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Price structure of extra virgin olive oil: a hedonic approach

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PRICE STRUCTURE OF EXTRA VIRGIN OLIVE OIL: A HEDONIC APPROACH

Abstract

Analyzing consumer preferences about Extra Virgin Olive Oil (EVOO) and its characteristics is an important issue to improve consumption. The hedonic prices approach is a revealed preferences method that allows us to disaggregate EVOO market price into the implicit prices of its attributes. We found that 9 out 21 attributes are statistically significant over the price structure, some of which have lesser impact than expected whereas others have an opposite sign.

Keywords: extra virgin olive oil, attributes, hedonic prices

1. Introduction

Extra Virgin Olive Oil (EVOO) is a high quality product, with multiple attributes and a potential differentiation capacity. Nevertheless, EVOO consumption in households is still a small percentage of the overall consumption of olive oil and, even in traditional producer countries, there is a lack of knowledge about EVOO among consumers (Torres et al., 2012). This fact complicates to distinguish between product qualities, so EVOO value may be underestimate. The aim of this study is identify which EVOO attributes impact over its price. Moreover, results show that important characteristics of EVOO have not a high price impact, therefore it would be necessary to insist on consumers' knowledge about them.

2. Methods

The hedonic price approach, developed by Rosen (1974) within the framework of revealed preferences, assumes that consumer's utility is maximized through the characteristics of the product and the services they provide. In the EVOO case, these services are related to the quality of life, the product acquisition costs, the purchase uncertainly and the image of the product (Stanley and Tschirhart, 1991). Studies of Karipidis et al. (2005), Santos and Ribeiro (2005) and Romo et al. (2013) use a hedonic approach to analyze the EVOO market price-formation in Greece, Portugal and Chile, respectively.

The database for the statistical analysis has been obtained from products available at the six main supermarkets chains in Cordoba (Spain), city that is located in the second highest olive oil production area of Spain. The sample contains 146 observations, with a maximum price of 7 €/l, and a log-lineal functional form has been used to obtain the hedonic prices model. Table 1 shows the attributes found in the sample, but "organic", "integrated production" and "best before date" were not included in the model due to low data variability.

Table 1. EVOO attributes

Provided service	Cluster	Attributes[a]	Expected sign
Quality of life	Production and processing	Organic	+
		Integrated Production	+
		Cold extraction	+
	Intrinsic attributes	Taste	+
		Colour	+
		Acidity	+
Acquisition cost	Distribution features	Hypermarket	-
		Private brand	-
		Leader brand	+
		Cooperative brand	-
Purchase uncertainty	Origin	Region of origin	+
		Product of Spain	+
		Product of Andalusia	+
		PDO	+
	Additional information	Variety	+
		Nutritional information	+
		Best before date	+
		Conservation	+
		Specific uses	+
Product image	Packaging	Size	-
		Glass bottle	+
		Plastic bottle	-
		Non traditional bottle	+

[a] Dummy variables (1 = have; 0 = have not), except size (litres)

3. Results

The results show that nine attributes are statistically significant (adjusted R^2 value above 0.74). There are no problems of heteroskedasticity or collinearity, although the residuals do not follow a normal distribution. Nevertheless, based on the central limit theorem, the sample size (above 100 cases) makes this assumption less restrictive (Wooldridge, 2009, p.172). The attributes that have the major positive impact on EVOO, therefore increasing its price, are:

- **Glass bottle (8.06%)**: it increases product costs, comparing to plastic ones, and it is associated to a higher quality product by consumers.
- **Acidity (8.06%)**: it is important to remember that a cause and effect relationship between quality and acidity has not been established, despite consumers' opinion. Therefore, the current regulation about EVOO marketing standards establishes that, in case of including the maximum degree of acidity, it is compulsory to indicate other parameters too, in the same visual field, such as peroxides value, the wax content and the ultraviolet adsorption. Thus, adding all this information to the label can increase the final price.
- **PDO (5.28%)**: this certification grants a higher quality as well as the recognition that the product has a commitment to tradition and territory.

- **Hypermarket (3.72%)**: although these establishments can reduce product prices via economies of scale, they also offer a wide range of products and prices.

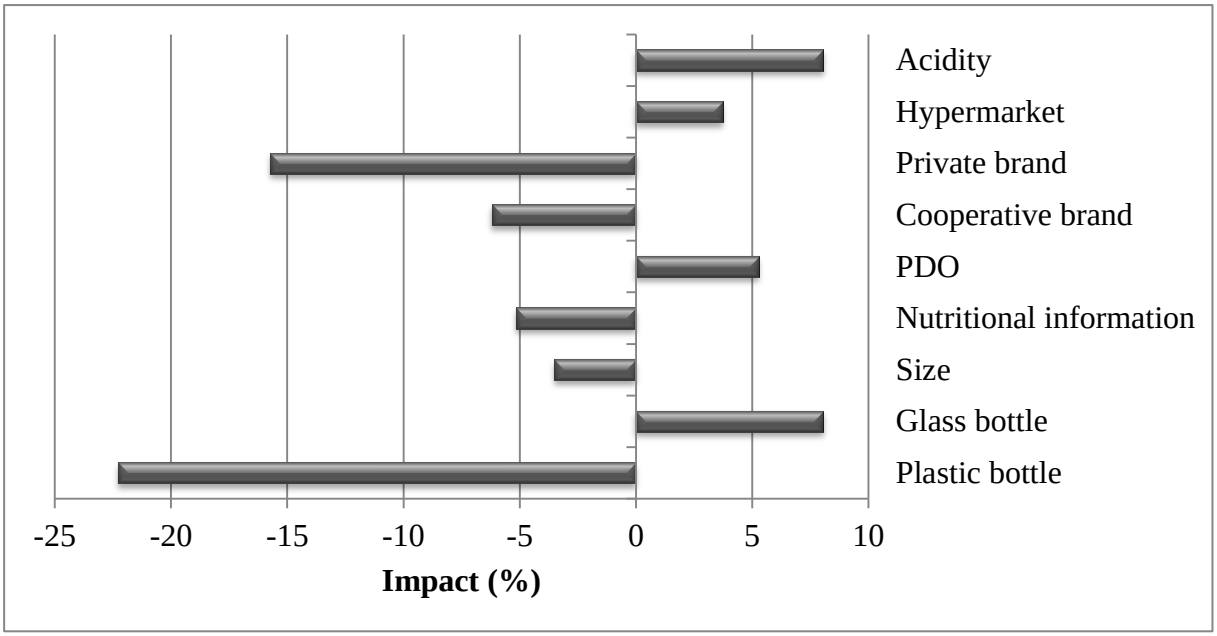

Figure 1. Impact over EVOO price

Considering the attributes that have a negative impact on price:

- **Plastic bottle (-22.28%)**: this material entails lower production costs and it is possible to make larger packages of EVOO, reducing product price per liter. Moreover, consumers may associate it with a lower quality product, compare with other packages.
- **Private brands (-15.72%) and Cooperative brands (-6.20%)**: because of economies of scale and the integration of many stages of the production process.
- **Nutritional information (-5.16%)**: its sign is opposite to the expected one. The nutritional information that appears in EVOO labels is very important to recognize its healthy composition, compared with other vegetable oils. Including some new information, e.g. the content of polyphenols, may invert the sign of this attribute.
- **Size (-3.5%)**: it is the least important attribute. Larger packages involve cheaper prices per liter, but not many brands present their product packaged on a bottle bigger than a liter.

4. Conclusions

The EVOO price structure has been estimated in relation with the product attributes based on the data collected at the main six supermarkets chains. This information can be useful to consumers to find out differences between products and make, accordingly, more aware choices. Nevertheless, this comparison is only possible if consumers are able to recognize all these attributes.

This study presents two main limitations. First, the hedonic prices methodology assumes a perfect competence situation, so implicit prices represent consumers' willingness to pay for each attribute. Although EVOO market is characterized for many producers and consumers and no barriers, there are some big producers that can play an important role applying oligopolistic practices. Second, the sample does not represent real purchases, like scanner data

does, and the obtained result can't be applied to EVOO markets in other cities, e.g. big urban cities that are far from production areas.

Finally, there are attributes that apparently are not statistically significant or their impact is lower than expected. More research is needed on EVOO and its characteristics from the consumer's point of view to increase the value of some attributes. For this purpose, the combination of the method with methods based on stated preferences mightovercome these limitations increasing as well the explanatory power of the model (Earnhart, 2002).

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