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Eco-labels as signals: the role of credibility and reputation

Abstract

This paper tries to analyze the degree of effectiveness of eco-labels as an instrument designed to avoid informational problems derived from environmental labels proliferation and pseudo-labels. The emergence of national and international eco-labelled programs, in this context, are insufficient to solve this market failure. However, the credibility and reputation of certifiers seems a key element for the eco-label effectiveness.

In the empirical application, consumers are willing to pay a higher premium price for those products with pseudo-labels emitted by considered firms than for those products with eco-labels not well-known yet in the Spanish market, although consumers know that the first are self-declarations. The author thinks that this result leads to recognize the need to rethink eco-labelled policies because it seems that there exists a commonly ignorance with respect to real eco-labels and an unexpected distrust with respect to government guarantee. It seems that only an intensification of advertizing campaigns, a direct public intervention or anything that improve consumers education, can generate a higher reliability, and a higher effectiveness of eco-labels as signals designed to achieve that consumers are capable to distinguish between products of different environmental quality.

Keywords: green marketing, eco-label, asymmetric information, discrete choice models.

Introduction

We can perceive in practically all food markets, increasing consumer sensitivity about the environmental impacts of production processes, and about the ecological and health qualities of the products and services that they consume. This has generated a willingness amongst some consumers to pay a premium for those goods endowed with higher ecological characteristics (Dibb & Simkin, 2001). This has led to attempts to segment the market according to levels of green purchasing behavior, using different variables, such as: socio-demographics (Kassarjian, 1971; Ottman, 1993; Bohlen et al., 1993), personality factors (Balderjahn, 1988; Carrus et al., 2008; Teisl et al., 2009), and environmental consciousness (Calomarde, 1995; Schlegelmilch et al., 1996; Griffith and Nesheim, 2008). Although, this process is visible across a wide range of markets for consumer goods and services, this consumer concern about environmental and health issues is most intense in food products (see Jolly et al., 1989; Jordan and Elnaghebb, 1991; or Baker and Crosbie 1993, and, Wander and Bugge 1996, among others). Therefore, demand is growing for this kind of product, especially in those countries with higher per capita income levels. The logical corollary of this situation is the continuing growth of organic or otherwise ecologically-orientated agriculture¹, since the appearance of a market segment composed of those consumers with a higher expenditure capacity provides an incentive to produce products with desirable characteristics for them. This is particularly of the case in markets otherwise in danger of stagna-

tion, even though the change to new production methods may lead to increases in production costs.

The development of a market for products endowed with different environmental attributes tends to lead to an information problem for consumers, and this issue has been intensely explored within the literature in recent years (Kirkhlof, 2000; Lohr, 1998; Van Amstel et al., 2008; De Freitas and Bottega, 2009). In fact, the difficulty for consumers of identifying and verifying ecological characteristics of products, leads to an information problem for both producers and consumers. Economic analysis predicts that an absence of appropriate signals will lead to market failure (Akerlof, 1970; Spence, 1973, 1976)². In this case, lower environmental quality products may drive out higher quality products.

To avoid this situation, an instrument, environmental labels, can be used in order to resolve informational problems associated with this kind of market. To describe how such instruments operate, and analyze their ability both to reduce informational problems, and to segment differentiated products by their environmental attributes, are the primary aims of this work.

Producers use environmental labels as a signal designed to avoid informational problems, but there are other instruments such as nutritional charts, traceability charts or technical and health rules that may achieve similar objectives.

One problem with this strategy is that, there is nothing that prevents it being imitated. Lower quality producers can incorporate pseudo-ecological labels for their products, transferring the informational problem

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¹ More than 30.4 millions of ha was exploited under this regime in 2006 (World of Organic Agriculture, 2008).

² The classical approximation to the asymmetric informative problems can be found in the works of these two authors.

from characteristic space to label space. Label proliferation leads to new informational problems and a new choice for consumers, between alternative labels with unknown characteristics that are non-verifiable.

The proliferation of eco-labels and environmental claims has brought confusion to certain markets (Chrysoschoidis, 2000; Hutchins and Greenhalgh, 1997; Nadai, 1999). In 1991, more than 40% of the US consumers did not believe in eco-labelling (Ravensway, 1996). In Britain 71% consumers were sceptical about the premium charged for environmentally friendly products (Robins and Roberts, 1997). Moreover, there is evidence of consumer confusion about what organic labels imply about environmental attributes and other qualities (Park and Lohr, 1996).

In this context, our analysis is focused on the analysis of eco-label effectiveness from a theoretical and empirical perspective, analyzing their role as an instrument designed to overcome the informational problems generated by pseudo eco-label proliferation, and suggesting some guidelines to make them more effective. These guidelines apply to the role of certifier firms and government intervention, from the perspective of both national and international eco-labels programs.

Specifically, this paper seeks to explore these issues by studying the consumer's estimated willingness to pay for variously labelled organic products, by mean of a simulated market. This allows us to verify the effectiveness of different types of eco-label in avoiding informational problems connected with consumers' uncertainty about the characteristics associated with each product. It also allows us to explore the effect of price premiums on the demand of these products, to understand their demand characteristics, and to measure the degree of knowledge of eco-labels. Finally, we try to check label proliferation effects and the role of certifiers' reputation and credibility. This is done in the context of a specific food market, strawberries, in a local market (Huelva, Spain), using consumer survey data, composed of 301 household interviews.

1. A selective review of empirical findings about the determinants of the demand of ecological products

In recent decades, there have been numerous findings relating to different aspects of 'green' consumer behavior, derived from empirical research. Following Bigné (1997), for the most part of studies do not find consistent evidence of significant differences in the ecological behaviors of consumers by age, economic level, sex, occupation or marital

status (Kassarjian, 1971; Ottman, 1993; Davies et al. 1993; and Wagner, 1997).

In the context of Spain Garcés, Pedraja and Rivera (1995), obtain evidence of a positive relation between income, social class, level of education and the ecological behavior. From the consumer's perspective, perhaps the work of Calomarde (1995) is the most interesting contribution in terms of understanding the influence of ecological aspects in the buying habits of Spanish consumers, although their conclusions are not extrapolated given the limitations of his study. But this work is an important point of reference due to its methodology and its original conclusions. In this sense Gómez, Noya and Paniagua (1999), and Calomarde (1995) consider that pollution and health are not the main problems as perceived by Spanish consumers. However, recent health and food crises, such as mad cow disease, dioxins in chicken, problems in feedstuffs, the use of banned hormones or the use of antibiotics in order to put on weight in livestock have lead to growing consumer distrust with respect to the food system. These issues are changing Spanish consumers' priorities¹. Three of the Calomarde's results are particularly interesting, in terms of novelty:

1. Price isn't a key factor in the purchase of eco-labelled products.
2. It seems that firms' ecological appearance is a factor of increasing importance.
3. Consumers trust themselves in their capacity to evaluate ecological characteristics.

Recent work has put the price variable and the premium at the center of attention along with a number of individual characteristics by using consumers' personal data and market simulation, in order to estimate determinants of demand for this kind of product versus the determinants of demand for traditional products. In this way, Blend and Van Ravensway (1998), provide us with an important contribution applied to the demand for eco-labelled apples in the US. In their work, socio-demographic characteristics and the price premium are the key elements in eco-labelled consumption decisions. Gil et al. (2000) conclude that lifestyles and attitudes toward environmental issues are the key factors explaining organic food consumption. From a similar perspective, Sánchez et al. (1999), using the Heckman model (1979), find evidence that consumers' willingness to pay a premium for eco-labelled products is conditioned by their degree of ecological sensitivity, socio-economic characteristics and by the cross-price elasticity of demand.

¹ Confederación Española de Organizaciones de Amas de Casa, Consumidores y Usuarios: Informe No19: Las españolas y la seguridad alimentaria.

In some cases, it seems that socio-economic variables are generally poorer predictors of the willingness to pay for eco-labelled products than attitudinal variables and price premiums.

In the empirical work presented here, applications are designed on the basis of individual observations of households who were questioned about socioeconomic characteristics and attitudinal variables. The study is complemented by a market simulation which aimed to obtain a set of predictions about the relative influence of price premium on the decision to consume eco-labelled products, and on the choice between alternative eco-labels.

2. Method

Evaluating the existing empirical literature about the degree of environmental awareness and its relation to the demand for ecological products, it seems clear that there are opportunities to explore this topic more deeply, particularly in relation to the role of price and ecological product characteristics in the consumer's buying decision. This research seeks to shed new light on these issues and explore the use of new proxies to identify green consumers, the role of different kind of eco-labels, and the role of credibility and reputation of certifiers on household buying decisions. An ideal source would be household consumer panel relating to eco-labelled products. However, the *Expenditure Familiar Continuous Survey* or *European Panel Household* in Spain does not cover this kind of information. Even the Food Household Panel Survey (by the Agricultural Ministry of Spain) does not contain information about ecological products. For this reason we use a specific survey which provided the empirical data for use in this study.

The survey contains 228 households of Huelva (Spain), and involves a market simulation based on two types of strawberry: eco-labelled and non-eco-labelled, available in Huelva's local market. The location was chosen for reasons of operational feasibility, and the product was chosen, because it is already the subject of a pseudo eco-label¹, widely available for some years prior to the study. The wide availability of this pseudo eco-label has a beneficial effect for this study because households polled have a priori more complete information about eco-labels.

On this basis, the objectives of the study are:

1. To discover the extent to which variables such as householders' individual characteristics, in-

cluding education, sex, age and income level, have some influence on the choices relating to eco-labelled strawberries. This allows us to test some of the propositions obtained from the existing literature on this subject.

2. To estimate the influence of price premium on potential consumption of eco-labelled strawberries.
3. To verify if there is some effect of eco-label proliferation on the consumer choice. In other terms, we try to check if reputation and credibility are key elements in the consumer's choice, and explore whether label proliferation could lead to the failure of eco-labelling.

3. Methodology

An eco-label is a guarantee provided by producers. This consists of a commitment which guarantees to consumers the adherence to certain environmental standards. These standards are capable of being inspected by public or private institutions, a process which ensures standardization. Therefore, eco-labels are characterized as imposing standardized environmental regulations, in contrast to the less specific and enforceable first person voluntary labels or pseudo eco-labels (typified by words such as "*environmentally friendly*"). In agricultural goods, eco-labels impose specific rules on a firm's production function, which they must implement.

Our first target is to find out what effects socioeconomic and personal variables have over the demand for environmental goods compared to traditional goods, and to understand the effect of price on the choice between these goods. Also, we sought to explore new questions relating to the coexistence of these two types of goods with two types of labels.

The main difference between the environmental labels is on whether the characteristics can be verified by an independent body.

Actually, consumers haven't got information either training for translate technical requirements to good's characteristics. Consumers perceive the labels, concretely their logos, which are assigned credibility's level.

This is the last purpose of our research, to find if the credibility and reputation of the organisms which certify if consumers are capable to distinguish between eco-labels and first person voluntary labels. This has been declared in a preference for verifiable goods, also in willingness to pay extra for these goods.

4. About the questionnaire

Econometric analysis was used to estimate the potential demand for eco-labelled and non-eco-labelled

¹ The term pseudo-green marketing – or "greenwashing", is used to describe practices that attempt to portray their product as somehow eco-friendly when it is, in fact, not. One of the greatest tools in the green-washers' arsenal is given by the emergence of self-eco "certifications". We will use the term pseudo eco-labels for this kind of eco-labels.

strawberries, on the basis of data obtained from a random sample personal survey of households in Huelva, through an interview with the family member that usually does the shopping. The questionnaire was designed with the aim of diagnosing consumers' priorities with regard to strawberries with and without eco-labels. This allows us to understand the determinants of choice between alternative labels: true eco-labels and first person voluntary labels (or pseudo eco-labels).

Because of the limited use of eco-labels in the markets of agro-foods generally, and in strawberries especially, a market is simulated based on a questionnaire. Those polled were asked about goods with different prices and characteristics, principally the presence or absence of eco-labels. The different labels were explained in terms of the institutions and the certification process backing them, but not the details of the technical standards involved. Then the sample was asked what goods they would be likely to buy at each price. Because of the seasonal characteristic of the goods, the hypothetical purchase was set in spring.

Two scenes were presented to those polled people. The first is a traditional market, and people were asked to answer if they would buy 1 kg of traditional strawberries at different prices. The second scene is the same, but involves four kinds of different strawberries: traditional – unlabelled, and three kinds with green claims, only one of which is certified. The quality is otherwise assumed to be homogeneous, except in terms of the compliance with environmental standards. In the first market, traditionally, those polled were asked to imagine that they are faced with purchasing normal strawberries, for set prices which were selected at random from those used during the season by *FresHuelva*. This should indicate, supposing that other prices for fruits are at normal levels, how much money people are willing to pay for the strawberries, supposing that the effects of the other substitute fruits, and of other attributes, remain constant.

In view of prices for two kinds of strawberries and the characteristic of each type, we asked the consumer about the type of strawberries they would buy for each price, revealing the premium that the consumers is willing to pay for environmental characteristics. To demonstrate the effects of the type of environmental label on purchase intention, three sorts of labels are shown to those polled people. The descriptions, which have been given to the consumers about the labels, varied in two dimensions: whom the first person voluntary label belonged to, and the existence or not of an institution which guarantee the environmentally quality stan-

dards. In this way, three kinds of labels, which co-exist in the real-life market, are compared. Only one of them is an accredited eco-label. These characteristics and identification numbers are showed in Table 1 and Table 2.

Table 1. Eco-labels analyzed

Type of label	Brief description	Identification number	Organization
Pseudo-ecolabel	Te use of chemical pesticides and fertilizers are limited but not eliminated	1	Goverment
Verifiable ecolabel	Te use of chemical inputs are forbidden	2	Non profit-organization
First person voluntary label	It means a concern of the producer about the environment	3	Individual firm

Table 2. Characteristics of eco-labels

Dimensions		Possibility of verifying environmentally benefits	
		No	Yes
Number of environmentally requirements	More		2
	Less	3	1

Although the government eco-label analyze is verifiable it has less requirements than the 'true' eco-label.

The benefits of each environmental label analyzed varied depending on whether the characteristics can be verified by an independent body. The three labels were shown to consumers in a random order. From a base price of 2 euros (based on the average price in the local market), four realistic possible premium prices (provided by *FresHuelva*) were shown to consumers for a kg of strawberries, 2.5 euros, 3 euros, 4 euros and 5 euros (representing a premium of 0.25, 0.5, 1 and 1.5 over the standard retail price).

Table 3. Mix of prices used in the survey

Mix of prices (Premium)	Traditional strawberries' price	Environmental labelled strawberries		
		1	2	3
A	2	2.5 (0.25)	2.5 (0.25)	2.5 (0.25)
B	2	3 (0.5)	2.5 (0.25)	2.5 (0.25)
C	2	3 (0.5)	3 (0.5)	2.5 (0.25)
D	2	4 (1)	3 (0.5)	3 (0.5)
E	2	4 (1)	4 (1)	4 (1)
F	2	5 (1.5)	4 (1)	4 (1)

In addition to information about purchase intentions, some other questions were asked of consumers. These questions should help us to identify different variables that may affect purchasing. These included demographic factors, social and economics factors such as age, income, family size, education, and reason for purchasing environmentally labelled prod-

ucts. This allows us to determine if different segments respond to eco-labels differently, and to verify that the sample had similar characteristics to Spanish Household Panel Data¹.

The sample was also asked about the place where they normally purchase strawberries, since location of purchasing can affect choice (Hutchins and Greenhalgh, 1997, Thompson, 1998). The groups used were: supermarket, hypermarket, specialized shops (green-grocers), or another place². Respondents were also asked about their perceptions and knowledge with respect to environmental goods and labels relating to organic production, integrated production and green quality. Finally they are asked if they have purchased strawberries (yes-75.75% / no- 24.25% and why).

5. The sample

The household sample size, and the number of people to be interviewed, was obtained by dividing the total number of people in the province by 2.83, the average family size (according to INE). Therefore, according to the population census the total population of Huelva on January 1, 2004, was 476,707 inhabitants, so we established a universe of 168,448 households.

Only those people who answered positively that they were potential consumers of strawberries, were completely interviewed. Therefore 85.45% (n = 228) answered positively. From now it is called the sub sample, because all the results are derived from this group. In relation to social and demographic characteristics, 84% of them were women, because the survey was directed to the person who purchases the food in the household. The highest percentage represented families which belong in the middle-income bracket of between 18,000 and 36,000 euros a year, with a majority having medium and higher education level (53.49%). These are key differences between our survey and Spanish Household Data.

6. Preliminary results based on a tabulation of the survey data

Tables 4 and 5, show the responses to different prices in both scenarios. Some 77% of the total sample answered that they would purchase strawberries in our first scenario, if the price was 2 €/Kg. This percentage decreases to 42.86% if the price

was 3 €/Kg, and it decreases drastically (to 8.64%) when the price increases to 4 €/Kg.

Table 4. Should you purchase at 2 €, 3 €, 4 € ?

Decision purchase traditional strawberries ³		Percentage of sample	
		Yes	No
Price per kg. (traditional strawberries)	2	77.08	22.92
	3	42.86	57.14
	4	8.64	91.36

With the introduction of environmental benefits and the use of an eco-label (or pseudo eco-label) then, 93.78% of consumers would purchase labelled strawberries if these were 25% more expensive than the traditional (mix of prices A, described in Table 3). However, when the price premium increases to 50% for labels 1 and 2 (mix of price C), then only 79.53% of regular strawberry buyers preferred the environmental labels. With a 100% mark-up (mix of prices E), only 24.77% would purchase eco-labelled strawberries. If we distinguish between the types of label, we find that first person voluntary labels' demand decreases as their price is similar to eco-labelled strawberries.

Table 5. Percentage of survey that should buy traditional and eco-labels strawberries for different combination prices

Mix of prices	Traditional strawberries	Eco-labels and pseudo-eco-labels	1	2	3
A	6.22	93.78	74.88	24.17	0.95
B	7.31	92.69	27.14	69.90	2.96
C	20.47	79.53	43.86	19.88	36.26
D	42.58	57.42	23.32	69.94	6.74
E	75.23	24.77	58.50	33.95	7.55
F	74.77	25.23	36.36	56.38	7.26

Table 6. Reasons for buying or not eco-labelled strawberry

Why do you buy eco-labelled strawberry?	
Reasons	Percentage
Environmentally care	15.35
Curiosity	15.79
Healthy	56.14
Higher quality	12.72
Why don't you buy eco-labelled strawberries?	
Reasons	Percentage
Very expensive	30.26
I don't know anything about the eco-labels	20.61
Traditional strawberries are good by health	24.56
It is marketing (only publicity)	24.56

On the other hand, health was the main reason given by consumers for choosing environmental

¹ According to Living Conditions Survey for Spain, in 2003, an average household have 2.83 members. Equally average age and incomes are 42.09 years old, and 21551 euros.

² The last item was incorporated because on respondent said, in a preliminary study, that they purchase strawberries directly from producers.

³ Traditional strawberries are non-labeled strawberries produced without environmental requirements.

labels, while only 15.35% gave environmental reasons. There was no single explanation that dominated why people didn't buy them but, cost was the most commonly cited. The willingness to purchase traditional or environmental labelled strawberries is not affected by the size of household or level of education. The higher education people are willing to purchase eco-labelled goods (39.29%).

With regard to place, 31.89% of strawberry purchasers said that they would use a hypermarket or supermarket, against 55.48%, that purchase them in traditional shops.

Almost 90% didn't know anything about the organic agricultural standard (Label 1) or the less rigorous 'integrated production' standard (Label 2). Strangely, the logo of the least rigorous green quality standard (Label 3), which is similar to recycle goods' logo, was perceived as the most familiar. Therefore, the effectiveness of this label seems to be related more to confusion and informational problems than actual environmental standards.

Table 7. Knowing eco-labels

Do you know Label 1?	
Response	Percentage
Much	3.07
Enough	10.52
A little	42.97
Nothing	43.85
Do you know Label 2?	
Response	Percentage
Much	2.20
Enough	6.61
A little	35.06
Nothing	56.14
Do you know Label 3?	
Response	Percentage
Much	4.85
Enough	18.06
A little	37.44
Nothing	39.65

6. Results

This section presents estimation results of different kinds of linear probability models of binary choice in order to contrast the following hypotheses:

Hypothesis 1: Price premium is one of the most important factors in the decision to choose environmentally labelled products.

The design of the second part of the survey, the part that includes a market simulation with four different types of strawberries, allows us to estimate the influence of different factors as determinants of the demand for environmentally labelled strawberries versus factors that influence the demand of traditional strawberries.

On the basis of an initial sample of 228 households, we applied a filter that split those surveyed into two groups: households that were not willing to pay for environmentally labelled strawberries and household that are willing to pay at least a 25% premium. After applying this filter, our sample contains only 171 records. From this subsample, we *expand* the sample as follows. Only those individuals that are willing to pay for environmentally labelled strawberries are asked questions relating to the market simulation. These polled survivors, are asked about different combinations of prices. We then generate a dichotomy variable, with a value of 1 if the individual is willing to pay for the environmentally labelled strawberries and 0 otherwise. Doing so, for each individual we have six different observations that corresponds to each choice that is made in the six combinations proposed.

Given the objectives of this first exercise, we have split the four possible responses into two categories: traditional strawberries and environmentally labelled strawberries. We then use a STATA filter that allows us to assign each observation with the premium associated with the kind of strawberries chosen. In this way, we can expand the sample so that this now contains 1350 observations and we have information about the price premium associated with each decision¹.

After this filtering process, we have generated a dependent variable, designated by y , taking the value 1 with probability p and taking the value 0 with probability $(1 - p)$ that expresses the choice between traditional and environmentally labelled strawberries.

Given our simple random sample with n observations of this variable, we will have n_1 observations in which y takes the value 0, and n_2 observations which takes the value 1, so that $n_1 + n_2 = 171$.

As we know, for a random sample of size n , since $y_1 \dots y_n$ are independent and identically distributed, the joint probability function is given as the product the marginal probability density functions:

$$L = p^{n_1} (1 - p)^{n_2},$$

Taking logs:

$$\begin{aligned} \ln L &= \sum_{i=1}^N y_i \ln p + (1 - y_i) \ln(1 - p) = \\ &= n_1 \ln p + n_2 \ln(1 - p). \end{aligned}$$

¹ In order to analyze the determinants of the demand of labelled strawberries versus the determinants of the demand of traditional strawberries, we expand the sample in the following way: we collect the answer of each interviewer with regard to the six sceneries proposed. Hence, each individual has six registers in the expanded set sample (1350 observations), that reflects their decisions when they face the different mark ups proposed.

Hence, in order to estimate p , we have to find the maximum likelihood estimator. However, we are not interested in making a marginal analysis of y , but a conditional analysis: we are interested in knowing the distribution of y conditioned by a set of variables $x_1, \dots, x_n$. In our case we want to know the probability of consumers choosing labelled products as a function of the product's price premium and a set of individual socio-economic characteristics:

$$E(y/x_1, \dots, x_n) = p(x_1 \dots x_n).$$

Specifying $p(x_1 \dots x_n)$ thorough a logistic distribution function, we have:

$$E(y/x_1, \dots, x_n) = \frac{e^{\alpha + \beta_1 x_1 + \dots + \beta_n x_n}}{1 + e^{\alpha + \beta_1 x_1 + \dots + \beta_n x_n}}.$$

Hence, our objective is to construct a model, similar to the previous one, in which the variable y is used to indicate if the household is willing to pay for labelled strawberries or not, and how this decision is explained by the price premium, level of educational, age, income, and the reason given for choosing strawberries. To construct this model, we use some dummy variables in order to capture the effect of education, income, number of household members and the reasons for purchase. Table 8 shows the results obtained in the econometric specification of the model chosen as the best in function of the significance of the estimated parameters.

In this specification, the probability of choosing labelled strawberries depends on the price premium with respect to non-labelled strawberries, jointly with an individual's characteristics such as age, educational level, or the kind of work by occupation of the person that usually does the shopping in each household. In the estimated model, the variable occupation is a *dummy* variable that takes the value 1, if the person is a woman who doesn't work, and 0 otherwise. According to results of estimation, there is a greater probability of choosing labelled strawberries the lower the *premium* of these with respect to non-labelled strawberries. On the other hand, it seems that amongst the rest of the characteristics, it is the kind of occupation (entrepreneurs versus wage workers), that is the main determinant of the probability of choosing environmentally labelled products. This result, against what we could expect a priori, according to previous studies, there does not seem to be (in terms of supporting evidence) any relation between income level, the number of family members or the degree of ecological or health sensibility, and the decision between labelled and non-labelled strawberries.

Table 8. Willingness to pay for eco-labelled strawberry

Dependent variable: willingness to pay for eco-labeled products	Coef.	Std. err.	t-student	P value
Premium	-1.930528	10.71486	18.02	0.000
Education	.2729857	.1732072	-1.58	0.115
Income	.0162408	.1898059	-0.09	0.932
Age	.0300273	.0134214	-2.24	0.025
Quality	.4008138	.4934377	-0.81	0.417
Environment	.0107466	.4835279	0.02	0.982
Health	.0411965	.3903654	0.11	0.916
Occupation	-.2106386	.1074632	-1.96	0.050
Constant	-.1091217	1.054737	-0.10	0.918
Number of observations = 1262				
LR $\chi^2(8) = 1202.48$				
Prob > $\chi^2 = 0.0000$				
Log likelihood = -234.5396				
Pseudo $R^2 = 0.7194$				

Hypothesis 2: the eco-labelled strawberry versus pseudo-labelled strawberry choice depends on the premium and on the guarantor credibility and reputation.

In order to test this hypothesis, we again use the expanded sample, but we now apply a new filter in order to suppress those observations corresponding to individuals that have chosen traditional strawberries in any of the scenarios proposed. This new data set, is composed of 863 observations, corresponding to the choices realized by consumers between the three environmental labels proposed. Now, premium values are determined by the relation between the eco-labelled strawberry – Organic Agriculture – and the two types of strawberry with non-certified voluntary labels. Jointly with individual characteristics and others variables included in the previous test, we now include a new variable of *reputation*, which captures the effect of the issuing organization on the label's effectiveness. The model's proposed estimation results are shown in the next table. The most important result is the effect of *premium* on the eco-labelled strawberry demand versus pseudo-labelled strawberry demand. We verify the main propositions derived from the Akerlof and Spence models, in the sense that bad labels can potentially drive out good labels. On the other hand, environmental labels benefit from the degree of perceived credibility of the issuing enterprise. So that, the stronger the reputation amongst the issuing enterprises of pseudo-labels, the lower the probability of consumers choosing genuine and verified eco-labelled products. Finally, individual or socioeconomic characteristics did not appear to significantly influence choice (Table 9).

Table 9. Willingness to pay for eco-labelled vs. pseudo-eco-labelled strawberry

Dependent variable: willingness to pay for eco-labelled strawberry	Coefficient	Std. err.	t-student	P value
Premium	-.93148	.8414631	-11.07	0.000
Dummy reputation	.9245091	.1860965	4.97	0.000
Education	.0144904	.0969819	0.15	0.881
Credibility "Agricultura ecológica" label	.1840302	.1172497	1.57	0.117
Credibility "Producción integrada" label	-.1365984	.1434516	-0.95	0.341
Credibility "calidad verde" label	.0841408	.1086354	0.77	0.439
Constant	.0944816	.6203041	0.15	0.879
Number of obs. = 809 LR chi ² (8) = 223.07 Prob > chi ² = 0.0000 Log likelihood = -444.95575 Pseudo R ² = 0.2004				

Conclusion

In this work we have obtained evidence that reinforces the importance of price premium associated with eco-labelled products as a key factor in determining people's propensity to consume eco-labelled products. In this sense, our results are in

line with previous results obtained in the literature, but we don't find evidence on the influence on intentions of attitudinal variables. A key finding of this paper, is related with the central role of issuer's reputation and credibility for those consumers which are inclined to buy eco-labelled products. Certifier reputation is a crucial element in consumer choice. However, the degree of verification of environmental rules by independent authorities associated with each label is unclear to consumers. The importance of this result is clear if we take into account the eco-labelled programs characteristics: if we are right, we think that some national eco-labelled programs should be reconsidered. Even, it questions the strictly utility of eco-labels. Perhaps, the main failure associated to eco-labels is the consumer's educational policy.

This study has some key limitations. It is limited to a single product and single geographical location, and it is possible that the findings will not apply equally to other locations and products. A simulated market is also open to criticism because it reveals buying intentions not actual buying behaviour. However, this exercise does produce some interesting findings and insights which can be the basis for future consumer research into these issues.

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