Environment, Development and Sustainability
https://doi.org/10.1007/s10668-021-01464-3

Supporting mountain agriculture through "mountain product" label: a choice experiment approach

Chiara Mazzocchi[1] · **Guido Sali**[1]

Received: 13 April 2020 / Accepted: 22 April 2021

Abstract
The valorization of typical food products contributes to local economy sustainability. The European Union introduced the optional "mountain product label" (European Commission, EUR-Lex 2014, European Parliament 2012) to promote the mountain economic system sustainability. Although some researchers have focused their studies on the mountain product label, at our knowledge, the mountain product label value has never been investigated before. The aim of the study is to assess consumers' willingness to pay for a typical mountain cheese with different sustainable production characteristics, among which the "mountain product label", using a Choice Experiment approach. More in detail, we tested as sustainable issues: the presence on the label of the mountain product certification (i), the organic certification (ii) and some animal welfare information (iii). We also investigated socio-demographic and attitudinal variables influencing consumers' propensity towards the three attributes. The main results confirm the consumers' interest for the mountain product label, probably for a renewed consumers' interests for environmental respectful production process in food market and because the mountain territory is perceived as carrier of positive values. Moreover, also the other attributes, organic label and especially the indication on animal welfare resulted to have a premium price. Another result emerging from our study is the sensitivity of young people to the issue of mountain product brand and animal welfare, suggesting an interesting target to address.

Keywords Sustainable label · Mountain product · Sustainable development · Choice experiment · Consumer behaviour

✉ Chiara Mazzocchi
chiara.mazzocchi1@unimi.it

Guido Sali
guido.sali@unimi.it

[1] Department of Agricultural and Environmental Science, University of Milan, Via Celoria 2, 20133 Milan, Italy

Published online: 11 May 2021

1 Introduction

Local food productions contributes to the sustainability of local economies, by incorporating traditional knowledge and territorial value of a place within the food product (Tregear et al., 2004). Moreover, local food productions support local agriculture economy especially in disadvantaged areas as the mountains (Mazzocchi et al., 2019a, 2019b), where the economy is strictly based on the territorial resources. But, in European mountain areas, traditional extensive agriculture and maintenance of pastures had long been declining: the abandonment of the agricultural regions is widespread. Cultural heritage, environment and the rural economy of territories are affected by the depopulation of mountains (Mazzocchi & Sali, 2018). For several decades a gradual process of abandonment has involved pastures and meadows (Mazzocchi & Sali, 2018; Mc Donald et al. 2000) and today they have lost their primary function of ensuring the livelihood of alpine farming and meeting the local market demand (Corti, 2004). Alpine agriculture has a poor performance in comparison with agriculture of the plains, and the lack of economic sustainability threatens its resilience. Nevertheless, in recent years we see an increasing of consumers' care for environmental and ethical issues, leading to a considerable attention for traditional and healthier food productions (Ricci et al., 2018). Moreover, the mountain territory usually recalls a collective imagination made of green valleys, clean waters and pure air, with a strong cultural identity represented by mountain traditions, ancient rural agricultural buildings and traditional processing methods (Borec et al., 2009; Schjøll et al., 2010; Mazzocchi & Sali, 2018). Thus, the positive characteristics that distinguish mountain territories in the collective imagination and the renewed consumers' interests for a sustainable production process in the food market, have encouraged to improve a certification to support mountain agriculture. Indeed, more than a third of the production of typical geographical indications of the European Union, is made in mountain areas, of which between 50 and 75% are Protected Designation of Origin (PDO) cheeses (Martins & Ferreira, 2017). Despite this, according to Eurobarometer data (2011), although the 65% of EU consumers declared to benefit from the consumption of mountain products, more than half of European consumers report having difficulty distinguishing a mountain product from a non-mountain one. And although European food certifications have the aims to promote productions and economy of the most disadvantaged zones, such as mountain areas, part of the mountain production is not covered by these certifications. In fact, the high cost associated with PDO and Protected Geographical Indication (PGI) brands forces producers not to adopt any type of certification (Martins & Ferreira, 2017). Some products do not fall within the areas covered by specifications and are not entitled to the PDO /PGI disciplinary adoption. Thus, the European Union introduced the optional "mountain product label" with EU regulations 665/2014 and EU 1151/2012 (European Commission, EUR-Lex 2014, European Parliament 2012) to enhance development and sustainability of the mountain economic systems, since the sustainable development of mountain areas is based on agriculture system, including the all food chain, also foodstuffs and food delivery (McMorran, et al., 2015). But, which is the consumers' purchasing behaviour face to mountain product label? Choice Experiment (CE) approach is a widespread method to estimate the hypothetical consumers' Willingness To Pay (WTP) for a given asset and to identify which product characteristics influence consumer choices. The literature on consumers' behaviour concerning sustainable-friendly products employing CE method is rich (Bazzani et al., 2017; Mazzocchi et al., 2019a, 2019b; Costanigro et al., 2014; Rousseau, 2015) but at our knowledge, the mountain product label issue has never been treated before with CEs. Using a

Fig. 1 Mountain product logo

CE approach this research analyses consumers' WTP for a typical mountain cheese with different sustainable production characteristics, among which the mountain product label and the organic certification. The good under estimation we studied in our work is a typical mountain cheese, mainly because according to Martins and Ferreira (2017), a good part of the European Geographical Indications are made in mountain areas, and more than half are cheeses. Thus, typical cheeses are fundamental products inherently to mountain territory, historically produced by grazing cattle in mountain meadows.

Section 2 introduces the mountain product label and Sect. 3 presents the relevant literature on CE and consumers' behaviour related to sustainable food labelled products. Section 4 explains the methodology and the collection of data. Results are presented in Sect. 5 and discussed in Sect. 6. Conclusions are drawn in Sect. 7.

2 Mountain product label

Agrofood activities in the mountains preserve the sustainability of these areas and support the development of supply chains for mountain foods (Tebby et al., 2010). Mountain-related labelling could increase the competitiveness of traditional mountain farming system. Mountain foods uniqueness give them remarkable value as high-quality niche products. At European level, in 2012 the European Parliament and Council launched the Regulation No. 1151/2012, called "Quality package", included in the "European Charter for Mountain Quality Food Product". This package concerned the quality schemes for agricultural products and foodstuffs in the mountain areas. The aim was proposing a single legal instrument to protect and promote the quality of agricultural foodstuffs with different schemes. The Regulation provided for two optional quality terms: "mountain product" (Article 31), and "product of island farming" (Article 32). As for "mountain product" term, the Regulation N. 665/2014 established the criteria for using the new label (Fig. 1). The Ministerial Decree approval in the August 2018 (Official General Series n. 227 of 29 September 2018) (Mipaf, 2018) regulates the use of the mountain product label in Italy, implementing the Ministerial Decree n. 57,167 of 26 July 2017.

The mountain product label can be used for products obtained from animals reared for at least two thirds of their life in mountain area and from transhumant animals raised for at least one quarter of their life in transhumance grazing in mountain areas and transformed in these areas. Moreover, feedstuffs for animals have to come essentially from mountain areas. Mountain product label does not oblige producers to follow rigorous production specifications, except for the rules set out above, contrary to what happens for the PDO /

PGI label. In fact, GIs' tool is a regulation system assigning an attribute of quality to agro-food goods due to the recognition of a specific relationship between production territory and quality of a product, and to certified quality standards established by a specification (Mazzocchi et al., 2012). Moreover, Italy is the European leader in terms of number GIs products (899 products, Qualivita-Ismea, 2018), but four PDO products[1] account for 65% of the top twenty GIs.[2] Thus, two GIs product typologies exist, the first one with the most significant quota of volume production and sales, and the second one with niche products, suggesting the need for diverse market approaches. These issues do not affect the new mountain product label, encouraging mountain producers to adhere to the new certification without strong changes in their way of the production process.

Furthermore, small-scale mountain agriculture cannot compete with the conventional one, because of its limited economic power, but small-scale mountain agriculture can have the potential to penetrate niche markets (Finco et al., 2017). Mountain product label could become the most appropriate tool for local and small-scale producers in assuring their resilience and in fostering territorial development in mountain areas. In fact, according to Finco et al. (2017), smallholder farmers are weakly integrated into the global market, and they hardly compete with large-scale producers, but the labelling rules can offer an opportunity for launching mountain products building a market identity justifying a premium price (von Dach, 2013). Moreover, the mountain product label is substantially free of use costs.

Another aspect of the mountain product label is related to the environmental impact it could have. In fact, traditional mountain agriculture includes pastures and grazing management, ensuring environmental sustainable practices and hydrogeological asset management, protecting mountain slope from erosion and landslides (Bischetti et al., 2014). Indeed, providing ecosystem services, mountain areas supply for biodiversity conservation, carbon sequestration, freshwater, protection from natural hazards (Bentivoglio et al., 2019; Saleem et al. 2013; D'Ottavio et al. 2018).

But, since the 80s, the gradual process of migration from Italian mountains to the plain has produced a decline in traditional extensive agricultural systems, leading to an environmental fragility of mountain territory (Mazzocchi and Sali, 2016). In fact, grasslands biodiversity, wetlands and moorland settings are typical mountain landscape associated with low-intensive agricultural practices. Thus, supporting local agricultural economy, the mountain product label can help to improve and maintain mountain territories, as affirmed by Bentivoglio et al. (2019, pp. 436): "The new label could protect the origin of the mountain products, including also positive externalities derived from mountain areas: protection of the environment, biodiversity, […] protection of the territory". Moreover, the Charter for Mountain Quality Food Products (Euromontana 2005) affirmed that mountain foods provide for traceability of products, environmental quality and biodiversity conservation and erosion risks limitation, contributing to connect mountain agricultural productions with environment protection.

[1] Grana Padano, Parmigiano Reggiano, Prosciutto di Parma, Mozzarella di Bufala Campana.

[2] In terms of turnover.

3 Sustainable food labels in choice experiments

Public opinion awareness of environmental and social issues related to the production of food is increasing (Mazzocchi et al., 2019a, 2019b; Ricci et al., 2018), and several consumers have chosen to adopt more sustainable habits in terms of purchasing choices (Planck and Teichmann, 2018). Providing consumers with accessible information when they are choosing the object of their purchase has considered remarkably important because the label is the first source of information for consumers during the purchasing action (Boncinelli et al., 2019). Moreover, there is an increasing presence of "awareness" consumers in the market (Apostolidis & McLay, 2019) that try to influence companies by their spending (Spaargaren & Oosterveer, 2010). This new trend towards more sustainable consumption has had concrete effects in the food sector, with the creation of certification systems that communicate to consumers about the environmental-friendly characteristics of the products, from vegetables and fruit (Chen et al, 2018) up to oil and wine (Krystallis & Chryssohoidis, 2005; Pomarici et al, 2018). Sustainability-related food labels are usually called "ecolabels", and help to increase transparency in food chain, reducing the information asymmetry between producers and consumers (Asioli et al., 2020). According to Asioli et al. (2020), up to date, in ecolabelindex.com, 463 ecolabeling schemes diffused in 199 countries have been registered, and 148 of these brands are food labels. Environmental-friendly food labels are focused on products produced with care for the environment, such as organic labels (Asioli et al., 2020), carbon-foot print labels, water-food print labels (Pomarici et al., 2018).

Several CE studies have been implemented focusing on organic certified products, probably the most famous certification in food market (Mazzocchi et al., 2019a, 2019b), and the value of the organic label has been deeply investigated, for example using meat (Van Loo et al., 2014), fish (Mauracher et al., 2019) and wine (Ruggeri et al., 2020) products. The literature on environmental-friendly labels in food marketing widely employed CE approach, because of its eligibility to investigate individuals' preferences for a certain good or service. Several remarks were highlighted by scholars, among which Ruggeri et al. (2020), who having found a WTP for organic wines concluding that consumers' perception of organic production may not be strictly focused on the protection of the environment, but it rather encompasses a broader range of topics that altogether contribute to generating a higher propensity to pay for this typology of products. Van Loo et al. (2014) emphasized that income has an effect on organic food purchases, finding that the WTP estimates for participants with a higher income are 50% more than for those with a lower income. Other studies (Mauracher et al., 2019) pointed out that consumers perceive the higher price of organic food as higher quality than conventionally grown food, and in many cases, the quality is the main reason to buy organic food for consumers, also intended quality as a better "taste" of food. Moreover, organic agriculture practices, avoiding the use of synthetic fertilizers, pesticides, and genetically modified organisms (GMOs) is more challenging in terms of environmental protection, than conventional agriculture practices. Thus, organic label remains the most famous environmental-friendly label in food market (Leach et al., 2016).

However, all these studies confirmed the existence of a premium price for organic-labelled products.

Other studies focused on the effect of a water-saving approach in food production, by using a certification system. More in detail, Pomarici et al. (2018), investigated the impact of water-saving label on wine products, found that consumers are more incline to consider

the issue of natural resources protection in their wine purchases, that is, for example, the guarantee of a rational use of pesticides, rather than a water-saving approach in wine production. Another environmental-friendly label focuses on biodiversity conservation; Mazzocchi et al. (2019a, 2019b) found the consumers' preference for a wine labelled with a brand that certify the use of sustainable agricultural practices to protect biodiversity in vineyards. Attention to environmental issues is a concern also for grocery stores, as Tesco (UK), that since 2008 studied the consumers' sensitivity for climate change and carbon labelling of supermarket products (Tesco, 2008), confirming the consumers' care for this issue. Other authors (Leach et al., 2016; Vanclay et al., 2011) explored the impact of carbon-footprint labels on consumers' food purchases, where the carbon footprint of a product or service is defined as the greenhouse gas emissions during the lifecycle of the food product. Vanclay et al. (2011) have attested the importance of carbon labelling on consumers' purchasing choice, strongly evident on food products with low prices, while Leach et al. (2016) developed a model to test the impact of a food label including carbon, nitrogen and water foot-print on consumers' behaviour. Results have shown that the integrated label used across a wide range of food products and retailers can be effective and appreciated by consumers.

Animal welfare is a credence attribute of growing interest for consumers (Zuliani et al., 2018; Cembalo et al., 2016). According to Zuliani et al. (2018) extensive traditional agriculture in mountain is perceived as animal welfare-friendly, with people mainly concerned about housing condition of animals. In particular, Zuliani et al. (2018) realized a study focused on the consumers' perceptions towards dairy cow welfare in mountain farms with expensive pastures and meadows by using a qualitative approach, resulting in a more positive perception of animal welfare in traditional mountain farming systems by rural inhabitants rather than the urban ones. Moreover, both rural people and urban people have recognized in welfare indicator the most important, and strictly linked to an adequate housing space for the cattle. A study by Elbakidze and Nayga (2012) investigated consumers' WTP for animal welfare in both ice-creams and cheese, by means of both Vickrey auction and CEs approaches. The main findings were the participants' WTP for an ice cream certified with a label that it was produced with animal-respectful ingredients. At the same time, authors did not found participants' WTP for a cheese marked with the same animal-respectful label. However, the animal welfare issue in food market is unquestionably become a point of debate in academic researches and in public opinion.

The literature on sustainable food labels often includes the geographical indication issue. Labels focused on food geographical origin are included in CEs model, trying to keep its influence on consumers' purchasing choice for several foods (Banovic et al., 2019; Tait et al., 2019; Demagistris and Gracia, 2016; Apostolidis & McLay, 2019). The geographical origin issue is one of the main attributes of the food consumer's choice and has been investigated both in the case of PDO/PGI labels and of local brands. Apostolidis and McLay (2019) compared seven typologies of sustainability labels in three different groups of meat consumers, to verify the impact of these labels using a CE Latent Class. Results showed that the effect of origin label varied across groups, and while it was important for meat consumers, vegetarian consumers were less concerned about the origin of their food. The importance of "country of origin" label seems to be related to the fact that consumers associate product quality and domestic "country of origin" especially in fresh and perishable products, where the health and safety perceived risk is higher than in other kinds of food (Banovic et al., 2019). Tait et al. (2019) found that for wine labels, the geographical indication is always a driver in purchasing choices, but the WTP for a bottle of wine depends on the specific country in which it has been made. Other authors (DeMagistris

& Gracia, 2016) emphasized the importance of local attribute in food purchasing, that includes not only an indication of the production place but pointed out the proximity between producers and consumers (Corsi & Mazzocchi, 2019).

Nevertheless, although a number of studies assessed the consumers' preferences for sustainability brands in the food market and several environment-friendly certification systems have been created in the food industry, among which reduction of emissions and waste (Pomarici et al., 2018), sustainable fishery, biodiversity protection (Ruggeri et al., 2020) labels, at our knowledge the estimate of mountain product label value has never been investigated before.

Few researchers have focused their studies on the mountain product certification, mainly centring on the mountain food supply chain actors, exploring this issue by means of qualitative surveys. The objective was to test producers' (Bonadonna et al., 2017; McMorran et al., 2015) and retailers' interest in mountain food product label (Finco et al., 2017), to study consumers' perceptions of mountain food (Schjøll et al., 2010) and to present the main aspects related to European legislation of mountain food product (Bentivoglio et al., 2019).

In this research, we employed CEs to assess consumers' preferences and WTP for certifications that deal with sustainable issues, as the mountain product label, organic label and animal welfare information on a typical mountain cheese. We verified the knowledge that consumers claimed to have regarding mountain and organic logo and evaluating how they reacted to the introduction in the market of mountain product branded cheese, investigating socio-demographic and attitudinal variables influencing their propensity towards the two certifications.

4 Methodology

CEs are rooted in random utility theory and consistent with Lancaster's theory (Lancaster, 1990; McFadden, 1974), deriving the individual's marginal utility by examining the trade-off between relevant attributes of a product when making purchase decisions. The product is described by different attributes, further classified into levels of intensity. Consumers express their preferences when they choose among different possible product formulations. By manipulating the conditions in which consumers make a choice it is possible to infer information about preferences for specific attributes. The survey is divided into sets of alternative options consisting of at least two options and the no-buy option. Consumers are asked to choose which alternative product they would buy within each set of alternative options (choice set) based on the description provided, revealing their preference for specific attributes or levels and their relative importance (Train, 2009).

4.1 Data collection

The data collection has been performed within-person interviews using a CE survey, by means of trained interviewers.[3] Although respondents completed the survey by themselves, interviewers were always present in order to clarify any possible respondents' doubt.

[3] The questionnaires had been directly collected by the researcher's authors of this study that are qualified for this work.

Table 1 Description of attributes and levels of CE

Attribute	Number of Levels	Description of levels				
Mountain product label	2	No	Yes			
Organic label	2	No	Yes			
Animal welfare	4	Cattle to the chain	Cattle in stable	Cattle in stable with external paddock	Grazing cattle	
Price	4	FP[a] = 3.00	FP + 2.00 = 5.00	FP + 4.00 = 7.00	FP + 6 = 9.00	

[a]FP = floor price

Cheese consumers were the target of our survey, and they were randomly recruited outside of four grocery stores in Milan city, in Italy, based on a quota sampling criteria[4] and without using any rewards. Data collection took place from February to September 2018, in six different days.[5] During these days, 220 questionnaires were proposed to respondents, obtaining 197 complete documents, with 89.5% of response rate. Participants were only cheese consumers, and this feature was verified before proposing the survey to the potential respondent; the respondents were all adult consumers, from a minimum of the"18–24″ years old class to the "over 65″ years old class (Table 2). An average participant to complete the survey employed around 20 min, supported by the interviewer.

4.2 Selection of attributes

The main objective of this research is to investigate consumers' preferences and marginal WTP (mWTP) for the mountain product label, and the selection of attributes and corresponding levels was specifically intended for this aim.

In the CE the mWTP is extracted from the "price" attribute included in the choice set among the other attributes. Attributes and levels are shown in Table 1.

Price is included as an attribute, the levels were indicated in local currency based on realistic average prices in the market, including a surcharge for the highest levels. More in detail, the product under evaluation is defined in the CE as a "mountain summer cheese", meaning that it has been produced with the milk derived by cows that, according with attribute and levels, may be bred in pastures. Thus, we have established that the cheese with the highest levels of the attributes have to be the most expensive: in this sense, we have employed the average price of the most famous Alpine cow's cheeses in the market,[6] fixed at 9€/hg at supermarket. We also fixed a floor price (FP) at 3€/hg for the cheapest cheese, employing the average price for a mountain cheese sold in supermarket, by using the price of products found in the website for on-line purchases of the three main large-scale retailers[7] of the Northern Italy. So, in the survey the floor price corresponds to the baseline level

[4] The sample stratification was based on the age class and gender criteria.

[5] The interviews took place in February (2), April, May and September (2).

[6] In particular: Bettlematt,.Fontina Valdostana, Formai de Mut, Bitto Storico, Bagoss cheeses.

[7] In detail: www.esselugaacasa.it, www.cooponline.it, www.carrefour.it v.

of each attribute (cattle to the chain; absence of organic certification; absence of mountain product certification). Consequently, the prices of the two middle levels were fixed (5€/hg; 7€/hg).

The "mountain product label" used in the CE is a real registered trademark that a producer can use according to the Italian DM 2/08/2018. As highlighted before, the mountain product label could be the most appropriate tool for local and small-scale producers in promoting their products, and its impact on consumers has never been tested before with a CE approach.

The "organic label" is the organic certification of products and practices according to the European law 203/2012. In fact, organic certification embraces several issues, all of them related to sustainability concept: consumers' perception of this certification system includes the environmental aspect of sustainability, the healthy issue of food, the ethical aspect related to sustainable agriculture productions. Thus, since it is the most known environmental-friendly food certification, it works well as a benchmark for the other two attributes (Costanigro et al., 2014).

The "animal welfare" attribute included four levels corresponding to four types of cattle breeding. The cow can be bred in fixed housing linked to the chain (i), can move in the barn (ii), can move both in the barn and in an external paddock (iii), or can graze in meadows. According to some scholars (Elbakidze and Nayga, 2012) provision of information pertaining to animal welfare dimension of production usually have a major effect on demand for products with beneficial but costly to observe attributes. In particular, a number of studies found a consumers' preferences for products that respect the animal welfare (Zander & Hamm, 2010) and, more in detail, the practices that care for animal welfare in breeding (Heid & Hamm, 2013) and on cheese products (Elbakidze and Nayga, 2012, Zuliani et al., 2018.

The above attributes were included in the CE as: animal welfare (four levels), mountain product label (binary), organic (binary), and price (four levels). Our "a priori" expectations regard an increase in utility for the attributes "mountain product label" (Moun), "organic label" (Org),"cattle in stable with external paddock" (Externalpaddock) and "grazing cattle" (Grazingcattle); at the contrary, the attribute "cattle to the chain" (Cattlechain) that represents livestock with the characteristics to keep the cattle tied to the chain may have a negative coefficient, as well as the no-buy option and the price attribute.

The first part of the questionnaire addressed the personal characteristics of the respondents, in the second part subjects were asked to declare their consumption habits about cheeses and their knowledge concerning mountain. In the third part of the questionnaire, the choice tasks were presented.

4.3 Experimental design

In order to maximize the validity and reliability of the resulting value estimates, we tried to minimized bias related to survey structure and implementation. In particular, we described the scenario of our analysis by using as baseline the average price of a mountain cheese usually sold in grocery stores, as described before, with base levels of all the attributes proposed in the CE. In fact, a cheese with the base level of "mountain product label", that is the zero level, "organic label" that is the zero level and "cattle to the chain", is the baseline and it is associated with the floor price of 3€/hg. In other word, it can be defined as the benchmark on which the change is measured.

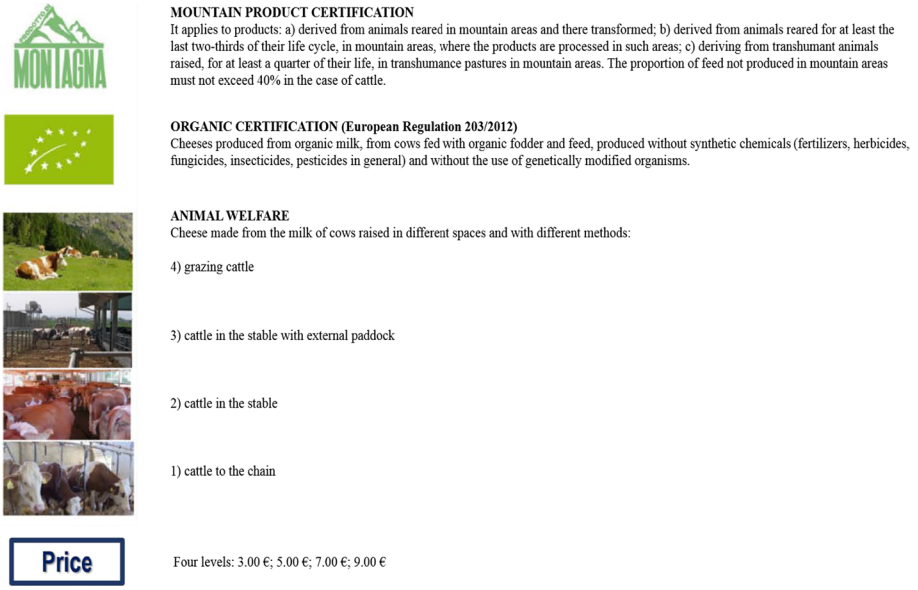

Fig. 2 Mountain product label, organic label and the animal welfare levels, used in the CE as attributes

The base level[8] was described by the interviewer to the respondents, in order to "elicit evidence that these pieces of information are understood, accepted and viewed as credible" (Johnston et al., 2017, pp. 10).

Moreover, the attributes used to describe the typical cheese were presented and briefly explained to respondents in the questionnaire, included the description of the brands, logos and pictures employed in the questionnaire, and their corresponding definition (Fig. 2). This explanation made by text and figures is useful to better explain in measurable and clearly interpretable terms the level of the attributes we propose in the CE. In this sense, the attributes and levels the survey we proposed, are objectively measurable, avoiding the use of expressions as "medium" or "high" that could be easily misinterpreted, being ambiguous and inaccurate (Johnston et al., 2017).

In addition, a cheap talk script was presented to respondents in a page placed before the Choice Experiment. The methodology consists of a brief text explaining the potential hypothetical bias to the respondents before the experiment starts (Cummings & Taylor, 1999) leading them to reveal their real preferences.

Quantitative pretest facilitated bid and attribute designs for stated preference questions, to calibrate survey and verify response rates (Johnston et al., 2017). Our pretest has been conducted on our target population, and the data we collected had been used to mitigate respondent fatigue by synthetizing some information that were included in the

[8] In Choice Experiments in which the good under estimation is an environmental asset, the base level is called "status quo", and described as the condition in which the good under estimation is, without providing changes. Moreover, if the good under estimation has no market (i.e. redevelopment of an urban park, recovery of a watershed, repopulation of wild fauna in protected areas), other precautions have to be put in place to avoid omissions leading to incorrect empirical evaluation.

1.1	 CHEESE 1	 CHEESE 2	NO OPTION
ORGANIC		–	–
MOUNTAIN PRODUCT	–		–
ANIMAL WELFARE	Cows can move both in the barn and in an external paddock 	Cows stay in fixed housing linked to the chain 	–
PRICE	5.00€ (200 g)	3.00€ (200 g)	–

Fig. 3 Screenshot of a choice set

questionnaire but resulted to be worthless. But, after the pretesting, we added the cheap talk script we mentioned before, to better frame the context.

We employed the Bayesian approach to design our survey. This method assumes a prior distribution of likely parameter values, the design is optimized over this distribution; thus, without assuming fixed priors for the attributes (Sándor & Wedel, 2001). A D-Optimal design was generated and used for the pilot survey on a sample of 40 respondents.

A multinomial logit model was employed to analyse data that has been retrieved from this pilot survey.

The coefficients estimates and variances for the different attributes were used as priors to generate the final Db-optimal design (Bliemer & Rose, 2010).

A random blocking was used to reduce the number of questions for each respondent resulting in four blocks (A, B, C and D). Each respondent was randomly assigned to one of the blocks and had to make 12 choices between three alternatives, for a total of 36 product alternatives, one of which is the no-buy option.

We used the randomization process in Qualtrics software to avoid path dependency and any order effect (Fig. 3).

4.4 Econometric model

Discrete choice models are based on the utility obtained by individuals in the choice process. The respondents' utility is measured on an ordinary scale; we separate the price p and the non-price attribute x (Train & Weeks, 2005), and the utility function is:

$$U_{\mathrm{njt}} = -\alpha_n p_{\mathrm{njt}} + \beta_n' X_{\mathrm{njt}} + \varepsilon_{\mathrm{njt}} \tag{1}$$

where:

n are the individuals, j is the alternative, t is the choice occasion. In order to account for preference heterogeneity, a β_n vector representing individual-specific characteristics is considered to be random. At the contrary, the price p is held fixed and included in Eq. (1).

As explained before, we accounted for preference heterogeneity, using a mixed logit model (MXL) allowing random coefficients for non-price attributes and controlling for random taste variation, correlations in unobserved factors over time and unrestricted substitution patterns. In our study, two MXL models were specified. Model A is the basic specification, controlling only for the main effects, without covariates. The price coefficient held fixed, indicating that the WTP values are normally distributed and avoids a positive coefficient for price in the MXL results (Train, 2009, Britwum et al., 2019).

The utility can be modelled as follows:

$$U_{nj} = -\alpha_n * \text{Price}_{njt} + \beta_0 * \text{NoBuy}_{njt} + \beta_1 * \text{Moun}_{njt} + \beta_2 * \text{Org}_{njt} + \beta_3 * \text{Cattlechain}_{njt} + \beta_4 * \text{Externalpaddock}_{njt} + \beta_5 * \text{Grazingcattle}_{njt} + \varepsilon_{njt} \quad (2)$$

The alternative options (option 1, option 2, no-buy option) are described by "j", where the nobuy option "NoBuy", is interpreted as an alternative-specific dummy variable (=1 for the no-buy alternative, =0 for all other alternatives in the choice set). The price of a slice of cheese (200 g) is the variable Price_{njt} in Eq. (1). The "mountain product label" ($\text{Moun}_{njt)}$ and the "organic label" (Org_{njt}) are described by "=1": logo, "=0": no logo. In the (2), Cattlechain, Externalpaddock, Grazingcattle are the three levels (1, 3, 4) of a discrete variable representing the animal welfare issue. The level 2 of this variable (Cattlestable) is the base level attribute, so it must not be included in the utility function. ε_{njt} is the unobserved random error term.

Model B includes the interaction terms between the non-monetary attributes and personal characteristics of each respondent, as age, gender, etc., and respondents' attitudes towards the mountain and organic product consumption. To detect the best interactions to be included in the Model B, identifying the best fitting model, we employed the log-likelihood (LL) value. The increase or the decrease in the LL value was controlled by adding a variable in each step of the process.[9] In (2), the best fitting model is presented; the utility function can be expressed as follows:

$$\begin{aligned} U_{njt} = &-\alpha_n * \text{Price}_{njt} + \beta_2 * \text{Moun}_{njt} + \beta_3 * \text{Org}_{njt} + \beta_4 * \text{Cattlechain}_{njt} + \beta_5 * \text{Externalpaddock}_{njt} \\ &+ \beta_6 * \text{Grazingcattle}_{njt} + \beta_5 * \text{MounYouth}_{njt} + \beta_6 * \text{OrgYouth}_{njt} + \beta_7 * \text{AW4Youth}_{njt} \\ &+ \beta_8 * \text{MounFre3}_{njt} + \beta_9 * \text{OrgFre3}_{njt} + \beta_{10} * \text{Grazingcattle Fre3}_{njt} + \beta_{11} * \text{MounSpend3}_{njt} \\ &+ \beta_{12} * \text{OrgSpend3}_{njt} + \beta_{13} * \text{Grazingcattle Spend3}_{njt} + \varepsilon_{njt} \end{aligned} \quad (2)$$

where MounYouth, OrgYouth, GrazingcattleYouth is the term related to the interaction between level 1 of "mountain product label", "organic label", variables (presence of the certification on the label), level 4 of the animal welfare variable (Grazingcattle) and respondents comprised in the age range of 18–24 years; MounFre3, OrgFre3, GrazingcattleFre3 is the term related to the interaction between level 1 of "mountain product label", "organic label", variables (presence of the certification on the label), level 4 of the animal welfare variable (Grazingcattle) and respondents that are regular mountain tourists (respondents that go to mountain more than once a year up to once a month). MounSpend3, OrgSpend3, GrazingcattleSpend3 referred to the interaction between level 1 of "mountain product label", "organic label", variables (the presence of the certification on the label),

[9] Step-wise approach.

level 4 of the animal welfare variable (Grazingcattle) and respondents that usually buy medium–high spending cheeses.[10]

In Table 3, the basic model without covariates (Model A) and the best fitting model (Model B) with covariates tested through the log-likelihood value were shown.

The MXL model accounts for heterogeneity in preferences that are not related to observed characteristics, and it has been shown that any discrete choice random utility model can be approximated by an appropriately specified MXL model. We calculated the average marginal willingness to pay (mWTP) for each attribute using:

$$\text{mWTP} = -\left(\beta_x / \beta_p\right) \tag{4}$$

In (4), $x = 1, 2, 3$ and describes the coefficient of the three different attributes, while the price attribute is indicated as β_p, the price coefficient. We used the Stata 14 command *mixlogit*.

5 Results

Summary statistics are shown in Table 2.

In the interviewed population, gender variable shows a distribution of 53% females and 47% males. As given in Table 2, the sample is balanced by age group. Respondents generally have a high educational level, and the majority of them has a degree (36%) or a high school diploma (42%). More than 50% of the sample declares to go frequently to the mountains (fre3; fre4). Most of the respondents usually buy cheese on supermarket (72%) and spend between 10€ and 15€/Kg to purchase it (48%). Concerning the knowledge of Mountain product brand, very few people have seen the logo before (21%); at the opposite, quite obviously the majority of respondents are familiar with the organic logo (72%).

Estimated parameters of CE using MXL model are shown in Table 3, in the two estimated models.

Concerning Model A, estimated standard errors are quite small, and all coefficients are significant at 99%, confirming the quality of the attributes choice, experimental design, and sample size. Estimated standard deviations of attributes coefficients were all statistically significant at the 99% level.

In order to estimate the effect of the socio-demographic characteristics on the purchasing choices, we tested different models with several interactions terms to define the best fitting model, by using the log-likelihood value and AIC criteria (Table 3). A stepwise analysis was employed; we have added one variable in each step, and we have checked for increase or decrease in the values of the two goodness-of-fit indicators. We identified in Model B (Table 3, Model B with interactions) the best fitting model.

Concerning Model A, as shown in Table 3, all the estimated standard deviations of the attributes resulted to be statistically significant. Significant standard deviations of coefficients attributes suggest that treating the parameters as random in the model has been the right choice. In fact, when the standard deviation of a beta parameter is expressed, it allows for preference heterogeneity in the sample, thus for the unobserved heterogeneity. Moreover, since we allowed for attributes correlation, then the standard deviation beta has to be replaced by the diagonal of the Cholesky matrix (Table 6, in Appendix). In other words,

[10] Up to 22.00€/Kg product.

Table 2 Descriptive statistics

		Frequency	%
Gender (gen)-***dummy***-	Female	105	53.03
	Male	92	46.07
Age (age1, age2, age3, age4, age5)-***classes***-	18–24	41	20.81
	25–34	61	30.96
	35–49	28	14.21
	50–64	41	20.81
	Over 65	26	13.20
Education (edu1, edu2, edu3, edu4, edu5)-***classes***-	PhD	14	7.11
	Degree	72	36.55
	Diploma	84	42.64
	Middle school	25	7.78
	Primary school	2	1.02
How often do you go to the mountains? (Frequency of visit to mountain: fre1, fre2, fre3, fre4) ***-classes-***	Respondents never go to mountain	12	6.09
	Respondents go to mountain once a year	81	41.12
	Respondents go to mountain more than once a year up to once a month	84	42.64
	Respondents go to mountain more than once a month	20	10.15
Do you know the mountain certification brand? (moun_know) ***-dummy-***	No	155	78.68
	Yes	42	21.32
Do you know the organic certification brand? (org_know) ***-dummy-***	No	55	27.92
	Yes	142	72.08
Where do you usually buy cheese? (where) ***-classes-***	Supermarket	141	71.57
	Specialized shops	25	12.69
	Directly from producers	27	13.71
	Other (online shops, EPGs, etc.…)	4	2.03

Table 2 (continued)

		Frequency	%
How much do you usually spend to buy cheese? (spend1, spend2, spend3, spend4) ***-classes-***	Less than 10€/Kg	52	26.40
	Between 10€ and 15€/Kg	96	48.73
	Between 16€ and 22€/Kg	44	22.34
	Between 20€ and 30€/Kg	5	2.54

Table 3 Estimates for mixed logit model

Variables	Model a (main effects)	Standard Deviation	Model b (with interactions)
No-buy	− 2.05*** (0. 17)	–	− 2.06*** (0. 18)
Mountain product label (Moun)	1.27*** (0.12)	0.83***	0.84*** (0.16)
Organic label (Org)	0.86*** (0. 12)	1.21***	0.64*** (0.17)
Animal welfare 1 (Cattlechain)	− 3.20*** (0.37)	2.22***	− 3.37*** (0. 38)
Animal welfare 3 (Externalpaddock)	1.64*** (0.14)	1.19***	1.55*** (0.13)
Animal welfare 4 (Grazingcattle)	2.78*** (0.29)	2.96***	1.94*** (0.30)
Price	− 0.40 *** (0.03)	–	− 0.40*** (0.03)
Youth* Moun	–	–	0.70* (0. 32)
Youth* Org	–	–	0.16 (0.32)
Youth* Grazingcattle	–	–	1.46** (0.51)
Fre3* Moun	–	–	0. 60** (0.21)
Fre3* Org	–	–	0.23 (0.23)
Fre3* Grazingcattle	–	–	0.55 (0.36)
Spend3* Moun	–	–	0.31 (0.25)
Spend3* Org	–	–	0. 28 (0.28)
Spend3* Grazingcattle	–	–	0. 90* (0.45)
Number of obs	7,092	–	7,092
Log-likelihood	− 1747.98	–	− 1734.46
AIC	3539.97	–	3530.93

*$p < 0.1$; ** $p < 0.05$; ***$p < 0.001$

Standard errors in parentheses

for a better understanding of the correlation between attributes, the Cholesky decomposition matrix has been employed to define attribute-specific standard deviations (Tonsor et al., 2009). The diagonal values of the Cholesky matrix show "the true level of variance for each random parameter once the cross-correlated parameters terms have been unconfounded" (Tonsor et al., 2009, pp. 721). The evidence that preferences heterogeneity have persisted has demonstrated in the diagonal Cholesky elements significance and this suggests that cross-correlation parameters would have been confused without the application

Table 4 Marginal Willingness to Pay from main effects model

Variables	WTP (€)
Mountain product	3.17
Organic	2.15
Animal welfare 1	− 8.01
Animal welfare 3	4.11
Animal welfare 4	6.96

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.001$

Standard errors in parentheses

of the Cholesky matrix. Our results show that the diagonal Cholesky elements for the random parameters were statistically significant for all parameters, except for the "cattle to the chain" variable, suggesting preference heterogeneity in the attributes choice (Britwum et al., 2019). Other important findings are related to the positive covariance between some factors resulted to be significant in the Cholesky diagonal elements, as could be noted in the covariance matrix table (Table 6 in Appendix). More in detail, the attributes "cattle to the chain" and "mountain product label" show a positive relationship, probably due to the fact that "cattle to the chain" is chosen when it is associated with "mountain product label" in the choice set, thus resulting in a positive coefficient in the Cholesky and covariance matrix.

A weak positive covariance value has found for "mountain product label" and "organic label" variables, suggesting that people that prefers "mountain product label", usually prefers also the Organic one. This is probably because mountain food is often perceived as characterized by environmental-friendly production practices (Borec et al., 2009), as well as the organic label (Leach et al., 2016; Meemken & Qaim, 2018). Other weak positive covariances are shown between the "organic label" and the "cattle in stable with external paddock" and "grazing cattle" variables; in fact, this can be explained by the common ethical values that these attributes expressed, as confirmed by literature (Cembalo et al., 2016; Zander & Hamm, 2010).

As explained in Sect. 3, several studies has shown a willingness to pay for sustainable food production processes with particular attention to animal welfare issues, and this finding is confirmed by the present study (Table 4). Although the attributes "grazing cattle" and "mountain product label" are not mutually substitutable, as evidenced by the Cholesky and covariance matrixes results, and the "grazing cattle" attribute is the most preferred among our consumers' sample in the MXL models (A and B), the significance of the large and positive covariances for the "cattle in stable with external paddock", representing the cattle held in stable with external paddock, and "grazing cattle", suggests that for an individual, large parameter values for the "cattle in stable with external paddock" attribute in the distribution were corresponding to large parameter values for the "grazing cattle" attribute. This reveals that respondents choosing "grazing cattle" parameter, also prefer "cattle in stable with external paddock" parameter, suggesting that respondents perceived these attribute levels as close substitutes. Accordingly, the animal welfare issue resulted to be important in mountain cheese purchasing choice of the sample, and similarly, some authors (Zuliani et al., 2018) identified a link between mountain agricultural production practices and animal welfare, as perceived by consumers.

In Model A, an increase in utility is associated with the presence of the attributes "mountain product label", "organic label" and "cattle in stable with external paddock",

"grazing cattle", since these attributes have positive and significant coefficients. At the contrary "cattle to the chain" that represents livestock with the characteristics to keep the cattle tied to the chain has a strongly negative coefficient of − 3.20, showing that respondents prefer not to choose it. At the same time, also the coefficients of the no-buy option (− 2.05) and the price attribute (− 0.40) have a negative sign, as they are not preferred choices.

Furthermore, Model B, deriving by the selection of personal characteristics and interactions by using a stepwise approach, as described before, shows interesting results. Significative interactions are shown between personal characteristics, as age, frequency of visiting mountains and purchasing habits. In particular, Model B shows a positive relation between young people and the choice of mountain product brand (0.70); similarly, young people prefer to choose the "grazing cattle" attribute, that is the "grazing cattle", shown by the positive interaction Youth*Grazingcattle (1.46). Also, in Model B we found an interaction between the respondents who frequently go to the mountain (fre3) and the attribute "grazing cattle" (0.60), that is people who go to the mountains for tourism choose the product made with milk of grazing cattle. Lastly, the attribute "grazing cattle", positively interact with people that usually buy medium–high spending cheeses (0.90), meaning that this consumer's segment of the market would have on the label the indication of "grazing cattle" livestock.

6 Discussion

Regarding the main effects results (Model A), it is possible to draw some interesting considerations.

Regarding "mountain product label" our study confirms that there is a premium price also for it, at least in cheese products. The variable "mountain product label" has a positive coefficient that, although lower than the coefficient of the "grazing cattle" attribute, is higher than the "organic label" coefficient. As in our previous hypothesis, a willingness to pay for the mountain product label has been confirmed by the analysis, probably because a renewed consumers' interests for environmental respectful production process in food market (Ricci et al., 2018), and the positive characteristics that distinguish mountain territories in the collective imagination exist, according to which mountain territory is perceived as carrier of positive values as nature, clean water and air, heritage conservation and so on (Borec et al., 2009). That is, for consumers, producing food in mountain territory is perceived as a value "per se", thus for mountain producers could not be necessary, as instead occurs for the GIs producers, to lead strict rules of production and to possess rigorous features to be included in the certification, but to have the "mountain product label" is enough. Thus, according to our case study, this certification could support mountain agriculture, especially in terms of consumers' purchasing, without the high cost associated with PDO and PGI brands (Martins & Ferreira, 2017) that usually producers have to sustain. Concerning the results of interactions between the mountain product label (Moun) and sociodemographic characteristics tested in Model B, young people choice more frequently the product with the mountain logo, but also with the indication of the cheese production typology on the label, that is milk produced by "grazing cattle". This suggests to propose two observations: first, young people are interested in the mountain product certification probably because in recent years the mountain offers new recreational activities to be carried out in the open air, such as hiking trails, adventure parks, and mountaineering, particularly attractive for youth. Second, young generations usually have a "greener" approach

to consumption, as reported in the literature (Ricci et al., 2018), confirmed by the positive coefficient of the interaction between the Young variable and the "grazing cattle" variable.

In our study, those who "goes to mountain more than once a year up to once a month" (Fre3) choose the mountain product label. This could be due to the fact that the mountain goers are loyal to it, to the place of holidays, and try to relive the experience of buying typical products of the mountain place (Devesa et al., 2010) an element of "emotional revival". Furthermore, they are usually more sensitive to the issue of the economic development of mountain areas, and could be more interested than others in supporting their development through the "mountain product label".

As shown in the literature (Rousseau, 2015; Schaufele and Hamm, 2018), the organic food label has a premium price that consumers are willing to pay. Feelings about organic certification are shown to be positive and can regard environmental and healthy issues (Lee et al., 2013).

Lastly, consumers perceive "cattle to the chain" as a negative feature of the product they do not like, both for perceived lower quality and for the lowest care for animal welfare regarding livestock conditions. Thus, consumers are sensitive towards animal welfare issue and they strongly prefer to choose a product made with milk of grazing cattle, that is the attribute "grazing cattle", as it seems evident by the high coefficient (2.78). "grazing cattle" is the most preferred among the attributes proposed, and it represents both the concept of traditional mountain livestock of which the grazing of cattle is one of the main characteristics and the care for animal welfare and health. The first element is linked to the consumers' interest in mountain traditional landscape and heritage, and is strictly connected to the collective imagination of mountains, as confirmed in Schjøll et al. (2010) and Mazzocchi et al. (2019a, 2019b); moreover, the second element regards the issue of animal welfare and health and concerns the consumers' attention to these environmentally friendly and health issues, well exposed in Ricci et al. (2018). Both the two subjects lead to the consumers' willingness to pay for "animal welfare" attributes, also witnessed by the highest WTP as shown in Table 4. Communicating on the label the breeding method of animals in mountain pastures could be a new marketing strategy, a topic never introduced before in the market.

Lastly, we found the significance of the interaction between consumers who "usually pay a medium–high price for the cheeses" (Spend3) purchased, and the presence of the indication on the product of "grazing cattle" (Grazingcattle). This finding can be explained with the spread of environmental friendly products, so a segment of consumers who are still used to pay medium–high prices for cheeses are interested in an indication of animal welfare on the label.

7 Conclusions

According to our results, the mountain product brand needs to be communicated in a widespread manner, since 72% of respondents affirmed they have never seen the brand before the survey. A communication strategy aimed at fostering the mountain product brand to consumers would certainly have a positive effect on the sales of products that employ it; to date, this communication does not seem to have taken place yet.

The organic certification is confirmed as having a premium price, but it does not seem to be particularly important in our case study, probably because mountain cheese is already perceived as a natural and quality product, therefore the organic brand is in our case

obscured by the effect of the mountain product certification. Therefore, the mountain product label is an opportunity to be exploited also by producers who do not produce organic products. As previously highlighted, the element of animal welfare, and in particular the "grazing cattle" attribute referred to the method of breeding, could bring added value to the product that is sold on the market.

Another result emerging from our study is the sensitivity of young people to the issue of mountain product brand and animal welfare, suggesting an interesting target to address. Further steps of the research will include other typology of products to study, and other consumers' personal characteristics to investigate, in order to better understand the consumers' needs and feeling about the mountain product certification.

Appendix

Tables 5, 6.

Table 5 Cholesky matrix

	Moun	Org	Aw1	Aw3	Aw4
Moun	0.84***				
Org	0.63***	1.03***			
Aw1	1.81***	− 1.27***	− 0.25		
Aw3	0.07	0.60***	0.64*	0.81**	
Aw4	0.52	1.33***	1.68***	1.52***	1.25***

Table 6 Covariance matrix

	Moun	Org	Aw1	Aw3	Aw4
Moun	0.70***				
Org	0.53***	1.47***			
Aw1	1.52***	− 0.16	4.96***		
Aw3	0.06	0.66**	− 0.78*	1.43***	
Aw4	0.43	1.71***	− 1.16	3.14***	8.77***

Acknowledgements This study was developed by University of Milan under the "Integrated Alpine Livestock System-IALS" project, funded by AGER Foundation.

Funding Open access funding provided by Università degli Studi di Milano within the CRUI-CARE Agreement.

References

Apostolidis, C., & McLay, F. (2019). To meat or not to meat? Comparing empowered meat consumers' and anti-consumers' preferences for sustainability labels. *Food Quality and Preference, 77*, 109–122

Asioli, D., Aschemannitzel, J., & Nayga, R. M., Jr. (2020). Sustainability-related food labels. *Annual Review of Resource Economics, 12*(1), 171–185

Banovic, M., Reinders, M. J., Claret, A., Guerrero, L., & Krystallis, A. (2019). A cross-cultural perspective on impact of health and nutrition claims, country-of-origin and eco-label on consumer choice of new aquaculture products. *Food Research International, 123*, 36–47

Bazzani, C., Caputo, V., Nayga, R. M., & Canavari, M. (2017). Revisiting consumer0s' valuation for local versus organic food using a non-hypothetical choice experiment: Does personality matter? *Food Quality and Preference, 62*, 144–154

Bentivoglio, D., Savini, S., & Finco, A. (2019). Quality and origin of mountain food products: the new European label as a strategy for sustainable development. *Journal of Mountain Science*. https://doi.org/10.1007/s11629-018-4962-x

Bischetti, G., Chiaradia, E., Gandolfi, C., Monaco, F., & Sali, G. (2014). Irrigation water resource: Economic evaluation and scenario analysis in a rice-cult. In T. Bournaris, J. Berbel, B. Manos, & D. Viaggi (Eds.), *Economics of water management in agriculture.* (pp. 98–125). Taylor and Francis.

Bliemer, M. C., & Rose, J. M. (2010). Construction of experimental designs for mixed logit models allowing for correlation across choice observations. *Transportation Research Part B: Methodological, 44*(6), 720–734

Bonadonna, A., Macar, L., & Peira, G. (2017). The dark side of the European quality schemes: The ambiguous life of the traditional specialities guaranteed. *Calitatea, 18*(156), 102

Boncinelli, F., Dominici, A., Gerini, F., & Marone, E. (2019). Consumers wine preferences according to purchase occasion: Personal consumption and gift-giving. *Food Quality and Preference, 71*, 270–278

Borec, A., Majkovic, D. and Neve, N. (2009). How much do consumers know about mountain food products: Is there a need for labelling? In *Proceedings of the Agricultural Economics and Rural Sociology*, 44th Croatian & 4th International Symposium on Agriculture, Opatija, Croatia, 16–20 February 2009, 134–138.

Britwum, K., & Yiannaka, A. (2019). Consumer willingness to pay for food safety interventions: The role of message framing and issue involvement. *Food Policy, 86*, 101726

Cembalo, L., Caracciolo, F., Lombardi, A., Del Giudice, T., Grunert, K. L., & Cicia, G. (2016). Determinants of individual attitudes toward animal welfare-friendly food products. *Journal of Agricultural and Environmental Ethics, 29*, 237–254

Chen, X., Gao, Z., Swisher, M., House, L., & Zhao, X. (2018). Eco-labeling in the fresh produce market: not all environmentally friendly labels are equally valued. *Ecological Economics, 154*, 201–210

Corsi, S., & Mazzocchi, C. (2019). Alternative food networks (AFNs): Determinants for consumer and farmer participation in Lombardy, Italy. *Agricultural Economics-Czech, 65*, 259–269

Corti, M. (2004). "L'alpeggio nelle Alpi Lombarde tra Passato e Presente". [The Pasture Practise in Lombardy Alps Between Past and Present] *SM Annali di San Michele*, Vol 17, pp. 31–155.

Costanigro, M., Appleby, C., & Menke, S. D. (2014). The wine headache: Consumer perceptions of sulfites and willingness to pay for non-sulfited wines. *Food Quality and Preferences, 31*, 81–89

Cummings, R. G., & Taylor, L. O. (1999). Unbiased value estimates for environmental goods: A cheap talk design for the contingent valuation method. *American Economic Review, 89*(3), 649–665

Demagistris, T., & Gracia, A. (2016). Consumers' willingness-to-pay for sustainable food products: the case of organically and locally grown almonds in Spain. *Journal of Cleaner Production, 118*, 97–104

Deves, M., Laguna, M., & Palacios, A. (2010). The role of motivations in tourism satisfaction: empirical evidence in rural tourism. *Tourism Management, 31*, 547–552

D'Ottavio, P., Francioni, M., Trozzo, L., Sedić, E., Budimir, K., Avanzolini, P., Trombetta, M. F., Porqueddu, C., Santilocchi, R., & Toderi, M. (2018). Trends and approaches in the analysis of ecosystem services provided by grazing systems: A review. *Grass and Forage Science, 73*(1), 15–25

Elbakidze, E. L., & Nayga, R. M., Jr. (2012). The effects of information on willingness to pay for animal welfare in dairy production: Application of nonhypothetical valuation mechanisms. *Journal of Dairy Science, 95*, 1099–1107

Eurobarometer. (2011). The Common Agricultural Policy. Special Eurobarometer 368. http://ec.europa.eu/public_opinion/archives/. Accessed 8 May 2021.

Euromontana (2004). "Mountain food products in Europe: existing legislation and examples of relevant brands for their promotion". *Euromontana*, Brussels Vol 72. https://www.euromontana.org/wpcontent/uploads/2014/08/axe3-web-en.pdf.

Finco, A., Bentivoglio, D., & Bucci, G. (2017). A label for mountain products? Let's turn it over to producers and retailers. *Quality–Access to Success, 18*, 198–205

Heid, A., & Hamm, U. (2013). Animal welfare versus food quality: Factors influencing organic consumers' preferences for alternatives to piglet castration without anaesthesia. *Meat Science, 95*(2), 203–211

Johnston, R. J., Boyle, K. J., Adamowicz, W., Bennett, J., Brouwer, R., Cameron, T. A., Hanemann, W. M., Hanley, N., Ryan, N., Scarpa, R., Tourangeau, R., & Vossler, C. A. (2017). Contemporary guidance for stated preference studies. *Journal of the Association of Environmental and Resource Economists, 4*(2), 319–405. https://doi.org/10.1086/691697

Krystallis, A., & Chryssohoidis, G. (2005). Consumers' willingness to pay for organic food: factors that affect it and variation per organic product type. *British Food Journal, 107*, 320–343

Lancaster, K. J. (1990) Modern Consumer Theory. Edward Elgar Publishing, No 270, November.

Leach, A. M., Emery, K. A., Gephart, J., Davis, K. F., Erisman, J. W., Leip, A., Pace, M. L., D'Odorico, P., Carr, J., Noll, L. C., & Castner, E. (2016). Environmental impact food labels combining carbon, nitrogen, and water footprints. *Food Policy, 61*, 213–223

Lee, W. C. J., Shimizu, M., Kniffin, K. M., & Wansink, B. (2013). You taste what you see: Do organic labels bias taste perceptions? *Food Quality and Preferences, 29*(1), 33–39

MacDonald, D., Crabtree, J. R., & Wiesinger, G. (2000). Agricultural abandonment in mountain areas of Europe: environmental consequences and policy response. *Journal of Environmental Management, 59*(1), 47–69

Martins, N., & Ferreira, I. (2017). Mountain food products: A broad spectrum of market potential to be exploited. *Trends in Food Science and Technology, 67*, 12–18

Mauracher, C., Procidano, I., & Valentini, M. (2019). How product attributes and consumer characteristics influence the WTP, resulting in a higher price premium for organic wine. *Sustainability, 11*(5), 1–15

Mazzocchi, C., Ruggeri, G., & Corsi, S. (2019a). Consumers' preferences for biodiversity in vineyards: A choice experiment on wine. *Wine Economics and Policy, 8*(2), 155–164

Mazzocchi, C., Ruggeri, G. and Sali, G. (2019b).A multivariate analysis on pastures landscape conservation in the alps and tourists' preferences, *Landscape online*.

Mazzocchi, C., & Sali, G. (2018). Assessing the value of pastoral farming in the Alps using choice experiments: Evidence for public policies and management. *Journal of Environmental Planning and Management, 62*(4), 552–567

McFadden, D. (1974). Conditional logit analysis of qualitative choice behavior. In P. Zarembka (Ed.), *Frontiers of Econometrics.* (pp. 105–142). Academic Press.

McMorran, R., Santini, F., Guri, F., Gomez-y-Paloma, S., Price, M., Beucheri,e, O., Monticelli, C., Rouby, A., Vitrolles, D., & Cloye, G. (2015). A mountain food label for Europe? The role of food labelling and certification in delivering sustainable development in European mountain regions. *Journal of Alpine Research Revue de géographie alpine*. https://doi.org/10.4000/rga.2654

Meemken, E.-M., & Qaim, M. (2018). Organic agriculture, food security, and the environment. *Annual Review of Resource Economics, 10*, 39–63

Ministero delle politiche agricole alimentari forestali e del turismo. (2018). Istituzione del logo identificativo per l'indicazione facoltativa di qualita' «prodotto di montagna» in attuazione del decreto ministeriale n. 57167 del 26 luglio 2017. 2 agosto 2018. http://www.gazzettaufficiale.it/eli/id/2018/09/29/18A06205/SG. Accessed 8 May 2021

Plank, A., & Teichmann, K. (2018). A facts panel on corporate social and environmental behavior: Decreasing information asymmetries between producers and consumers through product labeling. *Journal of Cleaner Production, 177*, 868–877

Pomarici, E., Asioli, D., Vecchio, R., & Næs, T. (2018). Young consumers' preferences for water-saving wines: An experimental study. *Wine Economics and Policy, 7*, 65–76

Qualivita-Ismea (2018). "Rapporto sulle produzioni agroalimentari e vitivinicole italiane". http://www.ismea.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/10497

Ricci, E. C., Banterle, A., & Stranieri, S. (2018). Trust to go green: An exploration of consumer intentions for eco-friendly convenience food. *Ecological Economics, 148*, 54–65

Rousseau, S. (2015). The role of organic and fair trade labels when choosing chocolate. *Food Quality and Preference, 44*, 92–100

Ruggeri, G., Mazzocchi, C., & Corsi, S. (2020). Drinking biodiversity: A choice experiment on Franciacorta sparkling wines. *British Food Journal, 122*, 8

Saleem, M., Rahim, I., Jalali, S., et al. (2013). Morphological characterization of Achai cattle in sedentary and transhumant systems in Pakistan. *Animal Genetic Resources, 52*, 83–90

Sándor, Z., & Wedel, M. (2001). Designing conjoint choice experiments using managers' prior beliefs. *Journal of Marketing Research, 38*(11), 430–444

Schäufele, I., & Hamm, U. (2018). Organic wine purchase behaviour in Germany: Exploring the attitude behaviour- gap with data from a household panel. *Food Quality and Preference, 63*, 1–11

Schjøll, A., Amilien, V., Revoredo-Giha, C., Leat, P., Kupiec, G., & Lamprinopoulou, C. (2010). "Promotion of mountain food: An explorative a study about consumers'and retailers' perception in six European countries". 9th European IFSA Symposium (pp. 1558–1567).

Spaargaren, G., & Oosterveer, P. (2010). Citizen-consumers as agents of change in globalizing modernity: The case of sustainable consumption. *Sustainability, 2*(7), 1887–1908

Tait, P. (2019). Estimating wine consumer preferences for sustainability attributes: A discrete choice experiment of Californian Sauvignon Blanc purchasers. *Journal of Cleaner Production, 233*, 412–420

Tebby, C., Giraud, G. and Amblard, C. (2010). "Determinants of interest in mountain food products: A European crosscountry study". In 9th European IFSA Symposium pp. 1568–1578. http://ifsa.boku.ac.at/cms/fileadmin/Proceeding2010/2010_WS4.1_Tebby.pdf

Tesco (2008). Carbon labelling and Tesco. www.tesco.com/assets/greenerliving/content/pdf/Carbon_Labelling_and_Tesco.pdf (consulted 7/8/2008).

Tonsor, G. T., Olynk, N. J., & Wolf, C. A. (2009). Consumer preferences for animal welfare attributes: The case of gestation crates. *Journal of Agricultural and Applied Economics, 41*, 714–730

Tregear, A., Arfini, F., Belletti, G., & Marescotti, A. (2004). The impact of territorial product qualification processes on the rural development potential of small-scale food productions. XI World Congress of Rural Sociology, Trondheim, Norway, July 25–30.

Train, K. (2009). *Discrete choice methods with simulation*. U.K.: Cambridge University Press.

Van Loo, E. J., Caputo, V., Nayga, R. M., Jr., & Verbeke, W. (2014). Consumers' valuation of sustainability labels on meat. *Food Policy, 49*, 137–150

Train, K., & Weeks, M. (2005). Discrete choice models in preference space and willingness-to-pay space. In R. Scarpa & A. Alberini (Eds.), *Applications of simulation methods in environmental and resource economics.* (pp. 1–16). Dordrecht: Springer.

Vanclay, J. K., Shortiss, J., Aulsebrook, S., Gillespie, A. M., Howell, B. C., Johanni, R., Maher, M. J., Mitchell, K. M., Stewart, M. D., & Yates, J. (2011). Customer response to carbon labelling of groceries. *Journal of Consumers Policy, 34*, 153–160

Von Dach, W., S., Romeo, R., Vita, A., Wurzinger, M. and Kohler, T. (2013). Mountain farming is family farming: a contribution from mountain areas to the International Year of Family Farming *2014.* FAO.

Zander, K., & Hamm, U. (2010). Consumer preferences for additional ethical attributes of organic food. *Food Quality and Preferences, 21*, 495–450

Zuliani, A., Esbjerg, L., Grunert, K. G., & Bovolenta, S. (2018). Animal welfare and mountain products from traditional dairy farms: How do consumers perceive complexity? *Animals, 8*, 207