RESEARCH ARTICLE

Wine consumers' preferences in Spain: an analysis using the best-worst scaling approach

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Abstract

Research on wine consumers' preferences has largely been explored in the academic literature and the importance of wine attributes has been measured by rating or ranking scales. However, the most recent literature on wine preferences has applied the best-worst scaling approach to avoid the biased outcomes derived from using rating or ranking scales in surveys. This study investigates premium red wine consumers' preferences in Spain by applying best-worst alternatives. To achieve this goal, a random parameter logit model is applied to assess the impacts of wine attributes on the probability of choosing premium quality red wine by using data from an ad-hoc survey conducted in a medium-sized Spanish city. The results suggest that some wine attributes related to past experience (*i.e.* it matches food) followed by some related to personal knowledge (*i.e.* the designation of origin) are valued as the most important, whereas other attributes related to the image of the New World (*i.e.* label or brand name) are perceived as the least important or indifferent.

Additional key words: premium red wine; choice experiment.

Introduction

For decades, the wine sector has contributed significantly to the Spanish agricultural economy, in terms of both production and rural development. To illustrate this point, the Spanish vineyard area is the largest vineyard in Europe (904,000 ha), but it is also among the least productive wine sectors in Europe with an average about 36.9 hL ha^{-1}, quite below other countries such as France or Italy, which have yields close to 60 hL ha^{-1} (Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home). Even though the Spanish wine sector is still highly fragmented, Spanish wine sales in New World countries have increased dramatically in the past few years, reaching 81.5 million liters in the US wine market, ranking sixth in 2012 (OEMV, 2012). In the international wine scenario, Spanish wineries are faced with the eruption of New World countries, which base their marketing strategies on strong brands linked to standardized wines. Their wines are supported by substantial investments in promotion and advertising, which lead them to be easily identifiable by consumers through varieties and colored labels. Nevertheless, Spanish wineries are responding to this export strategy by still marketing their wines based on traditional wine attributes (*i.e.* appellation of origin and vintage). On the demand side, Spanish wine consumption has dramatically decreased, reaching 16.2 L per capita in 2010[1] whereas in New World countries (the

1 *Source:* Ministerio de Agricultura, Alimentación y Medio Ambiente de España (http://www.magrama.gob.es/es/alimentacion/temas/consumo-y-comercializacion-y-distribucion-alimentaria/panel-de-consumo-alimentario/base-de-datos-de-consumo-en-hogares/resultado.asp)

US, Argentina, Chile and South Africa), without a strong wine culture, consumption has developed at a substantial rate. To illustrate this, American wine consumption per capita was around 9.9 L in 2009, with a substantial increase of 14.5% from 2004 to 2009 (Wine Institute, 2010). These results suggest strong competition between Spanish wineries and those from New World countries in order to acquire international positioning, with a future risk, however, of potential market penetration into the Spanish wine market of wines coming from New World countries by using innovative commercial techniques.

Research in traditional wine production and consumption countries differs dramatically from that carried out in new production and consumption countries. For example, studies in Italy, France and Spain have shown that designation of origin (DO), vintage, "it matches food" and "I read about it" were considered to be the most important wine attributes (Angulo *et al.*, 2000; Martinez-Carrasco *et al.*, 2006; Mtimet & Albisu, 2006; Barreiro *et al.*, 2008; Bernabèu *et al.*, 2008; Cohen *et al.*, 2009; Goodman, 2009). However, grape variety, country of origin, "someone recommended it" and "I tasted the wine previously" are the most relevant and preferred wine attributes by consumers from New World countries such as Australia, New Zealand and the United States (Hall *et al.*, 2001; Loureiro, 2003; Schamel & Anderson, 2003; Charter & Pettigrew, 2006; Lockshin *et al.*, 2006; Boudreaux & Palmer, 2007; Jarvis *et al.*, 2007; Johnson & Bruwer, 2007; Hollebeek *et al.*, 2007; Veale, 2008; Kolyensikova *et al.*, 2008; Cohen, 2009; Cohen *et al.*, 2009; Goodman, 2009). Finally, some studies have found that brand name, label design, price and "it won a medal/award" had a similar perceived relevance by Old World and New World wine consumers (Angulo *et al.*, 2000; Hall *et al.*, 2001; Skuras & Vakrou, 2002; Thomas & Pickering, 2003; Lockshin *et al.*, 2006; Martinez-Carrasco *et al.*, 2006; Mtimet & Albisu, 2006; Perrouty *et al.*, 2006; Boudreaux & Palmer, 2007; d'Hauteville *et al.*, 2007; Jarvis *et al.*, 2007; Johnson & Brower, 2007; Barreiro *et al.*, 2008; Bernabèu *et al.*, 2008; Hertzberg & Malorgio, 2008; Kolyesnikova *et al.*, 2008 Casini & Corsi, 2009; Cohen, 2009; Cohen *et al.*, 2009; Goodman, 2009).

Most studies mentioned above have been based on surveys and the importance of wine attributes has been measured by using rating/ranking scales or the discrete choice experiment (DCE) method to estimate wine preferences (Cohen, 2003, 2009; Cohen & Neira, 2003;

Cohen & Orme, 2004; Finn & Louviere, 1992; Hein *et al.*, 2008; Casini & Corsi, 2009; Bernabèu *et al.*, 2012). Although the DCE allows new attributes and combinations to be tested for preferences and respondents are forced to make a trade-off, according to Cohen (2009), the DCE's design and analysis is complex with several attributes. Moreover, Louviere *et al.* (2000) stated that the most important disadvantage of the DCE is not being able to compare utilities across different experiments. On the other hand, using a rating scale is easy for respondents; however, in accordance with Hein *et al.* (2008), Cohen (2009), Casini & Corsi (2009) and Bernabèu *et al.* (2012), rating scales are not discriminative and there is no trade-off or equal distance between categories in an ordinal scale. To illustrate this, rating scales have been used to compare studies among different countries that could differ significantly in their response styles, which might lead to biased conclusions and an increase in the variance in the results (Cohen, 2003, 2009; Cohen & Neira, 2003; Cohen & Orme, 2004; Finn & Louviere, 1992). On the other hand, while ranking scales are easy when the number of attributes is small, when the number increases, they do not provide the importance degree of each attribute (Lockshin & Hall, 2003). Hence, the ranking task could be simplified by using a paired comparison (Cohen, 2009).

To avoid this problem, the most recent economic literature on wine marketing has introduced the best-worst scaling (BWS) methodology. This methodology has the advantage of using a one-dimensional interval scale of the importance of attributes and thus it overcomes the problem of bias caused by differences in the use of rating scales across countries and respondents (Finn & Louviere, 1992; Goodman *et al.*, 2005; Cohen, 2009; Cohen *et al.*, 2009; Goodman, 2009; Casini & Corsi, 2009; Mueller & Rungie, 2009; Bernabèu *et al.*, 2012). Secondly, even though BWS is a multiple choice extension of a paired comparison, offering similar benefits, it is a more efficient questioning structure (Cohen & Orme, 2004; Casini & Corsi, 2009). Moreover, the BWS method provides the best way to discriminate the degree of importance respondents place on each item, while it is easy to understand for respondents (Marley & Louviere, 2005; Auger *et al.*, 2007; Cohen, 2009; Cohen *et al.*, 2009; Goodman, 2009).

Most commonly, researchers decide the attributes to be considered for their surveys according to their own perceptions, findings and previous works undertaken by other researchers in referred markets. There

are rarely breakthroughs but a continuous development in the investigated population. However, this work aims to find out how consumers could react if they were exposed to a hypothetical situation, which means that they should buy their wines according to different communication policies that do not exist in the Spanish market at the moment.

The aim of this study was to analyze Spanish consumers' preferences for premium red wines that have a mixture of attributes appreciated not only in the Old World but also in the New World. Indeed, our hypothesis is that some wine attributes relevant in the New World, such as "I tasted the wine previously" and "grapevine variety" are valued as more important than other wine attributes such as "vintage" and "it matches food", which are some of the most important wine attributes in Spain. This assumption might indicate a movement towards paying more attention to different characteristics in accordance with new dynamic markets.

We undertake this study by using data from a survey conducted in Spain applying the BWS methodology. The multinomial logit model (MNL) and random parameter logit model (RPL) were estimated in order to identify some heterogeneity in wine preferences and a related market share for each wine attribute.

This study expands the literature on consumers' preferences in wine marketing, using the BWS method to assess wine preferences in Spain. To illustrate this, Bernabèu *et al*. (2012) conducted a similar study on consumer preferences in Spain, during the same year (2009) but in a different area (Castilla La Mancha). This was addressed to consumers that know their wine preferences and they introduced 11 attributes. The selected attributes were mostly different from this work, although some of them were the same.

Material and methods

Data collection

In order to analyze consumer preferences by using the BWS methodology for wine in Spain, data were collected from a survey conducted in Zaragoza (Aragon-Spain), during November and December 2009. The socio-demographics in Zaragoza are representative of the Spanish Census of Population (see Suppl. Table S1 [pdf]). Zaragoza is located in the north of Spain, in the Aragón region, where four DOs exist (Borja, Cariñena, Catalayud and Samontano). The average consumption of wine in Aragón was 8.25 L per capita in 2009, close to the Spanish average of 9.87 L[2]. Target respondents were wine shoppers and interviews were carried out face-to-face outside supermarkets. Interviewers randomly approached individuals asking them whether they consume wine at least occasionally.

The questionnaire was designed to include nine choice sets based on premium red wines[3] with different characteristics/attributes. They were presented to respondents, explaining to them the purpose of the study and how to fill in the choice sets in the survey. In addition, consumers were asked questions related to their knowledge about premium red wine, attitudes towards wine and willingness to buy premium red wines. The questionnaire also contained questions on socio-demographic characteristics (*i.e.* sex, family size and composition, age, education level, income) and consumers' eating habits. Prior to the main survey, this questionnaire was validated by using a pilot survey of 20 consumers to test the questions.

The sample size in Zaragoza was set at 200. A stratified random sample of consumers was carried out based on town district and age. About half of respondents are female (55%) living in households of three members on average (Table 1). In addition, the average age in Zaragoza is about 50 years, while nearly 10% belong to high-income groups and about 23% of subjects have a university degree.

The BWS method: experimental design

The BWS methodology was introduced by Finn & Louviere (1992) and formalized more recently by Marley & Louviere (2005). It consists of a measurement and scaling technique where respondents are asked to choose in each data set of attributes or statements the most preferred and least preferred attributes. Normally,

Table 1. Sample characteristics

Name (Type)	Variable definition	Value
FEMALE (dummy)	Gender	
	Male	45%
	Female	55%
HSIZE (continuous)	Household size	2.97
AGE (continuous)	Age of respondent (average)	49
UNIVERSITY (dummy)	Education of respondent	
	Elementary	30%
	Secondary	47%
	University	23%
HINCOME (dummy)	Average household income	
	Households with net income lower than € 1,500 month^{-1}	34.5%
	Households with net income between € 1,500 and € 2,500 month^{-1}	37.3%
	Households with net income higher than € 2,500 month^{-1}	28.2%
KNOWLEDGE	Consumer's wine knowledge	
	High (3)	6.0%
	Medium (2)	61.5%
	Low (1)	32.5%
SPECIALTY	Place of purchase wine	
	Specialized wine store	13%
INFORMATION (Likert scale)	I used to seek for information about premium red wine before buying it	3.65
DO (Likert scale)	I used to consume designation of origin products	4.03
FEELINGS (Likert scale)	Drinking premium red wine make me feel good	4.02

researchers are interested in measuring attribute impacts on consumer decisions (Flynn *et al.*, 2007). The experimental design in this study consists of 12 wine attributes selected from a literature review of papers published from 2000 to 2009 in ISI- or Scopus-indexed journals. The idea was to analyze to what extent Spanish consumers value different hypothetical wines defined by well-known attributes used to market wines in both the Old World and the New World. In particular, we considered four attributes related to consumers' preferences in Old World countries, four attributes that are more relevant in New World countries and four attributes that are considered to be important by both of them. Some of the selected attributes such as the DO, vintage and grapevine are linked to the personal knowledge levels of wine consumers, whereas others refer to their past experiences such as tasting it previously and matches food. Furthermore, some wine attributes evocate an image of wine, such as the country of origin and winning a medal or prize.

We expect that wines with a higher recognition or image will have a higher premium price. Finally, some attributes such as label and brand name are linked to wine reputation.

The first step to design our experimental design was to decide the choice set size because large choice sets provide more preference information than short ones, but they demand more cognitive effort and the quality of the answers may decrease. The second step was to decide the number of times that each attribute would be presented to respondents. Orme (2006) recommended that the choice set size should be between three and five alternatives and that each attribute should be presented to respondents between three and five times. Therefore, the total number of choice sets in the experiment was nine (Number of attributes × Number of times that each attribute is presented / Number of attributes in each choice set = 12 × 3 / 4)[4].

The next step in the experimental design was the allocation of the attributes along the choice sets. The

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[4] We used a balanced incomplete block design since the attributes appeared three times in the nine choice sets in each version. This design was used by Goodman *et al.* (2005) and Bernabèu *et al.* (2012).

Most important		Least important
☐	Price	☐
☐	Someone recommended it	☐
☐	It won a medal/award	☐
☐	Matching food	☐

Figure 1. An example of best worst choice set as presented to respondents.

software "Sawtooth MaxDiff Designer" (Sawtooth, 2007) was employed to carry out simulations with different combinations of attributes to get the best experimental design properties. According to Orme (2006), this program considers one-way frequency (how many times each attribute appears across the entire design), two-way frequencies (how many times each pair of items appears within the same set across the entire design), connectivity (all items are linked directly) and positional frequencies (how many times each item appears in the first, second, third or fourth positions). The experimental design also considered the alternative position effect, which is why the simulations resulted in four task versions. Each version has the same sample size to maintain its statistical properties.

Likewise, in the questionnaire, nine choice sets were shown and each choice was presented in a separate table. An example of one choice set is presented in Fig. 1. Respondents were asked to tick the attribute/item that most influenced them and the one with least influenced them when shopping for wine.

Specification models

Stated choice methods are based on random utility theory, which was proposed by Thurstone in 1927. This theory supposes that person (q) has a determined utility (U_{qi}) with an alternative (i) and that this utility can be separated into a systematic component (V_{qi}) that can be observed and measured and a random component (ε_{qi}) that captures the measurement errors of the model (Eq. [1]):

$$U_{qi} = V_{qi} + \varepsilon_{qi} \qquad [1]$$

In traditional DCEs, the key assumption is that individual q will choose alternative i as the best

alternative of choice set A if and only if $U_{iq} > U_{jq}$ all $i \neq j \in A$. Discrete best-worst choice experiments (DBWCEs) consider that individual q chooses the pair of alternatives i and k, respectively, as the best and worst alternatives of choice set A if and only if $\Delta U_{q, ik} > \Delta U_{q, lm}$ for all $i \neq k$ and $l \neq m \in A$.

When consumers are asked to answer best-worst questions, they choose the two wine attributes that maximize the difference between them on an underlying scale of importance. If a choice set has J wine attributes, then there are J (J–1) possible best-worst combinations a Spanish consumer could choose. The specific pair of wine attributes chosen by the consumer as best and worst then represents a choice from all J (J–1) possible pairs that maximize the differences in importance.

There are many kinds of DBWCEs and one of them measures attributes. This experiment involves the measurement of attributes relative to importance. The choice task consists of stating the most and least important alternatives, which are represented for an attribute, in each choice set. In our case, consumers indicated the most and least important attributes of a premium red wine. By adopting the variable representation in Lusk & Briggerman (2009), Eq. [1] can be modified to Eq. [2] to represent attribute importance and Eq. [2] can be transformed into Eq. [3] to represent the differences in attribute importance:

$$I_{qi} = \lambda_{qi} + \varepsilon_{qi} \qquad [2]$$

$$\Delta I_{q,ik} = I_{qi} - I_{qk} = \lambda_{qi} - \lambda_{qk} + \varepsilon_{q,ik} \qquad [3]$$

where I_{qi} is the latent unobserved level of importance that individual q gives to attribute I; λ_i represents the location of value i on the underlying scale of importance; ε_{qi} is a random error term; $\Delta I_{q, ik}$ is the importance difference between attributes i and $k;$ and

$\varepsilon_{q, ik}$ is an error term of selecting i as the most important attribute and k as the least important. This error term is an independent and identically distributed type i extreme value across j premium red wine attributes. Thus, the probability ($P_{q,ik}$) that individual q selects attribute i and attribute k as the most and least important attributes, respectively, from a choice set with J items is the probability that the difference in I_{qi} and I_{qk} is greater than all other $J(J-1)-1$ possible differences in the choice set. This takes the MNL form, as in Eq. [4]:

$$P_{q,ik} = \frac{\exp(\lambda_i - \lambda_k)}{\sum_{l=1}^{J} \sum_{m=1}^{J} \exp(\lambda_l - \lambda_m)} \qquad [4]$$

In traditional DCEs, the probability of choosing alternative i as the best one is directly proportional to its utility and the utility provided by the other alternatives. In our case (*i.e.* a DBWCE), the probability of choosing the pair ik of alternatives, respectively, as the most and least important attributes is directly proportional to the difference in importance and the differences in importance between the remaining $J(J-1)-1$ pairs of alternatives (attributes).

The relative importance of each attribute is estimated by the maximization of the log-likelihood function based on the probability $P_{q,ik}$. The dependent variable takes the value of 1 for the pair of wine attributes chosen by respondents as best and worst, and 0 otherwise. The estimated parameters λ_i represent the importance of wine attribute i relative to another wine attribute that was normalized to zero (Lusk & Briggerman, 2009).

Then, the share of preferences for each wine attribute (s_i) is calculated as follows:

$$s_i = \frac{\exp(\hat{\lambda}_i)}{\sum_{k=1}^{J} \exp(\hat{\lambda}_k)} \qquad [5]$$

This equation reports the importance of value i on a ratio scale, meaning that if one value has a share value twice that of another value, it can accurately be said that the former value is twice as important as the latter. These shares are the forecasted probability that each attribute is picked as most important (Lusk & Briggerman, 2009).

The MNL model assumes preference homogeneity in the sample, indicating that consumers place the same importance on each premium red wine's attribute; therefore, all the coefficients of the utility function in

Eq. [2] are the same across individuals. By contrast, the RPL model takes into account the heterogeneity of consumers' preferences and allows for random preferences, unrestricted substitution patterns and correlations in unobserved factors over time (Train, 2003). In particular, the importance coefficient for wine attribute j for individual q may be specified as $\bar{\lambda}_{qi} = \bar{\lambda}_{qi} + \sigma_i \mu_{qi}$, where $\bar{\lambda}_i$ and σ_i are the mean and standard deviation of λ_i in the population and μ_{qj} is a random term normally distributed with mean zero and unit standard deviation. Substituting this last expression in Eq. [4] yields the probability statement that depends on the random term μ_{qi} and the model is estimated via simulation. Parameters are calculated by maximizing a simulated log-likelihood function, evaluated as the number of pseudorandom Halton draws for μ_{qi}. These random draws are individual-specific, which means that it considers that each consumer has answered nine choice situations and in each choice set he or she stated the most and least important attributes.

In the standard RPL model, estimated preference parameters are assumed to be random but independently distributed from each other. However, depending on the attributes under study, we can expect some attributes to be interdependent. To take this into account, the correlation structure of the estimated parameters is assumed to follow a multivariate normal distribution (normal with vector mean μ and variance-covariance matrix Ω). If at least some of the estimates for elements of the Cholesky matrix C (where C'C = Ω) show statistical significance, then the data are supportive of dependence across preferences.

Three different models were estimated by using Nlogit 4.0, keeping "it won a medal" as a reference wine attribute. Model 1 corresponds to the standard MNL model and model 2 to the RPL model. Model 3 is an RPL model where the assumption about the independence of preference parameters is relaxed by assuming a multivariate normal distribution.

Finally, we tested whether the preference shares for all the attributes statistically differ according to individuals' characteristics by using the t-test, the Bonferroni test and the Pearson correlation test depending on the types of variables. Individuals' characteristics are presented in Table 1. Firstly, wine knowledge (KNOWLEDGE) was measured by the consumer's self-reported level of knowledge from 1 to 3, where 3 indicates the highest level of knowledge (Table 1). Moreover, repsondents were asked whether they usually buy wine in specialty stores (SPECIALTY). Regarding eating

and drinking habits, respondents were asked to indicate their agreement or disagreement with statements, using a five-point Likert scale where 1 indicates strong disagreement and 5 strong agreement. These statements were I used to seek information on red wine before buying it (INFORMATION), I used to consume DO products (DO) and drinking premium red wine made me feel good (FEELINGS).

Results

Estimated parameters

The results for the three models are presented in Table 2. To test which of the different assumed specifications is preferred, first we looked at the log-likelihood and pseudo R^2 values. Both values reached their best values in Model 3. In addition, all values in the Cholesky matrix were statistically significant except for the "it matches food" attribute, indicating that the random parameters are indeed correlated. Thus, Model 3 was the one used for further analysis.

Note that Spanish consumers considered "it matches food" to be the most important attribute, followed by "DO". The next most important attributes influencing Spanish consumers were "I tasted the wine previously", "grapevine variety" and "country of origin". "Vintage", "someone recommended it" and "price" were positively valued but less important. "Brand name" and "I read about it" were not statistically significant from zero. This last result suggests that Spanish consumers are indifferent towards these two attributes because they do not perceive them either best or worst. Finally, on the negative side, "label design" was the least important wine attribute (statistically significant at 5%). This result implies that Spanish consumers are to a lesser degree influenced by the "label design" when they buy a bottle of premium red wine and then a possible strategy adopted by Spanish wineries based on label design could not be successful.

Finally, the standard deviations of wine coefficients in Model 3 were statistically significant at 5%, implying that heterogeneity is an issue to be taken into account for wine consumers' preferences.

Share of preferences

As shown in Table 2, around 24% people on average chose "It matches food" as the most important wine attribute. The attribute "DO" had the next highest share of preference with almost 19% of people on average, followed by "I tasted the wine previously" with an average of 12%. Around 9% of participants chose "country of origin" and "grape variety" as the most important wine attributes followed by "vintage" (7% of respondents). The next group of attributes, with percentages of between 3% and 5%, were "someone recommended it", "price", "brand name" and "I read about it". Finally, fewer than 1% of participants chose "label design" as the most important attribute.

The "price" attribute showed low importance for consumers (around 5%). This result confirms that price is not considered to be an important factor when consumers buy premium red wine. Actually, consumers expected these kinds of wines to have higher prices, and thus they pay more attention to other wine attributes such as "DO" and "it matches food".

Explaining heterogeneity

As mentioned above, the heterogeneity of consumers' preferences towards wine attributes was detected. Heterogeneity is an issue to be taken into account when marketing premium red wines. To investigate further the main determinants of this heterogeneity, consumers were asked about their level of wine knowledge, in which type of store they buy wine to be consumed at home, some eating and drinking habits and their economic and socio-demographic characteristics. From our previous estimations, we calculated the preference shares for each respondent by using individual-specific estimates[5].

Table 3 shows the mean preference shares and consumers' personal characteristics with the statistical

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[5] It is important to note that these calculations do not produce each respondent's preference shares but as discussed by Train (2003), they are the means of the conditional distribution, which are not necessarily the same as persons' actual coefficients. However, the difference between these two statistics becomes small when people face even 10 choice situations. It has to be taken into account that individual-specific preference shares are the means of the parameter distribution conditioned on each individual's actual choices (Lusk & Briggerman, 2009).

Table 2. Relative importance of wine attributes: Estimates parameters and market shares. In parenthesis, t-value

Attribute	Model 1 Parameter	Model 2 Parameter	Model 3 Parameter	Market share (%)
Designation of origin	1.17** (13.28)	1.67** (13.56)	1.69** (18.51)	18.63
Label design	−1.14** (−12.02)	−1.57** (−11.00)	−1.53** (−11.68)	0.74
Vintage	0.48** (5.63)	0.67** (6.03)	0.73** (6.44)	7.14
It is matching food	1.34** (14.90)	2.03** (13.07)	1.94** (16.43)	23.93
Country of origin	0.58** (6.90)	1.04** (7.87)	0.91** (8.79)	8.54
Grapevine variety	0.66** (7.74)	1.02** (8.03)	1.05** (8.89)	9.83
Brand name	−0.028 (−0.03)	−0.01 (−0.09)	−0.11 (−0.91)	3.08
Someone recommended me	0.15* (1.80)	0.23* (1.90)	0.32** (2.69)	4.74
I tasted the wine previously	0.81** (9.23)	1.13** (9.25)	1.27** (11.49)	12.24
I read about it	−0.01 (−1.15)	−0.15 (−1.29)	−0.12 (−1.05)	3.05
Price	0.22** (2.62)	0.35** (3.06)	0.30** (2.79)	4.64
It won a medal[1]	n.a.	n.a.	n.a.	3.44
Standard deviations				
Designation of origin		0.92** (11.81)	0.72** (10.01)	
Label design		1.29** (6.87)	1.58** (9.18)	
Vintage		0.67** (5.17)	0.90** (8.61)	
It is matching food		1.67** (12.10)	1.80** (13.36)	
Country of origin		1.45** (10.90)	1.42** (11.57)	
Grape variety		1.22** (10.60)	1.54** (13.36)	
Brand name		0.95** (7.04)	1.19** (11.55)	
Someone recommended me		1.29** (10.72)	1.46** (13.94)	
I tasted the wine previously		1.04** (7.25)	1.11** (14.48)	
I read about it		0.92** (11.81)	1.22** (15.05)	
Price		0.92** (11.81)	1.27** (14.97)	

Table 2. Relative importance of wine attributes: Estimates parameters and market shares. In parenthesis, t-value (cont.)

Attribute	Model 1 Parameter	Model 2 Parameter	Model 3 Parameter	Market share (%)
Diagonal values in Cholesky matrix				
Designation of origin			0.721** (10.01)	
Label design			0.115** (2.53)	
Vintage			0.100** (4.35)	
It is matching food			0.113 (1.16)	
Country of origin			0.122** (8.08)	
Grape variety			0.124** (10.84)	
Brand name			0.113** (7.63)	
Someone recommended me			0.128** (9.09)	
I tasted the wine previously			0.086** (6.96)	
I read about it			0.072** (10.01)	
Price			0.072** (10.0)	
# individuals	200	200	200	
# choices	1,800	1,800	1,800	
Log Likelihood	−3,869	−3,549	−3,503	
Pseudo R^2	0.12	0.20	0.21	
AIC	4.34	3.99	3.95	

[1] The attribute "It won a medal/award" is the reference category. *, ** statistically significant at 10% and 5%, respectively (z-test).

significance from the t-test or Bonferroni test. Moreover, Table 4 reports the correlations between the shares of preferences and consumers' personal characteristics and the statistical significance from the t-test or Bonferroni test. The results indicate that only three socio-demographic characteristics (gender, education and age) explain the heterogeneity of preference shares and for only seven of 12 attributes. In addition, level of wine knowledge explains preference heterogeneity for five of the wine attributes. Other personal characteristics, such as the individual states that purchase wine in specialty stores, seeking additional information before buying wine, usually consumes DO products and feels better when drinking wine, were statistically significant for some attributes. On the other hand, preference heterogeneity for "brand name" and "I tasted the wine previously" were not explained by any of the analyzed consumers' personal characteristics.

First, we focused on the results for those attributes with the highest shares ("it matches food" and "DO") and the "price" attribute because price is usually considered to be a quality signal. As shown in Tables 3 and 4, the preference share heterogeneity for "it matches food" was only explained by the respondent's age and whether he or she buys wine in a specialty store. These

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Table 3. Means preference shares and consumers' personal characteristics

Attributes	FEMALE		UNIVERSITY		KNOWLEDGE			SPECIALTY	
	Female	Male	Yes	No	Low	Medium	High	Yes	No
Designation of origin	0.160*	0.138*	0.131*	0.156*					
Vintage					0.044^a	0.058^b	0.052^b		
It is matching food								0.39**	0.28**
Country of origin								0.118*	0.071*
Grape variety					0.073^a	0.118^b	0.114^b		
Someone recommended me			0.073**	0.044**	0.059^a	0.043^b	0.079^c		
I read about it			0.035**	0.024**	0.029^a	0.025^b	0.022^c		
Price	0.040**	0.066**			0.068^a	0.043^b	0.054^b		
It won a medal/award								0.020*	0.024*

$^{a, b}$ Different superscript letters indicate that group means are different at the 5% significance level using the Bonferroni test.
*, ** statistically significant at 10% and 5%, respectively (t-test).

Table 4. Correlations between shares of preference and consumers' personal characteristics

Attributes	AGE	INFORMATION	DO	FEELINGS
Designation of origin			0.210**	
Label design	–0.187**			
It is matching food	0.236**			
Grape variety		0.236**		
Someone recommended me	–0.298**			–0.186
Price			–0.216**	–0.218**

*, ** statistically significant at 10% and 5%, respectively (t-test)

results mean that as the age of the respondent increases, he or she is more likely to choose the attribute "it matches food" as the most important. The same happens for those respondents who state buying wines to be consumed at home in specialty stores (SPECIALTY) because a higher percentage of them would choose this attribute as the most important. On the other hand, the preference share heterogeneity for "DO" was explained by gender, university degree and whether respondents usually buy DO products. In particular, the findings suggest that higher percentages of women, people without university degrees and people who state that they usually buy DO products chose "DO" as the most important attribute compared with the percentages for their counterparts.

The preference share heterogeneity for the "price" attribute was explained by gender, level of knowledge, whether the respondent buys DO products and feels better when drinking wine. As expected, a lower percentage of women and a higher percentage of less knowledgeable respondents chose price as the most important attribute. In addition, there was a negative correlation between price and usually buying DO products as well as feeling better when drinking wine. Hence, consumers that think that price is more important to a lesser extent usually buy DO products and feel better when drinking wine.

Second, we focused on the results on the level of knowledge because this characteristic influences a higher number of attributes. The findings indicate that the percentage of respondents who chose "vintage" and "grape variety" as the most important was lower for people with lower knowledge. On the other hand, this percentage for the attribute "someone recommended it" was higher for respondents with higher knowledge. Finally, the percentage of respondents who chose "I read about it" as the most important was higher for those people with lower knowledge.

Discussion

During recent years, New World countries have continuously gained market share in world wine markets

at the expense of Old World countries whose share of exports has gradually declined. The success of New World countries is based partially on their capacity to emphasize different attributes of their wines from those of Old World countries, which are still marketing their wines by using traditional attributes. So far, the market penetration of wines coming from the New World into the Old World is weak, but future prospects might be different.

Published research suggests that wine consumers place more importance on some attributes than others depending on different national cultures. The most recent advances about consumer preferences have shown that the BWS methodology provides a more discriminating way to measure the degree of the importance respondents attach to different attributes. This method was applied in this work to assess the importance Spanish consumers attach to different wine attributes. These attributes, selected after a literature review of published research in the most important journals, were found to be highly appreciated by consumers in the Old World and New World, although with different levels of intensity. A mix of attributes appreciated by consumers from the Old World and New World was thus tested.

The results of our study confirm that the BWS method overcomes most of the limitations of rating and ranking methods since it provides a better understanding of a consumer's evaluation of wine attributes. The similarity with another experiment undertaken in Spain (Bernabèu *et al*., 2012) during the same year, but in a different region, provides material for a comparative analysis. This analysis provides business managers insights into how consumers evaluate usual and unusual wine attributes. Hence, they are more likely to design efficient marketing strategies aimed at targeting different consumer segments and to face more efficiently the decreasing wine consumption in the Spanish market. It is commonly accepted that young consumers and women are two segments with great consumption potential that do not receive appropriate communication. In this work, we found empirical evidence that gender and age explain preference share heterogeneity for seven attributes and more emphasis is given to these two segments.

We found that Spanish consumers consider "it matches food" to be the most important attribute and this is linked to their age, since the older the respondent, the greater the consumer's preferences are. Therefore, young people might not prefer this attribute and

marketing communication should be based on other attributes. For them, wine consumption is not necessarily linked to food but rather other consumption occasions. This is an important finding to redesign the communication policy for young consumers. However, older people buy premium red wines for special gatherings with friends and family where food is present and they more often use specialty shops to buy their wine.

"DO" is the second most important attribute but this is mostly preferred by women. These results are in accordance with other studies from Old World countries (Angulo *et al*., 2000; Combris *et al*., 2000; Mtimet & Albisu, 2006; Perrouty *et al*., 2006; d'Hauteville *et al*., 2007; Barreiro *et al*., 2008; Hertzberg & Malorgio, 2008; Bernabèu *et al*., 2012). Thus, there are clear indications that this attribute should have more emphasis in communications with them. The communication policy should include many different aspects related to DO and not only technical matters, as is usually the case. It is also remarkable that consumers without university degrees appreciate this attribute, which reinforces the idea about carefully selecting the topics that define the DO.

However, in contrast to previous studies carried out in Spain (Angulo *et al*., 2000; Mtimet & Albisu, 2006; Barreiro *et al*., 2008), the following most important attributes were "I tasted the wine previously", "grapevine variety" and "country of origin", which are unusually employed in Old World countries. In that respect, this work shows that Spanish consumers concur with New World consumers. The greater number of wines in the market has switched consumers' preferences towards attributes that imply less knowledge or that are more easily identifiable. In a market with so many different brands, tasting is becoming more and more important as a consumer reference. This is in accordance with the weak importance they give to labels and brand names.

This work shows that past experiences (expressed by the attributes "matches food" and "tasted previously") are more important than personal knowledge ("DO", "vintage" and "grapevine") and the image of wine ("country of origin" and "winning a medal or prize"). This suggests pursuing marketing with greater emphasis on tasting complemented by information to reinforce knowledge, which affects five attributes.

When comparing this work with that undertaken by Bernabèu *et al*. (2012), it should be stressed that only five attributes were exactly the same in both studies,

while three are different and the rest do not measure exactly the same topic. For example, "vintage" cannot be considered to be the same as "ageing", "country of origin" does not reflect the same as "region of origin" and "label design" is not the same as "design of the bottle and label". In our study, nine data sets were considered, whereas in Bernabèu *et al*. (2012) there were 12. It would be also interesting to check the optimum level of data sets that consumers are able to distinguish.

The findings of Bernabèu *et al*. (2012) showed that the attributes that seemed to condition wine consumers the most were "tasted the wine previously" and "region of origin", which is not precisely the order found in this study. Subtleties could also be important to compare consumers' reactions, because the use of "DO" instead of "region of origin" implies not only the territory but also quality assurance. Similar to our work, the preference share heterogeneity for "DO" is explained by gender, suggesting that a higher percentage of women would choose this attribute as the most important.

Although we identified heterogeneity in wine preferences for Spanish consumers and explained this heterogeneity to some extent, it would also be interesting to identify specific groups of consumers and profile them in further research. However, this study shows two limitations. The first one is related to the measurement of wine knowledge, which is very subjective and may have influenced the results. The second limitation of the analysis is that it wasonly conducted in Spain, an Old World country. Further research extending the analysis to New World countries should be undertaken to find out whether marketing strategies should differ when selling wines in Old World and New World countries.

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