

Drivers of Consumers' Wine Choice: A Multiattribute Approach

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Abstract

Wine consumers are generally facing a wide variety of wines with different tastes, qualities, prices, and other related attributes. Choosing a specific wine, therefore, is a complicated task for consumers. Wine producers and marketers are trying to target wines to different consumer segments, based on their preferences to increase sales, efficiency, and profits. The label name of a wine is aimed at describing the product, its quality and its value. Researchers have developed information cues that try to assist consumers in selecting wines. These cues are different for each wine in accordance with general wine knowledge, regional and winery style. However, tasting the wine is still the best tool for selecting a wine. In this paper we propose a probabilistic choice modeling approach to explore the saliency of wine attributes in the process of wine choice. We employed a multinomial logit model that enables us to identify such attributes and, simultaneously, to estimate the choice probabilities for each different wine. Our results, based on four different red wines, indicate that consumers tend to utilize several wine attributes in their choice process. The saliency of these attributes varies in different segmentation schemes such as gender, frequency wine drink and wine involvement.

Introduction

Wine consumers generally have access to a wide variety of wines with different tastes, quality, prices, and other related attributes. Since wine can be considered as an experience quality type of good (Nelson 1974), the purchasing decision depends upon many factors that define, for example, the consumer's perceived quality of the wine. In general, the purchase of such a product can be influenced by aspects such as product characteristics, the perceived qualities of the producer, and the consumer's own characteristics. Wine producers, for example, try to influence potential consumers by reducing some of the uncertainty concerning their wines. To this end, producers create several wine brands for the same varieties based on the quality of the grape juice, which could be a signal or self-declaration of quality. Other indicators are vintage, winery and its reputation, geographical location and other external characteristics that may classify the wine. With respect to the consumer's personal characteristics, their preference and previous experience and knowledge of the product category might affect their purchasing decision. The decision to buy or not to buy certain wine, therefore, depends on the consumer's perception about these factors. The purchasing decision becomes even more complex once the potential consumer faces multiple alternatives to choose from. There has been rather limited work, however, aimed at modeling this purchasing decision process in wines. More specifically, there is no complete understanding of the competitive intensity between various wines available to the consumer in general, and for red wines, in particular. Furthermore, the effect of the wine attributes on the purchase decision has not been adequately addressed in the literature. In order to fill this void, we propose a probabilistic modeling approach that will address these issues.

In particular, we employ a multinomial logit choice model to examine the choice probabilities of different red wines as a function of the wine attributes.

Researchers have tried to define wine quality on the basis of objective characteristics that are based on chemical and instrumental analyses of wine attributes. Such characteristics include acidity, color, volatile components, and other aroma-related and measurable attributes. Wine's compositional and sensory profiles are widely documented and several models have been proposed to identify and classify wine quality and origin, based on these profiles (see, for example, Cliff and Dever 1996, Kwan et al. 1980, Vanier et al. 1999).

These measures, however, are not fully appreciated by consumers, who generally rely on their own perception of product qualities. Furthermore, some characteristics are not easily measurable. For example, the aroma and sensory attributes of wine are complex and difficult to measure and describe. Hence, sensory evaluation of wine is usually performed by wine experts who evaluate the wine and describe its attributes for potential consumers. It is often the case that wine experts publish their opinions on a variety of wines, and their expertise is usually accepted by producers, retailers and consumers, constituting a basis for quality rating. Thus, a subjective measure is used to describe the product attribute.

Many wine customers buy wine on the basis of the recommendations of wine experts, their earlier experience or tasting. In most cases the consumer is facing a wide variety of wine styles and varieties and choosing a wine is a complicated issue. Previous research studies tried to assist customers in making their purchase decisions concerning wine based on several cues that can predict wine quality. However, these cues are different for each wine in accordance with general wine knowledge, regional and winery style (Horowitz and Lockshin 2002). A recent study (Goodman et al. 2005) showed that in Israel, 'recommendation' by a friend or in a wine store is the most important factor driving wine choice. This is not surprising since Israel is a 'developing wine market' with a high number of relative low-knowledge consumers. For a developed wine market such as Australia or France, region, brand, variety and medal are the most important aspects in choosing wine in various combinations depends on wine consumer segments (Lockshin et al 2006).

Tasting the wine is still the best tool for selecting a wine. Namely, it is the closest proxy to consumers most preferred wine. In a winery or wine stores, it is common to offer a taste of several wines and the customer is supposed to select (and buy) a bottle of wine or more. The customer in this case is faced several alternatives while he or she is supposed to decide which wine to select, or which wine he or she prefers. What are the attributes that most affect consumers in such a choice process? Are these attributes differ across different consumers segments? In other words, does heterogeneity among consumers such as experience, age, gender, education, and other demographic variables have an effect on the saliency of the wine attributes in a choice context? From the producers' point of view, an answer to these questions might indicate a potential for constructing a marketing strategy that is based on those important attributes. Such a strategy might be more effective and efficient than others since it will focus on the potential drivers of consumers' preferences and choice. In a recent study (Cohen and Lowengart 2003) similar issues related to white wines were

explored. There is still, however, lack of understanding as to the salient attributes in red wines which are different from white wines in their characteristics and the variation in different consumer segments.

The purpose of this study is aimed at filling the void in the literature on such issues. In terms of methodology, we first identified the relevant red wine attributes that consumers are considering when they purchase red wines. As noted earlier, the main interest of this study is to gain a greater understanding of the red wine choice process. We therefore have focused on one type of wine, i.e., red, young, not complicated and at the mid-range price level. As this is a rather new type of research approach in this area, we are at a very early stage of this research stream and obtaining high internal validity is an advantage in this case. We therefore used a rather homogeneous sample in our empirical investigation. Furthermore, we used a blind taste setting to capture the effect of the wine qualities only.

We used the following list of characteristics as representative of the wine attributes: color intensity, aroma, bouquet, taste, tannic, harmony, and after-taste sensation. This set of wine attributes conforms to the generally accepted rules of wine tasting (see, for example, Kolpan et al.1996).

Data collection

The subjects used for this study were students, visitors and staff members at Ben Gurion University of the Negev during two days of the study. One hundred and thirty five respondents participated in the study. The tasting experiment was performed in the lobby of a large building complex to attract potential participants. The researchers suggested wine tasting to the visitors who walked through the building. They presented four wines covered by brown paper. All of the tasted wines were presented to the subjects simultaneously, without any information about the wine. Furthermore, random mixing of the alternatives across participants was carried out to avoid a potential primary effects. Overall, four red generic wines from different brands were tasted, as follows: unknown producer with a private label, Carmel wine (a well known brand), Yasmin (Recanati, a boutique winery) and Mount Hermon (Golan Height, a well known brand and wine).

Overall, 135 participants took part in the wine tasting procedure and filled the questions pertained to this test. The sample was formed by 88 males and 47 females. The age of the participants was mostly young adults with 41 of them between the ages of 18 and 24, 89 between 25 and 40, and 5 above 40 (age drinking is 18). With respect to income level, 81 of the participants earned less than the average salary, 46 at about the average, and 14 above the average income. The level of employment ranged from full time, 64, to part time, 8, and full time students (unemployed), 62.

Subjects were asked to taste the wine and to rate each of the following wine attributes described earlier: color intensity, aroma, bouquet, taste, tannic, harmony, and aftertaste. Respondents were asked to rate their responses on an interval scale of 1 (very low level) to 10 (very high level). In addition, respondents were asked to rate

their overall evaluation of each wine and to rate their overall preference for each wine of the four wines they tasted.

Method and Data analysis

The main objectives of this study, as noted earlier, are twofold: 1) estimating the probability that a potential consumer will choose a specific wine from a set of alternative wines, and 2) to identifying the red wine attributes that most affects customers in their purchasing decision. We employed a probabilistic multinomial logit choice model (McFadden 1974) for the data, based on the assumption that the overall consumer preference for a choice alternative (i.e., the preferred wine) is a function of the perceived relative utility that the alternative (wine) holds for the consumer. The probability that a specific wine j will be chosen by consumer i is given by:

$$P_{ij} = \frac{\exp^{(U_{ij})}}{\sum_{j=1}^{j=m} \exp^{(U_{ij})}}$$

where U_{ij} is the utility of the wine j for consumer i , and m is the number of wines in the choice set. The utility function can be separated into a deterministic component V_{ij} (measured in terms of perceived value associated with the wine characteristics), and unobserved random component ε_{ij} , which yields:

$$U_{ij} = V_{ij} + \varepsilon_{ij}$$

The deterministic component of the utility function has the following form:

$$V_{ij} = \alpha_1 \text{COLOR}_{ij} + \alpha_2 \text{AROMA}_{ij} + \alpha_3 \text{BOUQUET}_{ij} + \alpha_4 \text{TASTE}_{ij} + \alpha_5 \text{TANNIC}_{ij} + \alpha_6 \text{HARMONY}_{ij} + \alpha_7 \text{AFTERTASTE}_{ij}$$

where $\alpha_1, \dots, \alpha_7$ are parameters to be estimated.

Results and Discussion

The estimated parameters $\alpha_1, \dots, \alpha_7$ for all subjects tasting red wine are presented in Table 1. The data indicate that four wine attributes are salient in the choice process – namely, taste and harmony and to a lesser degree bouquet and aftertaste. In a similar analysis for white wines Cohen and Lowengart (2003) reported that taste and harmony were the two salient attributes. Thus, wine producers and marketers should focus on these wine attributes while targeting wine consumers similar to the consumers in our study.

Table 1: Multinomial Logit Coefficients –Aggregate Level

| Wine Attribute | Coefficient | Significant level |
|-------------------------|-------------|-------------------|
| Color Intensity | - 0.449 | 0.750 |
| Aroma | - 0.082 | 0.553 |
| Bouquet | 0.261 | 0.091 |
| Taste | 0.684 | 0.000 |
| Tannic | 0.067 | 0.446 |
| Harmony | 0.616 | 0.000 |
| Aftertaste | 0.146 | 0.075 |
| Log-Likelihood | -105.15 | |
| McFadden R ² | 0.451 | |

Understanding consumers' preferences and what drive their choice is essential is developing marketing strategies for different segments. To that end, we employed the same multinomial logit analysis for different segments based on gender, frequently wine drinking (less than once a week and twice a week or more, for low and high frequently wine drinking respectively), and wine involvement.

Gender trait and consumers behavior of alcohol consumption has been widely documented (see for example Ricciardelli et al. 2001). Since heavy alcohol drinkers may be more experienced in wine styles, the segmenting the market based on the frequency of drinking wine might be valuable in gaining more understanding of different consumer needs and, therefore, aiding in designing marketing strategies. Studies show that involvement is one of the most used and powerful methods of separating wine drinkers preferences (see for example Kapferer and Laurent 1993, Lockshin et al. 1997, Lockshin et al 2001, Lockshin et al. 2006, Quester and Smart 1998). Deriving "involvement" variable, respondents were asked to rate their behavior concerning wine in a 1-5 points scale, and the sum of the scores was considered as "wine involvement". Subjects were classified in two categories, those with value of "wine involvement" less or equal the median value were classified as "low involved" and those with a value higher than the median value were classified as "high involved". The results of the multinomial logit coefficients for gender, frequent drink wine and wine involvement are presented in Tables 2, 3 and 4, respectively.

With respect to male/female segmentation scheme, our results show that taste is a salient attribute for both male and female. These two segments, however, are different with respect to other wine attributes. Harmony plays an important role in the male segment (harmony is recognized as the balance among all wine attribute) and, to a lesser degree, aftertaste. Bouquet is also significant at the female segment. A possible justification for this finding is that bouquet is considered as the mouth feeling while drinking wine and not the actual meaning of bouquet which is the combination of aroma and odors developed in the wine during fermentation and aging.

Table 2: Multinomial Logit Coefficients - Male and Female Segments

| Wine Attribute | Male | | Female | |
|-------------------------|-------------|-------------------|-------------|-------------------|
| | Coefficient | Significant level | Coefficient | Significant level |
| Color Intensity | -0.075 | 0.711 | -0.217 | 0.391 |
| Aroma | -0.867 | 0.584 | -0.068 | 0.799 |
| Bouquet | 0.010 | 0.955 | 0.710 | 0.029 |
| Taste | 0.674 | 0.000 | 0.859 | 0.000 |
| Tannic | 0.011 | 0.931 | 0.132 | 0.361 |
| Harmony | 0.776 | 0.000 | 0.360 | 0.143 |
| Aftertaste | 0.219 | 0.076 | 0.218 | 0.155 |
| Log-Likelihood | -65.882 | | -30.427 | |
| McFadden R ² | 0.454 | | 0.512 | |

Analyzing the results of the frequency of drinking segmentation scheme, results indicate that bouquet is a salient attribute in the low frequent wine drinkers' segment (87 respondents, drink once a week or less, Table 3). Both segments appreciate taste and harmony. The high frequency segment is also affected to a certain degree by the aftertaste and color of the wine. The results are reported in Table 3. It comes as no surprise that less experienced and knowledgeable consumers tend to evaluate products with a smaller set of attributes (see, for example, Sujan 1985).

Table 3: Multinomial Logit Coefficients - Low and High Drinking Frequency Segment

| Wine Attribute | Low Frequency | | High Frequency | |
|-------------------------|---------------|-------------------|----------------|-------------------|
| | Coefficient | Significant level | Coefficient | Significant level |
| Color Intensity | 0.036 | 0.840 | -0.533 | 0.108 |
| Aroma | -0.149 | 0.378 | 0.045 | 0.857 |
| Bouquet | 0.421 | 0.036 | -0.030 | 0.909 |
| Taste | 0.687 | 0.000 | 0.740 | 0.009 |
| Tannic | 0.114 | 0.305 | -0.097 | 0.547 |
| Harmony | 0.387 | 0.027 | 0.999 | 0.000 |
| Aftertaste | 0.150 | 0.130 | 0.325 | 0.109 |
| Log-Likelihood | -65.159 | | -31.391 | |
| McFadden R ² | 0.447 | | 0.508 | |

The involvement segmentation scheme (Table 4) show the taste and harmony are salient in the choice process in both segments. The high involvement segment, however, is also affected, to a certain degree, by the aftertaste.

Table 4: Multinomial Logit Coefficients – Level of Involvement Segmentation Scheme

| Wine Attribute | <u>Low Involvement</u> | | <u>High Involvement</u> | |
|-------------------------|------------------------|-------------------|-------------------------|-------------------|
| | Coefficient | Significant level | Coefficient | Significant level |
| Color Intensity | -0.140 | 0.501 | 0.065 | 0.743 |
| Aroma | -0.043 | 0.831 | -0.133 | 0.493 |
| Bouquet | 0.192 | 0.430 | 0.301 | 0.152 |
| Taste | 0.681 | 0.000 | 0.741 | 0.000 |
| Tannic | 0.176 | 0.170 | 0.029 | 0.819 |
| Harmony | 0.549 | 0.009 | 0.681 | 0.002 |
| Aftertaste | 0.094 | 0.477 | 0.209 | 0.067 |
| Log-Likelihood | -48.861 | | -48.381 | |
| McFadden R ² | 0.466 | | 0.463 | |

In order to verify whether our segmentation scheme is meaningful (i.e., whether separating the sample into two segments should result in better data fitting than in an aggregate sample) we conducted log-likelihood tests, $-2 \log \lambda$, where $\lambda = (LL_{segments} - LL_{aggregate})$, (Gensch, 1985) on the different segmentation schemes (see Table 5). All of these tests are significant at least at the 0.05 level thus indicating that our segmentation scheme is meaningful and such groups of consumers do behave differently.

Table 5: Log-Likelihood tests

| Segment | Log Likelihood | | |
|--------------------------|----------------|---------|---------|
| Aggregate Model | -105.15 | -105.15 | -105.15 |
| Male | -65.88 | | |
| Female | -30.43 | | |
| Low Frequent Drink Wine | | -65.16 | |
| High Frequent Drink Wine | | -31.39 | |
| Low Wine Involvement | | | -48.86 |
| High Wine Involvement | | | -49.33 |
| 2 λ | 17.68 | 17.20 | 13.92 |

When it comes to constructing a marketing strategy for a red wine that targets a similar consumer segment to that which participated in this study, marketers can increase the choice probability of their wines by improving its taste, either by technological improvements or by blends with other varieties of grapes, and emphasizing the wine's harmony. It is not easy, of course, to delineate what is the exact taste and harmony for a preferred wine; rather, this study can indicate which wine attributes are those that influence the choice process. Wine marketers, therefore, need to construct sensory evaluations tests to identify the most preferred tastes and flavors for their wines. Our results also indicate variation in the saliency of the wine attributes across segments. Incorporating these heterogeneities into better understanding customer preferences can result in a strategy that will indicate different types of wine for different segments. For example, the male segment can offered a wine that is a bit more complex in that it will include indications about its harmony and aftertaste, in addition to its taste and whereas a wine that is more targeted toward the female segment should indicate the bouquet of the wine in addition of its taste.

Conclusions and future study

The purpose of this study, which constitutes initial step in a more general understanding of consumers' wine preferences, is aimed at exploring the wine attributes that influence the consumer's wine choice. As such, it is focused on seven wine attributes that were identified as part of the consumer's considerations. We employed a probabilistic choice model to address this issue and were able to identify those wine attributes and, in addition, we could estimate the effect of a change in these attributes on the probability of choosing a wine.

Our results from the wine category indicate that consumers evaluate mostly wine taste and harmony. Such diagnostic information can aid wine marketers in constructing more efficient marketing strategies to increase their market share.

This is one of the first studies in investigating the effect of wine attributes on consumers' wine choice. The current study introduces a framework for future studies that can focus on the effect of other consumers' characteristics on wine selection, as well as the wineries' effect on that choice. That is, exploring whether consumers' heterogeneity in responsiveness to various wine attributes might aid marketers in tailoring marketing strategies that are more targeted and therefore more efficient. Another venue to explore is the inclusion of other types of wines in such an analysis, which might increase the ability of wine marketers to compete against other wineries.

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