A calibrate auction-conjoint experiment to elicit consumer valuation of sustainable farming: is agro-systems preservation relevant?

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Abstract

This paper analyses the role of agro-systems preservation on making food choices. It employs the “Calibrate Auction-Conjoint Valuation method” (CACM), which relates hypothetical conjoint valuation of product attributes with real market behavior using real economic incentives. The paper also allows comparing the hypothetical and non-hypothetical valuations in order to value the difference between the theoretic and the incentive-compatible WTP for a same respondent and within a single experiment. Thus the paper aims at testing for: 1) the internal consistency on people’s behavior towards sustainable agriculture, and 2) the relevance of the price attribute versus agro-ecosystems preservation for a fresh product. Results suggest that Spanish respondents’ valuation of an agricultural product highly depends on the type of system used for its production. Nevertheless, respondents mainly differ between sustainable and non sustainable production, and do not discriminate between organic and integrated systems. In addition, both the price and the protection of the environment are the most important elements taken into account when purchasing. Moreover, consumers tend to overestimate their WTP in hypothetical settings (60% of the sample). Finally, factors such as gender, respondents’ knowledge towards organic production and practices, health concerns, trust on organic marketing agents and risk perception are significant on explaining differences between individual’s hypothetical and non-hypothetical experiments.

Introduction

During the last decade, the significance of the results obtained from hypothetical valuation methods has been questioned. In particular, it has been noticed that consumers do not reveal their real economic behavior by means of hypothetical valuation questions, overestimating their real willingness to pay, in contrast to what happens in real economic incentive experiments, (e.g., List and Gallet, 2001, Lusk and Schroeder, 2004 and Lusk and Schroeder, 2006). The fact that real money is exchanged in experimental valuation methods can make participants to be more responsive of revealing their true value for a product in comparison with hypothetical survey settings. However, understanding why people mistake and overestimate their real willingness to pay for hypothetical questions remains an important issue. Therefore, the present study wants to consider the differences between hypothetical and incentive-compatible valuation mechanisms, for a specific case of agro-ecosystems preservation.

The most widely used hypothetical valuation methods are conjoint analysis and Choice experiments. However, discrete choice and conjoint data do not offer immediate financial consequences for the participants. For that reason, researches investigate approaches to incorporate incentives into the traditional conjoint and choice methodologies.Incentive compatible elicitation mechanisms can be categorized in two general categories: experimental auctions and non-hypothetical discrete choice experiments or conjoint methodology (Lusk and Shogren, 2007 and Corrigan et al., 2009). One of the main features of the experimental auctions is to place subjects in an active market environment, where they can learn and adjust to market conditions (Lusk et al., 2006). In addition, bids directly allow researchers to estimate each participant’ WTP for one or several specific goods (Corrigan et al. 2009). In contrast, nonhypothetical choice experiments incorporate incentives into the traditional conjoint and choice methodology. It uses the traditional choice-based conjoint analysis methods, but randomly selects one of the several repeated choices between competing product profiles as the binding. The participant purchases the product indicated as most preferred in the randomly select choice set (Alfnes et al. (2006), Carlsson (2001), Ding, et al. (2005), Ding (2007) Lusk and Schoroeder (2004), Lusk et al., (2008)).

Although incentive compatible elicitation mechanisms do achieve a more real WTP estimation, may not totally allow researchers to notice the rationality associated to individuals choices. As Lusk and Schoroeder (2007) pointed out, experimental researches aim at balancing control (over the environment) and context (contextual cue about the implication of their decision). But for the case of experimental auctions, a high attention to the control is given (Lusk and Schoroeder, 2007), while subjects does not have contextual cues. In order to deal with this, the present study follows Norwood and Lusk (2010) and employs an elicitation setting that promotes more systematic and rational behavior: the so called Calibrated Auction Conjoint Method (CACM). The CACM combine the strengths of the conjoint and auction value elicitations mechanisms. In this methodology people calibrate their attribute-bases utility function to produce the auction bids they desire. The CACM have several advantages over existing valuation approaches. First, it generates consistent and systematic responses by linking auction bids with conjoint ratings. Second, the CACM is an iterative valuation process that promotes learning and provides feedback for the formation of rational preferences. Third, it allows for a distribution-free characterization of heterogeneity in preferences, and finally the CACM allows for the evaluation of a large number of attributes and attribute-levels and permits the estimation of people's values for a very large number of products (Norwood and Lusk, 2010).

The present study conducted a CACM to examine consumer valuation of sustainable farming (organic and integrated) following Norwood and Lusk (2010). Our main contribution is that in addition of linking the auction bids with the conjoint rating to investigate consumers' preferences towards sustainable farming, we compare the hypothetical and no hypothetical valuations in order to verify: first the internal consistency on people's behavior, and second the relevance of the price attribute versus agro-ecosystems preservation in the food market for a fresh product.
The structure of the article is as follows. Next section explores the background on organic and integrated farming systems. The third section is devoted to the description of the methods, data and analytical procedures, while section four reports the results. Finally, section five portrays some concluding remarks.

Background on Organic and Integrated farming Systems

There are two main sustainable farming production systems in Spain: Integrated and Organic Farming. These production systems meet the potentially conflicting challenges at farm level, in a manner that balances food production, profitability, safety, animal welfare, social responsibility and environmental care. Organic farming is a production system that combines best environmental practices and the application of high-animal welfare standards. It also restricts the use of chemical fertilizers and pesticides, and livestock is farmed with restrictions in terms of use of drugs and hormones (Magistris and

Gracia 2008; Michaledou and Hassan, 2009). It is considered a form of sustainable agriculture, which means that the sources of food production cause lower degradation of the ecological system compared with conventional production systems (Quenum, 2010). On the other hand, integrated farming is defined as an agricultural system of food production and other high quality products, which use resources and natural regulation mechanisms to avoid adverse contributions to the environment and also ensures long-term sustainable agriculture (International Organization for Biological Control, IOBC). One of the differences between organic and integrated production is that crop protection in the case of integrated production combines the use of biological controls for pest control with traditional techniques based on agrochemicals, while organic farming prohibits the use of synthetic agrochemicals (Miret, 2004). It is important to highlight that integrated farming is not considered by any European regulation, and therefore each member state have its own regulation with the consequent differences among countries. Nevertheless, there is a initiative named "European Initiative for Sustainable Development in Agriculture (EISA)" which tries to eliminate the "gap" between the different European regulations regarding to integrated production by establishing a definition of Integrated farming (IF) as well as setting some guidelines at the European level. In Spain it is regulated by REAL DECRETO 1201/2002 which establishes the general characteristics and requirements for integrated agriculture. From a survey done in 2010 by the Spanish ministry of agriculture, Spain dedicates 601,394 hectares to integrated production and 988,323.67 hectares to organic production.

Methods, data and analytical procedure

The data

The data used in this study was collected by means of an experiment with real economic incentives. To carry out the experiment specific "software" was developed using Visual Basic programming for Microsoft Excel. A sample of Barcelona population, selected by a marketing research company, was recruited for the purpose of this study. Participants were recruited by phone to participate in a computer-based survey for an "apple preference study". Eight sessions of 10 participants were carried out in March 2010. In brief, the sample was made up of 40% men and 60% women. Almost 70% of the respondents are in between 35 and 65 years old. And as expected, the majority of the sample (more than 80%) has finished secondary school and revealed to have medium household income levels (from 1000 to 5000 Euros/month family).

Experiment design

The experiment was conducted in three stages[1]. 1) Welcome and introduction to the experiment; 2) survey and 3) CACM. During the introductory stage each respondent was allocated in a cubicle with a computer. Then, a brief explanation about the experiment objectives and confidentiality of the data was done. Respondents were requested to

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[1] First of all, a pilot experiment was conducted. Its aim was to test both the "software" developed for the CACM experiment and the methodology that would be used for the auction. A total of 10 participants (students and colleagues) were employed.

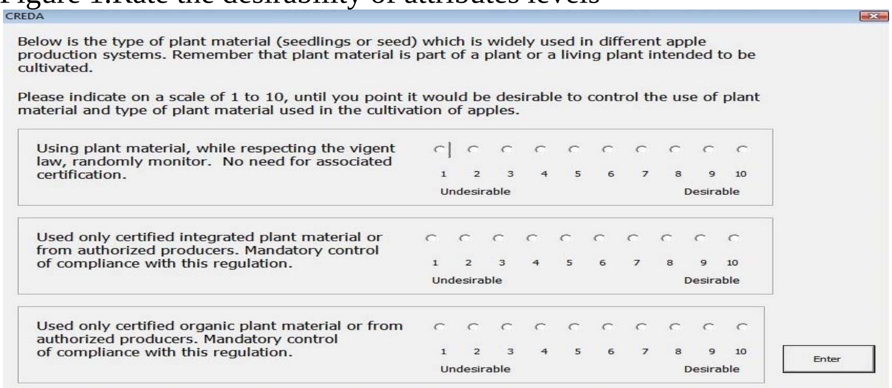
behave as in real live and not as they wanted to behave. Finally, respondents received the payment of 20 Euros for their participation in the experiment.

During the second stage, the survey, respondents were requested to answer a computer based survey with questions about organic purchase behavior, risk perception of agricultural products, environmental attitudes, the influence of social norms on respondents behavior, trust on organic market agents and, finally, the importance of price for respondents purchase intentions. As well, some socio-demographic questions where requested. This stage starts with some instructions about the “software” use. Researchers asked participants not to be ahead in responding the survey, so everyone would answer at the same time and if any questions arose during the experiment would be easier to ask for help.

Finally, the last stage of the experiment consists of the CACM. Following (Norwood and Lusk, 2010) respondents were first asked to rank their preference towards different characteristics associated to three different production systems (organic, integrated and conventional production). In order to select and define the attributes associated to the different production systems a focus group with experts was previously performed by the research team. The attributes selected were price, environmental impact, the use of fertilizers, pesticides and herbicides, plant material, post-harvest treatments and, finally, certification (see table 2 for a description of attributes and levels as they were delivered to respondents). Before starting this stage of the experiment, a cheap talk to eliminate the hypothetical bias was introduced. We explained to the consumers that their answers could affect the final price of the product, so we ask them to be careful and think about their answers. Collection of data for the CACM proceeded in three steps:

Step 1: participants were shown numerous tables, in the computer screen, corresponding to each of the attributes studied, and in each table, people were asked to rate the desirability of each attribute-level on a 1 to 10scale, where one was very undesirable and 10 was very desirable. In each case, and previous to participant’s evaluation, a full description of what each level represented was provided (See figure 1 as an example).

Figure 1.Rate the desirability of attributes levels



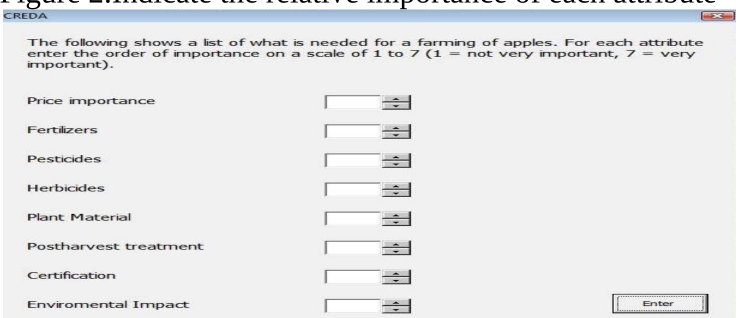
Step 2: participants were asked to indicate the relative importance of each attribute when purchasing apples on a 1 to 7 scale, where 1 was very unimportant and 7 was very

important (see figure 2). Respondents were encouraged not to rate everything as very important, but rather to think about the relative importance.

Table 2.Attributes and attributes levels

Attributes	**Level 1** *Conventional System*	**Level 2** *Integrated System*	**Level 3** *Organic System*
A1 ***Fertilizers***	Random control It allows the use of three types of fertilizers (mineral chemical synthesis, organic and natural minerals)	Mandatory control It allows the use of three types of fertilizers. The obligatory control enhances the application of natural fertilizers and reduces the use of mineral and chemical synthesis fertilizers.	Mandatory control. The use of mineral and chemical synthesis fertilizers is prohibited. It allows the use of natural extractive mineral fertilizers and organic fertilizers
A2 ***Price***	P1	P2(20 – 25% more expensive than P2)	P3 (20 – 25% more expensive than P2)
A3 ***Pesticides***	Random control Allows the use of synthetic chemicals.	Mandatory control Allows the use of synthetic chemicals, as long as it is a rational application. Have to precede the biological, biotechnological, cultural, physical and genetic methods to the chemicals methods.	Mandatory control The use of synthetic chemicals products is prohibited.
A4 ***Herbicides***	Random control It allows the use of herbicides	Mandatory control Only allows the use of certain herbicides in some conditions. Have to precede the biological, biotechnological, cultural, physical and genetic methods to chemical methods.	Mandatory control The use of herbicides is prohibited.
A5 ***Plant material***	Random control Using plant material, while respecting the law. No need for associated certification.	Mandatory control Used only certified integrated plant material or from authorized producers.	Mandatory control Used only certified organic plant material or from authorized producers.
A6 ***Postharvest treatment***	Random control It allows the use of any post harvest treatment according to law.	Mandatory control Only allows the use of post harvest treatments authorized by law if they are technically justified. Priority is given to physical methods or natural products to synthetic chemical products.	Mandatory control. Prohibited unless they are natural products (eg hot water).
A7 ***Certification***	There are not certification	Integrated production certification.	Organic certification production
A8 ***Environmental impact***	Not explicitly consider the environmental impact. Simply follow the existing general regulation.	Produce, respecting the environment and minimizing environmental impact.	Produce supporting biodiversity, respecting the environment and minimizing environmental impact.

Figure 2.Indicate the relative importance of each attribute



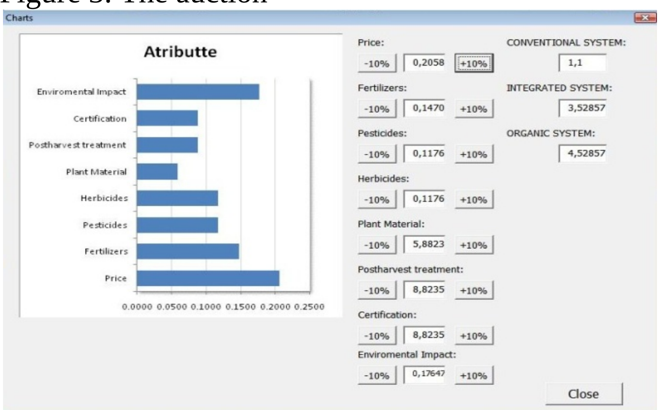
Step 3: the last step of the CACM consisted of an auction[2]. The bids had to be the highest amount of money that they were willing to pay for the product. Furthermore consumers were told that the winner would have to pay for the kilo of apples that would be selected following the procedure commented below. Participants were asked to bid for a kilo of convention apple. Following Norwood and Lusk (2010), a bid was forecasted for each of the other products (organic and integrated) using each person's previous responses to the ranking questions. To estimate the willingness to pay of each individual for each apple we followed Lusk y Norwood (2010). First, each individual i's attribute-based utility for a kilogram of each apple type j (Z_{ij}) was calculated multiplying the relative importance of each attribute, using data obtained from the stages 1 and 2 of the CACM as follows:

$$(1)\ Z_{ij} = W_{kl}\sum_{k=1}^{K}\sum_{l=1}^{L_k}(I_k R_{kl})$$

Where, k^{th} represent the stated importance of the k^{th} attribute, considering $\sum I_k$=1. Further, R_{kl} represent the rating of the l^{th} of the k^{th} attribute, normalized so that the lowest rated level of each attribute has a scaled rating of 0 and the highest rated level of each attribute has a scaled rating of 1. Besides, L_k is the number of levels over which the k^{th} attribute is varied, K is the number of attributes, and W_{kl} is a dummy variable that equals 1 if the product processes the l^{th} level of the k^{th} attribute, and 0 otherwise. The term $I_k R_{kl}$ can be interpreted as a utility "part-worth," which is the utility provided from the l^{th} level of the k^{th} attribute. This part-worth is analogous to the coefficients in a random utility model estimated from a conjoint analysis, with W_{kl} being the explanatory variable for the presence of absence in the conjoint analysis.

Lastly, the willingness-to-pay to have one product versus another was calculated dividing equation (1) by the "part-worth" on price, which represents the marginal utility of income (Lusk y Norwood, 2010). The forecasted bits were shown to people together with the relative importance of each attribute level on its final bid by means of a bar chart (see figure 3).

Figure 3. The auction



[2] For that, people were trained on the bidding procedures uses. Consumers participated in an auction for a mineral water 33cl bottle to familiarize them with the procedures. The mineral water was design to mimic the apple auctions to facilitate the learning process.

Participants had the opportunity to change the relative importance of each product attribute by means of a drop-down box. Simultaneously to the adjustment of the attribute importance people could see how their bids were changing for the three types of apples. The participants had to press the button submit when they were satisfied. Their final bids appeared in the screen. One production system (conventional, organic and integrated) was randomly selected. The highest bidder for the chosen type of apples was announced as the winner of the auction. (S)he took the chosen apples at home after paying the second highest bid.

Analytical procedures

To understand differences between participants' hypothetical and the non hypothetical bids a Tobit model was specified as in all cases hypothetical bids were lower or equal to the non hypothetical ones.

For each observation$i$, $i = 1, \ldots, n$, the dependent variable of the Tobit model is defined by (Gourieroux, 2000):

$$y_i = \begin{cases} y_i^*, if\ y_i^* \geq l_i \\ l_i, \quad otherwise, \end{cases}$$

where $y_i^* = x_i b + u_i$. b is a vector of unknown parameters containing K elements x_i is a vector comprising observations corresponding to the elements of b, and the $l_i - s$ elements are the (known) thresholds. The error terms u_i are assumed to be independent and to have conditional density functions f and distributions$F$.

Results

Main results from the CACM are shown in table 3. We start by reporting the bids for a kilogram of apples from each of three production systems and for each experiment (hypothetic and no hypothetic). In the hypothetical experiment the average bid for a kilogram of apples from conventional production system was 1.15€. This value increased to 3.65€ for apples from integrated production systems and to 4.14€ for apples from organic production systems. It is interesting to see that for the non-hypothetical experiment the average bid for a conventional system remained the same as for the hypothetical case 1.15€. However, the value for the apples from the integrated production systems was of 2.76€. This implies a decrease of 24% compared with the hypothetical case. Furthermore, the average bid for apples from organic production systems was of 3.15€, 0.99€ less than the hypothetical bid.

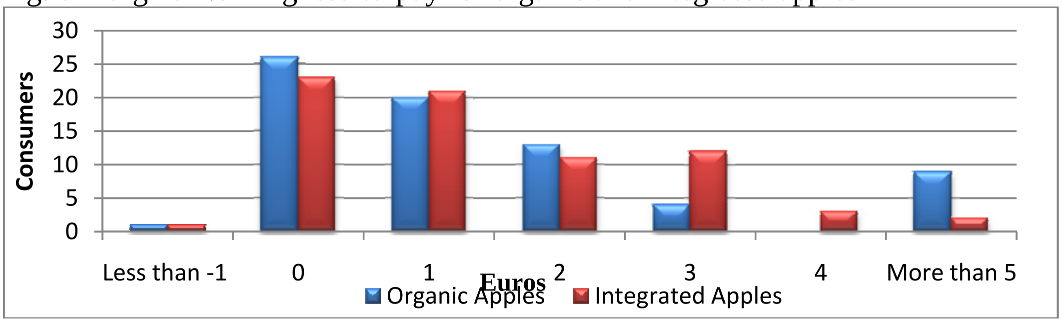
Additionally, results show that in hypothetical experiments participants' revealed a higher willingness to pay for organic and integrated apples than in a incentive compatible setting. These results are consistent with List and Gallet (2001), Lusk and Schroeder (2004), and Lusk and Schroeder (2006). This difference can respond to the fact that in the hypothetical experiment, even having introduced the cheap talk, there was neither a real interchange of goods, nor money involved, so probably all attributes were value in a conceptual way. However, when introducing real money in the experiment and therefore making it closer to reality, the price plays a more important role. In this last case respondent give priority to price, scarifying some other features.

Table 3. Distribution of the bids (Euros)

	Conventional	Integrated	Organic
Hypothetical			
Mean	1.15	3.65	4.14
Standard deviation	0.46	1.59	2.20
No hypothetical			
Mean	1.15	2.76	3.15
Standard deviation	0.46	1.53	1.85

Figure 8 reports the difference between the willingness to pay for the hypothetical and non hypothetical experiment for a kilogram of both organic and integrated apples. It can be observed that about 43% of people revealed a difference equal or less than 0.20 euros between the hypothetical and non hypothetical experiment for the two production systems. This indicates that more than the 40% of the sample answered the hypothetical experiment in a rational way, and therefore maintained very similar bits, for the non hypothetical experiment.

Fig. 8 Marginal Willingness-to-pay for organic and integrated apples



In order to deeply analyze the differences between the hypothetical and non hypothetical bits, Figure 9 and 10 shows respondents' average ranking of the relative importance of the attributes associated to the productions systems for both the hypothetical and non hypothetical experiment respectively.

As expected, the most important attribute is price. However, it can be observed that the attribute environmental protection is also very important for the sample, followed by the use of pesticides. The rest of the attributes were considered as equal important. It must be also highlighted that when moving from the hypothetical to the non hypothetical experiment, price relevance increases in about 16%. However, it is interesting to observe that when respondents modify the relative importance of the rest of the attributes to increase the importance of price they maintain almost the same ranking order as they revealed in the hypothetical experiment, validating the rationality of their first step responses.

Fig. 9 Hypothetical Experiment: Relative Importance of Attributes

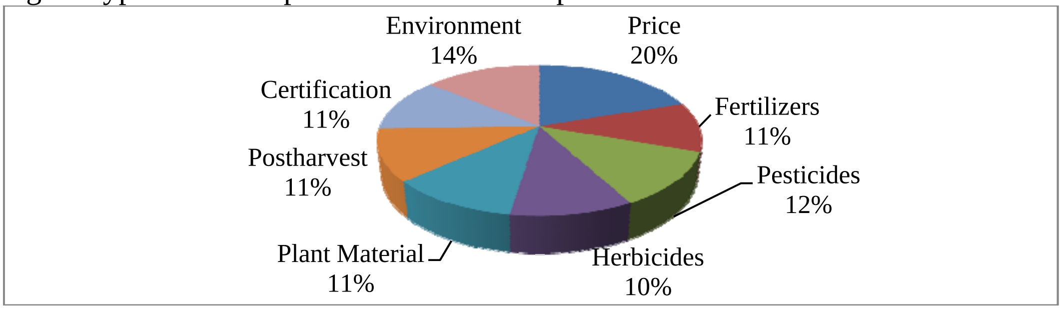


Fig. 10 Non-Hypothetical Experiment: Relative Importance of Attributes

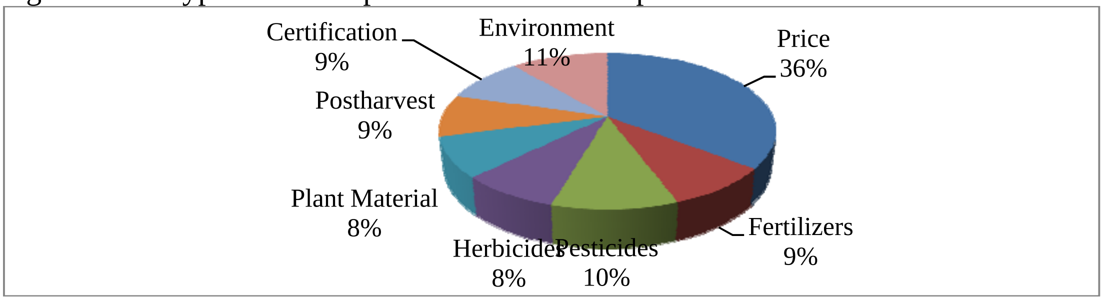


Table 4 shows the average willingness to pay for selected changes in all attribute levels for apples. That is, the WTP for shifting from one level on a specific attribute to another level of the same attribute.

Results are presented for the hypothetical and the non-hypothetical bids. In the hypothetical setting, we can observe a positive WTP to shift from conventional production to organic or integrated production for all attributes. However no significant differences can be observed if we compare the two sustainable production systems. For the non-hypothetical setting respondents are not willing to pay for changing between environmentally friendly productions systems and they prefer the conventional setting.

In order to control for socioeconomic and attitudinal differences among respondents, it has been performed a tobit analysis of respondents WTP differences between the hypothetical and the non hypothetical experiment. Results from the organic and the integrated production systems are shown in Table 6.

As can be observed, when valuing organic apples, men are less consistent that women as for the former significant differences between the theoretical and the incentive compatible bids (WTP3-WTP2). Other significant elements that affect respondents' differences in their WTP for organic systems are trust and price importance. We can see that when respondents assign a higher relative importance to the price attribute the difference between hypothetical and non-hypothetical bids is larger. For the case of trust, either high or low levels of trust in organic marketing agents have a negative impact on the difference between hypothetical and non-hypothetical bids. Furthermore, the variables subjective knowledge and health concerns have a positive impact on the difference between the hypothetical and non-hypothetical bids. The contrary occurs with objective knowledge; the higher the objective knowledge level is the lower differences between hypothetic and non hypothetic bids are. Lastly, results show that respondent's perception of organic food as not equal[3] to conventional is also significant. Respondents that perceive organic food not equal to conventional food are more consistent between their theoretical and incentive compatible bids.

Table 4 Willingness to pay Values for Selected Changes in Apples Production (Euros)

	Mean Bid 1	Mean Bid 2
Fertilizers		
The use of mineral and chemical synthesis fertilizers is prohibited vs It allows the use of three types of fertilizers	0.36*	-0.11
The obligatory control enhances the application of natural fertilizers and reduces the use of chemical synthesis fertilizers vs It allows the use of three types of fertilizers	0.30*	-0.15
The use of mineral and chemical synthesis fertilizers is prohibited vs The obligatory control enhances the application of natural fertilizers and reduces the use of chemical synthesis fertilizers	0.06	0.04
Pesticides		
The use of synthetic chemicals product is prohibited vs Allows the use of synthetic chemicals	0.41*	-0.12
Allows the use of synthetic chemicals, as long as it is a rational application vs Allows the use of synthetic chemicals	0.33*	-0.16
The use of synthetic chemicals products is prohibited vs Allows the use of synthetic chemicals, as long as it is a rational application	0.08	0.04
Herbicides		
The use of herbicides is prohibited vs It allows the use of herbicides	0.37*	-0.12
Only allows the use of certain herbicides in some conditions vs It allows the use of herbicides	0.29*	-0.15
The use of herbicides is prohibited vs Only allows the use of certain herbicides in some conditions	0.07	0.04
Plant Material		
Used only certified integrated plant material vs No need for associated certification	0.37*	-0.15
Used only certified integrated plant material vs No need for associated certification	0.32*	-0.17
Used only certified integrated plant material vs Used only certified integrated plant material	0.05	0.02
Postharvest treatment		
Prohibited unless they are natural products vs It allows the use of any post harvest treatment according to law	0.37*	-0.15
Only allows the use of post harvest treatments authorized by law if they are technically justified vs It allows the use of any post harvest treatment according to law	0.32*	-0.17
Prohibited unless they are natural products vs Only allows the use of post harvest treatments authorized by law if they are technically justified	0.05	0.02
Certification		
Organic certification production vs There are not certification	0.38*	-0.12
Integrated production certification vs There are not certification	0.32*	-0.16
Organic certification production vs Integrated production certification	0.06	0.05
Environmental Impact		
Produce supporting biodiversity, respecting the environment vs Not explicitly consider the environmental impact	0.46*	-0.15
Produce, respecting the environment vs Not explicitly consider the environmental impact	0.38*	-0.19
Produce supporting biodiversity, respecting the environment vs Produce, respecting the environment.	0.08	0.04

[3] equally secure, equally safe and with the same level of vitamins and minerals.

Table 6. Determinants of consumers WTP differences between hypothetical and non hypothetical bits for integrated and organic apples.

	Integrated		Organic	
Variable	**Coef.**	**P**	**Coef.**	**P**
Gender	0.2003	0.197	0.4439	0.053
Childs at home	0.0991	0.592	-0.2530	0.304
Age1	0.1031	0.676	0.0495	0.882
Age2	0.2994	0.182	0.2307	0.408
Education Level 1	-0.6041	0.025	0.0867	0.8
Education Level 2	-0.2691	0.301	0.0733	0.834
Income 1	-0.3685	0.039	-0.2284	0.343
Income 2	-0.0259	0.897	-0.0666	0.805
SN1	-0.3144	0.092	-0.2348	0.375
SN2	-0.5200	0.048	-0.2125	0.518
R1	-0.4635	0.006	0.0679	0.75
R2	0.1499	0.419	0.2489	0.329
T1	0.4053	0.066	0.8916	0.005
T2	0.0255	0.901	0.5475	0.053
P1	-0.0711	0.714	0.2681	0.336
P2	0.4365	0.015	0.8297	0.002
A1	0.3414	0.083	0.7194	0.01
A2	-0.3250	0.091	-0.2451	0.36
EA1	-0.0749	0.694	0.1356	0.609
EA2	-0.0003	0.999	0.0538	0.846
Price Importance1	-0.5441	0.234	0.3121	0.631
Price Importance2	-0.1138	0.548	0.4494	0.11
Health Concern 1	0.1364	0.678	-1.4275	0.118
Health Concern 2	-0.4065	0.057	0.7562	0.011
Subjetctive Konwledge 1	-0.4195	0.012	0.8221	0.116
Subjetcitve Knowledge 2	-0.6758	0.07	2.9265	0.002
Objective Konwledege	-0.4919	0.013	-0.9023	0.003
Cons	2.8541	0	0.2510	0.747

***Integrated:** Obs =72, Log likehood =-39.89, LRchi2(36) = 136.68, Pseudo R2 = 0.6314
***Organic:** Obs = 72, Log likehood =-55.46, LRchi2(36) = 125.75, Pseudo R2 = 0.5314

Results obtained for the integrated system are similar than those mentioned above for the organic system, in relation to the variables price importance, trust and objective knowledge. Other significant elements that affect respondents' differences in their WTP for integrated systems are income and education level. The higher the education and income levels are the lower differences between hypothetic and non hypothetic bids are. In addition, the variable risk perception shows that respondents with high level of risk do reveal significant differences between their hypothetic and non-hypothetical WTP. Finally, it can be observed that subjective knowledge and health concern are significant and have a negative impact on respondents' differences between their hypothetic and non-hypothetical WTP.

Conclusions

This study compared hypothetical conjoint valuation experiment and incentive compatible experiments using the Calibrated Auction – Conjoint Valuation Method proposed for Norwood and Lusk 2010. The CACM methodology has been used to estimate of people's values for environmentally friendly production systems, named organic and integrated farming. The advantage of the CACM, is that the auction bid can be de-composed to identify the attributes and the attribute levels that make people willing to pay more for an organic or integrated apple in comparison with a conventional one. The CACM methodology allows respondents to develop a rational behavior in the bidding experiment. In addition, this study attempts to value the differences between a hypothetic and incentive-compatible choice for a same respondent and within a unique experiment.

Our results show that people's valuation of apples is affected by the production system, and that Spanish respondents place a higher value on organic products in comparison with the ones obtained front integrated or conventional production. On average, respondents are willing to pay 3.5 and 4.14 Euros for a kilogram of integrated and organic apples respectively, for the non-hypothetical bid. For the incentive compatible experiment the biding decreased to 2.76 and 3.15 Euros respectively.

In addition, it has been noticed that from the set of attributes associated to a production system (price, environmental impact, the use of fertilizers, pesticides and herbicides, plant material, post-harvest treatments and finally certification) the one with a higher relative importance is the price followed by the environmental impact of the production system. This fact would explain, at least portray, the differences found when we compare results from a hypothetical and a non-hypothetical setting. However it is important to highlight that when respondents decrease the WTP due to the introduction of the monetary incentive, is was done in a rational way, that is the relative importance of the other attributes were maintained in the same relative proportion as in the first bidding.

Our study also suggests that there are some factors that can explain why participants bid in a different way in hypothetical vs. non hypothetical settings. In particular, more inconsistencies have been found in relation to gender, respondents' knowledge about organic production and practices, risk perception, price importance and health concerns.

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