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WINE CONSUMPTION FREQUENCY DURING LOCKDOWN IN THE IBERIAN MARKETS

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Abstract

This study aims to analyse how psychological factors related to the Covid-19 lockdown affected wine consumption frequency among Iberian consumers. To achieve this goal, data collected from an online survey in Europe was used, comprising 4489 observations for Portuguese and Spanish samples. Using an ordered probit model, the wine consumption frequency is analysed as a function of a set of explanatory variables related to psychological factors and also sociodemographic variables, motivations related variables, and consumption characterization. Results allowed us to conclude that the fear of isolation was important for Spanish respondents to increase the probability of rising the frequency of consumption of wine, while in Portugal the fear of an economic crisis was the psychological factor leading to a higher consumption frequency. In both countries, psychological factors have influenced the frequency of wine consumption during the lockdown due to Covid-19. However, the impact of Covid-19 was felt differently in Spain and Portugal, with differences both in psychological and behavioural attitudes that have influenced the frequency of wine consumption that could indicate also significative cultural differences.

Keywords: Covid-19; consumer behaviour; lockdown; psychological factors; wine consumption, frequency

JEL: C2, D12, L66

Introduction

Since the Second World War, the consumption of wine in the world has experienced a remarkable increase. This trend has been driven by increasing globalization, the emergence of new producing countries and regions, greater openness and expansion of international trade, and growing standardization of typology, habits and attitudes of consumers (Anderson & Pinilla, 2018). However, in the traditional producing countries of Southern Europe, France, Italy, Portugal and Spain, consumption has decreased notably, while that of other alcoholic beverages, and particularly beer, has increased. In general, in Western countries, there has been some convergence in the consumption patterns of alcoholic beverages. An extensive literature has been devoted to explaining these trends and analysing the determinants of alcoholic beverage consumption (Anderson et al, 2018; Fogarty, 2010; Holmes & Anderson 2017).

However, the behaviour of alcoholic beverage consumers can also be affected by unexpected shocks, such as economic or financial crises (Bor et al., 2013; Garbinti et al., 2020), wildfires (Thach & Eyler, 2017), earthquakes (Forbes and Wilson, 2018) and threats or terrorist attacks (Gergaud et al., 2018).

The Covid-19 pandemic and the subsequent lockdown, the resulting containment and associated public and individual control measures is an entirely new and unknown phenomenon in modern economic and social history, with disruptive psychological and behavioural effects. Specifically, Covid-19 generated extreme fear and anxiety. It disrupted people's routines, with people developing “disproportional cognitive, affective, or behavioural responses to the objects and situations that they associate with the Covid-19 pandemic and severe deteriorations may occur in the physiological and psychological functionalities” (Arpaci et al., 2020, p: 2).

At the microeconomic level, wine consumer's behaviour has usually been analysed using variables related to both subjective and objective wine attributes, consumer motivations, together with sociodemographic characteristics (e.g. Charters & Pettigrew, 2008; Gonçalves et al., 2020; Ribeiro et al., 2020). What has been observed during the Covid-19 lockdown about the determinants of wine consumption frequency suggests that variables related to psychological behaviour should be added to the hedonic demand function as explanatory variables (taste, health or relaxation).

In this context, this study aims to analyse how psychological factors related to the Covid-19 lockdown crisis affected the wine consumption frequency among Iberian

consumers. Consumer behaviour is heterogeneous, not only between social classes but also and between countries (Bor et al., 2013; Garbinti et al., 2020), the second research question is whether the impact of the lockdown (Covid-19) has been homogeneous between countries. The impact of Covid-19 was probably felt differently in Spain and Portugal. Compared to Spain, Portugal had a lower lethality rate and a less restrictive lockdown, which was certainly felt in the psychological and behavioural attitudes on the frequency of wine consumption.

For this purpose, based on samples collected for Spain and Portugal, an ordered probit model was estimated through a stepwise approach, to gather consumers' behaviour (consumption frequency) explained by significant psychological variables as well by control variables related to the sociodemographic characteristics of respondents and wine-related variables, such as motivations to drink wine and drinking and purchasing habits.

The paper is organized as follows. After the Introduction, Section 2 presents our theoretical approach and the hypothesis that we want to test. Section 3 includes the survey, sample, and data collection. Section 4 describes the methodological approach, including econometric framework and the variables used in the study. Section 5 presents the estimation results and is structured in two parts. First, the set of results for Spain and Portugal as a whole are analysed; second, the data from both countries were analysed separately, to identify possible national determinants, which could be associated with cultural or social factors, in the event of significant differences. Final remarks are presented in Section 6.

1. Theoretical approach and hypothesis

COVID-19 has caused a global health crisis unprecedented in our time. The WHO (World Health Organization) recognized it as a pandemic on March 11, 2020. From that moment, numerous countries around the world rushed to decree a generalized State of Emergency to confine the population and restrict numerous non-essential activities. In the case of Spain, the declaration of the state of alarm took place on March 14, 2020, and, after several extensions, it remained in effect until June 21. In the case of Portugal, the declaration took place on March 18 and was in effect until May 2. Since the end of the state of national emergency, local lockdowns have occurred in some municipalities or districts because of the appearance of serious outbreaks of the infection in a second wave during the summer months.

This situation has forced millions of citizens to stay in their homes for weeks and has caused the closure, in principle temporarily, of many workplaces. Confinement reduces social contacts and limits activities, both work-related and personal. This has essential cognitive,

affective and behavioural consequences (Arpaci et al., 2020). Isolation generates feelings of loneliness; the evolution of the crisis causes negative thoughts and behaviours that are inexorably modified. Fear of contagion and anxiety about the future, among other factors, have a negative psychological impact on many citizens (Chaix et al., 2020; Sibley et al., 2020; Atalan, 2020; Brodeur et al., 2020; Van Hoof, 2020).

Being a catastrophe, this lockdown constitutes an extraordinary economic and natural social experiment for many social sciences, since it allows us to study the changes that occur in the life of affected people. A particularly exciting aspect refers to their behaviour as consumers, especially of those products that are controversial due to the consequences of their excessive consumption. The most representative case is that of beverages whose alcoholic component is addictive (Bentzen et al., 1999), being especially dangerous in the case of young people (Gil & Molina, 2009). Additionally, the interest in studying this kind of products is more significant due to the limitations imposed during confinement, and even afterwards, to the HORECA channel (on-trade and off-trade), whose establishments have been closed for weeks. This channel is especially important for virtually all alcoholic beverages since it represents a significant part of their sales, particularly of those products with greater added value, and for consumers, it represents a moment of social consumption.

Within these drinks, wine deserves special attention since its consumption has a specific cultural dimension given that it is closely linked to gastronomy, although in recent decades its hedonic function has become increasingly important (Platania et al., 2016). Consumption patterns have been identified that can be understood as healthy within the framework of diets such as the "Mediterranean alcohol drinking pattern" (Bazal et al., 2019; Gunay & Baker, 2011), which does not prevent situations of abuse occurring (Goldsmith & d'Hauteville, 1998).

In general, consumption is conditioned by psychological and cultural factors (McGuire, 1976; Callwood, 2013). Its pattern responds to motivations, perceptions, learning, beliefs and attitudes of consumers and, on to customs and social guidelines. Often both types of factors are linked (Silva et al., 2017).

In the case of wine, a positive association has been found between its consumption and psychological factors such as sensory gratification (Peixeira & Bernardo, 2015), social bonding (Dunbar et al. 2017), pleasant experience (Peele, 1999), the creation of a positive or relaxed mood and the ability to cope with difficulties and to adapt (Cooper, 1994; Foster et al., 2014; Sayette, 1993; Stritzke, et al., 1996). In the same way, Baum-Baicker (1985)

identified five areas of psychological benefits derived from moderate consumption of alcoholic beverages: (a) reduction of stress; (b) improved mood; (c) higher cognitive performance; (d) reduction of clinical symptoms, and incidence of depression (Gea et al., 2013); and (e) better functioning in the elderly. These results are consistent with alcohol releasing dopamine and serotonin, neurotransmitters associated with the experience of pleasure (Lovinger, 1997; Banerjee, 2014).

With this background, one of the hypotheses that this work will test is whether the foreseeable increase in feelings of anguish, anxiety and worry during confinement caused changes in consumption patterns, in particular to frequency, since this can be an indicator of increased moments of discomfort. Frequency is, together with intensity, one of the two parameters that define the demand and consumption patterns of any good. In the case of alcoholic beverages, they cannot be treated as substitutes, since each one has different psychological and cultural implications (Heckley et al.; 2017), and both have significant but other consequences on health (Attard et al., 2019). Frequency is especially relevant for its ability to create habits that influence purchasing and consumption decisions in the medium and long term (Ji & Wood, 2007).

Cultural factors have a significant national component, although interdependencies between countries are increasing. Thus, for example, investigating the effects of the 2008 crisis on the consumption of some substances, including alcoholic beverages, (Dom et al., 2016) discovered significant differences between countries of the European Union. However, Leifman (2001) and Smith & Mitry (2007) found, at least in Europe, a relative cultural convergence between European countries regarding wine consumption patterns. Cultural patterns are related to consumption occasions, in which the same consumer adopts different behaviours. For example, Hall & Lockshin (2000) established three models of consumption – consumption at parties, at work meals, and private consumption–, the two first eliminated during the lockdown.

In the case of the COVID-19 crisis, all countries have been affected, although not with the same intensity, and neither has the quality of public management of the crisis been the same, which also affects the psychological state of the citizens. A particularly interesting case is that of Spain and Portugal, neighbouring countries, both Iberian and culturally very close, although with differences in some social behaviours and the evolution and incidence of the COVID-19. Compared to Spain, Portugal had a lower lethality rate and a less restrictive lockdown (OECD, 2020). Therefore, the impact of Covid-19 was probably felt differently in

Spain and Portugal, with differences both in psychological and behavioural attitudes and on the frequency of wine consumption.

Consequently, in addition to comparing the psychological changes of the citizens of both countries during confinement, the second hypothesis tested was whether the impact of Lockdown (Covid-19) on wine consumption was homogeneous between countries, and particularly between neighbouring countries Spain and Portugal

2. The survey, sample, and data collection

The survey was firstly administrated by the European Association of Wine Economists (EUAWE) in four European countries, France, Italy, Portugal, and Spain, through the exponential discriminative snowball sampling technique, between April 17 and May 10, 2020, and using the SurveyMonkey platform. The survey includes four groups of questions regarding the patterns of purchase and consumption, consumption situation, Likert scales to assess feelings and emotions during the lockdown, and sociodemographic information.

Preliminary results from the European study available on April 30 indicate that, in general, the frequency of wine consumption has increased during the lockdown period for more than 35% of respondents. However, the expense of alcoholic beverages decreased, with the average price of wine being lower when compared to normal conditions. The frequency of wine consumption through personal cellars has increased, as well as consumption in a non-social sphere, and especially drinking alone. When analysing the determinants of the increased drinking frequency, the anxiety generated by the Covid-19 has a relevant role, with respondents in all countries expressing a powerful fear for the economic consequences of the crisis, as various factors of precariousness may arise or may be intensified. These results can be found online on the page of the European Association of Wine Economists (https://www.euawe.com/).

To a better understanding of consumers' behaviour in this time of crisis, additional research should be done regarding how psychological factors affect alcoholic beverages consumption, namely wine. Therefore, the goal of this research is to study how psychological variables influence consumption frequency during the lockdown period in the Iberian market, given a set of control variables related to consumption motivations, consumption behaviour, and socioeconomic characteristics. The sample comprises 1940 respondents in Portugal and 2549 in Spain, which resulted in 4489 valid responses (collected from April 17 to May 10, 2020). Table S1 (Supplementary Material) provides the socioeconomic characteristics of

respondents and wine and Covid-19 related variables in both countries, as well as the results of the different means tests.

The majority of respondents is male (61.9% in Portugal and 59.6% in Spain), living in urban areas (50.1% and 62.3%, respectively), and employed in the services sector. In Portugal, unemployment is more prevalent, with 13.4% of respondents unemployed compared to 4.4% in Spain. 30.9% of the Portuguese sample is represented by the 41-50 age group, followed by 51-60 age with 22.9%. In Spain, 28.7% and 28.6% of the respondents belong to the 41-50 and 51-60 age categories, respectively. More than half of the sample in Portugal states itself to be "coping on present income" (54.3%), while in Spain, the majority of respondents states itself to be "living comfortably· (64.6%). Regarding wine-related variables, the Portuguese show a higher degree of consumption with online interactions, with 34.5% (22.5% in Spain) having a wine app on their smartphones, 20.5% (12.5% in Spain) improved wine knowledge through online content during the lockdown, and 54% (40.3% in Spain) received online offers from winemakers to buy their wine online. In both countries, and during the lockdown, personal cellars were the second most important place of wine purchase after supermarkets, followed by the online channel. Turning to the motivations for wine consumption, matching with food and wine taste are the most common reasons for drinking wine, followed socialize with friends. The Portuguese state that they had organised digital gatherings to have a drink with family or friends almost daily, while the Spanish organized a one least once a week. Concerning Covid-19 psychological variables, in both countries' respondents feared the virus and economic crisis as a consequence of the pandemic. Still, they also agreed that this period provides an opportunity for positive initiatives. However, the fear of isolation is more prevalent in Spain, possibly due to the more widespread adverse effects of Covid-19 in that country.[1]

Figure 1. Wine consumption frequency during the lockdown, in %

[1] The comparison between the two samples proved to be statistically different in most variables, except for gender, lock proc online frequency, fear of isolation, opportunity for initiatives, students, taste, romance and sleep motives, supermarket, wine store, online and drive purchase places.

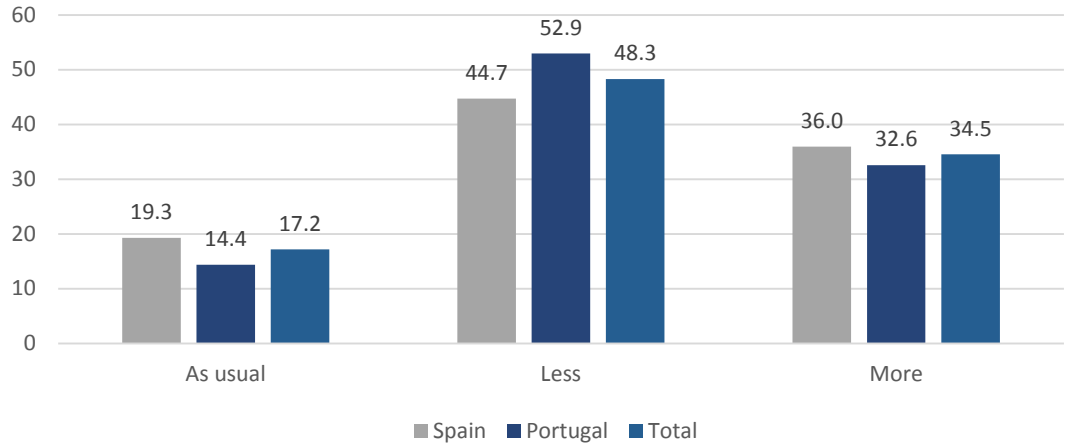

Figure 1 displays the observed values of wine consumption frequency during the lockdown per country. In both countries, almost half of the sample reports a lower frequency of consumption when compared to normal circumstances, before Covid-19, this being more prevalent in Portugal. Less than 20% state they consumed wine as usual and more than 30% more frequently than usual.

3. Methodological approach

3.1. Model

As the measure of wine consumption frequency is a categorical, ordinal variable, the appropriate econometric model to represent the causal relationship, as opposed to a relationship that simply captures statistical associations is the ordered probit model. This model identifies statistically significant relationships between explanatory variables and a dependent variable, accounting for unequal differences between the categories in this variable (McKelvey & Zavoina, 1975, and Greene, 2003 and Wooldridge, 2002).

The ordered probit model, proposed by McElvey & Zavoina (1975), is built around a latent regression, specified as follows:

$$y^* = \beta' x + \varepsilon \qquad (1)$$

where i is the observation, y^* is the unobserved Nx1 dependent variable, β' is the vector of the Kx1 estimated parameters or unknown marginal utilities, x is the of NxK covarites that are assumed to be independent of ε, and ε (Nx1) is the error term including unobservable factors and assumed to be normally distributed across observations (with zero mean and unit variance). The probabilities underlying this model are:

$$Prob[y = 0] = \Phi(-\beta' x), \qquad (2)$$

$$Prob[y = 1] = \Phi(\mu_1 - \beta' x) - \Phi(-\beta' x), \qquad (3)$$

$$Prob[y = 2] = \Phi(\mu_2 - \beta' x) - \Phi(\mu_1 - \beta' x), \qquad (4)$$

...

$$Prob[y = J] = 1 - \Phi(\mu_{J-1} - \beta' x). \qquad (5)$$

where Φ(•) denotes the cumulative distribution function, and μ_j the unknown thresholds parameters between which the categorical responses are estimated. Given the continuity assumption, and to preserve positive signs, probabilities require $\mu_j > \mu_{j-1}$. Also, including a constant term will require $\mu_0 = 0$.

The likelihood function for the estimation of the model parameters is based on the implied probabilities. The parameters estimated have no behavioural meaning, but the partial effects are particularly meaningful and given by:

$$\frac{\partial Prob[y = j|x]}{\partial x} = [\varphi(\mu_{j-1} - \beta' x) - \varphi(\mu_j - \beta' x)]\beta. \qquad (6)$$

where φ(•) is the density function.

The marginal effect for a dummy variable (D) would be obtained by a difference of probabilities, rather than a derivative, as follows:

$$\Delta_j(D) = [\Phi(\mu_j - \beta' x + \gamma) - \Phi(\mu_{j-1} - \beta' x + \gamma)] - [\Phi(\mu_j - \beta' x) - \Phi(\mu_{j-1} - \beta' x)]. \qquad (7)$$

where γ is the coefficient on D.

Regarding the empirical specification of the model used in this study and to solve the research questions, the following process is adopted. First, although in this typology of models the endogeneity is not a common issue since the decision of consumption frequency of wine, beer and spirituous beverages can be simultaneous and interdependent, which can arise endogeneity, with at least one of the explanatory variables (frequency of consumption of beer and spirits) determined simultaneously along with the explained variables and correlated with the term error (Woldridge, 2002). Therefore, we deal with the issue by including as instrumental variables the probability of consumption of spirits in the lockdown period, and beer gave the frequency of consumption in the pre-Covid period[2]. After assessing potential endogeneity in the explanatory variables, econometric practices recommend that when using a considerable number of explanatory variables, a stepwise regression approach be used. This process has the advantage of selecting only the statistically significant variables, eliminating non-significant outcomes, thus improving the statistical quality and the reading of the model.

[2] The probability of spirits and beer was, respectively, estimated through an ordered probit model (with the dependent variable being the lockdown period consumption frequency and the explanatory variable the frequency of consumption in the pre-Covid period). Only the statistically significant variables remain in the analysis.

We performed a backward selection for the complete ordered probit regressions, with the decision level being significance at the 10% level.

To assess potential structural differences between countries, the ordered probit regression model for both countries (jointly), was estimated and the regression re-run by adding the set of explanatory variables multiplied by a country factor (dummy variable) and a likelihood ratio test performed with the nested and global model. This allowed for the identification of structural (partial regression estimated parameters) differences between the countries data. Therefore, we proceeded to the estimation of the ordered probit model, following a stepwise approach for Portugal and Spain separately. In the sequence of this procedure, the model estimated is described in equation 8, where a set of explanatory variables, including related psychological factors and consumer characteristics affect the probability of changes in consumption frequency.

$$Prob[y = \text{"Lockwine"} = \text{J})] = 1 - \Phi\big(\mu_{J-1} - (\beta_1 Fearcrisis + \beta_2 Isolation + \beta_3 Age + \beta_4 D_{Employed} + \beta_5 D_{Motivtaste} + \beta_6 D_{Motivhealth} + \beta_7 D_{Motivrelax} + \beta_8 D_{Lockonline} + \beta_9 Normwine + \beta_{10} Lockspirits)\big). \quad (8)$$

3.2 Variables

Table 1 includes the list of statistically significant variables used in the final econometric models. The dependent or explained variable is the frequency of wine consumption during the lockdown. Therefore, the “Lockwine” variable is ordinal, with three categories, evaluating potential changes, when compared to the pre-lockdown period (i.e., normal consumption): i) less frequent; ii) as usual; iii) more frequent.

A set of factors are expected to affect wine consumption frequency during the lockdown period. First, we are interested in the effects of psychological factors on wine consumption, which are included to analyse how consumers perceive the emerging crisis, the insecurity, and changes to daily life. Thus, Likert scales measure the "fear of crisis", i.e., the expectations of future economic consequences of Covid-19 related crisis to be assessed. Additionally, the lockdown promoted a sense of social isolation, which is expected to influence consumer behaviour. To account for this potential effect, the variable “isolation” was included.

Second, a group of control variables, including sociodemographic variables, motivations related variables, and consumption characterization was used. The first subgroup

includes age and professional situation of the respondent. The second subgroup, the reasons related, comprises a set of variables to assess the three main possible motivations for consuming wine: taste, as wine consumers may favour the taste of wine when compared to other substitute beverages; relaxation and stress relief, to assess the influence to the consumption of wine; and health, which is a significant concern during Covid-19 pandemic crisis. The final subgroup of variables included in this study consists of consumption characterization. The habit of consumption of alcoholic beverages (wine, beer or spirits) is included to assess how pre-lockdown consumption habits influenced changes in the consumption frequency during the lockdown period. A dummy variable for "online" buying is included as well, to assess whether the lockdown has changed the use of the purchase channel. With specialized wine stores, wineries, cellars and other traditional channels closed, the online channel may have facilitated product availability, thus influencing wine consumption behaviour.

Table 1. List of variables used in the econometric models

Variable name	Description	Typology
Dependent variable		
Lockwine	Frequency of wine consumption during the lockdown	Ordinal variable (1- less frequent; 2- as usual; 3- more frequent)
Psychological Covid-19 related variables		
Fear_crisis	The measure of the level of fear with Covid-19 crisis (economic consequences)	Likert scale (1- Strongly disagree; 2- disagree; 3- neither agree nor disagree; 4- agree; 5- strongly agree)
Isolation	The measure of the sense of isolation	QCAL scale (5-point Likert scale) unified by a factor analysis which grouped 3 items into one factor.
Sociodemographic variables		
Age	Age group	Categorical variable (1- under 18; 2- From 18 to 29; 3- From 30 to 40; 4- From 41 to 50; 5- From 51 to 60; 6- From 61 to 70; 7- 71 and above)
Employed	Professional situation	Dummy variable (0- unemployed; 1- employed/student/retired)
Motivations to wine consumption variables		

Motiv_taste	Enjoying the taste as a factor of wine consumption	Dummy variable (0- not relevant; 1-relevant)
Motiv_health	Health issues as a driver of wine consumption	Dummy (0- not relevant; 1-relevant)
Motiv_relax	Wine consumption as a factor of relaxation and stress relief	Dummy variable (0- not relevant; 1-relevant)
Consumption characterization variables		
Lockonline	Use of online channel during the lockdown to buy wine	Dummy variable (0- not used; 1- used)
Normwine	The measure of consumption frequency in the period pre-Covid	Likert scale (1-never; 2-less than once a month; 3- at least once a month; 4-at least once a week; 5- daily)
Lockspirits	The measure of consumption frequency of spirits in the period pre-Covid	Estimated probability of consumption

4. Results

Table 2 includes the final estimation results for Spain and Portugal. The results of the estimations suggest that there are similarities and disparities between Spain and Portugal. It should be noted that the variables that are statistically significant for both countries (Age, Motiv_taste, Motiv_relax and Lockonline) have the same direction effect, which allows the conclusion to be drawn that the changes in consumption patterns are determined by similar factors. This appears to be in line with the analysis presented in Section 2. However, there are some disparities in the key factors influencing changes in consumption behaviour.

Table 2. Ordered probit estimation results

	Explanatory Variable	Spain	Portugal
Psychological Covid-19 related variables	Isolation	0.0411 * (0.0247)	-
	Fear_crisis	-	0.0895 ** (0.0421)
Sociodemographic variables	Age	-0.0869 *** (0.0200)	-0.0857 *** (0.0217)
	Employment	-	0.2245 *** (0.8179)
Motivations to wine consumption variables	Motiv_taste	0.2150 *** (0.0534)	0.1587 *** (0.0605)
	Motiv_health	-	-0.3301 ** (0.1338)
	Motiv_relax	0.4429 *** (0.0599)	0.5171 *** (0.0614)

Consumption characterization variables	Lock_online	0.1887 *** (0.0683)	0.3389 *** (0.0810)
	Normal wine cons	-0.1220 *** (0.0261)	-
	Lock_spirits	-0.8544 *** (-0.3163)	-
	Observations	2549	1940
	Log-likelihood	-2585.0326	-1820.8574
	LR Chi2(7)	158.23***	168.20***
	Pseudo R^2	0.0297	0.0441

Note: ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively. '-'denotes excluded variables from the stepwise approach—standard deviations in parenthesis.

Given the nature of the estimated model, the ordered probit coefficient results do not provide meaningful interpretations, apart from the significance and direction (signal) of the effects. Thus, the ordered probit marginal effects were estimated and show how wine consumption frequency probabilities change with a variation in the explanatory variables. Table 3 reports the results for the countries under analysis, highlighting both differences and similarities between these two markets.

The analysis of the marginal effects allows for the corroborating of the argument that the impacts of the determinants of wine consumption changes have similarities for both countries. It is noticeable that the direction of the marginal effects remains the same for both countries across all variables, for all outcomes.

Table 3. Average Marginal Effects

Explanatory Variable	**Wine consumption frequency (outcome)**	**Spain**	**Portugal**	**Global (for comparison)**
Psychological Covid-19 related variables				
Isolation	Less	-0.0156 *	n.s.	-0.0127*
	As usual	0.0009	n.s.	0.0010*
	More	0.0147 *	n.s.	0.0117*
Fear_crisis	Less	n.s.	-0.0335**	-0.0225**
	As usual	n.s.	0.0032**	0.0017**
	More	n.s.	0.303**	0.0208**
Sociodemographic variables				
Age	Less	0.0329***	0.0320***	0.0280***
	As usual	-0.0018 ***	-0.0031***	-0.0021***
	More	-0.0311***	-0.0290***	-0.0260***

Employment	Less	n.s.	-0.0840***	-0.0721***
	As usual	n.s.	0.0080***	0.0055***
	More	n.s.	0.0760***	0.0666***
Motivations to wine consumption variables				
Motiv_taste	Less	-0.0815***	-0.0594***	-0.0747***
	As usual	0.0045***	0.0057***	0.0057***
	More	0.0770***	0.0537***	0.0690***
Motiv_health	Less	n.s.	0.1235**	0.0559*
	As usual	n.s.	-0.0118**	-0.0043*
	More	n.s.	-0.1117**	-0.0516*
Motiv_relax	Less	-0.1679***	-0.1935***	-0.1737***
	As usual	0.0092***	0.0185***	0.0132***
	More	0.1587***	0.1750***	0.1605***
Consumption characterization variables				
Lock_online	Less	-0.0715***	-0.1268***	-0.1033***
	As usual	0.0039**	0.0121***	0.0079***
	More	0.0676***	0.1147***	0.0954***
Lock_spirits	Less	0.3238***	n.s.	n.s.
	As usual	-0.0178**	n.s.	n.s.
	More	-0.3060***	n.s.	n.s.
Normal wine cons	Less	0.0462***	n.s.	0.0342***
	As usual	-0.0025***	n.s.	-0.0026***
	More	-0.0437***	n.s.	-0.0316***

***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.

The psychological factors included in this study, "feeling of isolation" and the "fear of a crisis" display different results in terms of significance. These results are different for each country, although both variables show the significance of the sample as a whole. The feeling of isolation, which is significant for Spain and the global sample, show that the higher this feeling, the higher is the probability of increased frequency of wine consumption. A consumer with a greater sense of isolation is more likely to have increased the frequency of wine consumption during the lockdown. Different length of the lockdown between Spain (100 days) and Portugal (45 days) can explain this feeling.

Additionally, for Portugal and the whole sample, it is noticeable that the fear of a crisis displays the same effect. i.e., higher concerns with a crisis result in the higher probability to have increased consumption frequency. The results of the psychological factors show that insecurity, uncertainty and threat to regular daily life have a positive impact on the probability of higher frequency of wine consumption during the lockdown, which is in line with the interpretations of the frequency of consumption during the lockdown. Consumers have responded emotionally to the threat of Covid-19, which is linked with changes in the consumption patterns. The high level of threat and uncertainty is positively linked to a higher frequency of consumption of wine.

The sociodemographic variables considered in this study are age and the consumer's professional situation. The age of consumers is significant in both countries, and the marginal effects allow for concluding that older consumers tend to be less likely to have increased frequency of consumption of wine during the lockdown. At the same time, younger consumers have a higher probability to keep or increase their frequency of consumption during this period.

The marginal effects for employment show that, on average, employed people are more likely than the unemployed to say their wine frequency stayed constant during the lockdown or then increased with the lockdown (in Portugal) and less likely to say their wine consumption decreased. For Portugal, it is possible to conclude that being employed improves the probability to have increased the frequency of consumption.

The control variables included in the estimation, i.e., the motivations and the consumption characteristics, display exciting results. The motivations for consuming wine are linked with consumers' loyalty to a product. It is noticeable that consumers driven by "taste" are more likely to have their frequency of consumption increased, which enhances the

differentiation of wine when compared to other substitute beverages. The “health” concerns, however, tend to hurt the frequency of consumption in Portugal, i.e., health concerns decrease the probability of a consumer to change to a higher frequency. This is especially interesting in the Covid-19 context, where health concerns are expected to change consumer behaviour and patterns. In Portugal, this result is consequential in the same way as the variable Fear COVID Crisis.

The "relax" variable as motivation has an expected result. For both countries, it shows that the higher a consumer values relaxation as a motive for drinking wine, the more likely they are to increase the frequency of consumption. This result may have two interpretations. Wine is a good that favours the feeling of relaxing for consumers and the lockdown experience with social distancing, isolation and feelings of uncertainty has driven consumers to increase the search for relaxing factors, such as drinking wine.

For the consumption characterization variables, it is noteworthy that the “online channels” were indeed crucial for the demand for wine. Consumers who have opted for buying wine in online media have a higher probability to have increased their frequency of consumption (those who do not opt for online buying have a higher probability for the lower frequency of consumption). The “previous consumption” behaviour effects are as expected, even though the significance is only found for Spain and the global sample. Thus, the higher frequency of spirits consumption (Spain and the whole sample) is linked to lower probabilities of positive changes in the frequency of wine consumption during the lockdown. Wine consumption habits in the pre-COVID period also display expected outcomes (for Spain and the whole sample). A consumer who has a daily consumption habit is less likely to have experienced an increase in consumption frequency during lockdown but, inversely, consumers with a lower frequency of consumption (less than once a month) show higher probabilities to have increased their frequency of wine consumption. This behaviour means that wine is a product that has attracted non-consumers and lower frequency consumers during the lockdown. This result is in line with the frequency of consumption analysis established previously, which stated that the frequency of consumption increased for 34.5% of the respondents, whereas the majority of consumers had not increased their frequency, since they were already regular/daily consumers.

5. Conclusion

Covid-19 is a very recent phenomenon, whose effects require analysis in different fields. Regarding the impacts on alcohol consumption, namely on wine knowledge is scarce, which points out the need for research on the topic. This study aims to contribute to providing a better understanding of wine consumers' behaviour during the lockdown, with a focus on the effects of psychological and cultural factors on wine consumption frequency.

Using data from Portugal and Spain, an ordered probit model was estimated to investigate how wine consumption frequency was influenced by psychological factors as well as whether there are differences between these two countries. The econometric results and the marginal effects show that the psychological factors have a distinct impact across countries, with fear of isolation increasing wine consumption frequency for Spanish sample and, in Portugal, the same effect was found for fear of a crisis. The feeling for consumers is similar. The lockdown length difference between both countries and the situation of fear related to the number of people infected reflect the same final result; anxiety and disruption in people's routines increase their wine frequency consumption.

The impact of Covid-19 was probably felt in different ways in Portugal and Spain (lower lethality rates and other restrictive lockdown measures) which certainly reflects the different results for wine consumption frequency.

Age is a determinant variable that may be included in future research because it needs more explanations. Two paths can explain the negative relationship between age and the increase of wine frequency consumption. First, older people do not increase their frequency of wine consumption as it was already high. But it is necessary to include the absolute variable of the quantity of consumed wine. And second, it is an opportunity to identify new possibilities to increase the wine frequency consumption of younger people.

Employment is determinant for the Portuguese people and the whole sample. This result must be related to consumers' incomes and the probability to increase the consumption frequency.

The variables that motivate wine consumption are related to a hedonic demand function such as taste or relaxation. The Iberian lifestyle is a part of the Mediterranean alcohol drinking pattern, and the relevance of health concerns must be related to the lifestyle also or to the Covid-crisis fear. This question is open for future researches.

However, one of the most interesting results of this study is related to the use of online media to buy wine. The growth of this channel is here to stay, and the wineries can develop

different apps to sell wine for different consumer profiles. One remaining uncertainty is whether the amount sold in this channel exceeds or does not exceed other sale channels and whether the average sales price increases or not for the different purchase places.

This result highlights the fact that the impact of lockdown on consumers' behaviour is not homogeneous between countries, so it is not possible to generalize one market results to other markets. Despite this, many similarities have been found between the two countries. Future research should extend the analysis to other markets as well as to collect and analyse data after the lockdown period.

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Supplementary Material – Table S1-Characteristics of respondents

	Portugal (n=1940)		Spain (n=2549)			Portugal (n=1940)		Spain (n=2549)	
	No.	%	No.	%		No.	%	No.	%
Socioeconomic characteristics					**Wine related variables**				
Gender (male)	1200	61.86	1518	59.55	Has a wine app	670	34.5	573	22.5
Residence					Improved wine knowledge	398	20.5	319	12.5
Urban	972	50.10	1588	62.29	Online offers received	1048	54.0	1027	40.3
Sub-urban	481	24.79	481	18.87	Wine purchase place during the lockdown				
Rural	487	25.10	480	18.83	Supermarket	1079	55.6	1376	53.98
Dedication sector					Grocery	116	5.98	247	9.69
Agriculture	298	15.36	334	13.10	Cellar	504	25.98	538	21.11
Industry	201	10.36	346	13.57	Wine store	169	8.71	219	8.59
Services	1043	53.76	1461	57.31	Online	266	13.71	374	14.67
Unemployed	260	13.40	111	4.35	Winery	297	15.31	263	10.32
Student	77	3.96	82	3.21	Drive-thru	8	0.41	12	0.47
Retired	88	4.53	213	8.35	Motivations for wine consumption				
Age					Taste	1321	68.1	1764	69.2
18-29	216	11.1	185	7.3	Relax	591	30.5	532	20.9
20-40	370	19.1	422	16.6	Friendly	840	43.3	774	30.4
41-50	599	30.9	728	28.7	Food	1477	76.1	1556	61.0
51-60	444	22.9	728	28.6	Romance	176	9.1	242	9.5
61-70	225	11.6	393	15.4	Health	94	4.8	186	7.3
>70	86	4.4	81	3.6	Helps to sleep	70	3.6	81	3.2
Income					Challenge	298	15.4	472	18.5
Living comfortably	531	27.4	1647	64.6	Lockdown digital drink (1=daily, 2=at least once a week, 3=Rarely, 4=I did not)	1.41		1.95	
Coping on present income	1054	54.3	564	22.1	Lock Proc online frequency (1=no, 2=for the first time, 3=as usual, 4=more than usual)	1.34		1.36	
Finding it difficult	201	10.4	100	3.9	**Psychological Covid-19 related variables**				
Finding it very difficult	31	1.6	26	1.0	Fear of virus (1=strongly disagree, 5=strongly agree)	3.5		3.6	
I prefer not to answer	123	6.3	212	8.3	Fear of crisis (1=strongly disagree, 5=strongly agree)	4.4		4.4	
Children in the household (mean)	1.7		1.6		Opportunity for initiatives (1=strongly disagree, 5=strongly agree)	3.8		3.7	
Adults in the household (mean)	3.4		3.2		Refocus on me (1=strongly disagree, 5=strongly agree)	3.2		3.2	
					Isolation (mean)	-0.08		-0.12	

Note: Difference of means tests - t-test – Adults (t(4487) = 4.20, p = 0.000); Children (t(4487) = 3.7, p = 0.000); Isolation (t(4487) = -1.6, p = 0.108); Wilcoxon Mann-Whitney test – age (U = 2229881.5, p = 0.000), Income (U = 1647621.5, p = 0.000); Lockdown digital drink (U = 1749448.0, p = 0.000); Lock Proc online frequency (U = 2426335,0, p = 0.110); Fear virus (U = 2299307.5, p = 0.000); Fear crisis (U = 2323773.0, p = 0.000); Refocus (U = 2357308.5, p = 0.005); Opportunity (U = 2413789.5, p = 0.151); Pearson Chi-Square – gender (χ2(1,N = 4489) = 2.45, p = 0.118); wine app (χ2(1,N = 4489) = 79.9, p = 0.000); online offers received (χ2(1,N = 4489) = 83.5, p = 0.000); Improved wine knowledge (χ2(1,N = 4489) = 52.5, p = 0.000); Urban (χ2(1,N = 4489) = 66.9, p = 0.000); Sub-urban (χ2(1,N = 4489) = 22.9, p = 0.000); Rural (χ2(1,N = 4489) = 25.6, p = 0.000); Agriculture (χ2(1,N = 4489) = 4.64, p = 0.031);

Industry (χ2(1,N = 4489) = 10.6, p = 0.001); Services (χ2(1,N = 4489) = 5.6, p = 0.018); Unemployed (χ2(1,N = 4489) = 118.9, p = 0.000); Student (χ2(1,N = 4489) = 1.8, p = 0.177); Retired (χ2(1,N = 4489) = 25.7, p = 0.000); Taste (χ2(1,N = 4489) = 0.6, p = 0.426); Relax (χ2(1,N = 4489) = 54.0, p = 0.000); Friendly (χ2(1,N = 4489) = 80.0, p = 0.000); Food (χ2(1,N = 4489) = 114.5, p = 0.000); Romance (χ2(1,N = 4489) = 0.2, p = 0.630); Health (χ2(1,N = 4489) = 11.3, p = 0.001); Helps to sleep (χ2(1,N = 4489) = 0.6, p = 0.428); Challenge (χ2(1,N = 4489) = 7.7, p = 0.005); Supermarket (χ2(1,N = 4489) = 1.2, p = 0.275); Grocery (χ2(1,N = 4489) = 20.4, p = 0.000); Cellar (χ2(1,N = 4489) = 14.7, p = 0.000); Wine store (χ2(1,N = 4489) = 0.02, p = 0.888); Online (χ2(1,N = 4489) = 0.8, p = 0.362); Winery (χ2(1,N = 4489) = 25.1, p = 0.000); Drive (χ2(1,N = 4489) = 0.09, p = 0.771)

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