Consumers' perceptions about food quality attributes and their incidence in Argentinean organic choices

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Abstract

There is an increasing consumers' concern for food safety and quality and, at the same time, there has been a significant market increment in differentiated or high value products consumption, including organic products. The lack of empirical research in Argentina regarding consumers' awareness of food safety brought our attention. Therefore, **the objective of this paper is to analyse consumers' perceptions about the risk and quality attributes of food consumption; and to evaluate the incidence of these factors when buying organic products in Argentina**.

 The Lancaster model (1966) provided the theoretical basis for the use of products attributes and characteristics to analyse the incidence of these attributes in consumers' choices. The data used in this study derives from a food consumption survey on organic and non-organic consumers conducted in Buenos Aires City, Argentina, in April 2005.

According to consumers' perceptions, 67% were worried about their health, 79% take care in meals, 57% perceived the high risk of hormones and pesticides in food content and 91% of consumers are used to reading labels before or during their purchase.

A Logit Binomial Regression Model was applied to explore which factors affected organic food consumption. The results yielded by this model suggest that the consumers with higher educational level, who eat healthy food, and consider food control organisms 'inefficient' are more likely to buy organic products.

A high percentage of consumers read and trust label information in Argentina. This has interesting policy implications to promote differentiated and high value products, and to reduce information asymmetries.

JEL: Q18, D1 - Keywords: Food safety; Quality attributes; Consumers; Organics

1. Introduction

Globalisation, growing incomes, fluctuating relative prices, urbanisation and migration are leading consumption behaviour to high value agricultural products in many developed and developing countries. These factors require changes both in food technology and food distribution systems.

There is an increasing consumers' concern for food safety and quality and, at the same time, there has been a significant market increment in differentiated or high value products consumption, including organic products. The goal of food consumption is not only body nourishment but also heath improvement over lifetime. If the food available is not safe or its consumption does not enhance health, it does not contribute to food security. In this sense Kinsey (2003) concluded: *"food safety does not jeopardise food security; both act together to enhance human health"*.

Quality uncertainty has played a key role in literature about safety and products liability. From all the articles dealing with quality and uncertainty, the most relevant is that by Akerlof (1970), which demonstrates that, although suppliers can determine quality, by incurring greater costs, consumers cannot test quality before purchase, and then bad goods tend to drive out good ones. Consumers will purchase products depending on their perceived quality expectations. The attributes of quality-nutritional content, i.e.; safety attributes of food; convenience; place and manner of product production, including environmental production processes are all valued according to the consumers' subjective perception.

Some consumers look for food safety and are willing to pay higher prices for "healthy or nutritive products", since they increase their utility level reducing health risks. However, consumers are unable to ascertain food safety before purchase, being this the most important constraint to economic efficiency in the production and marketing of food safety. *"The information problem faced by consumers undercuts economic incentives for producers to*

produce a safer product. Less safe food drives out safer food, and the government intervenes in the market to guarantee an acceptable level of food safety" (Weiss, 1995).

The lack of empirical research in Argentina regarding consumers' awareness of food safety brought our attention. Therefore, **the objective of this paper is to analyse consumers' perceptions about the risk and quality attributes of food consumption; and to evaluate the incidence of these factors when buying organic products in Argentina**.

In spite of the fact that the inclusion of "safe products", such as organic products, in the food consumption budget, is still small, they are considered a market niche with a great potential growth. This is due to the persistent interest in organic or ecological products during the last decade both in industrialized countries and in the domestic markets of developing countries[1].

2. Theoretical framework and methodology

The increasing awareness of consumers of food security is related to some potential risks associated to food production and processing technologies (Henson, 1996). Information is usually considered a public good and, consequently, it is undersupplied to the market (Henson and Traill, 1993). Consumers' trust in private and public institutions responsible of supplying information about food quality as well as their reliance on different stores and distribution channels are affecting their consciousness and perception of safety procedures in the agrifood systems.

Along the concept of food quality developed by Caswell (2001), the quality attributes of food products can be analysed in three different dimensions: a) Intrinsic/extrinsic; b) Information environment and c) Vertically/horizontally differentiated.

The consumers' perceived quality is influenced by expected quality, intrinsic experience and intrinsic credence attributes. Examples of intrinsic quality attributes are: food safety assessed by pesticide residues present, nutrition, taste, tenderness, colour, compositional integrity,

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[1] Argentina boasts a national organic law that has turned it into the first Third World Country to have a national regulation adapted to the European Union (1992) requirements. In 2001, the Programa Nacional de Producción Orgánica ((PRONAO) to encourage domestic and foreign markets was created but it has not been fully implemented yet.

organic and GMOs use. Certification, labelling and quality management systems are extrinsic quality indicators; and price, brand name, store name, advertising and packaging are the cues. The relative importance of the factors influencing organic food purchase varies from country to country, and it has been documented by several authors.

Some studies have found pesticide residues in food to be more important than environmental issues when it comes to buying organic food products. Even though this factor is more important in some countries like Germany (Vogtmann, 1988), it is not considered that relevant for organic consumers in Argentina (Rodríguez *et al.*, 2003).

Govindasamy and Italia (1999) reported that higher income earners and younger people were more willing to purchase integrated pest management produce than lower income earners and older people. In a Californian study (Jolly, 1991), organic food buyers were found to be older than non-buyers.

Wandel and Bugge (1997), found that interest in organic food in Norway was not related to income, occupation, age, or presence of children in the household; and Goldman and Clancy (1991) found that income and age were not relevant factors in the distinction between organic food buyers and non-buyers in America.

Wier and Calverley (2002) reported that, in general, Danish consumers are acquainted with organic products and trust labelling and certification programs, somehow explaining the highest *per capita* consumption figures recorded if compared to those in other European countries.

The Lancaster model (1966) provided the theoretical basis for the use of products attributes and characteristics to analyse the incidence of these attributes in consumers' choices. A more recent research by Eom (1994) derived an expected indirect utility function dependent on income, prices, risk perceptions and socio-demographic characteristics.

3. Survey design and data

The data used in this study derives from a food consumption survey on organic and non-organic consumers conducted in Buenos Aires City, Argentina, in April 2005. The 300-consumer sample was based on age and gender local distribution pursuant to the last National Population Census in Argentina (INDEC, 2001), for respondents aged 18 or above with a medium-high socio-economic level[2].

The questionnaire contained both close- and open-ended questions. A total of 261 completed responses were finally included in the data set of this study.

The survey was carried out in the largest supermarket chains and in an important specialised organic store[3]. The respondents were surveyed upon leaving the stores. In this type of convenience samples, the probability of being selected is unknown. But with a theory-based model, using relatively balanced explanatory variables, such as in this study, this type of samples could be used to obtain model-based inferences. The selection of this sampling method results from the difficulty to spot the target population (Organic food consumers) (Brewer, 1999; Chow, 2002; Schonlau *et al.*, 2002).

The representativeness of the sample in terms of demographic structure of Buenos Aires city population (gender and age) is given in Tables 1-A and 1-B:

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[2] As it is defined by the Argentinean Marketing Association (AAM). Web site: http://www.aam-ar.com
[3] Supermarket chains: Coto, Disco, Jumbo, Norte and Wall Mart. Specialised organic store: La Esquina de las Flores.

Table 1-A: Comparison between survey sample and Population Census in Buenos Aires City
(18 years or above)

Demographic characteristics	Categories	Relative frequency	
		Representation in the survey sample	Representation in Buenos Aires City
Respondent's GENDER	Male	29%	44%
	Female	71%	56%
Respondent's AGE (in years)	18-24	16%	14%
	25-34	18%	20%
	35- 49	25%	24%
	50-59	15%	15%
	60 or above	26%	28%

Note: Sample size: 261

Table 1-B: Proportion of Buenos Aires City Population in relation to Argentinean Population
(18 years old or above)

POPULATION	Buenos Aires City	Argentina	
	2,205,191	24,090,463	9%

Source: Consumption survey, Buenos Aires City/2005 and Population Census in Argentina (INDEC/2001).

The survey sample yields a higher female proportion as may be expected since grocery shopping is mostly a female activity (Baker, 1999; Chen *et al.*, 2002).

3. Results

Some of the attributes included in this study were selected from discussions with consumer focus groups about important issues related to unsafe productive process, labels, certification and the role government plays in food system regulation taken from a previous research (Rodríguez and Lacaze, 2005[4]) and other authors (Govindasamy and Italia, 1999; Kuchler, 2000).

3.1. Consumers' perception about food quality attributes

According to perceptions, 67% of the 261 respondents were worried about their health, 79% take care in meals, 57% perceived the high risk of hormones and pesticides in food content. Food nutritional content as a quality attribute was mentioned by a 56%. A relative high percentage (64%) did not mention production method as a food quality attribute; and a 62% did not mention the product origin as a quality attribute.

The questions related to consumers' perceptions about information demonstrated that 91% of the respondents are used to reading labels before or during their purchase. 53 percent feels

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[4] These focus groups were conducted in four different Argentinean cities that were chosen because of their similar consumption patterns and proximity to production regions.

satisfied with the information provided by the labels; and 53% would be willing to buy

organics were they cheaper[5]. 75 percent of consumers agree to the need of a food quality

regulation system and a 56% considers the food control system inefficient. The question about

whether regulations should be private and not public did not show a significant difference

(49% said "yes" (it should be private), 51% said "no" (it should not be private)).

3.2. Empirical analysis based on a logit model

A Logit Binomial Regression Model was applied to explore which factors affected organic

food consumption. The estimates were obtained using SPSS (version 11, 2001). The variables

selected are listed in Table 2:

Table 2: Description of model's variables

Dependent variable		Categories
CONSUMPTION	If organic food is consumed in the respondent's household	1 = Yes, 0 = Otherwise
Explanatory variables		Categories
CARE MEALS	If household members eat healthy food	1 = Yes 0 = Otherwise
LABELS	If the respondent considers the information provided by food labels of certain specific products (dairy products, flours and cereals, chicken and red meat) 'very reliable'	1 = Yes, 0 = Otherwise
REGULATION	If the respondent considers food control organisms 'inefficient'	1 = Yes, 0 = Otherwise
CHEAPER	If the respondent would be willing to buy organics if they were cheaper	1 = Yes, 0 = Otherwise
EDUCATION	Highest education level reached by the respondent	1 =if education level is High School or higher, 0= Otherwise
INCOME	Monthly respondent's household income	1 = Above US$ 500, 0= Otherwise
GENDER	Respondent's gender	1 = Female, 0 = Male
AGE	Respondent's age	1 = Above 34 years, 0 = Otherwise

Logit binomial regression model

As a preliminary step, the estimated model was as follows:

$$\text{Logit} (\pi) = \alpha + \beta_1 \text{ CARE MEALS} + \beta_2 \text{ LABELS} + \beta_3 \text{ REGULATION} + \beta_4 \text{ CHEAPER} + \beta_5 \text{ EDUCATION} + \beta_6 \text{ INCOME} + \beta_7 \text{ GENDER} + \beta_8 \text{ AGE}$$

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[5] The gap between conventional and organic prices was analysed by collecting prices data at the same stores where the survey was conducted.

Where:
CONSUME = dependent variable -Y- (Table 2)
CARE MEALS, LABELS, REGULATION, CHEAPER, EDUCATION, INCOME, GENDER, AGE = explanatory variables -X_i, i = 1, …, 8- (Table 2)
π = probability of success for dependent variable = 1 if organic food is consumed in the respondent's home.
α = intercept
β_i = coefficient -i = 1,…, 8-

However, after running the model and applying the Wald Statistic and the Likelihood-Ratio Statistic, the **INCOME**, **GENDER** and **AGE** variables were not statistically significant (p values > 0.10); and therefore they were desestimated. The final model's results are displayed in Table 3:

<div align="center">Table 3: Results from the estimated model</div>

| Variable	Parameter estimate (β)	Std. Error	Wald Statistic	p value	-2 (L_0-L_1)	p value	Odds ratio (e^{β})
CARE MEALS	1.250	0.385	10.551	0.001	11.930	0.0006	3.489
LABELS	-0.875	0.297	8.663	0.003	9.020	0.0027	0.417
REGULATION	0.966	0.295	10.704	0.001	11.110	0.0009	2.627
CHEAPER	1.011	0.293	11.900	0.001	12.520	0.0004	2.748
EDUCATION	1.010	0.414	5.952	0.015	6.530	0.0106	2.746
INTERCEPT	-3.117	0.571	29.766	0.000	39.370	< 0.0001	0.044

Note: Cut-off = 0.50.

Pearson's Chi-Square Statistic and Hosmer & Lemeshow Test indicate an adequate fit for the model:

Chi-Square Statistic			Hosmer & Lemeshow Test		
Chi-Square	d.f.	p value	Chi-Square	d.f.	p value
48.744	5	0.000	6.567	8	0.584

Ryan (1997) indicates that the R^2 computed as lineal regression should not be used in logistic regression, at least not when the possible values of the dependent variable are 0 and 1. Alternative forms of R^2 for this binomial logit model are Cox & Snell's R^2 (0.17) and Nagelkerke's R^2 (0.23). The overall predicted power of the model is 70%. Moreover, the predictive power of the model is evaluated by the Roc Curve (Receiver Operating Characteristics): the higher the area under the curve, the better the prediction (Figure 1). (Menard, 2000; Agresti, 2002)

Figure 1: Roc Curve
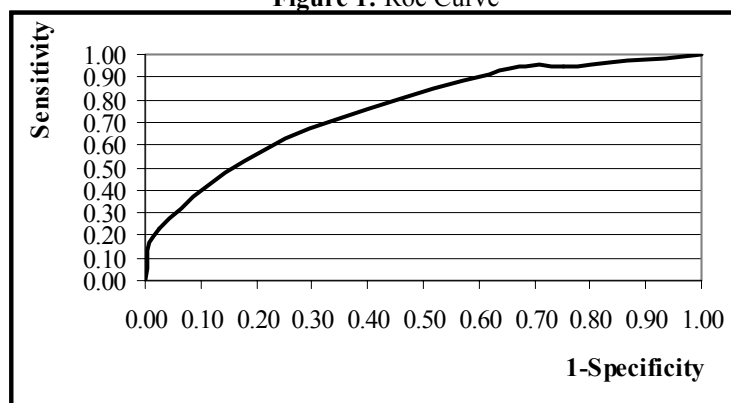
Source: Author's calculation. Consumption Survey, Buenos Aires City/2005.

The odds ratio in Table 3 suggests that those consumers who:

- Frequently eat healthy food, present 3½ more chances of consuming organic food. **(CARE MEALS)**

- Consider the information provided by food labels of certain specific products (dairy products, flours and cereals, chicken and red meat) as 'very reliable' have less than a half chance of consuming organic food. **(LABELS)**

- Consider food control organisms 'inefficient' have almost 3 times more chances of consuming organic food. (**REGULATION**)

- Would buy organic products were they cheaper have almost 3 times more chances of consuming organic food. **(CHEAPER)**

- Have got high school education or more, have almost 3 times more chances of consuming organic food. **(EDUCATION)**

4. Conclusions

The results obtained in this study suggest that most consumers in larger cities, Buenos Aires in this case, with particular lifestyles, an upper or middle income, working long hours and doing their purchases mainly in supermarket chains (Rodríguez *et al.*, 2002) are worried about health and eat healthy food. A high percentage (91%) of consumers are used to reading labels before o during purchasing, 56% consider the nutritional content as a food quality attribute and 53% consider that the label information satisfies their doubts about food contents,

particularly in the most important food groups (meat, dairy products, flours and cereals) included in the Argentine diet.

Although 75% agree that a food quality regulation is essential, 56% consider that the food control system is inefficient. According to the logit model estimation, the **REGULATION** variable plays an important role in explaining organic consumption. Argentineans seem to be "Europeanized" in so far as they place no trust in the regulatory system's ability to monitor and to assure food safety.

The empirical results yielded by the logit model suggest that the consumers with higher educational level, who eat healthy food, and consider food control organisms 'inefficient' are more likely to buy organic products. According to these results, educated people seem to be more exposed to diet and health information, and can better understand and process it. Also if organic food were cheaper, they would increase its consumption. This is explained by the gap between organic and conventional prices that range from 5% to 250%. Within the narrowest price gap, fruit juices and milk are included; the 40% to 60% price gap encompasses olive oil, sugar, tea, flour and cereals; and finally, honey and aromatics yield the widest price gap. Undoubtedly, organic prices constitute a very important constraint to organic consumption in the domestic market.

A high percentage of consumers read and trust label information in Argentina. This has interesting policy implications in relation to food labelling policies to promote differentiated and high value products, and to reduce information asymmetries in process attributes, such as organic, for consumers living in large urban areas. In Argentina, consumers' values or quality perceptions seem to be much better predictors of their behaviour than gender and age.

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