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Article

Italian Consumer Willingness to Pay for Agri-Food Sustainable Certification Labels: The Role of Sociodemographic Factors

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Abstract: Studying consumers' willingness to pay (WTP) for sustainable certification labels and preferences in consumption is a relevant issue for policymakers. Several studies have revealed a positive WTP a premium price for many certified products. The aim of this paper is to assess an overview of Italian consumers' WTP for eight different sustainable certification labels and to collect information about their consumption preferences and perceptions in consumption. Participants were selected by stratified simple random sampling, using regional distribution, gender, and age as stratification criteria, to obtain a representative sample of N=3600. Eight ordered logit models were estimated to understand how consumer socio-demographic characteristics influence the price premium. The results show important differences in WTP among different certification labels; a higher WTP emerged for ethical certifications than for environmentally focused labels. Younger individuals, women, those with higher education, income, and life satisfaction, as well as consumers in Southern regions, were significantly more willing to pay premiums for certified products. However, a key finding for policymakers is that the stated price premium consumers are willing to pay falls significantly short of the actual higher costs of these products in supermarkets. Furthermore, insights into consumer perceptions and preferences revealed that quality and origin are perceived as key price drivers, while method of production holds less importance. It also emerged that consumers primarily seek a balance between quality and price, with only a small segment prioritizing certified products.

Keywords: agri-food; willingness to pay; certifications; consumers

1. Introduction

Understanding consumer behaviour in response to sustainable attributes of agri-food products has become increasingly critical in promoting environmentally responsible and socially equitable food systems. As global awareness of environmental degradation and ethical concerns about food production intensify, sustainability certifications have emerged as key tools for guiding consumer choices and incentivizing responsible practices throughout the supply chain (Potts et al., 2014). However, a challenge remains: sustainable products are often perceived as more expensive (Gomes et al., 2023), which raises essential questions about consumers' willingness to pay (WTP) for certified attributes.

Willingness to pay, defined as the maximum price premium an individual is prepared to pay for a specific product characteristic, is a valuable indicator of consumer preferences and market demand. Exploring WTP in relation to sustainability certifications allows a deeper understanding of how ethical, environmental and quality considerations are combined in purchasing decisions (Roy & Biswas, 2016; Janssen & Hamm, 2012). Moreover, analysing how sociodemographic variables

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influence WTP provides insight into the heterogeneity of consumer behaviour (Knaggs et al., 2022; Mauracher et al., 2019; Wei et al., 2018), offering strategic guidance for policymakers and industry stakeholders.

This study addresses these issues by empirically investigating Italian consumers' WTP for a diverse set of eight sustainability-related certifications. The literature has explored WTP for individual certification types (Xhakollari et al., 2023, Nam et al., 2021, Liu et al., 2019, Wang et al., 2018, Anastasiou et al., 2017), whereas comprehensive assessments across multiple certifications in a nationally representative sample remain scarce. Our contribution is threefold. First, we quantify the declared WTP premium for a range of certifications encompassing environmental, ethical and local attributes. Second, we assess how sociodemographic traits, such as age, gender, education, income and regional residence, affect WTP. Third, we examine how economic hardship, life satisfaction and purchasing perceptions further condition these behaviours.

Using an ordered logit modelling approach, a method also used by Di Vita et al. (2022), Galati et al. (2019) and Mauracher et al. (2019), on a robust dataset collected from over 2900 Italian consumers, we not only provide granular insights into how sustainable food attributes are valued but also uncover major socio-economic disparities in sustainable consumption. The findings are of practical relevance for promoting equitable access to sustainable food and for designing targeted communication and policy interventions that align consumer values with sustainability goals.

The structure of the paper is as follows. Section 2 reviews the state of the art. Section 3 provides a description of the questionnaire, the sample and the statistical method. Section 4 presents and discusses all the results. Section 5 draws conclusions.

2. Review of the Literature

Breidert et al. (2006) review methods for measuring WTP. The methods developed for this purpose can be divided into those based on revealed preferences (market data and experiments), and others based on stated preferences (direct and indirect consumer surveys). For revealed preferences, the most common type of experiments are auctions, for example Akaichi et al. (2011) investigated the use of multi-unit auctions for measuring WTP for food products. For stated preferences, Akaichi et al. (2013) estimated consumer preferences and consumer WTP by indirect survey, whereas Gregory-Smith et al. (2017) investigated consumer WTP for environmentally-friendly products by direct survey. Many studies indicate that consumers are generally willing to pay a premium for products with sustainable attributes. For instance, Li & Kallas (2021) conducted a meta-analysis of 80 worldwide studies and found that consumers show a positive WTP for various sustainable food attributes, including organic production, animal welfare and fair-trade practices. They also found that hypothetical methods (choice experiments and contingent valuation) produced higher WTP estimates than non-hypothetical ones. In Italy, Betti et al. (2024) conducted several studies that examined and demonstrated consumer WTP a premium for products with quality and sustainability certifications. Bazzani et al. (2017) explored consumer attitudes to local and organic products, highlighting the influence of personality traits on purchasing preferences. Their findings indicate that while consumers are willing to pay more for organic and local products, the former attribute tends to command a higher premium than the latter. Other studies have focused on environmental certifications. Canavari and Coderoni (2020) examined Italian consumers' WTP for carbon-footprint certifications, exploring the way these labels impact purchasing decisions and perceived product value. They indicate that consumers who perceive low carbon-footprint (CF) products as an effective way to mitigate climate change were more inclined to pay a premium. Conversely, price-sensitive consumers demonstrated a lower WTP for CF-labelled products, suggesting that cost remains a significant barrier to adoption. The relationship between consumer WTP and Corporate Social Responsibility (CSR) certifications has also been widely studied in the literature. For example, Lerro et al. (2018) and De Magistris et al. (2015) explored how consumers value CSR certifications in their purchasing choices. The former demonstrated the willingness of consumers to reward ethical companies and the latter the capacity of certification to contribute to value creation. Ruggeri et al.

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(2021) investigated fair-trade certification and found that consumers perceived it positively, demonstrating WTP a premium for certified products. This premium increased when consumers received additional information about the fair-trade system. The topic of fair-trade purchases has also been addressed by De Devitiis et al. (2008), Besnard et al. (2006) and Rotaris and Danielis (2011). Cappelli et al. (2020) analysed the correlation between potential WTP a premium price for products Made in Italy and consumer sample characteristics. They found that higher education levels among consumers were positively correlated with WTP for these products, indicating that more educated individuals tend to make sustainable food choices aligned with a sustainable lifestyle.

Further research has analysed WTP in specific sectors. In the seafood sector, studies by Menozzi et al. (2020), Carlucci et al. (2017), Mauracher et al. (2013) and Disegna et al. (2009) explored consumer valuation of certifications. The dairy industry has also been examined, with research by Scozzafava et al. (2020), Moro et al. (2015), Tempesta & Vecchiato (2013) and Vecchio et al. (2016) assessing consumer readiness to pay a premium for certified products. Similarly, studies by Mazzocchi et al. (2019), Palmieri & Perito (2020), Piracci et al. (2022) and Pomarici et al. (2018) have focused on the wine sector and finally by Aprile et al. (2012) on the olive oil sector. According to Napolitano et al. (2010), in the beef industry, consumer WTP and preferences are significantly greater when information about animal welfare is provided. Studies have also explored the impact of labelling on consumer WTP. Research by Rossi et al. (2024) on Italian consumer preferences for the Quality Agricultural Work (QAW) label in the fruit sector indicated a positive WTP for socially sustainable products.

To explore the drivers of consumers' inclination to spend more for food products with sustainable certifications, researchers have used ordered logistic regression models. Several studies have specifically employed ordered logit or ordered probit models to estimate WTP for sustainable and high-quality food products. For instance, Pomarici and Vecchio (2014) used an ordered probit model to examine whether Millennials were willing to pay more for sustainable wines, finding a positive WTP among this consumer group. Similarly, Galati et al. (2019) used an ordered logit model to estimate WTP for natural wine and found a significant WTP a premium. In another study, Di Vita et al. (2022) estimated WTP for low-fat salami using an ordered logit model, identifying key socio-demographic factors influencing WTP. Their results indicate that men, individuals with higher monthly incomes and those who engage in regular sporting activity were more willing to pay a premium for this product. Cicatiello et al. (2020) used an ordered logit model to assess WTP for environmental protection, finding that WTP for environmental sustainability increased in Italian regions with high production in polluting sectors. This suggests that exposure to pollution may heighten consumer awareness and concern for environmental issues. Mauracher et al. (2019) used an ordinal logit model to assess the WTP for organic wine, finding that consumers who consume wine less frequently and young people (under 50 years) had a higher propensity to pay for sustainable and organic wines. Conversely, consumers who place a greater emphasis on price showed reduced WTP. Finally, D'Amico et al. (2016) employed an ordered logit model and found that consumers particularly sensitive to environmental and quality issues were willing to pay a premium for organic wines without sulphite additives. All these studies highlight the importance of consumers' sociodemographic traits and their environmental and quality considerations in determining WTP.

3. Materials and Methods

3.1. The Questionnaire

Here we used a direct sample survey focused on a hypothetical experiment in order to investigate the socio-demographic traits influencing consumer WTP a premium price for food products and to measure the magnitude of WTP. The survey questionnaire (see appendix) consisted of many sections, but here we only focused on socio-demographic characteristics, economic hardship, life satisfaction, declared WTP for sustainable certifications and consumer purchasing perception. The socio-demographic section collected information on respondents' gender, age, region of

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residence, education level, household size, income level and occupation. We also explored whether financial difficulties in the preceding year had forced respondents' families to reduce food consumption or to opt for a less healthy and varied diet. To evaluate consumer WTP for sustainability-related certifications, respondents were asked to indicate the additional amount they would pay for food products featuring specific certifications. Since the concept of sustainability covers different attributes, we based our selection on the validated framework of Muriel et al. (2021), which considers the following sustainability dimensions: animal welfare, environmental welfare, ethical concerns, local production and seasonal attributes. Accordingly, we assessed the WTP of consumers for eight common food certifications, each reflecting a different aspect of sustainability: organic certification, representing consumer preference for products grown without synthetic inputs, pesticides or chemical fertilizers, thereby reducing environmental pollution and promoting biodiversity; zero impact certification, focusing on carbon-neutral or environmentally neutral production processes that aim to mitigate climate change by minimizing CO_2 emissions; KM0 certification, indicating locally produced food that reduces transport emissions and supports local economies, thereby decreasing the environmental footprint of food distribution; declared agriculture 4.0 certification, emphasizing advanced technologies and traceability in agricultural practices, improving efficiency while reducing waste of resources and environmental degradation; animal rights certification, addressing ethical concerns related to humane treatment and living conditions of animals, in line with increasing consumer awareness of ethical food production; labour law compliance certification, ensuring that workers involved in the food supply chain are treated fairly, paid appropriately and work under safe conditions, reinforcing social sustainability; 100% recyclable packaging certification, reflecting consumer interest in minimizing waste by promoting sustainable packaging and reducing the use of plastic; finally, sustainable product certification, representing broad commitment to environmental and social responsibility, and incorporating different sustainability aspects into one label.

To further understand purchasing behaviour, we investigated consumer perceptions of price differences in food products, asking them to score which of the following factors most affected prices: product origin, store type, promotions, quality and production methods. Since health and environmental concerns often drive consumer choices, we were particularly interested in whether respondents perceived product origin and quality as key determinants of price variation. Finally, we investigated participants' purchasing priorities by examining whether they placed greater emphasis on food safety (health), official certification, a balance between quality and price, or cheap bulk-buying. The questionnaire was developed and tested in a preliminary pilot study (Brogi et al., 2024), an initial non-probabilistic survey that provided valuable insights into response rates, question relevance, and necessary modifications, ensuring that the final version was clear, effective and aligned with the research objectives.

3.2. The Sample

Cross-sectional data was collected from a representative sample of 3600 consumers in Italy in 2024 using a CATI (Computer-Assisted Telephone Interviewing) survey.

Table 1. Description of sample (Weighted frequencies).

Variable	Category	%
GENDER	Female	51.8
	Male	48.2
AGE	18-44	33.0
	45-64	38.0
	65+	29.0
REGIONS	Northern regions	46.4
	Centre regions	19.9
	Southern regions and islands	33.7

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EDUCATION	Middle school	17.8
	High school	47.3
	Bachelor's degree	6.5
	Master's degree	24.5
	Postgraduate	3.8
N FAM MEMBERS	1	18.4
	2	34.7
	3	21.1
	4	19.3
	5	4.6
	More than 5	1.9
INCOME	< 25000€	42.2
	25.000€ - 44.000€	38.9
	44.001€ - 69.000€	13.8
	> 69.000€	5.4
OCCUPATION	Employee	39.4
	Self employed	12.1
	Retired	29.5
	Housewife/Househusband	11.3
	Job seeker	3.6
	Student	3.4
	Other	0.7

Participants were selected by stratified simple random sampling, using regional distribution, gender and age as stratification criteria. The final sample comprised 51.8% females and 48.2% males, categorized in three age groups representative of the Italian population: 33% aged 18-44 years, 38% aged 45-64, and 29% aged 65 and over. All 21 Italian regions were represented and the regional distributions reflected national population statistics. The final results were weighted so that the sample distribution reflected national ones. For analytical purposes, we divided the sample into three Italian macro-regions: South and Islands, Centre and North with 33%, 19.9% and 46.4% of the population, respectively. The median household size was two members. Household composition may influence purchasing behaviour, as larger households often have different consumption patterns and budget constraints than smaller ones. Regarding household income, 42% of respondents reported an annual income below €25.000, 38.8% between €25.000 and €44.000, 13.8% between €44.001 and €69.000 and 5.4% above €69.000. Regarding occupation, 54.5% of respondents were working, 12.1% self-employed and 39.4% salaried, while the remaining 48.5% were either students 3.4%, retirees 29.4%, job seekers 3.6% or housewives/househusbands 11.3%. These are the key socio-demographic characteristics of the sample. The next section deals with the descriptive statistics of the survey variables.

3.3. Statistical Model

We developed an econometric model that estimates an order logit model to determine whether consumers are willing to pay a premium for certain sustainable attributes, according to the research cited in Section 2. We used the order logit model to detect social characteristics that positively or negatively influence consumer WTP more for a specific attribute.

The general model estimated the WTP in relation to sociodemographic traits, life satisfaction and economic hardship. Eight different models were estimated, one for each of the specific certification labels described in the previous section. The response variable y_i, where i is a single respondent, is discrete and has five categories (j=0,…,4). A response indicating that a consumer is not going to pay more for a product with that certification label is coded 0, a response indicating intention to pay 5-10% more is coded 1, 10-20% more is coded 2, 20-50% more is coded 3, and up to 100% more

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is coded 4. The ordinal logistic regression model was parametrized as a cumulative logit model with proportional odds $logit(P(Y\leq j))=log\frac{P(Y\leq j)}{1-P(Y<j)} = \beta_0+\beta_1x_1+\cdots+\beta_kx_k$ (Agresti, 2002, Pujol-Rigol et al., 2025).

In ordinal logit models, besides the coefficients of the explanatory variables, a set of parameters known as cut-points (or thresholds), denoted CUT_j, are also estimated. These cut-points define the boundaries between the categories of the observed response variable (y_i), under the assumption of an underlying continuous latent variable. The logistic function connects this latent variable with the cumulative probabilities of the observed categories. In practice, the cut-points are the parameters of the model that determine the intervals of the latent variable that correspond to the observed categories. For example, if the latent variable is less than CUT_1, the response falls in the first category; if it lies between CUT_1 and CUT_2, it falls in the second category; and so on. In our models, CUT_1 separated category 0% from 5-10%, CUT_2 category 5-10% from 10-20%, CUT_3 category 10-20% from 20-50% and CUT_4 category 20-50% from 100%. Although cut-points are essential for estimating the model, they are generally considered nuisance parameters, as they do not carry a direct substantive interpretation of the phenomenon under study (Greene and Hensher, 2010).

The coefficient vector β was estimated with the R software that exploits maximum likelihood techniques. The coefficient α_j is the intercept for ordinal category j and coefficient β_k can be interpreted as the change in the conditional mean of y given a change in regressor x_k, except for log income, which is an estimated unit change in the dependent variable for a percentage change in log income variable. Odds ratios (ORs) were also calculated by assessing how the probability of the dependent variable shifts with a one-unit change in the explanatory variable. An OR of 1 indicates no impact on the dependent variable. When all other explanatory variables remain constant, the further the OR deviates from 1, the stronger its influence on the dependent variable.

The predicted probabilities were also computed in R. The predicted probability is a value between 0 and 1 that represents the likelihood of a specific outcome occurring, based on the model's predictions. In an ordinal logit model, it is assumed that the observed categories of the response variable are driven by an underlying continuous latent variable that cannot be observed directly. Each category corresponds to a specific range of this latent variable. For each observation, the probability of belonging to a given category is determined by taking the difference between the values of the cumulative distribution function (CDF) at the upper and lower cut-points. To facilitate interpretation, all predictor variables are fixed at their mean values. This provides a baseline scenario representing an average observation in the dataset, which is particularly useful for continuous predictors. According to Hanmer and Kalkan (2013), standardizing predictions in this way enhances clarity and comparability. It also reduces the influence of extreme or atypical observations, offering a clearer representation of the relationship between predictors and outcomes. However, as McCullagh (1980) cautioned in his foundational work on ordinal regression models, the choice of predictor values, such as the mean, must be made carefully, particularly when dealing with skewed distributions or categorical variables, where the mean may not represent a meaningful scenario. If these well-established practices for ordinal regression are followed, the method provides a robust framework for interpreting model relationships and presenting them in a clear, standardized manner.

4. Results and Discussion

All the results were weighted using weights designed specifically to reflect the Italian population at regional level and across age groups. The initial sample consisted of 3605 observations; after data cleaning, a final sample of 2978 observations was used to construct the models.

4.1. Descriptive Results

About 20% of Italian respondents reported that they had to reduce their food consumption or opt for a less healthy and balanced diet due to financial constraints in the previous year. Regional disparities emerged: in the South and Islands, this percentage rose to 26%, while in the North, it was about 18%. These findings are consistent with existing socio-economic disparities across Italy, where

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the southern regions tend to experience higher levels of economic hardship. Considering age differences, respondents under 45 reported slightly lower food insecurity rates, with fewer than 20% experiencing such difficulties, possibly reflecting the fact that younger Italians depend more on family support.

Table 2. Consumption, economic hardship and life satisfaction.

VARIABLE		Category	%
Due to economic **hardship: less food**		Frequently	5.2
		Sometimes	16.4
		Never	78.4
Due to economic hardship**: less healthy diet**		Frequently	5.5
		Sometimes	15.0
		Never	79.5
Life satisfaction		0 - 4	5.1
Median	**8**	5 - 6	14.8
Mean	**7.5**	7 - 10	80.1
CV	**0.24**		

Reducing food consumption and opting for a less healthy and balanced diet were highly correlated (r = 0.67, Spearman correlation, see Table 6), as expected, indicating that families facing one of these issues are likely to experience the other as well. Of course, this does not mean that all affected families face both difficulties simultaneously. Households may prioritize maintaining food quantity or quality, based on their preferences and needs. Some may choose to reduce portion sizes while maintaining a diverse and nutritious diet, while others may prioritize sufficient food intake at the expense of variety and nutritional value. This distinction could be influenced by cultural food preferences, health considerations or household composition, including for example children or elderly members.

Life satisfaction was generally high, with a median score of 8 out of 10 and a mean score of 7.5. The coefficient of variation was 0.24, indicating low variability with respect to the mean. However, 5.1% of respondents reported low life satisfaction (i.e. below 5), and 14.8% of respondents scored only 5 or 6. Age played a crucial role in perceived life satisfaction. Among under 45s, 61% rated their satisfaction as 7 or 8, compared to 50% of over 65s. Conversely, 29% of over 65s rated their life satisfaction as 9 or 10, compared to 21% of younger respondents. Respondents in the 45-64 year group scored intermediate values. This trend indicates that life satisfaction increases with age, possibly due to factors such as greater economic stability, lower stress levels, and different life priorities among older individuals.

Table 3 shows the distribution of respondents' WTP premiums for various sustainability-related product attributes and certifications. The data is segmented into six *WTP more* categories: 0%, 5–10%, 10–20%, 20–50%, up to 100%, and "Don't know/NA."

Table 3. WTP for different certification labels.

Variable	Label	WTP more					
		0%	5-10%	10-20%	20-50%	Up to 100%	Don't know/ NA
Organic Certification	OrganicC	30.2	35.2	18.9	7.7	2.3	5.7
Zero Impact Certification	ZeroC	31.5	33.6	17.1	7.6	2.2	8.1
KM0 Certification	KM0C	25.3	36.9	20.1	9.7	3.4	4.7
Declared Agriculture 4.0	Agr40D	32.6	25.7	11.3	5.2	1.7	23.5
Animal Rights **Certification**	AnimC	23.3	35.1	20.7	11.0	4.2	5.8
Labou**r Law Compliance Certification**	LaborC	26.8	29.5	19.0	11.8	4.9	8.1
100% recyclable Packaging Certification	EcopackC	33.0	35.9	14.2	7.2	2.6	7.1

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Sustainable Products	SustC	28.0	36.9	15.7	7.8	2.6	9.0

Overall, the majority of respondents indicated moderate willingness to pay more, the 5–10% range being the most frequently selected category across most certifications. For instance, the KM0 Certification and Sustainable Products attributes showed the highest share in this range (36.9%), indicating consumer preference for locally sourced and environmentally responsible products. Conversely, certifications like Declared Agriculture 4.0 had a significantly higher share of respondents indicating no willingness to pay more (32.6%) and a notably high rate of uncertainty or lack of awareness (23.5% checked Don't know/NA), suggesting limited public understanding of the item or its perceived value. Certifications related to ethical considerations, such as Animal Rights and Labour Law Compliance, also showed a relatively even distribution across the 5–10%, 10–20% and 20–50% categories, indicating a subset of consumers willing to pay moderately higher premiums for ethical assurance. Conversely, the 100% Recyclable Packaging certification showed weak support, 33.0% of respondents being unwilling to pay more and a substantial 35.9% willing to pay only up to 5-10% more.

These findings underscore that while many consumers were open to paying a premium for sustainability-related product features, the level of that premium varied with attribute, presumably influenced by perceived value, trust and awareness. Attributes with less consumer familiarity, such as Agriculture 4.0, may benefit from targeted information campaigns to raise awareness and justify a rise in price

These results highlight a significant gap between consumer WTP and the actual price premiums associated with sustainable food products. This discrepancy suggests that price sensitivity remains a major barrier to purchasing sustainably certified goods. Big regional and age-related differences also emerged. WTP was highest in the South, lower in the Centre, and lowest in the North. One possible explanation is that food prices tend to be lower in the South, making price premiums for sustainability more acceptable. However, further investigation is needed to verify this hypothesis. Age was also an influential factor, younger respondents reporting a higher WTP than older age groups. This trend may reflect greater environmental awareness among younger generations and more concern about the future. Such insights emphasize the need for stronger consumer education and targeted awareness campaigns, particularly aimed at older consumers, to promote sustainable consumption more effectively.

Understanding how consumers perceive food prices and make purchasing decisions provides valuable insight into their WTP for sustainability certifications. The results showed that price sensitivity remains a strong factor in consumer choices, with differences emerging across age groups and geographical regions.

When asked the reasons for food price differences (Table 4), a majority of respondents, 44.1%, identified quality as the most important factor. This association stems from the common belief that higher prices reflect superior taste, nutritional value and food safety. Younger consumers tend to emphasize quality more than older ones, presumably due to greater exposure to premium food branding and health-oriented product marketing. The second most cited factor was product origin, 30.6%, though it was considered significantly less important by over 65s, 24.9%. This suggests that older consumers are less concerned about supporting local producers or mitigating the cost implications of imported goods. Promotions were identified as relevant by 25.4% of respondents, older consumers (30.2%) being more likely than younger (21.7%) to consider them important. This may reflect greater price sensitivity among the elderly, many of whom live on fixed pensions and have more time to search for specials. As such, they tend to prioritize cost savings over sustainability-oriented attributes, indicating a generational divergence in purchasing motivations. Regional differences were also detected. For instance, the type of retail outlet was more frequently cited as a price determinant in the North, 26.1%, than in the South, 20.4%. This may reflect the broader presence of large supermarket chains in the North, in contrast to more stable, localized pricing in southern retail formats.

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Table 4. Factors perceived as most affecting price differences (multiple choices were allowed).

	Italy	18-44	45-64	65+	Centre	North	South and Islands
Quality	44.1	47.5	43.8	40.6	46.7	42.6	44.7
Origin	30.6	32.7	33.0	24.9	30.7	32.6	27.6
Promotions	25.4	21.7	30.2	23.3	24.9	25.3	25.9
Retail type	23.3	25.6	25.2	18.2	21.8	26.1	20.4
Production method	21.4	26.4	21.7	15.3	21.8	22.3	20.0
Other	3.4	3.4	3.4	3.36	3.2	3.1	3.9
Don't know/ No response	4.4	2.5	4.1	6.9	3.9	4.5	4.4

Production method was another influential factor, particularly among younger consumers, 26.4%, supporting the notion that this demographic group has a higher WTP for products with sustainability certifications. Older respondents appeared less concerned with how food is produced, possibly due to long-standing trust in traditional farming and food production techniques.

Finally, a small proportion, 3.4%, cited other factors, while 4.4% of all respondents were unable to specify any reason—this figure rose to 6.9% among over 65s, indicating slightly lower engagement in price reasoning in this group.

The data on purchasing behaviour (Table 5) confirmed that balancing quality and price was the primary concern for Italian consumers, more than half of the sample selecting this option. This reflects a nuanced consumer mindset: price matters, but not at the expense of perceived quality. This trend was accentuated among older consumers, 57.3%, and in Northern Italy, 54.2%, where higher living costs may drive a more pragmatic approach to food purchasing.

Table 5. Self-Declared Purchasing Behaviour.

	Italy	18-44	45-64	65+	Centre	North	South and Islands
I prefer the right balance between quality and price	51.71	45.63	52.69	57.34	46.3	54.19	51.49
I am willing to pay a higher price if the **product is certified**	11.44	13.07	12.7	7.93	12.62	11.03	11.29
I am willing to pay a higher price if the product is safe (healthy)	28.68	33.37	27.05	25.48	32.34	26.9	28.96
I am willing to purchase a larger quantity of the product if the price is low	6.19	6.79	5.96	5.81	5.99	5.62	7.09
Don't know/ No response	1.99	1.14	1.61	3.44	2.75	2.25	1.17

Only 11.4% of the sample reported being willing to pay more for certified products, reinforcing the idea that certification alone is not a strong motivational factor. In contrast, nearly 29% indicated a willingness to pay more for safe and healthy products, a behaviour particularly evident among younger consumers, 33.4%, and residents of the central regions, 32.3%. This may reflect greater health awareness and higher purchasing power in these groups. Despite evident price sensitivity, few consumers, 6.2%, favoured bulk buying to save money. This suggests a cultural preference for freshness and quality, consistent with Italy's culinary traditions and frequent shopping habits centred on fresh ingredients. Slightly higher levels of non-response, 3.4%, among older consumers pointed to marginally lower levels of conscious decision-making, but overall engagement across all demographics remained high. These findings indicate that sustainability certifications alone do not significantly drive consumer purchasing behaviour. Instead, attributes such as quality, health benefits, and price are much more influential. Generational differences are evident, younger consumers demonstrating greater openness to health and sustainability, while older consumers remained more influenced by price promotions and familiar shopping environments. Regional differences further discriminated purchasing priorities. In the northern regions, consumers focused

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more on balancing quality and affordability, while in the central regions, there was a stronger WTP for health-related benefits. These variations underscore the need for targeted communication strategies. To make certified sustainable products more appealing, marketing and policy interventions should strengthen the connection between sustainability, health and food quality. Emphasizing how sustainable choices contribute to personal wellbeing could bridge the current communication gap and expand consumer engagement across age and regional groups.

4.2. Econometric Model Results

Eight ordered logit models were applied, using the WTP for each of the eight certifications as dependent variables. This approach allowed us to assess the influence and significance of socio-demographic characteristics, attitudes, behaviours and consumption preferences on respondents' WTP. It also showed differences in the relative importance of specific variables across various sustainability attributes. Regarding the variables included in the model, in order to avoid the dummy variables trap, we excluded the reference categories *Middle-age* and *Centre*, as they represented the central values of their respective categorical variables. *Gender* was coded 1 for females and 0 for males. *Education* was measured in years of schooling. *Nrelatives* was the number of household members. *Life Satisfaction* was coded from 1 (lowest) to 10 (highest). *Occupation* was coded 1 for employed and self-employed individuals, and 0 for students, retirees, the unemployed and housewives/househusbands. *LessHealthyDiet* was coded 1 if the respondent reported reducing consumption of healthy food "often" or "sometimes" and 0 if "never". *Logincome* was the logarithm of the average of the midpoint of each income class. For the open-ended top category (income above 69,000), the average value of 85,000 was used, and the logarithm was taken accordingly.

Multicollinearity was not a significant issue, the Spearman correlation coefficients between variables generally being low (Table 6). However, the variables *Less Healthy Diet* and *Less Food* showed a high correlation. To mitigate multicollinearity, we excluded *Less Food* from the models. We further assessed multicollinearity using the Variance Inflation Factor (VIF) for each model. VIF is a measure used to detect multicollinearity among explanatory variables. It is calculated as $\text{VIF}=\frac{1}{1-R^2}$ for each independent variable in a model. A VIF below 10 is typically considered acceptable (Belsley, Kuh, & Welsch, 1980), while a VIF of 1 indicates orthogonality with other variables (Robinson & Schumacker, 2009). In all eight models, VIF values ranged between 1 and 2, confirming the absence of serious multicollinearity concerns.

Table 6. Spearman pairwise correlations.

Variables	Young	Elders	Education	Gender	NRelatives	South	North	Life Satisfation	LogIncome	Occupa-tion	LessHealthyDiet	LessFood
Young	1.00											
Elders	-0.45	1.00										
Education	0.23	-0.27	1.00									
Gender	0.02	-0.01	-0.06	1.00								
NRelatives	0.15	-0.32	0.09	0.03	1.00							
South	0.07	-0.07	0.02	0.05	0.13	1.00						
North	-0.07	0.07	-0.04	-0.04	-0.10	-0.65	1.00					
Life Satisfation	0.01	0.03	0.06	0.00	0.07	-0.02	0.01	1.00				
LogIncome	0.10	-0.17	0.42	-0.17	0.21	-0.13	0.08	0.18	1.00			
Occupation	0.36	-0.63	0.37	-0.14	0.19	0.00	-0.01	0.04	0.29	1.00		
LessHealthyDiet	-0.03	0.00	-0.21	0.04	0.01	0.05	-0.07	-0.24	-0.25	-0.10	1.00	
LessFood	-0.03	0.01	-0.18	0.08	0.01	0.08	-0.07	-0.20	-0.24	-0.11	0.67	1.00

Table 7 shows the results of the model, significance levels and goodness-of-fit for each of the eleven independent variables. The four threshold parameters (cut points) used in the ordered logit specification are also reported.

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Table 7. Order logit model (beta coefficient, odds ratio, standard error).

- β coefficient	*Dependent variable:*							
- odds ratio	OrganicC	ZeroCO2C	Km0C	Agric40D	AnimC	LaborC	EcoPackC	SustC
- standard error	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Young	0.322***	0.380***	0.535***	0.449***	0.424***	0.265***	0.297***	0.393***
	1.380***	1.462***	1.708***	1.567***	1.528***	1.303***	1.346***	1.482***
	(0.084)	(0.086)	(0.084)	(0.095)	(0.084)	(0.084)	(0.086)	(0.086)
Elders	-0.352***	-0.141	-0.227**	-0.196*	-0.288***	-0.235**	-0.099	-0.184*
	0.703***	0.868	0.797**	0.822*	0.750***	0.791**	0.906	0.832*
	(0.105)	(0.107)	(0.104)	(0.119)	(0.105)	(0.105)	(0.107)	(0.108)
Education	0.056***	0.041***	0.039***	0.036***	0.042***	0.021*	0.024**	0.025**
	1.057***	1.042***	1.040***	1.037***	1.042***	1.021*	1.024**	1.025**
	(0.012)	(0.012)	(0.012)	(0.013)	(0.011)	(0.012)	(0.012)	(0.012)
Female	0.075	0.374***	0.062	0.343***	0.277***	0.196***	0.338***	0.363***
	1.077	1.453***	1.064	1.409***	1.319***	1.216***	1.402***	1.438***
	(0.071)	(0.073)	(0.071)	(0.081)	(0.071)	(0.071)	(0.072)	(0.073)
NRelatives	0.002	-0.017	-0.051*	-0.006	-0.051*	-0.045	0.019	-0.021
	1.002	0.983	0.950*	0.994	0.951*	0.956	1.019	0.979
	(0.031)	(0.032)	(0.031)	(0.035)	(0.031)	(0.031)	(0.031)	(0.032)
South	0.200**	0.240**	0.172*	0.313***	0.168*	0.185*	0.261***	0.201**
	1.221**	1.271**	1.187*	1.368***	1.182*	1.203*	1.298***	1.222**
	(0.098)	(0.099)	(0.097)	(0.111)	(0.097)	(0.098)	(0.100)	(0.101)
North	-0.124	-0.054	-0.113	-0.064	-0.068	-0.025	-0.008	-0.109
	0.883	0.948	0.893	0.938	0.934	0.975	0.992	0.897
	(0.091)	(0.093)	(0.090)	(0.104)	(0.090)	(0.091)	(0.093)	(0.094)
Life Satisfation	0.085***	0.105***	0.083***	0.087***	0.080***	0.086***	0.093***	0.087***
	1.089***	1.111***	1.086***	1.091***	1.083***	1.089***	1.097***	1.091***
	(0.021)	(0.021)	(0.021)	(0.024)	(0.021)	(0.021)	(0.021)	(0.021)
LogIncome	0.298***	0.443***	0.254***	0.429***	0.488***	0.510***	0.339***	0.409***
	1.347***	1.557***	1.289***	1.536***	1.629***	1.665***	1.404***	1.505***
	(0.064)	(0.066)	(0.064)	(0.073)	(0.064)	(0.065)	(0.066)	(0.066)
Occupation	-0.142	-0.306***	-0.050	-0.365***	-0.097	-0.236**	-0.256***	-0.232**
	0.868	0.736***	0.951	0.694***	0.908	0.789**	0.774***	0.793**
	(0.094)	(0.096)	(0.094)	(0.106)	(0.094)	(0.095)	(0.096)	(0.096)
LessHealthyDiet	-0.334***	-0.241***	-0.278***	-0.255***	-0.076	-0.077	-0.290***	-0.363***
	0.716***	0.786***	0.758***	0.775***	0.927	0.926	0.748***	0.696***
	(0.071)	(0.072)	(0.070)	(0.082)	(0.069)	(0.068)	(0.072)	(0.072)
Cut 1	3.540***	5.294***	2.572***	5.253***	5.035***	5.096***	4.023***	4.349***
	(0.632)	(0.642)	(0.617)	(0.714)	(0.629)	(0.631)	(0.639)	(0.641)
Cut 2	5.203***	6.897***	4.338***	6.822***	6.734***	6.527***	5.750***	6.179***
	(0.636)	(0.648)	(0.621)	(0.721)	(0.636)	(0.636)	(0.645)	(0.648)
Cut 3	6.628***	8.223***	5.645***	8.031***	7.949***	7.629***	6.911***	7.383***
	(0.640)	(0.653)	(0.625)	(0.725)	(0.639)	(0.640)	(0.647)	(0.651)
Cut 4	8.237***	9.864***	7.100***	9.637***	9.405***	9.02***	8.395***	8.875***
	(0.652)	(0.664)	(0.632)	(0.738)	(0.645)	(0.645)	(0.656)	(0.659)
Log-Likelihood	-3667.759	-3547.376	-3847.989	-2823.35	-3903.202	-3923.149	-3559.568	-3527.404
AIC	7365.518	7124.752	7725.978	5676.7	7836.405	7876.297	7149.135	7084.808
BIC	7454.722	7213.586	7815.314	5762.784	7925.599	7965.055	7238.078	7173.5
Observations	2827	2758	2852	2296	2825	2744	2778	2732

Note: *p<0.1; **p<0.05; ***p<0.01.

Due to missing values (NAs), the number of observations differed slightly across models. The results (Table 7) revealed consistent and statistically significant patterns.

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First it emerged that age was a strong determinant of WTP. Younger individuals showed significantly higher WTP across all eight certifications, as shown by positive and highly significant coefficients. In contrast, older individuals were generally less willing to pay. Notably, the *Elders* coefficient was not statistically significant for Ecofriendly Packaging and Zero CO_2 certifications, suggesting that environmental concerns may be more uniformly shared among older age groups for these specific attributes. Education had a consistently positive and significant effect on WTP across nearly all models, reinforcing the link between educational attainment and pro-sustainability attitudes. The only exception was the Labour Law Compliance certification, where the effect was marginally significant ($p < 0.1$), suggesting that education may play a more limited role in this specific domain. Gender was also a significant factor for nearly all attributes, females showing a higher WTP than males for most certifications, with coefficients significant at 1% level. Exceptions were Organic and KM0 certifications, for which the gender effect was not significant, suggesting uniform appeal across genders. The number of household members variable did not show a consistent effect on WTP, as the coefficients were mostly not significant across all models. This may reflect the complexity of financial dynamics in Italian households, where young adults often live at home longer and may contribute to household income, offsetting the cost burden typically associated with larger households. Regional differences also emerged. Consumers from the South showed a significantly higher WTP than those from the Centre, while differences between North and Centre were generally not significant. A strong and statistically significant positive association was observed between greater life satisfaction and WTP across all models. This suggests a link between personal well-being and concern for sustainability, possibly reflecting broader life attitudes. Income was positively and significantly associated with WTP in all models. This was expected, as individuals with higher incomes are more likely to afford and prioritize sustainable product choices. Workers showed consistently lower WTP across several certifications, particularly Zero CO_2, Animal Welfare, Ecofriendly Packaging and Labour Compliance. This may reflect time constraints or differing priorities among people who work. Finally, individuals who reduced their consumption of healthy food for economic reasons tended to show significantly lower WTP. These findings underscore the way economic limitations can constrain sustainable consumption, even among individuals who may otherwise be inclined to such choices.

Summarizing, the results indicate that being young, female, educated and well-off are all factors positively associated with WTP for sustainability certifications. Conversely, economic constraints, expressed as lower income or reduced food quality, significantly limit WTP. These findings underscore the importance of demographic, socioeconomic and behavioural factors in shaping consumer demand for sustainable products.

Table 8 shows the predicted probabilities of WTP across five expenditure categories for each sustainability certification. These probabilities are derived from the estimated coefficients and threshold parameters of the ordered logit models and represent the expected distribution of responses in the population.

Table 8. Predicted probabilities.

Dependent variables	**WTP**				
	No more	**5-10% more**	**10-20% more**	**20-50% more**	**100% more**
OrganicC	0.327	0.369	0.204	0.078	0.022
ZeroCO_2C	0.362	0.356	0.183	0.078	0.021
Km0C	0.268	0.391	0.212	0.095	0.034
Agric4.0D	0.428	0.338	0.148	0.068	0.019
AnimC	0.263	0.373	0.211	0.111	0.042
LabourC	0.296	0.326	0.204	0.123	0.051
EcoPackC	0.360	0.385	0.155	0.075	0.025

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SustC	0.321	0.404	0.169	0.080	0.026

Although the predicted probabilities are very similar to the observed relative frequencies, their inclusion is justified as they are derived from the model's estimated coefficients and thresholds. This ensures that the results reflect the relationships between predictors and outcomes, rather than merely describing the sample. Additionally, predicted probabilities allow generalization beyond the observed data and validate the model's ability to accurately represent the underlying distribution.

5. Conclusion, Implications, Limitations and Future Research

This study examined Italian consumer WTP for sustainability certification labels on generic food products, contributing to the literature on ethical consumption and sustainable food economics. By ordered logit models on survey data, we explored the determinants of WTP and the relative appeal of various certification types.

The findings indicate that ethical certifications, particularly those focused on Labour Law Compliance and Animal Welfare, were associated with higher WTP than environmentally focused labels. KM0 certifications also showed strong consumer support, presumably due to deep-rooted cultural preferences for local food. Demographic factors played a central role. Younger consumers, women, persons with higher education, and those with a higher income and life satisfaction were significantly more likely to pay premiums for certified products. Regional disparities were also notable, Southern consumers expressing higher WTP than their Central and Northern counterparts, possibly reflecting regional cultural or economic factors.

These insights suggest several policy implications. To enhance the adoption of sustainable certifications, communication strategies should go beyond environmental framing and highlight ethical, social and health benefits. Given the financial barriers some consumers face, especially those with lower income or who restrict their diet to save money, policies such as subsidies, tiered pricing or financial incentives could help improve access and equity in sustainable food markets.

The limitations of the study include the fact that our WTP estimates were derived from a hypothetical contingent valuation approach, which is prone to biases such as social desirability and hypothetical market effects (Bateman et al., 2002). While this method allowed us to explore preferences in a controlled setting, it may have overstated true WTP, as also noted in some meta-analyses (e.g. Li & Kallas, 2021). Despite this, our estimated WTP remained below actual market premiums for certified goods, reinforcing the need for affordability-enhancing policies. Furthermore, although these biases may affect absolute values, the relative differences across sociodemographic groups are presumably robust.

Future research is essential to assess the implementation and effectiveness of sustainability policies. We plan to conduct follow-up surveys and develop a rotating panel survey to track changes in WTP and consumer perceptions over time. We shall also incorporate advanced econometric models, such as Structural Equation Models (SEM), often used in WTP studies. In the present preliminary study we constructed an ordered logit model to examine differences in the Italian population.

Appendix A

Table A1. The questionnaire.

Section 1 Socio-demographic traits	
Gender	• Woman • Man • I identify as non-binary • Prefer not to answer
Age	_____

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Region	_____ (Select an Italian region)
Education level	• Lower secondary school • Upper secondary school • Bachelor's degree • Master's degree • Postgraduate
How many people belong permanently to your household, including yourself?	_____
Indicate your family's annual net income bracket.	• Less than 25,000 • 25,000-44,000 • 45,000-64,000 • Over 65,000
What is your profession?	• Student • Employee • Self-employed • Retired • Job seeker • Housewife/Househusband • Other
In the last 12 months, has your family had to reduce the amount of food served at meals for economic reasons?	• Never • Sometimes • Often • Not applicable, someone else covers the expenses
In the last 12 months, has your family had to give up a healthy and varied diet for economic reasons?	• Never • Sometimes • Often • Not applicable, someone else covers the expenses
Overall, how satisfied are you with your life?	From 0 - Not at all satisfied to 10 - Completely satisfied
Section 2 WTP for certifications	
How much more would you be willing to pay, compared to other similar items, for food that is certified organic?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)
How much more would you be willing to pay, compared to other similar items, for food that is certified zero impact, i.e. zero CO_2 emissions?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)
How much more would you be willing to pay, compared to other similar items, for food that is certified local (KM0)?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)
How much more would you be willing to pay, compared to other similar items, for food that is declared by the producer to be a 4.0 Agriculture product?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)

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How much more would you be willing to pay, compared to other similar items, for food that is certified as being produced without causing suffering to animals?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)
How much more would you be willing to pay, compared to other similar items, for food that is certified as being made in compliance with current labour regulations?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)
How much more would you be willing to pay, compared to other similar items, for food that is sold in 100% recyclable packaging?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)
How much more would you be willing to pay, compared to other similar items, for food that has a sustainability certificate?	• I am not willing to pay more • 5-10% more • 10-20% more • 20-50% more • Up to 100% more (double the price)
Section 3 Perceptions	
In your personal experience, which of the following factors most influence price differences for the same food product? (Multiple answers)	• Product origin • Type of store • Promotions (Advertising, flyers, etc.) • Product quality • Production method • Other: _____
Which phrase best describes your purchasing behaviour?	• I am willing to pay a higher price if the product is safe (healthy). • I am willing to pay a higher price if the product is certified. • I prefer the right balance of quality and price. • I am willing to buy a larger quantity of the product if the price is low.

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