Hanf & Kühl, 2005). Agricultural firms' new strategic framework has led to an increase in consumer preference and loyalty behavior (Kohls & Uhl, 1990). Aspects such as the creation of the protected designation of origin (PDO; Gómez & Caldentey, 1999; Loureiro & McCluskey, 2000), the increased emphasis of brands on aspects like quality, information and design, and the cultural "roots" that the product has among the population of the producer countries, particularly in the Mediterranean area (Farre, 1996), have made consumer loyalty an increasingly important element in olive oil purchase behavior (Langreo, Rodríguez, Mili, & Sanz, 1996). Therefore, a significant brand loyalty behavior is expected.

H3: Olive oil brand choice is influenced by previous choices.

Figure 2 summarizes the hypotheses proposed in this study.

From the above discussion, it follows that consumer choice is a function of both brand- and consumer-related factors:

Consumer's brand choice = *f*(price, price promotions, store flyers, brand loyalty)

As in previous studies that have analyzed consumers' choice behavior (Bucklin & Gupta, 1992; Chintagunta, 2001), the present study employed a multinomial logit (MNL) model. There were three reasons for choosing this model: (a) analytical tractability and ease of econometric estimation, (b) conceptual appeal (being grounded in economic theory), and (c) excellent empirical performance (as measured by model fit and other criteria; Guadagni & Little, 1983).

Using the estimations from MNL, marginal effects are analyzed. Using price-related marginal effect values we establish a competitive brand map. Also, using marginal effects allows us to analyze the impact of other variables (price promotions, presence of brands in store flyers and discounts) on olive oil consumer choice behavior.

4. RESEARCH METHODOLOGY

4.1. Data and Choice Set

For the empirical analysis, we use choice panel data from the olive oil sector collected by scanner generated during 2002 in a hypermarket belonging to an international distribution group located in the southeast of Spain. We have employed .4° acidity olive oil packaged in 1-liter plastic bottles since this form of olive oil is the most popular with Spanish consumers. Table 1 summarizes the characteristics of the data and the variables used in this work.

TABLE 1. Database and Variables

	Database
Data	Scanner choice data
Product category	Olive oil (0.4° acidity, 1-liter bottle)
Store	Hypermarket from international distribution group
Period	1 year
Choice set	10 brands: 8 National brands (Carbonell, Coosur, La Masía, La Española, Elosúa, Giralda, Ybarra and Mueloliva) 2 Store brands (Private label and Premium Price brand)
Consumers	Only customers paying for purchases with store's loyalty card
Size	389 individuals making a total of 3,241 purchases (8.33 purchase occasions/individual)
	Variables
Purchase price	Weekly purchase price (€) per brand ($price_{jt}$)
Store flyer	Dummy variable equal to 1 if brand j is featured in store flyer in t ($flyer_{jt}$), 0 otherwise
Loyalty	Dummy variable equal to 1 if consumer i chooses same brand j in t as in $t-1$ ($loyalty_{ijt}$), 0 otherwise
Price promotion	Dummy variable equal to 1 if brand j is promoted on price in t ($promotion_{jt}$), 0 otherwise
Discount	Percentage (expressed between 0–1) of discount per brand, calculated as difference between price (in promotion) of each brand in t and price in previous week when no promotion was in place, divided by that un-promoted price

The choice set comprises the 10 brands sold in the establishment at the time of analysis, followed by their market share: Carbonell (26.67%), Private label (PL) (22.38%), Coosur (16.34%), La Masía (11.87%), La Española (9.83%), Elosúa (4.01%), Giralda (3.87%), Ybarra (2.45%), Premium Price brand (PPB; 2.17%), and Mueloliva (0.41%). Only those customers paying for their purchases with the store's loyalty card are considered.

The consumer panel has a 53-week period and two subperiods, as follows: a first initialization period that we used to calculate an aggregation variable capturing the consumers' behavior over time (historic loyalty) and a calibration period that we used to estimate the model parameters. The initialization period ran from week 1 to week 20 (following other research works using an initialization period of approximately 40% of the total period, e.g., Guadagni & Little, 1983), while the calibration period ran from week 21 to week 53. Having carried out this division and following Sivakumar and Raj (1997), we considered only those individuals making at least two purchases in each of the two subperiods. Thus, the definitive scanner data set consists of 389 individuals making a total of 3,241 purchases[1] (8.33 purchase occasions/individual).

[1]This refers to the occasions when individuals go to the hypermarket and choose one of the ten brands under analysis, not the number of units acquired. However, in the software used to estimate the model we also take into account the number of units purchased in each purchase occasion.

4.2. Explanatory Variables

We considered two types of explanatory variable of the consumer's choice for each brand and in the unit of time defined (week): (a) marketing variables concerning the brands and (b) a loyalty variable referring to the consumer. Table 2 shows the values taken by the variables object of analysis for each of the brands from the choice set.

The first group of variables includes purchase price, existence of price promotion, relative (percentage) discount size, and presence in store flyers. In addition, the customers are assigned a binary index of their brand loyalty, demonstrated in successive purchase actions in the periods analyzed (previous loyalty). This is measured by a dummy variable taking value of 1 if the customer chooses the same brand in period t as in period $t-1$, and 0 otherwise. This approach of incorporating the individual's previous choice experience has been adopted in many works analyzing brand choice (e.g., Chintagunta & Prasad, 1998). In a previous work to this, as well as estimating this previous loyalty variable, the initialization period was used to incorporate the heterogeneity of the individuals' preferences through a historic loyalty variable. But, in the model, following principles of parsimony, we opted to include only the individuals' previous loyalty[2] because this had the most significant effect in the estimation of their choice behavior and improved the explanation of consumer choice behavior.[3]

The existence of a price promotion of a brand during a specific week is captured by observing the price levels of the 10 brands selected and assuming that a significant decrease in the price of a brand for a limited period (one or two weeks) must correspond to a promotion. Using one variable for the regular price and another for the price promotion is the best way of handling this promotional variable, as Mulhern and Leone (1990) indicate. In this respect, to analyze brands' relative promotional discount size (in those weeks in which a price promotion was actually in place), we calculated the difference between the price (in promotion) of each brand that week and the price from the previous week when no price promotion was in place, and divided this by the price from that previous week. When a brand is not being promoted this variable equals zero, as both prices coincide.

To analyze the brands' presence in store flyers, we used a dummy variable taking value 1 if the brand in question is present in the store's flyers for a particular week, and 0 otherwise. Treating promotional variables as dichotomous variables is one of the most commonly used procedures in the promotional marketing literature (Blattberg & Neslin, 1990), being used both for promotions based on price and for other types of promotion, such as promotional advertising (e.g., Kannan & Yim, 2001).

Finally, to determine the extent to which a brand's presence in store flyers strengthens the effect of price promotions on consumers' choice behavior and the extent to which a brand's price promotion strengthens the effect of its presence in

[2]The long term measure of loyalty incorporates heterogeneity in the model through the initialization period. The measure of short term consumer loyalty is an explanatory variable in the model that accounts for the immediate loyalty. However, it does not suppose to leave out any individuals from consumer panel, since all have been considered in both loyalty variables.

[3]The results are available from the authors on request.

TABLE 2. Descriptive Statistics of Explanatory Variables

	Carbonell	PL	Coosur	Masía	Española	Elosúa	Giralda	Ybarra	PPB	Mueloliva
Purchase price (price) (€)										
Mean	2.69	2.04	2.34	2.42	2.4	2.35	2.26	2.44	2.09	2.55
Maximum	2.69	2.1	2.39	2.49	2.45	2.35	2.59	2.45	2.09	2.55
Minimum	2.67	1.99	2.29	2.37	2.08	2.35	1.95	1.75	2.09	2.45
S.D.	0.0006	0.023	0.03	0.051	0.031	0	0.32	0.036	0	0.02
Price promotion (promotion)										
Mean	0.0016	0.071	0.012	0.12	0.05	0	0.044	0.05	0	0
Maximum	1	1	1	1	1	0	1	1	0	0
Minimum	0	0	0	0	0	0	0	0	0	0
S.D.	0.04	0.26	0.11	0.32	0.22	0	0.2	0.21	0	0
Promotional discount (discount)										
Mean	0.0008	0.2	0.02	0.27	0.13	0	0.42	0.17	0	0
Maximum	0.74	3.86	2.09	4.82	2.86	0	19.3	28.6	0	0
Minimum	0	0	0	0	0	0	0	0	0	0
S.D.	0.02	0.79	0.23	1	0.59	0	2.24	1.28	0	0
Presence in flyer (flyer)										
Mean	0.37	0.33	0.06	0.19	0.19	0	0	0.07	0	0
Maximum	1	1	1	1	1	0	0	1	0	0
Minimum	0	0	0	0	0	0	0	0	0	0
S.D.	0.48	0.47	0.24	0.39	0.39	0	0	0.26	0	0
Loyalty (loyalty)										
Mean	0.29	0.19	0.15	0.02	0.035	0.016	0.009	0.01	0.002	0
Maximum	1	1	1	1	1	1	1	1	1	0
Minimum	0	0	0	0	0	0	0	0	0	0
S.D.	0.45	0.39	0.36	0.14	0.18	0.12	0.09	0.12	0.05	0

store flyers on consumers' choice behavior, we propose an interactive variable between the flyer variable and the price promotion.

4.3. Empirical Model

For the empirical analysis, MNLs are employed. Consumer choice models, and specifically logit models, have economic and behavioral theoretical foundations that make them especially useful for analyzing aspects such as consumer choice behavior and market structure. (See McFadden, 1977, and Anderson, De Palma, & Thies, 1992 for more details.) Thus, the basic model we use is as follows:

$$U_{itj} = \beta_{0j} + \beta_{1j}\text{Price}_{tj} + \beta_2\text{Promotion}_{tj} + \beta_3\text{Discount}_{tj} + \beta_4\text{Flyer}_{tj} + \beta_5\text{Loyalty}_{itj} + \beta_6\text{Promotion}_{tj} \times \text{Flyer}_{tj} + \epsilon_{itj} \quad (1)$$

where U_{itj} represents the utility of brand j (from a set of M alternatives/brands) for consumer i in period t.

From Equation 1, individual i's probability of choosing brand j in period t (L_{itj}) is expressed as follows:

$$L_{itj} = \frac{\exp(U_{itj})}{\sum_{m \in M_{it}} \exp(U_{itm})} \quad (2)$$

Following Greene (1993), the absence of multicollinearity problems is verified. VIF values and the Conditional Index were estimated. Both variance inflation factor (VIF; 2.191 [purchase price], 2.074 [flyer], 1.783 [promotion], 1.639 [discount] and 1.016 [loyalty]) and conditional index values for each dimension[4] were found to be below harmful levels (Mason & Perreault, 1991). The interactive term ($\text{promotion}_{tj} \times \text{flyer}_{tj}$)[5] was formed by multiplying the centered predictors to avoid multicollinearity (Aiken & West, 1991).

The value of the Goldfeld-Quandt (GQ) statistic is 1.093, so that at a significance level of 99% (for an F distribution with 139 [145–6] d.f. both in the numerator and denominator) we can reject the possible existence of heteroscedasticity problems for price variable.[6]

To analyze the change in consumer choice probability with respect to a unit change in the brands' marketing variables, marginal effects are estimated. The marginal effects, which are partial derivatives of probabilities with respect to the set of characteristics, are calculated from multinomial logit results following the equation below:

$$\frac{\partial L_j}{\partial X_k} = L_j\left(\beta_j + \beta_h X_h - \sum_m \beta_m L_m\right) \quad (3)$$

where L_j represents the probability that brand j is chosen, m is the number of brands, k denotes brand attributes (price, price promotion, presence in store flyer, discount), X refers to the value of each brand attribute, β refers to the parameters of each brand

[4]The results are available from the authors on request.

[5]This variable was built in order to analyze the existence of a synergistic effect between both promotional techniques.

[6]Of the 389 observations, we eliminated 99 central observations, estimating model [1] for each of the resulting two groups of 145 observations.

attribute and β_h is an interaction coefficient (price promotion × presence in store flyer). Equation 3 shows the effect of a (percentage) change in the independent variable on the probability (percentage change) of a brand being chosen (e.g., a value of 0.5 related to brand j means that a 10% change in this brand's attribute, e.g., price, produces a 5% change in the probability that brand j is chosen).

One of the main aspects influencing brand performance is pricing because its consequences on sales can be immediately estimated and because pricing has the potential to provoke strong reactions from consumers and competitors (Srinavasan, Popkowski, & Bass, 2000). Throughout the literature (see, for example, Cooper & Nakanishi, 1988), the analysis of brand competitiveness in a market has been frequently based on own and cross price elasticities represented in a price response matrix, $R(j,m)$:

$$\begin{pmatrix} \zeta_{jj} & \cdots & \zeta_{jm} \\ \cdot & \cdot & \cdot\cdot \\ \zeta_{mj} & \cdots & \zeta_{mm} \end{pmatrix} \tag{4}$$

where $\zeta_{jm} = \frac{\partial L_j}{\partial \mathrm{Price}_m}$ is the partial derivative of brand j's probability of being chosen (L_j) with respect to brand m's price.[7]

Cooper and Nakanishi (1988) suggest measures of the attraction power and competitive position of each brand taken from the price elasticities matrix. The *attraction power* is measured by a brand's capacity to gain market share with changes in its price when the rest of the brands' prices remain constant, i.e., the diagonal elements of the price response matrix, which have a negative sign $-\zeta_{jj}$.

5. EMPIRICAL RESULTS

5.1. Sale Price: Sensitivity Toward Price and Price Promotions in the Spanish Olive Oil Market Structure

Table 3 shows the result of the estimation of basic model (Equation 1), the power of prediction, and the goodness-of-fit criteria.

The price-specific MNL model shows the existence of heterogeneity in consumer price sensitivity toward the brands comprising the choice set. Lower consumer price sensitivity is detected in the national brands of the category. The lowest specific purchase price coefficient is obtained in Carbonell, and the highest in Premium Price brand. Private Label also has a high specific purchase price coefficient (7.202). This finding is consistent with the marketing literature whereby the main appeal of store brands is their low price, and so these brands are competing on price and focusing their marketing strategy on price-sensitive shoppers (e.g., Hoch, 1996; Sivakumar, 1996). Table 3 shows the fitness and predictive value for the MNL model. A high value of ρ^2 can be observed (0.6548), indicating that the model explains around 65% of consumer choice behavior.

Each brand's price parameter is negative and significant, showing the negative effect of price on olive oil consumer choice probability and *supporting H1a*. This

[7]Following Mela, Gupta, and Jedidi (1998), we use marginal effects instead of elasticities because differences in cross-elasticities can result from differences in market shares and prices rather than responsiveness.

TABLE 3. Estimated Parameters of Basic Model With Specific Price Parameters

Olive-oil brands	Preference towards each alternative (σ)
Carbonell (NB)	4.87* (0.865)
PL (SB)	0.671* (0.234)
Coosur (NB)	2.621* (0.764)
La Masía (NB)	1.989* (0.719)
La Española (NB)	2.498* (0.579)
Elosúa (NB)	−1.667** (0.91)
Giralda (NB)	0.132 (0.436)
Ybarra (NB)	1.813** (.931)
PPB (SB)	−0.742 (0.714)
Mueloliva (NB)	–
Explanatory variables specific parameters (σ)	
Purchase price	–
Carbonell	−5.522* (0.671)
PL	−7.202* (0.883)
Coosur	−6.092* (0.775)
La Masía	−6.415*(0.752)
La Española	−6.204* (0.755)
Elosúa	−6.53* (0.771)
Giralda	−7.446* (0.926)
Ybarra	−6.506* (0.749)
PPB	−7.712* (0.869)
Mueloliva	−7.16* (0.736)
Price promotion	−0.404*** (0.21)
Discount	−0.766 (0.627)
Store flyer	0.671* (0.082)
Previous loyalty	1.705* (0.236)
Price promotion × Store flyer	0.859* (0.325)
Goodness-of-fit evaluation criteria	
Number of parameters	21
LL (β)	−2300.952
χ^2	8851.536
Adj. ρ^2	0.6548
AIC	4643.904
BIC	4759.473

NB, national brand; SB, store brand. *$p<0.01$ **$p<0.05$ ***$p<0.1$.

finding is consistent with agricultural literature (e.g., Siskos, Matsatsinis, & Baourakis, 2001).

Using brand-specific price parameters, we can estimate the own and cross price matrix (Table 4).

The diagonal elements in Table 4 show that Coosur, PL, and Carbonell (in that order) have the highest attraction power in the market analyzed, approximately three times higher than other national brands, e.g., La Masía, Elosúa, or Giralda. Table 4 confirms the existence of asymmetric competition in the Spanish olive oil market.

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TABLE 4. Own and Cross Price Elasticity Matrix

	Carbonell	PL	Coosur	Masía	Española	Elosúa	Giralda	Ybarra	PPB	Mueloliva	Vulnerability
Carbonell	−23.589	7.131	6.883	2.362	4.039	2.437	2.585	1.523	1.232	0.131	136.595
PL	5.648	−31.315	7.059	2.388	4.144	2.609	2.449	1.592	1.287	0.136	121.618
Coosur	6.239	8.345	−31.758	3.496	5.563	3.109	3.284	2.088	1.692	0.18	179.439
Masía	2.033	2.681	3.32	−13.56	1.825	1.066	1.315	0.72	0.578	0.062	29.396
Española	3.595	4.811	5.463	1.887	−21.32	1.806	2.3	1.294	0.984	0.105	80.680
Elosúa	2.061	2.878	2.901	1.047	1.716	−13.12	1.086	0.651	0.514	0.055	26.858
Giralda	1.917	2.369	2.687	1.133	1.916	0.952	−14.459	0.777	0.511	0.055	23.236
Ybarra	1.293	1.762	1.955	0.71	1.234	0.653	0.89	−8.979	0.355	0.038	11.971
PPB	0.882	1.202	1.337	0.481	0.791	0.435	0.494	0.3	−7.181	0.025	5.391
Mueloliva	0.101	0.137	0.153	0.055	0.091	0.05	0.057	0.035	0.027	−0.787	0.071
Clout	98.265	169.28	159.341	30.183	76.536	28.334	32.702	12.525	7.991	0.091	

Entries to be read as % change in probability of row brand being chosen with % change in price of column brand.

Asymmetry in competition proceeds from the assumption that the own and cross price response matrix is not symmetric, as Blattberg and Wisniewski (1989) suggest.

This asymmetry consequently means that a price promotion by a brand affects the market share of a rival more than the reverse ($\zeta_{mj} \neq \zeta_{jm}$). The differential performance of brands is a fundamental characteristic of their market power (Kamakura & Russell, 1989). Bannock, Baxter, and Davis (1992) define market power as "the degree to which a firm exercises influence over the price and output of a market" (p. 724).

The existence of asymmetric competition implies that the *competition in destination* (how the price movements of the manager brand affect the demand of competitors) will differ from the *competition in origin* (how the other brands' price changes affect the demand of the manager brand). Analysis of competition in destination has usually been synthesized by the *competitive clout index*[8] ($\sum \xi^2_{mj}$, $\forall m \neq j$) suggested by Kamakura and Russell (1989) or Cooper (1988) and applied here to cross price responses. In the case of substitutive brands, because ξ^2_{mj} measures the ability of the manager brand (j) to take share away from brand m, the competitive clout index measures the manager brand's ability to take share away from all competitors. Table 4 reports this index.

PL has the highest competitive clout, almost double that of Carbonell (largest-market-share brand), and five or more times higher than the others. As Table 4 shows, brands with a larger market share (Carbonell, PL, and Coosur) have a higher competitive clout too. Pearson's correlation coefficient (0.835; $p < 0.01$) confirms the direct relation between market share and price marginal effect, so a larger market share leads to a higher price elasticity and therefore higher attraction power. The vulnerability index ($\sum \xi^2_{jm}$, $\forall m \neq j$) measures the manager brand's vulnerability to competitors.

The price changes of a brand with considerable competitive clout have a major impact on competitors' market shares. Conversely, a brand with a high vulnerability score will face relatively large changes in share when competitors change their prices (Kamakura & Russell, 1989). Because competitive clout and vulnerability are complementary concepts, the strongest (weakest) brands in the market would be expected to have high (low) competitive clout and low (high) vulnerability. We can use both the competitive clout index and the vulnerability index to obtain a competitive map of the Spanish olive oil market (Fig. 3). In Figure 3 the size of each circle is proportional to the brand's market share.

As Figure 3 suggests, three brand groups are obtained: (a) three largest market share brands (Carbonell, PL, and Coosur), possessing both higher clout and vulnerability values,[9] even though PL has the highest competitive clout despite having a market share 4% lower than Carbonell; (b) a second group, competing in a different market than group 1, includes other national brands and PPB; and (c) La Española brand, in an intermediate position (in terms of both clout and vulnerability values) between groups 1 and 2.

[8]We use the squares of the cross effects since these effects can have either a positive (substitute brands) or negative (complementary brands) value. In either case the price of the manager brand has an effect on the choice of brand m, so the sum of the squares of these cross effects allows us to determine the total influence of the manager brand.

[9]These three brands possess more than 65% of total market share.

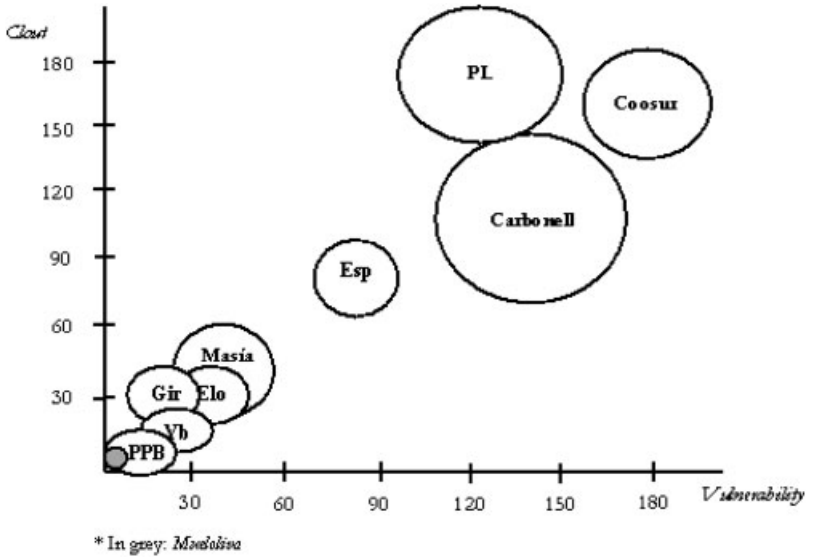

Figure 3 Competitive Clout Index Versus Vulnerability Index.

The value of the parameter β_2 indicates the effect of carrying out price promotions on the consumers' choice probability. As Table 3 shows, β_2 (-0.404) is significant ($p<0.1$), which leads us to *reject H1b*. We found this result to be very interesting because the effect of carrying out price promotions on the olive oil brand's choice probability is clearly negative. The negative result of the coefficient of price promotion (β_2) is hardly surprising because the measure of promotion used may have the so-called "promotion usage effect" implicit within it (Blattberg & Neslin, 1990). The "promotion usage effect" refers to the negative effect that can arise from using price promotions. Many authors (e.g., Hendel & Nevo, 2005) support this effect. It may be particularly intense in brands carrying out price cuts both very frequently and for long periods (more than three weeks). In our scanner database, the average promotion period is 3.5 weeks, although some brands have longer promotional periods (e.g., la Masía and Coosur, promoted for 4 weeks, and even PL, promoted for 6 weeks), which are repeated frequently.

An alternative explanation for the promotion usage effect is that price promotions may weaken the consumer's perception of the brand's quality as an effect of a negative inference about the (lower) quality of the brand, as several authors suggest (e.g., Mela, Gupta, & Jedidi, 1998). According to Jedidi, Mela, and Gupta (1999), this situation can lead to a "very negative" price promotion result in markets where brand value is especially important (as is the case in the Spanish olive oil market, particularly for Spanish consumers). As Table 3 shows, consumers' preferences toward different brands are strong, damaging those brands that use price promotions.[10]

Finally, Della Bitta, and Monroe (1980) also find that a discount of at least 15% is needed to get a positive effect on consumer choice probability. Because this research finds average price discounts of 4.89%, the discount size variable parameter (see

[10]Only one price promotion is used by the brand with the highest intrinsic preference (*Carbonell*).

Table 3) is not significant, leading us to *reject H1c*. This finding supports many authors' opinion about a minimum discount level being required to obtain a positive effect on consumer choice probability.

5.2. Effect of Store Flyers on Olive Oil Choice Behavior

The effect of brands' presence in store flyers on the consumer's probability of choosing them is positive and significant (0.671; $p<0.01$), *supporting hypothesis 2a*. In other words, when a brand is advertised in a store's flyers, consumers are on average more likely to choose it. This finding is consistent with many authors (e.g., Ward, Briz, & de Felipe, 2003), manifesting the positive effect of using promotional advertising in the Spanish olive oil market. The result is a first indicator of the efficacy of including brands in store flyers and will serve as a reference to provide evidence of the joint impact of both price promotions and store flyers on consumers' choice probability.

Thus, the parameter β_6 is positive and significant (0.859; $p<0.01$), showing the synergies between these two promotional tools. Combining β_6 with β_2 and β_4, we can see how both promotional tools combine, and we can also see the overall synergistic effect.

For price promotion, the resulting coefficient (-0.404 ($p<0.1$)$+0.859$ ($p<0.01$) $= 0.455$) shows that the brand's presence in store flyers not only increases the effect of price promotions on consumer choice behavior but also changes its sign, making it positive. In the same way, the effect of the appearance of a particular brand in store flyers is higher when the brand is also promoted on price inside the store, as suggested by the combination of β_6 and β_2 (0.671 ($p<0.01$)$+0.859$ ($p<0.01$) $= 1.53$). Thus, *H2b and H2c are supported*. This result confirms that these two traditional promotional tools in retailing are complementary and shows the synergies between them.

These two results make an important contribution to the food marketing literature because no previous studies have looked at the relation or synergistic effect between flyer and price promotion use.

5.3. Effect of Customer Loyalty on Olive Oil Choice Behavior

As Table 3 shows, consumers have a significant loyalty behavior (1.705; $p<0.01$), *supporting H3*. However, our previous results indicate that consumers can be influenced by promotions (especially when brands are featured in store flyers); perhaps they are loyal consumers until other brands, mainly national brands, appear in the store flyers as preference values show (e.g., Carbonell [4.87; $p<0.01$], Coosur [2.621; $p<0.01$], La Española [2.498; $p<0.01$], La Masía [1.989; $p<0.01$] or Ybarra [1.813; $p<0.05$]), and also PL (0.671; $p<0.01$). Brands not appearing in store flyers (Elosúa, Giralda, and PPB) show either a negative preference (Elosúa [-1.667; $p<0.05$]) or a nonsignificant one (Giralda and PPB).

5.4. Marginal Effects and Impacts on Consumer Choice

Interpreting the results of multinomial logit models based on the coefficients alone must be approached with caution because the coefficients do not give a true measure of the change in the dependent variable with respect to a unit change in the independent variable (Greene, 1993). The marginal effects show the effect of a unit

TABLE 5. Marginal Effects of Brands' Marketing Variables

	Price[a]	Price promotion[a]	Store flyer	Discount[b]
Carbonell	23.589	0.5303	0.8920	0.0129
PL	31.315	0.5390	0.6870	0.0171
Coosur	31.758	0.6447	0.6415	0.0217
Masía	13.56	0.2633	0.5595	0.0240
Española	21.32	0.4250	0.4735	0.0277
Elosúa	13.12	0.2493	0.4297	0.0217
Giralda	14.459	0.2423	0.4185	0.0319
Ybarra	8.979	0.1690	0.3422	0.0199
PPB	7.181	0.1153	0.0367	0.0148
Mueloliva	0.787	0.0137	0.0365	0.0013
Average marginal effect[a]	16.607	0.319	0.452	0.019

[a]Absolute value.
[b]Nonsignificant.

change in the independent variable on the probability of a brand being chosen (Nganje, Kaitibie, & Taban, 2005). Table 5 shows the marginal effects of price (taken from Table 4), price promotions, brand presence in store flyers and percentage discount size.

As Table 5 shows, the variable with the greatest marginal effect is *price*. So, a unitary change in the price will lead to a significant change in the average probability of choosing a brand by 16.607. This result shows that, on average, price is the most determinant olive oil consumer choice criterion. As Cravens and Piercy (2003) suggest, the pricing of goods and services is a key strategic element for many firms that they can use to strengthen their market position.

The variable with the next greatest marginal effect is *brand presence in store flyer*. For instance, a unitary change in the independent variable (brand is advertised in store flyer) will significantly increase the probability of choosing Carbonell by 0.892. Similarly, positive marginal effects are observed for the rest of the brands. Hence, a brand's presence in a store flyer plays a major role in the probability an olive oil brand is chosen.

In contrast (and we were not surprised at this finding), unitary changes in price promotion result in a significant decrease in the probability that an olive oil brand is chosen as a consequence of the "promotion usage effect" previously analyzed. It should be noted that the Equation 1 does ignore the effect of price on discount variable, though both effects are considered.

Finally, the marginal effect of discount size is nonsignificant (like the discount parameter in Table 3). Results suggest that whatever the size of the discount, consumer choice will not be affected, because price promotion has a nonsignificant impact on consumer choice behavior.

The three largest-market-share brands (Carbonell, PL, and Coosur) have the strongest marginal effects as well. In contrast, another group of brands (Masía, Elosúa, Giralda, Ybarra, PPB, and Mueloliva) manifests lower marginal effects (see Figure 4). However, La Española (9.38% market share) shows stronger marginal effects than, for example, La Masía (11.87% market share). This finding is consistent with the previous market structure result (see Figure 3), which identified three groups of brands competing in the Spanish olive oil market.

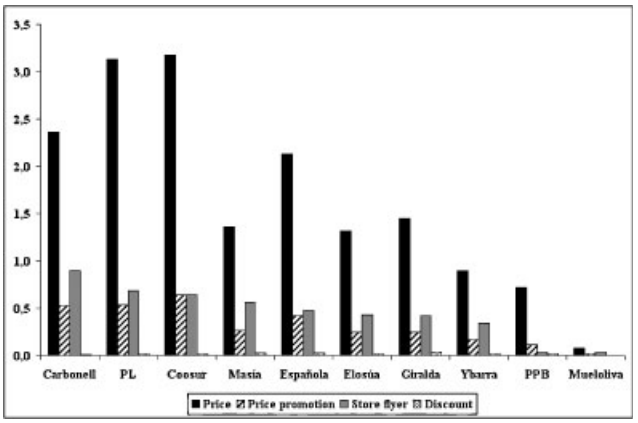

Figure 4 Marginal Effects Of Brands' Marketing Variables (Price Marginal Effect Divided By 10).

TABLE 6. Promotional Situations

	Average sales[a]	Minimum	Maximum	Average sales increase over a nonpromotional situation (%)
Nonpromotional situation	79	0	454	–
Promoted on price	179	0	312	126.58
Featured in store flyer	217	4	496	174.68
Promoted on price+ Featured in store flyer	138	18	267	74.68

[a]Number of bottles.

To confirm the results obtained in the analysis of marginal effects, we analyzed the sales of all the brands in each of the different promotional situations considered (Table 6).

Table 6 shows that when brands appear only in store flyers (not promoted on price), both average sales level (217 bottles) and maximum sales level (496) are the highest. We were surprised to learn that when brands are both promoted on price and featured in store flyers, both average sales level (138) and maximum sales level (267) are lower. Figure 5 depicts the average sales increase in each promotional situation over a nonpromotional situation.

As Figure 5 shows, when a brand is promoted on price and featured in store flyers, the increase in sales is "only" 74.68%, while when the brand is either promoted on price or featured in store flyers, the increase is higher (126.58% when promoted on price and 174.68% when featured in store flyers).

6. SUMMARY AND CONCLUSIONS

Each time consumers visit a store, they are faced with a decision about what brand to buy. The growing importance of olive oil in food habits makes consumers have a wider

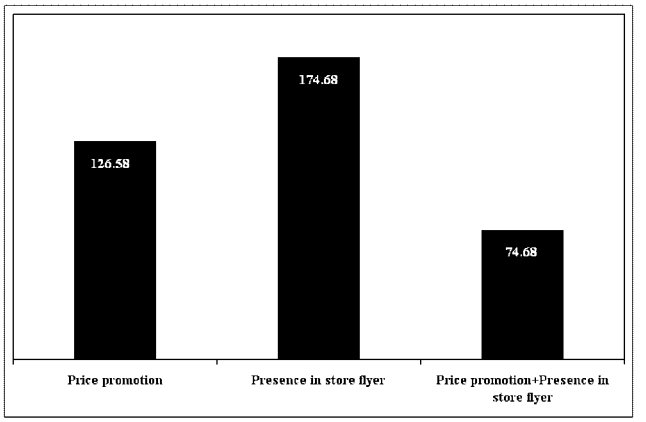

Figure 5 Average Sales Increase (%) Over a Nonpromotional Situation.

interest and knowledge of the brands. In addition, the choice set of olive oil brands is expanding, and key questions arise. Thus, brand managers are likely to be interested in knowing how different marketing-mix variables affect consumer choice behavior.

Our findings appear to support the idea that a traditional strong preference exists toward national brands present in the market for many years. For this reason, loyalty behaviors are very important in olive oil market, with promotions and price discounts having a less important role than they have for other frequently purchased consumer goods. Nevertheless, price is still one of the most influential variables in consumer choice as a consequence of the increase in olive oil's price and its limited production. Moreover, smaller companies or brands seeking added sales and market share can use price as a competitive tool. Indeed, competitive clout differences between brands have been predominantly conceptualized as arising from price changes by brands (Sivakumar, 2004). This is hindering the introduction of private labels, although stores are getting higher preference levels toward their brands through the use of other promotional tools such as store flyers, and all these actions are translating into important market shares. Nevertheless, a national brand, Carbonell, is the absolute market leader, which can be seen in the high consumer preference it holds, far superior to that of the remaining brands, and also a consequence of its largest market share. Generally, the higher the market share, the higher the clout index. But it is worth highlighting that some brands, even with smaller market shares, are able to gain some share from more powerful brands. This is related to the importance consumers give to aspects such as brand image or the traditional character of the brand. National brands such as Coosur (third in market share) and La Española (fifth) are more valued than Private Label, for example. Although PL has the second largest market share, it does not have a brand preference clearly defined by the consumer.

This marked consumer preference for the olive oil brands means that consumers behave very loyally, and it is difficult to get them to change brands even with price promotions. The results presented here show that reducing the sale price does not have a significant effect on the consumer's brand choice, regardless of the level of discount used. Consequently, the main national olive oil brands do not use this promotional tool very frequently because it could damage their image.

However, another of the promotional tools analyzed (brand presence in store flyers) does have a positive effect on the probability a brand will be chosen and can allow brands to gain customers from their rivals. The probability a brand is chosen increases by 0.451 on average when it is featured in store flyers. For this reason, we recommend featuring brands in store flyers because it is more effective than, for example, promoting on price (probably because consumers believe that all products appearing in flyers are also being promoted on price).

Finally, with regards to the limitations of this work, we should mention the limitations derived from the methodology employed. Although the validity of using multinomial logit models has been amply demonstrated, the methodology is not without its problems. Thus, the property of independence from irrelevant alternatives (IIA) and endogeneity—i.e., the possibility that correlation exists between the components of the deterministic part of the utility and its random component—may limit the validity of our estimations.

In addition, and as in similar studies using panel data, the analysis was conducted in only one single hypermarket located in the south of Spain. Olive oil consumer behavior is very similar all over Spain, but validation of these results is recommended in other Spanish regions because in many of them (e.g., Galicia or the Basque Country) olive oil consumption is lower than in the southern regions.

Because we had to build the consumer panel data, we selected only customers using the loyalty card. Thus, consumers not using the loyalty card (e.g., paying in cash) were not considered, meaning that some sample selection bias could exist.

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