Socioeconomic Factors and the Consumption of Wine in Tenerife

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SOCIOECONOMIC FACTORS AND THE CONSUMPTION OF WINE IN TENERIFE

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SOCIOECONOMIC FACTORS AND THE CONSUMPTION OF WINE IN TENERIFE[1]

Abstract

In this paper we measure the impact of an individual's socioeconomic conditions on the decision to consume wine in a traditionally wine-producing area. Based on the data obtained in an exhaustive survey on wine consumption and through discrete choice models, we assess the changes which come about in the decisions to consume the different types of wine under consideration, and we obtain the most relevant distinctive and differentiated characteristics for each one of them.

Key words: wine consumption, socioeconomic characteristics, discrete choice models.

Introduction

Historically, the Canary Islands is a wine-producing region. At present, and according to the vine register, more than 20,000 hectares are used for vineyards in the islands, and their contribution to total agricultural production and to the maintenance of the farming areas and landscape is important. In the last 15 years there has been a boom and expansion in the sector as a result of the coincidence of a series of circumstances and people (wine-growers, wine-producers and politicians) who, through suitable policy, have strengthened an activity which had been an important source of wealth in the past for the Canary Islands. Hence, the efforts made to boost quality wine production, without losing sight of the historical evolution and taking into account the fact that the islands are micro-continents in the Atlantic, has led to the creation of 10 Regulating Boards, five of them on the island of Tenerife. Nevertheless, annual wine production in both Canarian provinces is significantly lower than demand.

The object of this paper is to extend our knowledge of consumer behaviour of the residents on the island of Tenerife when they are faced with the decision of consuming or not a complex, unessential agricultural food product such as wine. Until recently, there was no quantitative data on the Canary wine consumer, making difficult a more or less accurate evaluation of his behaviour.

If wine consumption data is observed at a national level[2], two categories can be established: the consumption of table wines and the consumption of bottled wine with Appellation d`Origin (AO), the latter is only a quarter of the total consumption, a situation which is similar in the Canary Islands according to the data supplied by the Spanish Ministry of Agriculture. As far as the profiles of wine consumers at a national level are concerned, the *Alimentación 2001* report concludes that consumption is essentially urban, and that demand increases at a pace with the growth of the urban nucleus; the singles' homes show the greatest consumption, similarly to the housewives and people with low and medium-low income.

In regard to annual per capita wine consumption in the Canary Islands, it is below the national average (approximately in 6 litres), being along with Extremadura the regions

[2] Information on the wine market can be found in Angulo A.; Gil J.P.; Gracia A. y Sánchez M. (2000).

with the lowest consumption[3]. However, the importance of the consumption of unbottled wine should be underlined, this is a differentiating element perhaps due to the traditional belief that wine is a distinctive feature of popular culture on the islands (home-produced). The popularity of the so-called "barrel wine and rural tavern culture" co-exists with the growing interest of consumers in acquiring a certain expertise regarding wine, to be related with the changes in eating habits in favour of the "Mediterranean diet"[4].

At the moment, a study of the characteristics of potential local wine consumers is particularly important, inasmuch as it represents the acquisition of a certain knowledge allowing for an improvement in the quality of Canary wines. Hence, a study of the basic characteristics of residents wine consumption is the first step allowing producers to outline marketing strategies focused on obtaining a larger market share.

The aim of the paper is an analysis of the influence of individual characteristics which can be determinant in the decision to consume wine or a particular type of wine. The statistic tools used are the qualitative response models which allow us to study the effects of socioeconomic characteristics on the probability of consuming or not consuming wine, as well as a particular type of wine (unbottled, local bottled AO, or imported bottled AO).

The paper is organised in four sections. The data used are described in the first one. The second one contains a brief description of the discrete choice models. Subsequently, the main results extracted from the models are shown. Finally, the most relevant conclusions are presented.

Data: description and processing

The information used to carry out the analysis comes from the *Encuesta sobre consumo de vino en Tenerife* carried out in April and May 2001, whose details can be found in Guirao et al (2001). The data contain information about 1202 individuals residing on the island of Tenerife[5], concerning to the frequency of wine consumption and the characteristics of general wine consumers and local wine consumers. In regard to socioeconomic variables, they can be summarised by pointing out that the distribution by sexes is almost equal, around half of those interviewed are under 40 years old, and this is also the percentage of married people, about more than 50% belong to family units of 3 or 4 members, and the prevailing occupation is employee. In what concerns to qualifications, 34% have secondary education, and around 60% have an income of between 100 and 300 thousand pesetas per month.

From the descriptive viewpoint, the most significant results regarding consumption depending on certain socioeconomic conditions can be used as a basis for comparing the results at an inferential level, which will be obtained by analysing the individual decisions to consume wine with the models described in the next section. It can be pointed out that in the sample the percentage of male wine consumers is higher than that

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[3] According to MERCASA data in the "Alimentación 2001" report.

[4] Wine seen as a heart tonic, as well as the interest in the cultural dimension of food products with roots in the popular tradition (Godenau, 2000).

[5] The 1202 interviews were carried out proportionally to the population of three large areas: north, south and metropolitan.

of women, people aged between 30 and 39 show a greater frequency of consumption, as well as married interviewees. Occupation also affects the consumption frequency, which is greater among professionals, civil servants, employers and employees, related directly to the income level and inversely with the education level.

If the most frequently consumed wines, which are unbottled, local bottled AO and imported bottled AO are observed it can be noted that low-qualified and low-income consumers are the highest frequency consumers, as well as for men and those who are professionals. However, in the case of bottled wine, consumption increases at a rate with the income and qualification levels.

In this case, for the variables of interest in this analysis and detailed in the appendix, 30 observations had to be omitted because of lack of information, resulting in a sample of 1172 individuals. In 890 cases (76%) those interviewed confirmed they consumed some sort of wine, while 282 (24%) never consumed it. These proportions vary in relation to the different types of wine under consideration as can be seen in the following table:

Type of wine	N° cases consumption	% consumption
Own production unbottled	254	21.6
Local unbottled	538	45.9
Imported unbottled	60	5.1
Bottled local AO.	608	51.9
Bottled imported AO	378	32.3
Bottled local without AO	199	17
Bottled imported without AO	80	6.8

On the other hand, if the categories in regard to consumption frequency are considered, most of the cases show low or moderate consumption.

Consumption Frequency	Wine in general	Own production unbottled	Local unbottled	Import unbottled
Never	282 (24%)	918 (78%)	634 (54.1%)	1112 (94.9%)
Low	410 (35%)	103 (8.8%)	323 (27.6%)	48 (4.1%)
Moderate	384 (33%)	93 (8%)	155 (13.3%)	10 (0.9%)
High	96 (8%)	58 (4.9%)	60 (5.1%)	2 (0.2%)

Consumption Frequency	Bottled AO local	Bottled AO import	Bottled without AO local	Bottled without AO import
Never	564 (48.1%)	794 (67.7%)	973 (83%)	1092 (93.2%)
Low	384 (32.8%)	270 (23%)	151 (12.9%)	64 (5.5%)
Moderate	196 (16.6%)	106 (8.2%)	44 (3.7%)	13 (1.2%)
High	28 (2.4%)	12 (1%)	4 (0.3%)	3 (0.3%)

With the information available, the most important individual factors affecting consumption decisions were studied for general wine consumption and that of the three types of most frequently consumed wines. Moreover, an approximation is made of the possible changes which can come about for the highest frequency consumption.

Modelling of the consumption decision

The analysis of the impact of certain individual characteristics aspects in the decision to consume wine or not requires a field of econometrics which can allow us to study individual decisions when the dependent variable does not assume values in a real interval but, on the contrary, there is a discrete and finite number of results, that is, the discrete choice models[6].

The decision to consume $(y = 1)$ or not consume $(y = 0)$ is considered. The standard logit model is defined:

$$\text{Prob}(y = 1) = \frac{e^{x\beta}}{1 + e^{x\beta}} = \Lambda(x\beta)$$

where $\Lambda(.)$ denotes the standard logistic distribution function, x is the explanatory variable vector, with contains the set of factors about individual socioeconomic characteristics, among which are age, sex, qualification, marital status, number of members in the family unit, occupation, area of residence and income level. The description of these variables can be seen in the Appendix.

The marginal effects are given by:

$$\frac{\partial E[y \mid x]}{\partial x} = \frac{e^{x\beta}}{(1 + e^{x\beta})^2} = \Lambda(x\beta)[1 - \Lambda(x\beta)]\beta$$

In practice, a calculation of the marginal effects in various values of the characteristics row vector x is desirable, usually the means of the data sample are used. Given that discrete variables are used, the derivative is an approximation of the change in probability depending on whether the variable is included or not. However, it is interesting to analyse the variation in probability with respect to one characteristic, setting the rest in their constant value. These effects can also be understood by considering the odds-ratio.

In regard to the estimation of these models, the method used is that of maximum likelihood.

The main specification errors which arise in this type of model are the omission of variables and the presence of heteroskedasticity, which is common in microeconomic data. Among the most frequent tests used to evaluate such problems, there are the Lagrange multipliers for the omission of variables, and the test proposed by Davidson and McKinnon (1993) which basing on the construction of an auxiliary regression[7] allows for testing the presence or heteroskedasticity.

Normally, the validation of these models is based on an evaluation of the likelihood functions or on the comparison between the values observed and those predicted by the models. In this case, we will use the R^2 proposed by McFadden (1974) and the one by Efron (1978) and McKelvey and Zavoina (1975), respectively. Moreover, the

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[6] See Maddala (1983), McFadden (1984), Amemiya (1985), Green (2000) and Franses&Paad (2001) for a detailed description of these models.
[7] See Knapp&Seaks (1992), who carry out the heteroskedasticity test in an alternative way.

percentage of successes will be obtained as a way of validating the capacity of the model.

Main empirical results

This section shows the main results obtained from the logit binomial model estimations for decisions to consume wine in general and for the different types of wine consumed with the highest frequency. In all the models, the same explanatory variable vector will be kept, in an attempt to contrast some of the preconceived ideas regarding the defining characteristics of consumers and to make comparisons in regard to the most explanatory factors.

In the model corresponding to the decision to consume wine or not (general case), as can be seen in Table 1, it appears that the sex, age, marital status and education factors are the most relevant. Similarly, some categories of the occupation and income variables contribute to the consumption probability significantly. Specifically, sex, marital status, income level and belonging to the students or housewife category have a negative effect. One aspect which should be stressed is the role played by the education level of the individual, given that a high positive effect happens as the educational level rises, a result which is not maintained, as can be seen, when the different types of wine are analysed (see figure 1). As was indicated previously, the most recent data highlight that wine consumption is essentially urban. However, the results of the estimation in our case do not show significant differences between the areas taken into consideration, although across predicted probabilities (and the odds-ratios) a slightly higher effect is observed in the metropolitan area.

Table 1. Logit Binomial Model Estimation for wine consumption in general[8].

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
Intercept	1,268	0,453	0,005		
S2	-0,865	0,176	0,000	-0,140	0,421
AGE1	0,960	0,432	0,026	0,155	2,613
AGE2	0,747	0,376	0,047	0,121	2,111
AGE3	0,538	0,350	0,125	0,087	1,712
AGE4	0,602	0,352	0,087	0,097	1,825
AGE5	0,369	0,307	0,229	0,060	1,446
A2	0,022	0,181	0,906	0,003	1,022
A3	0,128	0,194	0,511	0,021	1,136
MS2	-1,138	0,258	0,000	-0,184	0,320
MS3	-0,540	0,246	0,028	-0,087	0,583
FM	0,001	0,054	0,993	0,001	1,000
O2	0,648	0,518	0,211	0,105	1,912
O3	-0,682	0,285	0,017	-0,110	0,506
O4	-0,669	0,266	0,012	-0,108	0,512
O5	-0,008	0,328	0,980	-0,001	0,992
O6	0,759	0,497	0,127	0,123	2,136
O7	-0,115	0,303	0,705	-0,019	0,892

[8] All the results have been obtained using LIMDEP version 7.0 econometric software. On the other hand, the goodness of fit statistics for all the models reject the null hypothesis of non-joint signification of the parameters, and the Davidson and Mckinnon test does not reject the homoskedasticity hypothesis.

Table 1 (Continued)

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
EDU2	0,795	0,262	0,002	0,128	2,214
EDU3	0,817	0,308	0,008	0,132	2,263
EDU4	1,257	0,358	0,000	0,203	3,513
I2	-0,580	0,256	0,024	-0,094	0,560
I3	-0,360	0,281	0,200	-0,058	0,698
I4	-0,306	0,336	0,363	-0,049	0,737
I5	0,065	0,375	0,863	0,010	1,067

$N = 1172$

$R^2_{Efron} = 0,15033$

$R^2_{MCF} = 0,1259$
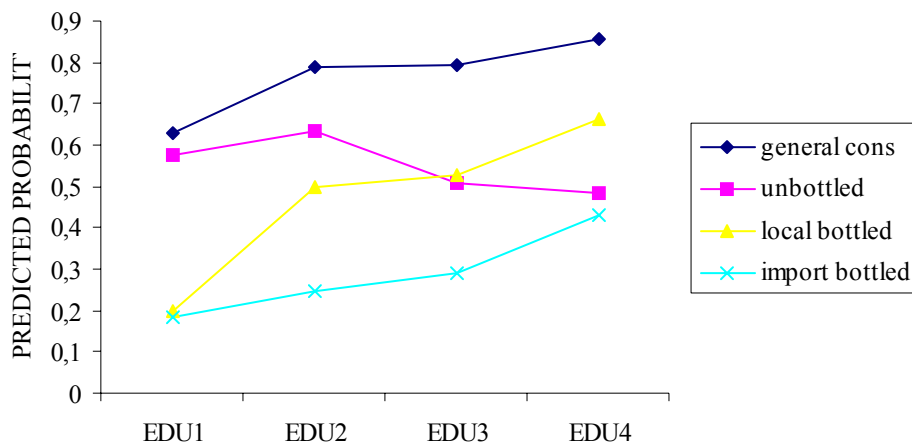
$DM = 28,66$

$R^2_{MZ} = 0,22568$

$\lambda_{RV} = 162,8930$

% of correct predictions $= 78,07$

λ_{RV} is the goodness of fit statistic based on the ratio of likelihood.

DM is the Davidson and McKinnon heteroskedasticity test.

GRAPH 1

If we proceed to the study of each type of wine, the effects of the different factors show some variations if compared to general consumption. In this case, consumption of each type of wine for the group of wine consumers will be considered, that is, it is assumed that the individuals have decided, firstly, to consume wine and subsequently a specific type of wine.

Tables 2, 3 and 4 show the estimations corresponding to the consumption of unbottled wine, local bottled AO and imported bottled AO. Generally, for the first type, there are no significant differences in the different age categories, except for individuals aged between 50 and 59, whose probability is greater. Again, sex and income level show an inverse relation to the probability of consumption. However, in the case of education level there is a radical change with respect to the analysis of consumption in general, given that the consumption probability decreases considerably as the education level of the individual rises (see graph 2). A distinctive characteristic of unbottled wine

consumption, related to the cultural aspects mentioned in the introduction, is the influence of the individual's area of residence on the decision to consume unbottled wine. Hence it is observed that the greatest tendency to consume this type of wine is registered in the north area, which complies with the condition of being a traditional wine-producing area. An additional fact is the change in sign which is produced for the students category regarding the decision to consume unbottled wine with respect to that observed in the general case; similarly, this effect is the one of greatest magnitude between the different occupations. Some explanations for this could be associated with the lower cost of unbottled wine and the induced valuation of aspects relating to the aforementioned culture and tradition.

Table 2. Logit Binomial Model Estimation for unbottled wine consumption

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
Intercept	2,960	0,660	0,000		
S2	-0,453	0,184	0,014	-0,085	0,636
AGE1	0,429	0,495	0,387	0,080	1,535
AGE2	0,418	0,444	0,347	0,078	1,519
AGE3	0,197	0,437	0,653	0,037	1,217
AGE4	0,705	0,456	0,122	0,132	2,024
AGE5	0,321	0,422	0,446	0,060	1,379
A2	-0,845	0,214	0,000	-0,159	0,429
A3	-0,616	0,216	0,004	-0,116	0,540
MS2	0,244	0,270	0,366	0,046	1,276
MS3	-0,242	0,275	0,380	-0,045	0,785
FM	0,153	0,068	0,023	0,029	1,166
O2	0,353	0,344	0,305	0,066	1,424
O3	0,675	0,324	0,037	0,127	1,964
O4	-0,251	0,302	0,407	-0,047	0,778
O5	-0,011	0,287	0,969	-0,002	0,989
O6	0,385	0,347	0,268	0,072	1,469
O7	-0,259	0,327	0,427	-0,049	0,772
EDU2	-1,122	0,483	0,020	-0,211	0,326
EDU3	-1,876	0,501	0,000	-0,352	0,153
EDU4	-2,220	0,527	0,000	-0,417	0,109
I2	-0,328	0,341	0,335	-0,062	0,720
I3	-0,666	0,348	0,056	-0,125	0,514
I4	-1,312	0,384	0,001	-0,246	0,269
I5	-1,087	0,409	0,008	-0,204	0,337

$N = 890$

$R^2_{Efron} = 0,13129$
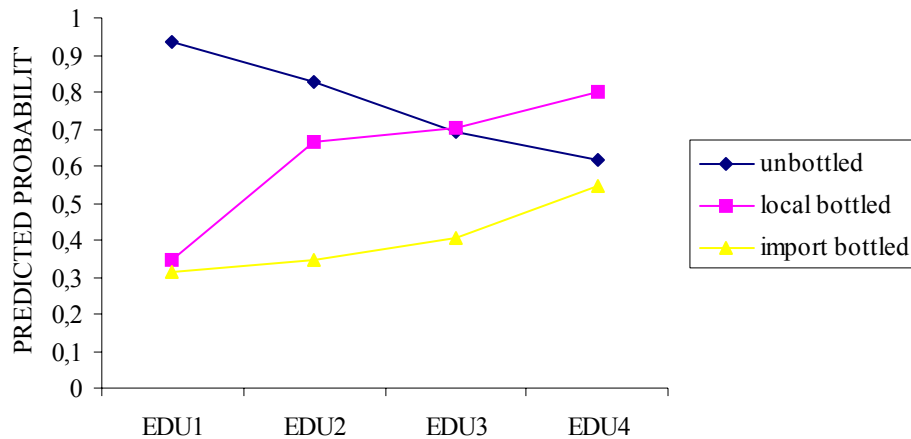
$R^2_{MCF} = 0,109$

$DM = 38,74$

$R^2_{MZ} = 0,16466$

$\lambda_{RV} = 116,4338$

% of correct predictions $= 74,04$

GRAPH 2

The wine showing the greatest consumption frequency for the whole group of interviewed individuals is the local bottled AO wine. As can be observed in the results, in this case significant differences are not observed in sex or age, while employers, professionals and employees show the greatest tendency to consume this type of wine (see graph 3). Contrarily to what happens with unbottled wine, both income and educational level have a positive impact on consumption probability. With this type of wine, living in the metropolitan area does have a significant and positive effect on the decision to consume.

Table 3. Logit Binomial Model Estimation for local bottled AO wine consumption

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
Intercept	-1,254	0,527	0,017		
S2	-0,047	0,182	0,795	-0,010	0,954
AGE1	0,312	0,466	0,504	0,066	1,366
AGE2	0,421	0,411	0,306	0,089	1,523
AGE3	0,289	0,401	0,471	0,061	1,335
AGE4	0,414	0,405	0,306	0,087	1,513
AGE5	0,216	0,372	0,562	0,045	1,241
A2	0,334	0,187	0,075	0,070	1,396
A3	0,520	0,199	0,009	0,109	1,681
MS2	-0,393	0,263	0,135	-0,083	0,675
MS3	0,066	0,270	0,807	0,014	1,068
FM	0,012	0,057	0,826	0,003	1,013
O2	-0,460	0,372	0,217	-0,097	0,632
O3	-0,449	0,304	0,140	-0,095	0,638
O4	-0,219	0,289	0,448	-0,046	0,803
O5	-0,046	0,290	0,874	-0,010	0,955
O6	0,051	0,347	0,884	0,011	1,052
O7	-0,341	0,300	0,256	-0,072	0,711
EDU2	1,336	0,324	0,000	0,281	3,804
EDU3	1,512	0,353	0,000	0,318	4,538
EDU4	2,026	0,399	0,000	0,427	7,583

Table 3 (Continued)

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
I2	-0,047	0,273	0,864	-0,010	0,954
I3	0,472	0,288	0,101	0,099	1,603
I4	0,333	0,333	0,317	0,070	1,396
I5	0,881	0,378	0,020	0,186	2,414

$N = 890$

$R^2_{Efron} = 0,1093$

$R^2_{MCF} = 0,084$

$DM = 34,83$

$R^2_{MZ} = 0,14257$

$\lambda_{RV} = 93,94072$

% of correct predictions $= 71,91$

GRAPH 3
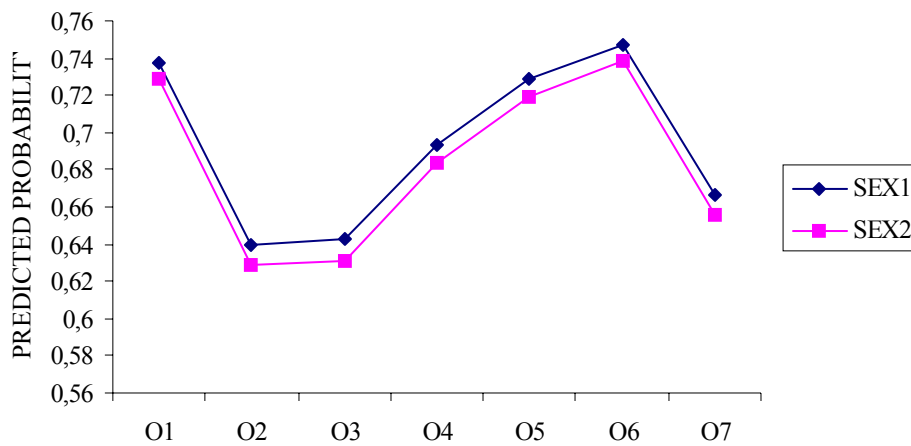
In relation to imported bottled AO wine, significant differences are observed in the age category, reaching the greatest consumption probability in those individuals aged between 40 and 49 (see graph 4) while the other variables follow similar patterns to the foregoing[9].

Table 4. Logit Binomial Model Estimation for imported bottled AO wine

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
Intercept	-1,990	0,565	0,000		
S2	0,031	0,167	0,853	0,007	1,031
AGE1	0,794	0,487	0,103	0,193	2,212
AGE2	1,032	0,442	0,020	0,250	2,805
AGE3	1,124	0,434	0,010	0,273	3,076
AGE4	0,891	0,439	0,042	0,216	2,439
AGE5	0,119	0,432	0,783	0,029	1,127
A2	0,204	0,184	0,266	0,050	1,227

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[9] Although the results are not shown here, it is interesting to note that if only unbottled wine and bottled wine consumption is analysed, the determining factors show similar effects to those previously analysed. The corresponding results can be requested from the authors.

Tabla 4 (Continued)

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
A3	0,706	0,187	0,000	0,171	2,026
MS2	0,275	0,244	0,260	0,067	1,316
MS3	-0,077	0,266	0,774	-0,019	0,926
FM	-0,015	0,056	0,784	-0,004	0,985
O2	0,120	0,329	0,715	0,029	1,128
O3	-0,481	0,281	0,087	-0,117	0,618
O4	0,027	0,279	0,923	0,007	1,027
O5	0,548	0,259	0,034	0,133	1,730
O6	-0,208	0,308	0,499	-0,050	0,812
O7	0,011	0,303	0,970	0,003	1,012
EDU2	0,130	0,357	0,717	0,031	1,138
EDU3	0,394	0,375	0,294	0,096	1,483
EDU4	0,952	0,404	0,018	0,231	2,590
I2	-0,136	0,288	0,636	-0,033	0,873
I3	0,156	0,294	0,595	0,038	1,169
I4	0,144	0,330	0,662	0,035	1,155
I5	0,401	0,351	0,254	0,097	1,493

$N = 890$

$R^2_{Efron} = 0,115$
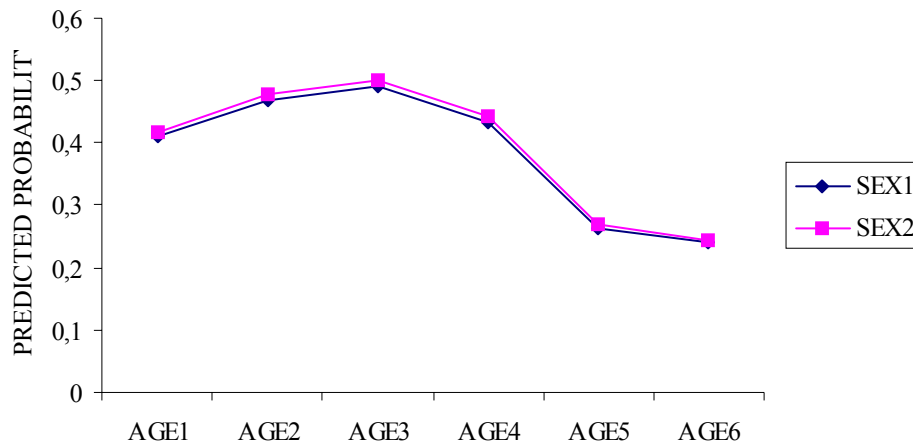
$R^2_{MCF} = 0,089$

$DM = 38,1878$

$R^2_{MZ} = 0,15338$

$\lambda_{RV} = 107,9099$

% of correct predictions $= 63,48$

GRAPH 4

Up to now, the quantity of wine consumed has not been considered. As could be seen in the description of data section, the greatest proportions of wine consumers fit the occasional consumption category. However, it is interesting to observe what happens with the highest frequency consumption in relation to the factors which have been analysed. In order to illustrate the main behaviour pattern of consumers, the analysis is

limited to consumption of wine in general[10]. Table 5 shows the high negative effect provided by sex, education level and the groups of students and housewives. On the other hand, the probability of greater consumption frequency grows with age reaching a maximum in those individuals aged between 50 and 69. Lastly, the metropolitan area has a negative effect on probability.

Table 5. Logit Binomial Estimation for high frequency general consumption.

Variable	Coefficient	Standard error	p-value	Marginal effects	Odds-ratio
Intercept	-1,346	0,589	0,022		
S2	-1,808	0,240	0,000	-0,177	0,164
AGE2	0,634	0,357	0,076	0,062	1,885
AGE3	0,577	0,396	0,145	0,057	1,781
AGE4	0,899	0,414	0,030	0,088	2,458
AGE5	0,956	0,458	0,037	0,094	2,602
AGE6	0,490	0,527	0,353	0,048	1,632
A2	0,390	0,208	0,061	0,038	1,477
A3	-0,361	0,242	0,136	-0,035	0,697
MS2	-1,087	0,302	0,000	-0,106	0,337
MS3	-0,005	0,285	0,987	0,000	0,995
FM	0,124	0,064	0,054	0,012	1,132
O2	-0,397	0,440	0,367	-0,039	0,672
O3	-0,522	0,473	0,270	-0,051	0,593
O4	-1,140	0,425	0,007	-0,112	0,320
O5	0,262	0,273	0,337	0,026	1,299
O6	0,241	0,339	0,476	0,024	1,273
O7	0,133	0,314	0,671	0,013	1,142
EDU2	-0,160	0,332	0,629	-0,016	0,852
EDU3	-0,449	0,371	0,226	-0,044	0,638
EDU4	-0,481	0,429	0,262	-0,047	0,618
I2	0,122	0,330	0,712	0,012	1,129
I3	0,270	0,353	0,445	0,026	1,310
I4	0,152	0,402	0,705	0,015	1,165
I5	0,584	0,430	0,175	0,057	1,793

$N = 1172$

$R^2_{Efron} = 0,2472$

$R^2_{MCF} = 0,2469$

$DM = 18,2358$

$R^2_{MZ} = 0,4049$

$\lambda_{RV} = 278,0308$

% of correct predictions $= 83,1$

Conclusions

In this paper, qualitative response models have been applied in order to illustrate the behaviour patterns of wine consumers in Tenerife. The characteristics defining consumers must be clarified using the responses obtained for the different types of wines consumed. Hence, for wine consumption in general the models suggest that being a woman, single, student or housewife are the characteristics with the highest negative effect on the decision to consume, while being male, married, with ages between 18 and

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[10] In order to carry out a more complete analysis, an ordered logit model would be suitable.

39, professionals, civil servants or employees and with higher education are the characteristics with the highest positive effect on the probability of consumption.

In regard to the different types of wine which are consumed, the highest probability of consuming AO wine corresponds to individuals of the metropolitan area, with ages ranging between 30 and 50 and with high income and education levels. The profile of the unbottled wine consumer corresponds to males aged between 50 and 59, students, professionals, residents in the north, and those with low income and education levels.

In order to provide a more illustrative view of the results obtained, it is interesting to compare predicted probabilities for the most determinant characteristics in consumption. Hence, these probabilities have been calculated for the previous profiles which describe the consumer, that is, those factors of highest positive or negative influence. For consumption in general, a probability of 0,9836 is obtained for the first case and 0,3917 for the second one. However, for both unbottled wine and local and imported bottled AO wine, there is an extension (0,9924-0,2356; 0,9363-0,1421 and 0,8766-0,1252 respectively).

These results provide an initial statistical approximation which can be a guide for a better understanding of wine consumer behaviour and which can be used in different fields of action.

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Appendix

Variables included in the models

Wine consumption	Dummy variable for the decision to
CONS	consume wine or not; 1=yes, 0=no
Sex	Dummy variable, 1=man, 2=woman
Age :	Dummy variables for age:
AGE1	18-29 years
AGE2	30-39 years
AGE3	40-49 years
AGE4	50-59 years
AGE5	60-69 years
AGE6	≥70 years
Area:	Dummy variables for area of residence::
A1	North
A2	South
A3	Metropolitan
Marital Status:	Dummy variables for the marital status of the individual
MS1	Married
MS2	Unmarried
MS3	Widower/Separated
Number of family members	Variable for the number of family
FM	members (1,2,3,.....)
Occupation	Dummy variables for the occupation of the individual
O1	Employee
O2	Civil Servant
O3	Student
O4	Housewife
O5	Employer
O6	Professional
O7	Others
Education	Dummy variables for the level of education of the individual
EDU1	No education
EDU2	Primary Education
EDU3	Secondary Education
EDU4	University Education
Income	Dummy variables for the monthly income level (thousands of pesetas)
I1	<100
I2	100-200
I3	200-300
I4	300-400
I5	>400