

# The importance of hand harvested grapes in consumers' choice of a bottle of wine

*Key words:* wine consumer behaviour, wine marketing, wine, food production process, hand harvested

## INTRODUCTION

While traditionally grapes were harvested exclusively by hand, starting from the early '70s began to spread the mechanical harvesting of the wine grapes. Nowadays, this production method is a technique increasingly diffused in the world winegrowing, supported by the lower costs compared with hand harvest without penalizing product quality (Galletto and Barisan, 2007; Pezzi and Martelli, 2015). Over 80% of California wine grapes are mechanical harvested (Dokoozlian, 2013), 75% in Australia, and in Europe approximately 40% (Sarri et al., 2016). In France, in 2009 the 65% of the total vineyard surface was mechanically picked up, compared to the only 12% of Italy (Melotti et al., 2009).

Although the mechanical harvesting is the main diffused harvest methods, nowadays in the market some bottles from different countries (i.e., Italy, Argentina, California, New Zealand, France) started to report the claims 'Hand harvested' or 'Harvested by hand' on the labels, indicating a specific production method. According to European and Italian regulations on wine, 'Hand-harvested' is an elective indication regarding the production method that is possible to specify on the bottle label. However, this indication is permitted as long as it is true and does not mislead the consumers. Notably, while for foreign wines 'hand harvested' is clearly visible on the front label, on the Italian wine bottles this indication is often included in the descriptive information on the back label, without a specific relevance. Clearly, the producers who introduced the 'Hand harvested' claim on their labels have some evidence that it may affect the consumers purchasing preferences of a wine bottle.

In general, in food sector there is a growing consumers' attention to label indication about production process (Lee et al., 2013; Vecchio et al., 2019), such as the description of farming and breeding methods, how the ingredients are handled, or the technology used for obtaining the final product. The interest in the information on the manufacturing process seems due to the impact on the consumers' perception of the product (Caporale and Monteleone, 2004). Indeed, the individuals link the specific methods to the expected outcomes of the consumptions. For example, people choose organic products thinking they will have some benefit in consuming them, in the opposite they prefer to avoid food including genetically modified organisms (GMO)s because they think the consumption of these products is harmful to their health (Bredahl, 1999). Moreover, some consumers associate a specific production method with other dimensions interesting for them such as sustainability, environmental safety, food healthiness and naturalness of the product (Abouab and Gomez; 2015; Torjusen et al., 2001).

The prove that wine consumers are influenced by the production methods is already well-demonstrated by a large number of empirical studies. These researches have focused on consumer preferences for wine reporting on labels the production methods, such as organic or biodynamic. However, at our knowledge, none study has been carried out to test consumer preferences towards wine reporting information on how the grapes are harvested. Which is the effect of the 'Hand harvested' claim on consumers' purchase decisions? Is this claim valued similarly the same across

different consumers? Do consumers associate this claim to other characteristic or dimensions? The current study attempts to provide some answers to these questions investigating the effect on wine consumer preferences of information given about a specific production process, that is the 'hand harvest' claim.

Hence, this research has three main objectives. First, we want to study how hand harvested attribute influences the choices made by wine consumers in purchasing a bottle of wine. Increasing the knowledge of this issue is pivotal to producers and shoppers since both can take advantages of the additional means of product differentiation, thus increasing their competitiveness. Second, we intend to identify if there is an interaction between organic and hand harvested attributes. As aforementioned, in the market, some wine already reported this claim. Therefore, we have consumers who show a higher willingness to pay for wine produced with hand-harvest grapes. The preference for the hand-harvest should be linked in the mind of consumers to a low processed product, with high naturalness and in general a less-input intensive product. These dimensions seem very close to what people associated with organic foods. For this reason, we have hypothesized a mutual influence between these two production methods. However, ex-ante we are not able to say if these two methods compete or complete each other. We verify this hypothesis by performing a choice modelling that includes an interaction term between organic and hand-harvest.

Finally, we want to explore and profile the market segments in which hand harvested is a determinant of choice. Specifically, we answered this research question using a latent class model (LCM).

## **METHOD**

We gathered information related to wine choice behaviour by carrying out a discrete choice experiment (DCE). We asked respondents to choose a bottle of red wine (0.75L) for a dinner with friends among two alternatives with different attributes and a no-buy option. We utilize a cheap talk script for introducing the choice questions to reduce hypothetical bias and to encourage respondents to reveal their real preferences in stated preference studies. Among the wine attributes that affected consumer's preferences, we selected four of these: price (€7, €10, €13, €16), organic claim (organic, none), harvest type (hand harvested, none) and geographical indication (GI). Since we carried out our analysis in Italy, we used the Italian GI system (IGT, DOC, DOCG, none).

The questionnaire was administrated online in 2018 to a sample of 408 Italian wine consumers. We performed a D-efficient design using the DCREATE module included in STATA 14.2 software. The design was specified to assess the attribute main effects and the interaction effect between organic and harvest. We opted for a design including blocking, in particular, 30 choice sets were divided into five blocks so that each respondent was randomly assigned to one block and answered six choice questions. Choice sets were designed with visual labelling elements in order to avoid biases in estimation generated by written-based DCEs.

The second section in the questionnaire collected consumers' habits. The information was related to wine purchasing habits and personal knowledge of the technique of mechanical harvest of grapes. Subjective wine knowledge was measured through a self-assessment with a 10-points Likert scale, ranging from non-expert=1 to very expert=10. We measured the individual characteristic of 'naturalness' using 7-points Likert agreement scales suggested by Siegrist et al. (2008) ranging from completely disagree=1 to completely agree=7. The last section of the questionnaire concerned sociodemographic information, occupation, and household income.

According to McFadden's random utility theory (1973), the utility  $U$  that a consumer  $n$  derives from the attributes of wine in the alternative  $j$  in the choice situation  $t$  takes the following form:

$$U_{njt} = \beta_0 \text{NOCHOICE} + \beta_1 \text{PRICE}_{njt} + \beta_2 \text{IGT}_{njt} + \beta_3 \text{DOC}_{njt} + \beta_4 \text{DOCG}_{njt} + \beta_5 \text{ORGANIC}_{njt} + \beta_6 \text{HANDHARVEST}_{njt} + \beta_7 (\text{ORGANIC}_{njt} \times \text{HANDHARVEST}_{njt}) + \varepsilon_{njt}$$

where  $\beta_0$  is the alternative specific constant and NOCHOICE is a variable coded as 1 when the no-buy option is chosen, and 0 otherwise. The coefficients  $\beta_1 - \beta_6$  capture the main effects related to the attributes, all coded as dummy excepted for PRICE that is modelled as a continuous variable. The coefficient  $\beta_7$  represents the interaction effect between the organic and the hand harvested attributes.  $\varepsilon_{njt}$  is the error term assumed to be independently distributed with an extreme value distribution.

The model shown in the equation was estimated with a Random Parameter Logit (RPL) using NLOGIT 6.0 software and involving 1,000 Halton draws with freely correlated random parameters. All the main effect parameters are modelled as random except price and NOCHOICE. Furthermore, for exploring preference heterogeneity among respondents, we performed a Latent Class Model (LCM).

## RESULTS

We present the results from two RPL models, Model 1 is without interaction while Model 2 includes the interaction between the attributes organic and hand harvested. For both models, the coefficients are relative to a 0.75 litre bottle of red wine with no organic claim, from grapes not harvested by hand, and without presenting a geographic indication appellation.

The two models show similar results in terms of signs, magnitude and statistical significance of the parameters. All the standard deviations from the parameters are statistically significant, indicating the presence of preference heterogeneity among consumers.

For both models, the organic and hand harvested coefficients are positive and significant thus these claims increase consumer's utility. In other words, consumers' utility increases when purchasing a wine bottle of organic wine, produced with hand harvested grapes. This result confirms our hypothesis that the hand harvest claim, *ceteris paribus*, increase the wine purchasing likelihood.

As expected, price shows a negative and statistically significant coefficient indicating that consumer utility decreases when price increases. The negative and statistically significant estimate of the NO-CHOICE implies that respondents take great utility from purchasing an alternative. Even GI positively affect the consumer's utility. In particular, the DOCG appellation is the most preferred, followed by DOC and IGT appellations.

Model 2 shows that the coefficient of interaction between the organic and hand harvested is the only not statistically significant. Therefore, there is not a difference in utility between an organic wine with grapes hand harvest and an organic wine with grapes mechanical harvest. In other words, organic and hand harvest are not complementary attributes.

To further explore preferences heterogeneity, we have performed a LCM using Model 1 specification. Considering the Akaike information criterion (AIC) and the Bayesian information criterion (BIC), the solution with three classes provides the best fit for our data. In all classes, the price coefficient is statistically significant and negative. Class 1 (47.8% of the sample) prefers wine produced with hand harvested grapes, with GIs and organic. Class 2 (33.0% of the respondents) show an aversion to the hand harvested attribute. Instead, this group of respondents prefers hand harvested

wine and with GIs. Class 3 (19.2% of the respondents) is featured by statistically significant coefficients of organic and denominations of origin's attributes. Furthermore, all the classes have a significant parameter estimate for no-choice, suggesting that consumers belonging to these classes prefer to choose a bottle of wine.

These results concern a first elaboration of data. We are performing other elaborations to better profile consumers segment and describe respondents purchasing behaviour.

## **DISCUSSION AND CONCLUSION**

Our findings highlight the importance of the claim 'hand harvested' written on a wine bottle. However, results rejected the hypothesis there is an interaction between organic and hand harvested attributes. This means consumers do not consider the mechanical harvest as contamination of organic wine.

The exploration and profiling of the market segments show that, for a sizable number of participants (67% of the sample), the hand harvest claim affects positively their utility. In Class 1, the consumers obtain the highest utility in choosing wine produced with grapes harvested by hand. These consumers are also interested in buying organic wine. Performing some preliminary tests, the attention of these respondents seems to be pointed towards the topic of naturalness. This result seems to confirm that in consumers' opinion a human contact system of production preserves food naturalness more than a mechanical production. Respondents of Class 2 are interested in organic wine with GIs, and they consider these characteristics as synonymous of wine quality. In this sense, hand harvested grapes do not add quality to the final product. In Class 3, consumers look at wine attributes (denominations of origins and hand harvested grapes) that can suggest a group of traditionalist consumer. In fact, they are not interested in organic wine and have lower values in WTP estimated. These preliminary considerations need further analysis and exploration, to better profile and explore the characteristics and attitudes of these classes of consumers.

The main limits of this study are the small sample size and the use of an online survey. A real choice experiment including the wine tasting could provide a better understanding of consumer's preferences for wine produced with hand harvested grapes.

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