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How Product Attributes and Consumer Characteristics Influence the WTP, Resulting in a Higher Price Premium for Organic Wine

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Abstract: Sustainable production systems have become a relevant issue for consumers in the wine industry. Several studies have revealed that consumers are increasingly interested in organic wine and have attempted to estimate the price premium that consumers would have to pay for this 'new' product. The aim of this paper is to assess the role of organic attributes in driving consumer choice, and how consumer socio-demographic characteristics influence the price premium for organic wine. An on-line survey was administrated among Italian wine consumers (N = 317) and an ordinal logistic regression model, based on cumulative probability distribution, was estimated. The results show important differences in the Willingness to Pay (WTP) between different market segments. Younger people have a more positive attitude towards wine with sustainable characteristics, and we found that consumers aged under 50 have a higher WTP. Price is another attribute that affects preferences for organic wine: consumers that state that price is a very important factor in the choice of a bottle are less willing to pay for organic wine. Consumers characterized by a low consumption frequency have a higher WTP for organic wine.

Keywords: organic; sustainability; wine; WTP; price premium; consumer behavior; ordinal logistic

1. Introduction

Worldwide consumer choices are paying growing attention to environmentally friendly practices and green products. The latest tendencies confirm a greater concern for health and the environment [1–6], and organic products in particular are perceived by consumers as healthier and of a higher quality, as well as more respectful of the environment.

Sustainable production systems have become a relevant issue for consumers in the wine industry [7]. Numerous studies in different countries have revealed that consumers are increasingly interested in organic wine. The definition of organic wine is not consistent, and different eco-labels related to organic certification are only partially recognized and understood by consumers [8–10]. This is also due to the presence of a growing number of regulations and standards. In the European Union, while a standard has existed for organic grapes since 1991, there was no standard for organic wine until recently. A formal definition of organic wine has only existed in the EU since 2012, when the rules for organic wines were implemented. Until then, a wine made in a more natural way could only have been described as a "wine made from organic grapes", which does not necessarily mean that it was vinified in an organic way. The new standard, set by Regulation (EU) No. 203/2012, was implemented for the 2012 harvest.

In general, organic production costs are higher than the conventional alternative [8]. In order to make organic production possible, consumers need to pay higher prices for such products. The higher

price for organic products is a consequence of both the higher costs of production and processing and the greater value that these products have for consumers, who perceive them as higher-quality, healthier, and more environmentally friendly.

There is a growing amount of literature on the market regarding certification and quality standards, including articles that specifically refer to organic wine. Preferences for organic products vary across countries and consumers within a specific country [11]. Consumers with specific values and attitudes are willing to pay more for organic food and wine.

First of all, it is important to highlight the fact that consumers are often unable to make informed purchase decisions when they choose sustainable food or wine, because the benefits associated with such products are poorly conveyed, and because consumers have a limited knowledge of sustainable agricultural production practices [12–15]. Several authors [9,10] have pointed out that the definition of organic wine is not consistent globally, and related terms such as sustainable, natural, or biodynamic can be confused.

Regarding the influence of information on organic methods, Schäufele and Hamm [7] confirmed that higher levels of knowledge are related to a more positive perception, a greater willingness to purchase organic wine [16], and a greater likelihood of paying a price premium for organic wine without added sulphites [17].

Greater knowledge regarding wine in general also makes consumers more likely to prefer organic wine [18].

Only a small segment of the consumers is willing to buy sustainable or eco-friendly wine [14,19].

In a cross-national study, a consumer segment of about 35–38% valued environmentally sustainable wine [20], whereas a higher percentage (73%) of respondents from New Zealand was interested in sustainable wine.

The analysis by Pomarici et al. [14] of Italian wine consumers showed an interest in eco-friendly wine and in particular, in the need to preserve natural resources and reduce water consumption when producing wine. The results indicate that 46% of respondents believe that the former aspect is very important, while only 28% believe in the specific importance of the water aspect. Applying a cluster analysis, the study identifies two different segments: the first (68% of the sample) includes consumers less sensitive to the environmental impacts of wine production, while the second includes respondents who pay greater attention to environmental aspects.

A more recent study, conducted by Schäufele and Hamm [21] and based on a German household panel dataset (real purchase data), indicated that ethically concerned wine consumers accounted for 35% of all German wine-purchasing households. However, only 21% showed a relatively high level of action when it came to environmentally conscious wine purchase behaviour. The rest of the ethically concerned wine consumers were indeed sustainably oriented, but did not convert these attitudes into actual purchase behaviour, probably because of the so-called "price barrier".

As for the amount of price premium, Sogari et al. [22], based on a survey on the perception of Italian consumers towards sustainable wine, highlighted the fact that consumers with a positive attitude towards sustainable wine and a strong belief in certification account for the majority of individuals (30.7%), with a WTP in the range of 2.01–3.00€. On the other hand, consumers with a positive attitude towards sustainable wine, but who do not believe in the importance of certification and environmental protection, are more willing to pay a price in the 1.01–2.00€ range. Cluster 3 is characterized by a very high WTP for both the 3.01–5.00€ and 5€ + ranges, confirming that even if they do not believe in the certification system, their attitude towards sustainable wine is extremely positive. In the last cluster, more than 45% of consumers would be prepared to pay either nothing or less than 1.00€ for a wine certified as sustainable.

As for the motivation for the purchase of organic wine, some studies found that consumer perceptions of environmental benefits [23] and environmental consciousness and curiosity [17] were positively related to the purchase of organic wine. However, those studies were based exclusively on surveys and did not involve tasting or sensory evaluations. Rahman et al. [24] found taste alone to be

a strong predictor of wine preferences, not only in the case of organic wines, but also for all four wines in their study. Positive health effects are also a determining factor [23,25].

Another important variable affecting organic wine purchase is the origin of the wine: this has a greater influence on consumer preferences than production methods [18,26].

Habits are also important drivers of sustainable wine. Being responsible for food shopping and wine purchasing or consumption frequency may influence willingness to pay a price premium [13,27]. In particular, those who drink wine more often are more interested in sustainable wines; consumers who are less interested in the sustainability of wine consume wine less frequently [14].

When choosing a bottle, individuals who are less interested in the sustainability of wine mainly pay attention to the price and the area of production, while the more environmentally oriented consumers spend more on average for wines consumed at home, and their wine choices are more heavily influenced by grape variety [14].

With reference to socio-demographic variables, Schäufele and Hamm [7] found that these could influence consumer behaviour indirectly, through attitudes. In particular, as regards gender, several authors found a significant relationship between this variable and behavioral intention: females are willing to pay a higher price premium [28]. Consumer income also has a positive impact on WTP for sustainable wine [14,28]. D'Amico et al. [17] did not find this correlation. With regard to age, empirical results are mixed: some studies indicated that younger people had a more positive attitude towards wine with sustainability characteristics [22,29], while other studies found that older consumers had a higher WTP [13,28] and were more likely to purchase [27] sustainable wine.

Because of the high level of product differentiation, consumers vary widely in their preferences regarding wine attributes. Identifying different segments of consumers allows for the development of specific marketing strategies. Numerous authors have carried out segmentation studies that have found homogeneous consumer segments.

The aim of this work is to assess the role of organic attributes in driving consumer choice, and how consumer socio-demographic characteristics influence the price premium for organic wine.

We have not referred to the Stated Choice Experiment (SC) to elicit information on preferences, because there is a high risk of respondents making different choices from those made in the real-life situation, producing the so-called hypothetical bias.

It is well-known that in SC experiments, it is costly to run, and very difficult to measure, hypothetical bias, and literature on how to mitigate hypothetical bias is currently rather limited.

To circumvent this problem, we decided to ask the respondents what price premium they were willing to pay for an organic wine. An ordinal logistic regression model, based on cumulative probability distribution [30], was used to achieve the aim of our work.

The paper is structured as follows: Section 1 reviews the literature on sustainability in the wine sector, and in particular, the influence of this attribute on consumer choice. The methodologies and analysis are presented in Section 2, and the results and discussion in Section 3. Finally, some conclusions and recommendations are provided on the potential for expanding the demand for organic wine in Italy.

2. Materials and Methods

2.1. Survey

The questionnaire was aimed at examining consumer perception of organic wine, willingness to buy this kind of wine, and willingness to pay a price premium for it. It was divided into sections and composed of 36 questions.

The questionnaire was distributed in April 2017 through social networks (Twitter, Facebook, Instagram); instant messaging apps (Facebook Messenger and Whatsapp); and, to a lesser extent, through mailing lists of famous wineries. We know the limit of this kind of survey: it does not supply a random sample of wine's consumer universe (who are unknown), but through a sample of 576

answers, we were able to collect the main characteristics of the population and by the POM model, we could account for sample heterogeneity, such as oversampling people with high-level education. Finally, we think that the on-line survey strengths (mainly speed and cost-effectiveness) overcome the weaknesses (self-selection bias, which remain an unresolved issue even in CATI or face-to-face surveys.

In total, 576 answers were collected, and 487 of them were from interviewees who stated that they consume wine. Additionally, 61% of them stated that they lived in Veneto and the remaining 39% in other regions.

All the interviewees were asked if they regularly buy organic products, and why or why not.

One section of the questionnaire examined wine consumption habits. Some questions were put to those who stated that they consumed wine, in order to understand their wine purchasing habits in general: for example, where they consume wine most frequently, frequency of consumption, price range of bottles they buy, whether they buy specialized wine magazines, and the most frequent mode of purchase.

The interviewees who stated that they personally bought wine bottles were asked to specify the importance given to some attributes of wine at the moment of purchase, using a five-point Likert scale. For the statistical analysis, we have reduced the five-point Likert scale to the following three evaluations: low (not important and slightly important), moderate, and high (important and very important) importance. The attributes in the questionnaire were bottle design, wine varietal, producer/winery brand, price, place of production, year, certification (CDO/GCDO/PGI), lack of chemical additives, and organic certification.

The most important section of the questionnaire was entirely dedicated to understanding the interviewees' perception of organic wine and their potential willingness to pay a price premium, using 10 classes from 0.5 euro to more than 5 euro, with a 50 cent range in each class. The aim of this section was to understand whether organic wine is present in the interviewees' everyday life, and the reason why consumers decide to buy or not buy organic wine.

The last section contained a number of socio-demographic questions.

2.2. Proportional Odds Models

Following the approach adopted by Brant [31] and Bender and Grouven [32], we used the Proportional Odds Model (POM) to fit observed variables to an ordinal outcome. The POM was introduced by McCullagh [30] for ordinal logistic regression and is based on the cumulative distribution function:

$$P(Y \leq j) = p_1 + p_2 + \ldots + p_j = \frac{exp\{\alpha_j + \boldsymbol{X\beta}\}}{1 + exp\{\alpha_j + \boldsymbol{X\beta}\}} \quad (1)$$

where j = 1,2, ... ,J is the outcome category, $\boldsymbol{X}$ is a matrix (nxp) of explanatory variables, α_j and $\boldsymbol{\beta}$ (a vector (px1)) are p+J parameters which must be estimated, and $P(Y \leq j)$ measures the probability of Y falling at or below a given j. From (1), the following odds can be calculated:

$$odds = \frac{P(Y \leq j)}{1 - P(Y \leq j)} = \frac{p_1 + p_2 + \ldots + p_j}{p_{j+1} + p_{j+2} + \ldots p_J} \quad (2)$$

If the cumulative odds are less than 1 (more than 1), the interviewee's response is associated with a shift towards the right (left) of the response scale, namely a rise in the probabilities in the higher categories.

The POM can be estimated by (2) transforming to linear form by calculating the natural logarithms of the odds [33]:

$$logit\ (P(Y \leq j)) = \log\left[\frac{P(Y \leq j)}{1 - P(Y \leq j)}\right] = \log\left[\frac{p_1 + p_2 + \ldots + p_j}{p_{j+1} + p_{j+2} + \ldots p_J}\right] = \alpha_j + \boldsymbol{X\beta} \quad j = 1, \ldots J - 1 \quad (3)$$

where each element of $\boldsymbol{\beta}$ describes the influence of the p explanatory variables on the logit, while α_j is related to the outcome category and not used in the interpretation of results. This effect does not change for all the J-1 cumulative logits. The more relevant assumption of such a logit formulation requires the common effect of $\boldsymbol{\beta}$ in the J-1 equation. Therefore, the J cumulative probability curves have the same shape.

The odds ratio (OR) can be calculated by comparing cumulative probabilities and their complements. Given the two values x_1 e x_2 for the i-th explanatory variable X_i, OR is derived from the following expression:

$$\frac{P(Y \leq j/X_i = x_2)/P(Y > j/X_i = x_2)}{P(Y \leq j/X_i = x_1)/P(Y > j/X_i = x_1)} = exp(\beta(x_2 - x_1)) \quad (4)$$

If $x_2 - x_1 = 1$, OR is equal to exp(β) for each outcome category j and this makes it possible to define (3) as a proportional odds model.

2.2.1. Testing the parallel lines assumption

This assumption states that the dependent variable's categories are parallel to each other. When the assumption does not hold, it means that there is no parallelism between the categories [34]. According to this assumption, parameters should not change across categories. If the assumption does not hold, interpretations of the results will be incorrect.

Brant's Wald Test [31] and other related tests, such as the Likelihood Ratio Test, can be used to assess the parallel lines hypothesis [35,36], together with a graphic approach (as detailed in Harrell´s book). The H_0 hypothesis states whether the coefficients of the independent variable (βj) are the same for each category j.

2.2.2. Goodness of fit

Many tests can be performed to check the goodness of fit of the estimated POM. The most popular are G^2, McFadden's pseudo r-squared, Maximum likelihood pseudo r-squared [37], and Cragg and Uhler's or Nagelkerke's pseudo r-squared.

In addition, the main literature suggests running specific goodness of fit tests for binary, multinomial, and ordinal logistic regression models: among others, the Lipsitz, Logitgof and Pulkstenis-Robinson tests (Hosmer-Lemeshow tests). The Lipztig test [38] uses the likelihood ratio test with g-1 degrees of freedom. The Hosmer-Lemeshow tests [39] compare observed with expected frequencies of the outcome and compute a test statistic which is distributed according to the chi-squared distribution. The degrees of freedom depend upon the number of quantiles used and the number of outcome categories. A non-significant p-value indicates that there is no evidence of good fit. Fagerland and Hosmer [40] suggest that the Lipsitz test should be run alongside the ordinal Hosmer-Lemeshow test and the Pulkstenis-Robinson test.

3. Results

3.1. Sample characteristics

The sample of respondents is composed of 317 people, including wine consumers and those willing to pay a price premium for an organic wine (65% of respondents). A total of 61.5 % are female, and approximately 50% are aged between 18 and 35 years, 27% between 36 and 50 years, and approximately 25% between 51 and 75 years. Additionally, 40% of the respondents live in Veneto and 60% in other Italian regions (Appendix A).

In general terms, respondents have a high level of education: about half of the interviewees claim to have a graduate or a post-graduate degree, 48% of respondents have a high school diploma, and the remaining 3% have a lower secondary school diploma.

Data analysis related to the respondents' profession shows that about 70% are employed. Furthermore, more than half of the interviewees claim to consume organic wine and about 83% consume organic products.

Considering wine consumption habits, 74% of the sample frequently (more times a week) consumes wine and about 55% mainly at home. The questionnaire took into account nine qualitative attributes of wine (design, vine, trademark, price, harvest year, place of production, certification, organic certification, and additives) and respondents were asked to state their preferences. Design was not very important for 60% of the sample, and quite important for 25%; harvest year was of negligible importance for 35% and quite important for 29%; 50% of respondents believed that price was moderately important and 26% that it was very important; trademark was unimportant for 18%, while the remainder of the sample was split equally (37%) between very and moderately important; organic certification was important for 38%, while approximately 27% considered it of low importance or quite important; the vine was very important for 45%, and fairly important for 31% of those interviewed; and responses were similar for place of production, additives, and certification: approximately 50% of respondents considered these very important, and only a minority (approximately 15%) unimportant.

Among those who consume wine, 44% state that they drink organic wine. When asked the price premium they were willing to pay for organic wine, 65% of interviewees answered (317 statistical units).

We decided to reduce the number of the classes and to use the frequency distribution of the answers illustrated in Figure 1.

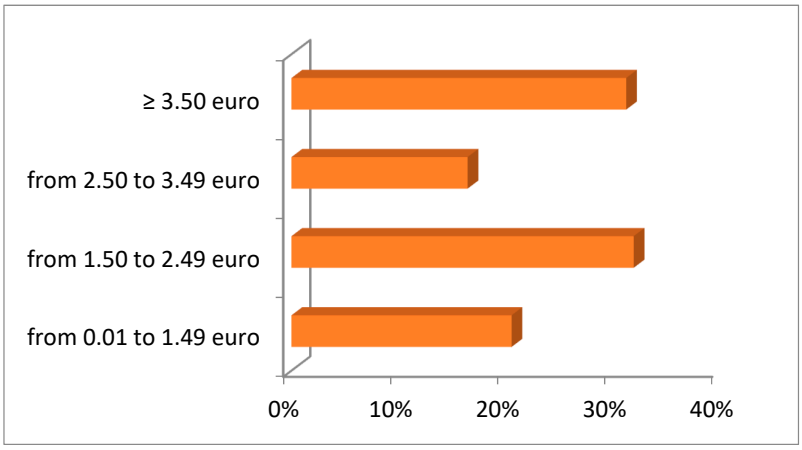

Figure 1. Price premium frequency distribution.

3.2. Model Estimation

Preliminarily, a set of explicative variables were selected, using the Kruskal Wallis Test (Appendix B). This is a non-parametric test and is used to verify whether changing outcome categories results in the groups of respondents being from identical populations (Null Hypothesis: H_0) or whether at least one of the groups comes from different populations than the others (Alternative Hypothesis: H_1).

The null hypothesis is accepted (according to a p-value > 0.10) 10 times out of 18, soit can be said that groups have the same scoring tendency, while for the other variables–Employed, Age, Consumption Frequency, Organic Wine Consumption, Organic Product Consumption, Price Importance, Harvest Year Importance, Additive Importance, and Organic Certification Importance–the hypothesis H_0 is rejected.

As a first step, a POM model with all these variables was estimated. The outcome variable is the price premium that respondents are willing to pay for organic wine (Table 1). The estimated coefficients of Harvest Year Importance, Additive Importance, and Organic Certification Importance did not prove statistically significant results, and the stepwise technique was used to re-estimate the model. In the end, all the estimated parameters were statistically significant.

Table 1. Outcome categories.

	Outcome Category
from 0.01 to 1.49 euro	1
from 1.50 to 2.49 euro	2
from 2.50 to 3.49 euro	3
≥3.50 euro	4

Table 2 shows the final estimated ordered model with J = 4 response categories and three α_j intercepts (usually they are not used in the interpretation of results). The model was estimated using the polr function from the MASS package in R.

Table 2. Estimated coefficients of the POM.

	Estimated	**Std.Error**	**p-Value**	$\mathbf{z^2}$	
Employed	−0.579	0.274	0.035	4.465	***
age1	−0.542	0.281	0.054	3.720	**
age2	−0.649	0.3	0.031	4.680	***
Price Importance: High	0.891	0.261	0.001	11.654	***
Price Importance: Low	−0.604	0.306	0.049	3.896	**
Consumption Frequency: High_	0.635	0.259	0.014	6.011	***
Consumption_organic wine	−0.691	0.227	0.002	9.266	***
α_1 (intercept 1)	−0.824	0.387	0.034	4.533	***
α_2 (intercept 2)	0.739	0.384	0.054	3.704	**
α_3 (intercept 3)	1.544	0.392	<0.001	15.514	***
Residual Deviance	739.582	AIC	855.546		

3.841 and 2.706 are critical values of chi squared distribution with df = 1 for α = 0.05 and 0.10, respectively.

3.3. Postestimation: Checking the Parallel Lines Assumption (Brant Test) and Model Fit

The results of the Brant test (Appendix B) provide evidence that the parallel lines assumption has been accepted in all cases except for Low price importance.

Moreover, the Goodness of Fit test for ordered response models [35] is reported in Appendix B.

The G^2 test (log–likelihood ratio) and the statistically significant χ^2 statistic (p-value <= 0.001) point out that the final model improves the goodness of fit over the baseline intercept-only model. In Appendix B, outcomes presenting McFadden's pseudo r-squared, Cox & Snell's Maximum likelihood pseudo r-squared, and Cragg and Uhler's or Nagelkerke's pseudo r-squared are reported.

The Lipsitz and Hosmer-Lemeshow tests (Logitgof and Pulkstenis-Robinson tests) indicate that there is evidence of a good fit, except for the Price Importance variable; for this covariate, the parallel lines assumption is rejected.

The estimated effect of the explicative variables is given by the estimated coefficients, and usually, the intercepts are not of interest, except for estimating response probabilities.

More interesting is the OR interpretation (Table 3), which can be summarized as follows:

- Employed: the response is in the low direction rather than the high direction and it is equivalent to about half the estimated odds for Unemployed (reference group);
- Age1 and Age 2: the responses are in the low direction rather than the high direction and are equivalent to about half the estimated odds for Age 3;

- Price Importance High: the response is in the high direction rather than the low direction and it is equivalent to about two and a half times the estimated odds for Price Importance Medium (reference group);
- Price Importance Low: the response is in the low direction rather than the high direction and it is equivalent to about half the estimated odds for Price Importance Medium (reference group);
- Consumption Frequency High: the response is in the high direction rather than the low direction and it is equivalent to about twice the estimated odds for Consumption Frequency Low (reference Group);
- Organic Wine Consumption: Yes: the response is in the low direction rather than the high direction and it is equivalent to about half the estimated odds for Organic Wine Consumption: No (reference group).

The estimated odds that an employed respondent's response is in the low direction rather than the high direction is equivalent to about half the estimated odds for the unemployed (exp(−0.579) = 0.560). Hence, employment decreases the log-odds of falling into or below any category. Looking at age, the reference category is people above fifty years; Table 3 shows younger people have an odds ratio of less than one (about 0.5), which means that younger people (<50 years) are half as likely to pay a low price premium as older people (>=50). Interviewees who already buy organic wine or for whom price is not important also show an odds ratio of about 0.5, so, like employed persons, they have higher odds of paying a price premium than the reference category (does not buy category and for whom price has a medium importance). The estimated odds that the response of consumers who frequently drink wine or think price is important is in the lower direction (to the left) rather than the higher direction is about twice the odds for consumers who occasionally drink wine and for whom price is not a determinant.

Table 3. Estimated Odds Ratio of the POM.

	OR	**95% Wald Confidence Limits**	
Employed	0.560	0.326	0.956
age1	0.522	0.288	0.939
age2	0.581	0.333	1.006
Price Importance: High	2.437	1.464	4.092
Price Importance: Low	0.546	0.297	0.993
Consumption Frequency: High	1.887	1.137	3.156
Organic Wine Consumption:Yes	0.501	0.319	0.781

From the fitted model, it is possible to calculate the estimated cumulative probability for selected variables. The results are shown in Figure 2 and Table 4. These represent, in a more intuitive way, how explicative variables affect the ordinal outcome.

The consumer has a probability of two thirds of choosing class 1 or 2 (0.01–1.49€ and 1.5–2,49€), therefore he/she has a low or medium willingness to pay a price premium. Compared to the baseline employed, younger and older respondents, organic wine consumers, and persons who state price is of low importance are more likely to choose class three or four (2.5–3.49€ and >=3.5), so they are more willing to pay a higher premium price in order to buy organic wine, while interviewees who consider price as very important are 68% more likely to choose class 2 and those who consume wine frequently are 50% more likely to choose class 1.

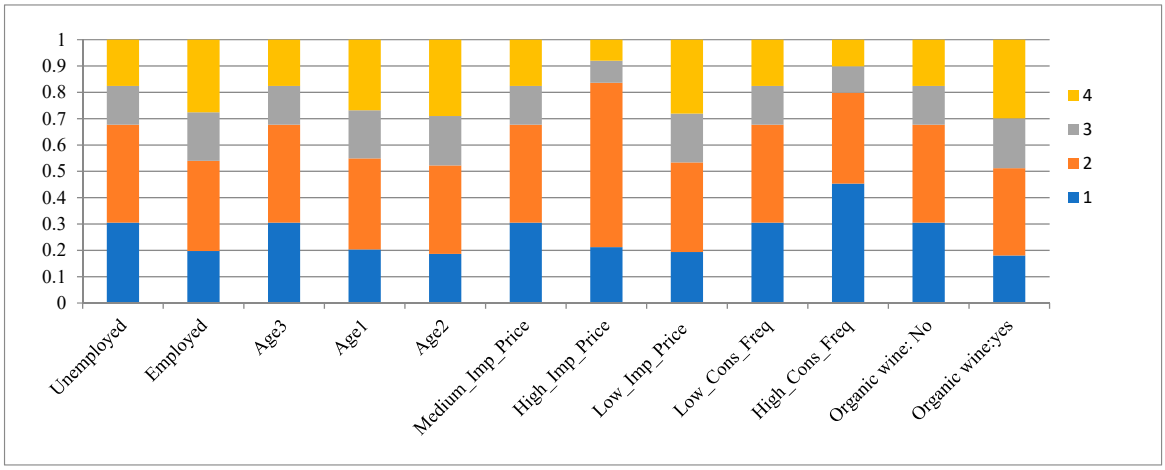

Figure 2. Outcome categories' probability for different consumer characteristics.

Table 4. Probability for outcome categories.

	P(Y = 1)	P(Y = 2)	P(Y = 3)	P(Y = 4)
Unemployed (reference class)	0.305	0.372	0.147	0.176
Employed	0.197	0.343	0.184	0.276
age3 (reference class)	0.305	0.372	0.147	0.176
age1	0.203	0.346	0.182	0.269
age2	0.186	0.336	0.188	0.290
Price Importance: Medium (reference class)	0.305	0.372	0.147	0.176
Price Importance: High_	0.212	0.624	0.083	0.080
Price Importance: Low_	0.193	0.340	0.185	0.281
Consumption_Frequency: Low_ (reference class)	0.305	0.372	0.147	0.176
Consumption_Frequency: High_	0.453	0.345	0.100	0.102
Organic Wine Consumption: No (reference class)	0.305	0.372	0.147	0.176
Organic Wine Consumption:Yes	0.180	0.332	0.189	0.299

4. Discussion

Consumption of food and non-food items is stagnating in Italy. Organic products instead show a positive trend, with a sales growth of 15% in the first few months of 2018 [41]. Moreover, nowadays, food consumers have changed their priority: price is less important, and different aspects are growing, such as environmental attention, food safety, health, and wellness. Organic products accomplish these new needs, but are consumers willing to pay a higher price? And to what extent? The objective of this paper was to analyse the willingness to pay a premium price for an organic wine and to estimate the variables that affect the class of WTP, using a proportional odds model.

Before our final comments, we would like to highlight two important aspects of our research. Firstly, all results have been obtained from a convenience sample chosen due to the difficulty/impossibility to spot the target population, i.e., individuals who usually consume wine. Survey respondents are a self-selected group that use the internet. Therefore, the dataset has some limitations regarding the representativeness of the Italian wine consumers, the risks of including multiple responses, and the introduction of bias due to the characteristics of those that use the internet. As opposed to a random sample, the results may not be used to make an inference about the whole population of wine consumers.

However, thanks to the growth of internet use among many Italian citizens of different ages, regions, and genders, we believe that our survey may provide an interesting insight into the opinions of Italian wine consumers.

Moreover, our data were not collected from SC experiments and were not analyzed using Random Utility Models (RUM). These models rely on Luce's Axiom of Choice also referred to as the Independence of Irrelevant Alternatives, or IIA for short. IIA hypothesis means that the probability ratio for the two alternatives depends only on the characteristics of these two alternatives and not on those of other alternatives. IIA is a very strong hypothesis, hardly satisfied, so that in the most recent literature, to our knowledge, there are no empirical works testing the IIA hypothesis. We believe that if IIA is not satisfied, the WTP estimated by RUM may be affected by a further not negligible bias. Although it is well-established that the bias in the WTP is greater if the CV method is used rather than the one derived from the RUM models, we preferred to use the CV method (according to Sogari et al. [22]) and estimated WTP through a statistical model as POM, for which the data collected by our survey satisfy all the underlying theoretical hypotheses.

The results show that half of the respondents claim to consume organic wine and confirm that consumers with a positive attitude towards organic products (wine in particular) are more willing to pay. In particular, 65% of interviewees answered that they were willing to pay a price premium for organic wine. According to previous studies, WTP is affected by several variables regarding socio-economic characteristics and behavioural aspects of consumers. Attributes like gender, education, harvest year, brand, place of origin, additives' presence, and organic certification are not significant. In other words, we found age, occupational status, consumption frequency, organic wine consumption, and price importance as attributes somehow affecting WTP for organic wine.

As expected, younger people have a more positive attitude towards wine with sustainable characteristics (in line with the findings of Sogari et al. [22], and Bernabeu et al., [29]). They are more educated and sensible to environmental questions. We found that consumers aged under 50 have a higher WTP: about 50% of respondents indicate more than 2.50 euros as a price premium.

The survey also found the price range which the wines usually purchased belong to and the average value of the sample is equal to € 11.9 per bottle (0.75 l). This means that the respondents would be willing to pay at least 20% more than the price of the conventional wine. One third of the sample would also be willing to pay + 30% or more for an organic wine.

In addition, employed consumers, as expected, claimed a higher WTP than the unemployed. This result is probably linked to the income of the consumer, according to previous studies of Pomarici et al. [14], Sellers [28], and Woods et al. [42], which showed that the income of the consumer has a positive impact on WTP for sustainable wine.

Price is another attribute that affects preferences for organic wine. In particular, consumers that state that price is a very important factor in the choice of a bottle are less willing to pay for organic wine. In line with previous studies, consumers who are less interested in the sustainability of wine mainly pay attention to the price when choosing a bottle, while, in contrast, the more environmentally oriented consumers spend, on average, more for wines consumed at home [14].

Finally, consumption frequency is also an important driver of organic wine and influences the WTP. Our results indicate that consumers characterized by a low consumption frequency have a higher WTP for organic wine. From our point of view, these interviewees sometimes buy wine, probably for special occasions, hence they prefer to buy a particular and expensive wine. Somehow, this result seems to be in contrast with the work by Pomarici et al. [14], which showed that those who consume wine more frequently are often more interested in sustainable wines. In our opinion, this difference depends on the aim and method of the two papers: Pomarici et al. [14] identified two segments of consumers (low vs high-involved in wine sustainability) using attitude towards the environment. Conversely, in this paper, we chose to estimate willingness to pay a price premium for an organic wine. Moreover, we estimated a Proportional Odds Model, and therefore are able to assert how one variable affects the probability to choose a higher price given other observables. In contrast to this,

Pomarici et al. [14] could describe the observed features of the two groups without being allowed to state the net effects of each variable.

The results show important differences in the WPT between different market segments, and target marketing should be a perfect tool to address the segment of consumers willing to pay the higher price premiums. For example, big-data from social media could be exploited to find younger people with a low consumption frequency of wine and a taste itinerary could be proposed to them. The results obtained could be very important in terms of increasing a firm's competitive advantages. Sustainable wine is a way to differentiate one's own product and satisfy an increasing demand of organic product in the segment of consumers willing to pay the higher price premiums.

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Appendix A

Table A1. Sample socio-demographic characteristics.

	Sample		Italian Population [a]
		Frequency	Frequency
Female	195	0.615	0.511
Male	122	0.385	0.488
Veneto: Yes	126	0.397	
Veneto: No	191	0.603	
Employed	221	0.697	0.666
Unemployed	97	0.306	0.334
Outside the home	142	0.448	
At home	175	0.552	
Consumption_Frequency: Low	81	0.256	
Consumption_Frequency:High	236	0.744	
Organic Wine Consumption: Yes	174	0.549	
Organic Wine Consumption: No	143	0.451	
Organic Product Consumption: Yes	265	0.836	
Organic Product Consumption: No	52	0.164	
Education: Low	11	0.035	0.232
Education: Middle	151	0.476	0.318
Education: High	155	0.489	0.450
Age1 (18–35)	153	0.483	0.196
Age2 (36–50)	86	0.271	0.239
Age3 (50–75)	76	0.240	0.293
NA	2	0.006	

[a] source: ISTAT (2011). The wine market penetration rate in Italy is about 52%. See also footnote 1.

Appendix B

Table A2. Kruskal Wallis Test for selecting covariates.

	Kruskall-Wallis Test p-Value	**Degree of Freedom**
Gender	0.877	1
Veneto	0.106	1
Employed	**0.002**	1
Where?	0.463	1
Consumption_Frequency	0.143	1
Organic Wine Consumption	**<0.01**	1
Organic Product Consumption	**0.015**	1
Education	0.478	1
Age	0.013	2
Design	0.202	2
Vine	0.719	2
Brand Importance	0.990	2
Price Importance	**<0.01**	2
Place	0.370	2
Year	**0.013**	2
Certification	0.765	2
Additives	**0.073**	2
Organic Certification	**0.004**	2

Table A3. Parallel lines assumption (Brant Test).

Brant Test for	χ^2	**df**	**p-Value**
Omnibus	23.04	14	0.060
Employed	1.71	2	0.425
age2	0.11	2	0.946
age1	1.02	2	0.599
Price Importance: High	5.04	2	0.080
Price Importance: Low	**13.24**	**2**	**0.001**
Consumption Frequency: High_	3.26	2	0.196
Organic wine consumption:Yes	1.97	2	0.374

Table A4. Goodness of Fit test.

G^2	**p-Value**	r^2 **Mc Fadden**	r^2**ML**	r^2**CU**
116.034	<0.001	0.135	0.329	0.347

Table A5. Lipsitz and Hosmer-Lemeshow test.

Lipsitz Test			**Logitgof Test**		
LR statistics	df	p-value	χ^2	df	p-value
3.812	9	0.641	35.844	24	0.057

Table A6. Pulkstenis-Robinson.

	χ^2	df	p-Value	Deviance-Squared	df	p-Value
Employed	4.7856	7	0.686	4.6623	7	0.701
Age	14.315	13	0.352	13.951	13	0.377
Price Importance	**35.844**	**24**	**0.057**	**34.114**	**13**	**0.001**
Consumption Frequency	10.147	7	0.180	10.399	7	0.167
Organic Wine Consumption_	5.481	7	0.601	5.479	7	0.602

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