

The demand for sparkling wine: insights on a diversified European market

Sparkling wine

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Abstract

Purpose – The article aims to study the demand for sparkling wines in Europe. The main objective is to estimate the classic demand parameters aggregately for the entire European area (European Union and the United Kingdom) and separately for groups of countries characterized by wine markets with similar characteristics.

Design/methodology/approach – Using 15-years market data for different wine categories from the Euromonitor Passport database, the estimation of price and income elasticities is performed through a Quadratic Almost Ideal Demand System. In line with the objectives, the model is applied first to the whole European area and then separately to the considered groups of countries (subareas). To identify homogeneous subareas, a cluster analysis was performed on basic characteristics of the wine market.

Findings – When considering the European market as a whole, sparkling wines should be considered a luxury category with a high own-price elasticity. However, the structure of their demand is rather different in different sub-areas. The observed heterogeneity suggests that differentiated policy and marketing considerations should be made. In addition, it widens the possibilities for producers, who can choose the submarkets that respond best to their needs to export their sparkling wines. This seems particularly important in markets, like the sparkling wine ones, that are experiencing a continuous expansion over the last decades.

Originality/value – Despite using a methodology well-established to study wine and alcohol demand, the study fills a considerable gap in the literature. Although the demand for sparkling wine is growing worldwide, so far only a couple of studies have engaged in the analysis of its structure. In Europe, the largest market for sparkling wine, this kind of studies is completely lacking.

Keywords Wine demand, Wine market, Demand analysis, Sparkling wine, Europe, Wine export, Cluster analysis

Paper type Research paper

1. Introduction

Unlike other types of wine, sparkling wines are often perceived to have a strong symbolic component, which several authors identified as one of the major factors driving their consumption (Charters, 2005; Velikova *et al.*, 2016). In a context where societies gradually attach more and more importance to experiential and symbolic functions of wine, at the expense of utilitarian ones (Brunner and Siegrist, 2011; Charters and Pettigrew, 2008), the image associated with sparkling wines is likely one of the reasons boosting their consumption in recent decades.

The growth in the international trade of sparkling wines is a phenomenon that has been in place since the turn of the century (Mariani *et al.*, 2012) and that has continued until more recent years (Thome and Paiva, 2020), resisting the periods of slowdown that characterized other wine sectors (Pomarici, 2016). Among these, also the COVID-19 pandemic appears as just a temporary interruption of this growing trend (Euromonitor, 2022), despite it producing



important negative effects for the wine sector in general and for the sparkling industry in particular (Wittwer and Anderson, 2021a), even if with differentiated regional patterns (Dubois *et al.*, 2021; Wittwer and Anderson, 2021b). Regarding the value of trade, in 2021, according to Euromonitor (2022), total sales of sparkling wine in the world exceeded \$45bn, 9.4% higher than in 2020.

The reasons behind this growth may be related both to the consumption and the production side. On the one hand, sparkling wines are considered as distinct products from other wine categories (Charters *et al.*, 2011), having a strong symbolic image that makes them particularly suitable for consumption in special occasions and as a tool to communicate social status (Verdonk *et al.*, 2017). This type of consumption matches the prestige-related image of some sparkling wines (e.g. Champagne). However, some studies showed that another main driver of sparkling wines growth is likely the high interest of young consumers in this wine category (Lerro *et al.*, 2019). Especially for this age cohort, sparkling wines consumption assumes traits beyond prestige, often being more related to informal occasions. This type of consumption is backed by the emergence of sparkling wines characterized by high volumes-low price strategies (the exemplary case being Prosecco PDO, Ponte, 2021), making them easily affordable for lower income consumers as well.

As usually happens, these emerging trends have also raised interest among researchers, leading to a proliferation of economic studies on sparkling wines. The importance of market studies is no doubts high for a sector and all the actors operating within or around it, from private enterprises to policymakers. However, market analysis can be conducted at various levels, which entail different implications and take-away messages for the involved stakeholders. On the one hand, studies focusing on consumers and retail scanner data are valuable to reveal customers' preferences or to analyze the dynamics of specific markets. In the sparkling wine sector, examples of such studies include Bassi *et al.* (2020), who identified different types of sparkling wine consumers, and studies investigating the factors shaping the purchase and willingness to pay for this type of wine, such as Charters *et al.* (2011), Ristic *et al.* (2019) or Adalja *et al.* (2021). These studies are particularly beneficial for companies, as they can inform them in planning standard marketing operations. This includes identifying potential consumer targets, selecting the most appropriate product attributes to emphasize and determining the most promising distribution channels and communication strategies.

However, due to their "spot" nature and to their focus on specific markets, these studies have usually a limited ability to provide insights into broader trends and characteristics of an entire sector. In the case of alcoholic beverages, obtaining such comprehensive insights is particularly desirable for their economic and social implications (Chang *et al.*, 2002). Therefore, wider structural analyses of market demand serve as a valuable complement to consumer-related studies, offering a more comprehensive view of a certain market. Within the alcoholic beverages sector, these analyses revolves around the identification of the potential impact of alcohol taxes (Gil and Molina, 2009; Luong and Vu, 2020) and general price changes (Araya and Paraje, 2018; Quirmbach *et al.*, 2018), despite specific topics such as imports (Carew *et al.*, 2004) or product origin (Agnoli *et al.*, 2014) are sometimes addressed as well.

In most of these studies, the focus is typically on the whole alcoholic beverages sector, with wine seldom being the primary subject of analysis. There are exceptions where wine is the main focus of research, such as in Pompelli and Heien (1991), Buccola and VanderZanden (1997) or Carew *et al.* (2004). In these cases, the authors often distinguish between red and white wines as separate categories, a more realistic approach than treating the wine sector as a homogeneous one (Gruenewald *et al.*, 2006). Some more recent studies have even included sparkling wines in their analyses, as we will do, such as in Capitello *et al.* (2015), Liu and Song, (2021) and Srivastava *et al.* (2015). However, most of these pieces of

research focus on new-world wine countries, leaving a significant research gap in the analysis of the European market. This gap is particularly notable in terms of differentiation between wine categories to focus on the sparkling wine demand. This gap in research is especially important considering that the EU and the UK markets retain more than half of the total world sparkling wine value (as of 2021) and almost 60% of its volume. Furthermore, two of the three major importers of sparkling wine (the UK and Germany) and the three main exporters (France, Italy and Spain) [1] are located in Europe.

To address this gap, we try to identify the structure of the demand for sparkling wine in the EU and the UK market. The objective of the study is to understand how the sparkling wine demand could be expected to respond to variations in wine prices and expenditure. This is done at both an aggregate level, considering the EU and the UK market as a whole and then separately for distinct, homogeneous wine submarkets. In discussing the findings, we focus on two potential sources of variations in wine prices and expenditure that are of particular interest in the present-day context: general/sectorial market trends and policy interventions.

On the one hand, the continuous growth of sparkling wines, along the evolution of the wine market in general, is likely to bring about relevant changes in the prices of different types of wines. Understanding how wine demand, and specifically sparkling wine demand, might respond to these changes can be useful for producers and traders in making informed investment decisions in different wine sectors and/or in various European submarkets. On the other hand, policy interventions, mainly driven by health-related concerns, are specifically aimed at modifying (usually, reducing) alcohol consumption. The effectiveness of these interventions is closely linked to the structural characteristics of the demand of the product they address. In this respect, our analysis can provide insights to policymakers regarding the potential effects of future policies, enabling them to compare the effects of different policy structures. At the same time, operators can gauge which wine sectors are likely to be more affected by specific policy interventions, helping them in directing investment decisions. The issue of policy interventions is particularly important in the studied context, as there is a debate within the EU about the potential introduction of a mandatory health-warning label to inform consumers about the alcohol content in alcoholic products.

To address the objective of our research, as outlined in the dedicated methodological section, we use country-level wine market data sourced from the Euromonitor Passport database. Consistently with the theoretical structure of demand analysis, a Quadratic Almost Ideal Demand System (QUAIDS) is estimated, which is particularly suited for modeling alcohol demand. As previously mentioned, the analysis is conducted both at an aggregate level and in European submarkets, delineated through cluster analysis utilizing pertinent characteristics of the wine market.

In the next section, we briefly describe the theoretical foundations of demand analysis. Drawing upon these foundations and past literature evidence, we formulate hypotheses to be tested by our analysis. Section 3 reports a description of the data and methodologies employed, while the findings are presented in Section 4, followed by their discussion in Section 5. The final two sections outline the limitations of the study and suggest potential future research avenues to address these limitations, concluding with a summary of key findings.

2. Theory of demand and hypotheses formulation

As commonly done when analyzing the demand for alcoholic beverages, this study employs the neoclassical theory of demand. This approach combines theoretical concepts with the prior knowledge about the sparkling wine sector to formulate hypotheses that can be tested through our analysis.

Previous studies have highlighted that the demand for alcoholic beverages in general, and for wine in particular, is usually characterized by low own-price elasticities (Fogarty, 2010, 2006; Nelson, 2013). However, some characteristics of the sparkling wines sector might suggest the structure of their demand to differ from this general pattern. On the one hand, despite sustained growth in recent years, the sparkling wine market share is relatively small compared to the other wine categories, namely reds and whites. Over the last 15 years, in the EU, sparkling wines accounted for around 10% of the total wine volume (Euromonitor, 2022). Additionally, sparkling wines are usually attached with a strong symbolic image (Charters, 2005; Velikova *et al.*, 2016), they are more connected to indulgence consumption (Mariani *et al.*, 2012) and their consumption pattern differs significantly from those of other wines. Consumption of sparkling wines is occasional, relatively disconnected from meals (Lerro *et al.*, 2019) and often associated to celebratory events (Ristic *et al.*, 2019). These characteristics are expected to contribute to the differentiation of sparkling wines from other types of wines, resulting in high responsiveness of the market demand, in an economic perspective. The smaller size of the sector and the expected higher consumer sensitivity, therefore, lead us to the first hypothesis:

- H1.* The demand for sparkling wine is more own-price elastic than the demand for other types of wines, especially red and white wines.

The same factors are expected to have an influence on the responsiveness of the demand for sparkling wines to changes in the wine expenditure. Additionally, the consumption pattern of sparkling wine, which is more occasional and associated to special events, suggests this category to have a less essential flavor than other wine categories. Hence, our second hypothesis:

- H2.* The demand for sparkling wine is more elastic, with respect to wine expenditure compared to the demand for other types of wines, especially red and white wines.

When it comes to the relation with other types of wines, the expectations are less solid, in part because of a shortage of literature investigating this topic, in part because previous results for other wine categories are not straightforward at a first glance. For instance, scientific literature, mainly from New World wine countries, usually does not recognize any substitution relationship between red and white wines (Buccola and VanderZanden, 1997; Carew *et al.*, 2004; Pompelli and Heien, 1991; Seale *et al.*, 2003), which one can presume as substitutes. In our case, we still leverage on the high of differentiation of sparkling wines, as mentioned before and on the “special occasion” consumption pattern. Since a weak product differentiation leads consumption to easily switch from one category to another (i.e. large cross-price elasticities) (Stasi *et al.*, 2011), a third hypothesis is the following:

- H3.* For sparkling wines, the substitution elasticities with other wine categories are expected to be low or not significant.

Finally, the geographical disaggregation of wine consumption leads us to expect that the demand for sparkling wine (as well as for other types of wine) has different characteristics in different markets. In fact, while Stigler and Becker (1977) argue that tastes for alcoholic beverages are relatively stable across markets, more recent empirical evidence shows that the situation for wine is more complex and heterogeneous (Fogarty, 2010; Mitchell, 2016). For instance, Fogarty (2010), summarizing the evidence from several studies assessing the demand for alcoholic beverages, observes that “beer is a necessity, spirits are on balance a luxury, and wine is a borderline case” (p. 451). However, suggesting that the demand for

sparkling wine differs across different geographical areas is a quite weak hypothesis; on the contrary, a considerations on the importance of the sparkling wine sector in different areas can lead to more precise guesses. Specifically, it is evident that the consumption of sparkling wine is more widespread in some countries (France, Germany and Italy consume approximately 70% of sparkling wines in terms of volume). Since a wider consumption is linked to a wider market share and likely, to a lower “specialty” character of sparkling wine, we hypothesize that:

- H4.* Sparkling wine demands in markets with a higher pro-capita volume of sparkling wine consumption are characterized by lower own-price and wine expenditure elasticities, compared to markets where the consumption of sparkling wine is less widespread.

3. Data and methods

One of the main issues when performing analyses including different countries is the possibility of ensuring comparability between different data sources. In our case, this issue is limited by the use of a common source for all countries, the Euromonitor Passport database. The Passport database retrieves data based on different sources (e.g. official national data and reports, companies, trade data), but ensures a common methodology for data collection, thus allowing the comparability of results from different areas.

The database contains several types of market information for different industries and sectors. In our case, we collected, directly from the Passport database, country-level data, disaggregated by wine category (i.e. sparkling, red, rosé, white) related to the market size of the wine sector. Specifically, we retrieved from the database data on total volumes, total values and prices of each of the four wine categories in each EU country and the UK. Prices and values were expressed in euros using year-on-year exchange rates. In addition to these data, yearly country population was retrieved from the World Bank. While price was directly used in both cluster analysis and demand estimation, the other variables were used to compute secondary variables. Specifically, at the country level, the market share of each wine category, both in value and in volume, was obtained (to be used, respectively, in cluster analysis and demand estimation), as well as the average pro-capita consumption (to be used in the cluster analysis) and the total value of the wine sector (to be used in the demand estimation).

With respect to the time and geographical scope of the analysis, we worked on a 15-years period (from 2007 to 2021) focusing on the EU and the UK, as previously anticipated. The inclusion of the UK, despite this country is no longer part of the EU from 2020, was motivated by its membership to the EU for almost the entire period considered in the analysis. In addition, the UK is the second largest importer of wine (as well as sparkling wine) in the world and the first in the European area, which signals its importance for the wine industry.

The time span selected for the analysis, although depending on the availability of data in the Passport database, can be considered a satisfactory compromise between having a large enough sample size and avoiding making too strong assumptions about the homogeneity of the characteristics of the country-specific demands across time [2].

3.1 Cluster analysis

While the study of the demand for wine exploits the QUAIDS model described in the next section, the second objective of this work, that is, to account for country heterogeneity,

requires to first identify groups of countries that can be considered similar in terms of the characteristics of their wine markets. To this end, we resorted to cluster analysis, a common strategy used in several scientific disciplines to group observations based on some observed characteristics in order to form meaningful groups that might also be useful in performing other types of analysis (Tan *et al.*, 2018).

The variables used to perform the clustering were, for each wine category, volume per-capita, price and market share in relation to the total expenditure on wine. The selection of these variables was driven by the will to identify areas that are homogeneous with respect to the three main market indicators (volume, value and price), avoiding the identification of many small clusters (as it would have been the case if finer indicators were used) that might have been intractable from a statistical point of view due to limitations in the data (see section 6). Specifically, since each variable contains 15 yearly observations for each country, the clustering was performed using the median value over the 15 years. Furthermore, since the prices of the still wines were highly correlated (Pearsons' correlation coefficient > 0.75), a unique "still wine price" was used, obtained by averaging the prices of the three still wine categories. Working with continuous variables, the Euclidean distance was used to measure the proximity between units. This required the standardization of all variables.

Before the analysis was performed, the presence of a clustering tendency was assessed through both a visual inspection of the dissimilarity matrix and the calculation of the Hopkins statistics value (0.364, p -value = 0.000) (Hopkins and Skellam, 1954). The clustering algorithm used was a combination of hierarchical clustering to identify the optimal number of clusters and the initial centroids, and k-means to form the final clusters.

3.2 Analysis of the demand systems

In the scientific literature, several models have been used to study the demand for alcoholic beverages. Log-log regressions, estimated through OLS, were first used; later, finer models have been proposed. Among these, the most used ones are the Rotterdam and the AIDS models, which are grounded on the neoclassic theory of utility. More recent models follow time-series approaches (e.g. fixed and random effects models), but their results seem not to consistently differ from those obtained from system-wide approaches (i.e. Rotterdam and AIDS models) (Fogarty, 2010). We decided to resort to a system-wide approach to estimate the structural parameters of sparkling wine demand because of their strong theory foundation, the wide recognition these models received in demand literature, as well as of the lack of any evidence of the superiority of newer approaches. Specifically, we used the Quadratic Almost Ideal Demand System (QUAIDS) model, an extension of the original Almost Ideal Demand System (AIDS) model devised by Deaton and Muellbauer (1980). The QUAIDS model was developed by Banks *et al.* (1997) to introduce additional flexibility in the original model through a quadratic term, allowing goods to behave as luxuries at some income levels and as necessities at others. Banks *et al.* (1997) noted that alcohol consumption is one of the sectors where expenditure elasticity might actually depend on the income level in a nonlinear way and several studies on wine and alcoholic beverages exploited the quadratic version of the AIDS model (e.g., Cembalo *et al.* (2014); Gil and Molina (2009)). Indexing by i and j the products (in our case, the different types of wine) and omitting the index for the unit of observation (i.e. country-year pairs), the system of expenditure shares entailed by the QUAIDS is the following:

$$w_i = \alpha_i + \sum_{j=1}^n \gamma_{ij} \ln p_j + \beta_i \ln \frac{m}{a(\mathbf{p})} + \frac{\lambda_i}{b(\mathbf{p})} \left[\ln \frac{m}{a(\mathbf{p})} \right]^2 \quad (1)$$

In (1), w_i represents the expenditure share of product i , α_i is the model intercept, p_j is the price of product j and γ_{ij} its associated parameter. Similarly, m is the total expenditure for wine in the country and β_i and λ_i its linear and quadratic parameters, respectively. The terms $a(\mathbf{p})$ and $b(\mathbf{p})$ are defined as in (2) and (3):

$$\ln a(\mathbf{p}) = \alpha_0 + \sum_{i=1}^n \alpha_i \ln p_i + \frac{1}{2} \sum_i^n \sum_j^n \gamma_{ij} \ln p_i \ln p_j \quad (2)$$

$$b(\mathbf{p}) = \prod_{i=1}^n p_i^{\beta_i} \quad (3)$$

Consistency with Demand Theory implies that the system in (1) must satisfy the adding-up conditions ($\sum_{i=1}^n \alpha_i = 1$, $\sum_{i=1}^n \beta_i = 0$, $\sum_{i=1}^n \gamma_{ij} = 0$, $\sum_{i=1}^n \lambda_i = 1$), the homogeneity of the Marshallian cost function ($\sum_{j=1}^n \gamma_{ij} = 0$) and the symmetry of the Slutsky matrix ($\gamma_{ij} = \gamma_{ji}$). Imposing these conditions also has the advantage of improving the efficiency of the estimates (Barnett and Seck, 2008). The estimation of the system of equations was performed using the iterated linear least squares estimator (Blundell and Robins, 1999) to overcome possible convergence issues that may arise in using non-linear seemingly unrelated regression, especially when working within subareas, where the number of observations is smaller [3].

Estimation of QUAIDS allows us to retrieve the expenditure (e_i^E) and price elasticities (uncompensated, e_{ij}^M , and compensated, e_{ij}^H) of the four types of wines according to equations (4)–(6), where δ_{ij} is the Kronecker delta:

$$e_i^E = 1 + \frac{\beta_i}{w_i} + \frac{2\lambda_i}{w_i b(\mathbf{p})} \ln \frac{m}{a(\mathbf{p})} \quad (4)$$

$$e_{ij}^M = \frac{\gamma_{ij}}{w_i} - \left(\frac{\beta_i}{w_i} + \frac{2\lambda_i}{w_i b(\mathbf{p})} \ln \frac{m}{a(\mathbf{p})} \right) \left(\alpha_j + \sum_k \gamma_{jk} \ln p_k \right) - \frac{\lambda_i \beta_j}{w_i b(\mathbf{p})} \ln \frac{m}{a(\mathbf{p})} - \delta_{ij} \quad (5)$$

$$e_i^H = e_{ii}^M + e_i^E w_i \quad (6)$$

It is important to note that in our analysis, as in similar studies (see, e.g. Mitchell, 2016), observations consist of country-year pairs. This is equivalent to taking an assumption of a unique demand curve (for Europe or for single groups of countries) for the whole period of analysis. At this level, this assumption is necessary to work with a large enough sample. In using this approach, one should be confident that the market for the considered goods do not undergo dramatic changes across the period, in order for the assumption to be reliable enough. Therefore, before conducting the analysis, we analyzed, within each country, the time variance of the market variables used for clustering (per-capita volumes, value shares, prices). In Table 1, we report, for each variable, the maximum observed value of the coefficient of variation (CV) and the share of countries with a value of this indicator greater than 30%. Despite the few exceptions for rosé wines, the low CV values for the large majority of the 28 European countries seem to suggest that the wine market did not change drastically in the last 15 years.

Table 1.
Coefficient of
variation (CV) of
considered wine
market variables

Variable	Type of wine	Average value (%)	Maximum value (%)	Share of countries with CV > 30 (%)
Volume pro-capita (liters)	Sparkling	14.8	37.2	7.1
	Red	11.8	28.5	0.0
	Rosé	18.6	48.8	21.4
	White	9.6	29.3	0.0
Value share (%)	Sparkling	12.7	25.2	0.0
	Red	5.7	9.9	0.0
	Rosé	16.3	51.1	17.9
	White	4.4	12.0	0.0
Price (US euros/liter)	Sparkling	11.2	21.9	0.0
	Still	9.2	22.2	0.0

Source: Table by author

4. Results

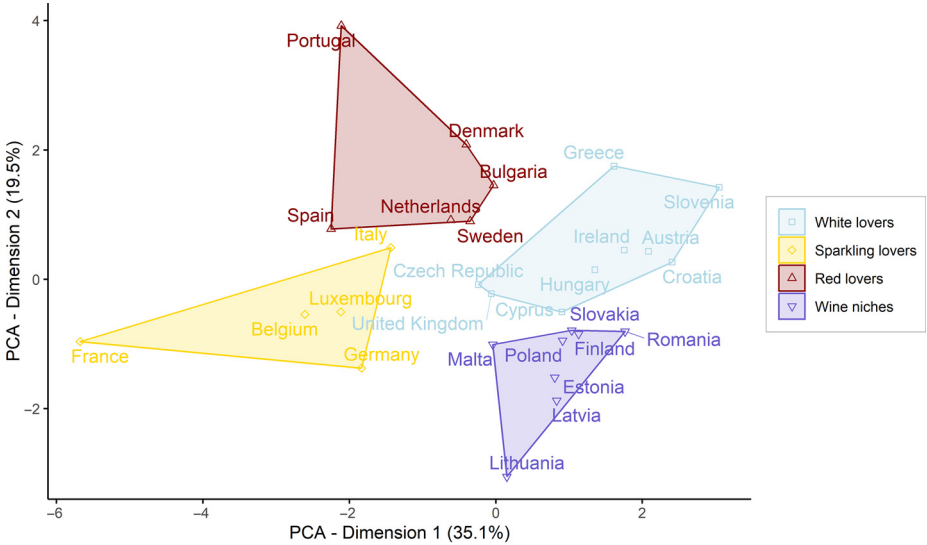
4.1 Identification of homogeneous groups of countries

Before turning to the results of the main analysis, we illustrate the evidence obtained from the cluster analysis. To obtain an immediate representation of the clusters, we report their graphical appearance in Figure 1, where principal component analysis was used to condense the information in a two-axis graph.

Table 2 illustrates the average value that the variables used for performing the clustering take in each cluster, thus allowing us to describe the characteristics of the wine markets in the different groups of countries. In the second part of the Table, some measures of cluster validity are also reported.

The highest average per-capita consumption of wine is found in cluster 2, where we find France, Italy and Germany. Although still red wine is the most consumed wine (and the one

Figure 1.
Graphical
representation of
clusters of EU
countries and UK
based on the
characteristics of
their wine market



Source: Figure by author

		Cluster				Sparkling wine
Variable	Type of wine	1 White lovers	2 Sparkling lovers	3 Red lovers	4 Wine niches	
Annual per-capita volume (liters)	Sparkling	1.07	3.86	0.77	1.46	
	Still red	7.33	13.19	14.42	3.45	
	Still rosé	1.12	3.85	2.08	0.37	
	Still white	12.13	9.24	7.55	3.69	
Value share (%)	Sparkling	0.08	0.26	0.08	0.19	
	Still red	0.34	0.38	0.56	0.39	
	Still rosé	0.06	0.09	0.08	0.04	
	Still white	0.52	0.26	0.29	0.38	
Price (euros/liter)	Sparkling	29.70	21.08	29.78	39.73	
	Still	13.47	8.47	8.93	11.69	
<i>Cluster validity measures</i>						
	Cohesion	13.62	5.83	9.19	9.48	
	Separation	16.47	15.28	13.78	14.59	

Source: Table by author

Table 2.
Means of the
clustering variables
in each cluster and
cluster validity
measures

with the highest market share), the per-capita consumption of sparkling wines is very high compared to the figures of the other clusters. Additionally, sparkling wines have a market share comparable to that of still white wines, and their average price is well below the price observed in the other groups. For the sake of ease, to highlight the importance of sparkling wines in these countries, we will refer to this group as “Sparkling lovers”. In contrast, cluster 4, which we will refer to as “Wine niches”, is characterized, on average, by very small individual consumption of every category of wine and high average prices, especially for sparkling wine. As can be seen from [Figure 1](#), in this cluster there are several Northern and Eastern European countries where the consumption of wine is nontraditional. The other two clusters can be distinguished by their preferences for the type of still wine. Cluster 1 has the highest average individual consumption of white wine, which also represents more than half of the total value of wine. In contrast, cluster 3 has similar characteristics for red wine: the highest per-capita consumption and the highest market share. In these groups, named respectively “White lovers” and “Red lovers”, the average price of sparkling wines is similar and its per-capita consumption is the lowest among the four groups.

4.2 Analysis of the demand for wine

For the sake of brevity, we report the estimated parameters from the QUAIDS model in [Table A1](#) in the Appendix, while we show here, in [Table 3](#), the elasticities for the aggregated EU and UK wine market, computed at the mean values of the variables of interest.

The estimated expenditure elasticities do not greatly differ from one, which is common when working with good categories with a relatively large market share. However, some differences are nonetheless observed in the expenditure elasticity of different wine types. Specifically, the expenditure elasticity of red and white wines is very close to one, indicating that an increase in the expenditure for wine encourages a proportional increase in the purchase of these wines. Conversely, the expenditure elasticity for rosé and, to a lesser extent, for sparkling wines, suggests that the demand for these wines grows more than proportionally than the corresponding expenditure increase. In neoclassical demand theory, goods having this behavior are referred to as “luxuries” and we will maintain this wording

Table 3.
Elasticities of the
aggregated model
computed at the
mean values of the
variables

	Sparkling	Red	Rosé	White
<i>Price (Marshallian)</i>				
Sparkling	−1.33**	0.07**	0.60**	−0.08**
Red	0.31	−0.60**	−0.95**	−0.34**
Rosé	0.37**	−0.12**	−0.70**	0.00
White	−0.38	−0.36**	−0.04	−0.57**
<i>Price (hicksian)</i>				
Sparkling	−1.24**	0.16**	0.70**	0.01
Red	0.75**	−0.18*	−0.49**	0.08
Rosé	0.43**	−0.07	−0.64**	0.06
White	0.07	0.08	0.43**	−0.14
<i>Expenditure</i>	1.03**	1.00**	1.09**	0.99**

Notes: Asterisks (*) and double asterisks (**) denote statistical significance at the 10 and 5% level. Own-price elasticities in italic
Source: Table by author

throughout the paper. Our evidence supports the hypothesis (*H2*) that the demand for sparkling wines is more elastic with respect to wine expenditure than the demand for other wines, like red or white, whose consumption in the EU area is well-established.

With respect to own-price elasticities, it has to be noted that studies considering large consumer products, as in our case, provide lower values than specific or highly differentiated ones, since in the latter the number of substitutes is usually larger.

As expected, all own-price elasticities are negative, since increases in their own price decrease the demand for all types of wines. Interestingly, in accordance to *H1*, the demand for sparkling wines appears to be more elastic than the demand for the other wines, while the demand for red and white wines shows an own-price elasticity close to one. Hicksian own-price elasticities are, as expected for normal goods, lower (in absolute value) than Marshallian elasticities. Specifically, the values for red and white wines suggest that most of the change in demand in response to a variation in the corresponding price is due to an income effect, while the substitution effect is dominant for sparkling and rosé wines.

Turning to the relations between wine categories, the only meaningful change in the demand for sparkling wines is associated with the change of rosé wine price, which appear to be close substitutes. Again, this result confirms the working hypothesis *H3*. The comparison of the cross-price elasticities of sparkling and rosé wines shows that sparkling has price leadership over rosé. Specifically, the variations in the sparkling price produce a larger variation in the quantity of rosé wines than the other way around. This is in line with the small value share represented by rosé wine. When considering the substitution effect only, sparkling wines can be seen as substitutes of red wines as well, but in this case, price leadership is retained by red wines. Although it was not the focus of our analysis, our estimates confirm the absence of any substitution relationship between red and white wines, a commonly observed phenomenon in the literature (Stasi *et al.*, 2011). As noted by Buccola and VanderZanden (1997), this may be due to the high specialization of consumers in drinking only red or white wines, as well as the inclusion, in analyses using aggregate data, of the effect of distributors' assortment choices and strategies.

In Table 4, we report the results in terms of elasticities (estimated parameters are provided in Table A2 in the Appendix) for the models corresponding to the four groups of countries identified by the cluster analysis. To avoid an excessive information burden, we

									Sparkling wine
	SP	<i>White lovers</i>				<i>Sparkling lovers</i>			
		RD	RS	WH	SP	RD	RS	WH	
<i>Price</i>									
Sparkling (SP)	-1.54**	0.10**	0.53**	-0.05**	-0.62*	0.54**	-2.52**	-0.68**	
Red (RD)	0.53	-0.42**	-1.11**	-0.32**	0.98	-0.95**	3.23**	-1.41**	
Rosé (RS)	0.44**	-0.14**	-0.26	-0.02	-0.56	0.40**	-5.22**	0.57**	
White (WH)	-0.62	-0.51**	-0.33	-0.60**	-0.94*	-0.91**	3.09**	0.58	
<i>Expenditure</i>	1.19**	0.97**	1.16**	0.98**	1.14*	0.92**	1.42**	0.94*	
		<i>Red lovers</i>				<i>Wine niches</i>			
<i>Price</i>									
Sparkling (SP)	-0.65**	-0.12	0.17	0.07	-0.90**	-0.07**	0.94**	-0.06*	
Red (RD)	-0.93	0.65**	-2.46**	-2.21*	-0.04	-0.79**	-4.43**	0.14	
Rosé (RS)	0.14	-0.29**	-0.02	0.26*	0.13	-0.34**	0.47**	0.15**	
White (WH)	0.14	-1.20**	1.03	0.95*	0.00	0.16*	1.97**	-1.30**	
<i>Expenditure</i>	1.30**	0.96**	1.28**	0.93**	0.81**	1.03**	1.05	1.07**	

Notes: Asterisks (*) and double asterisks (**) denote statistical significance at the 10 and 5% level. For expenditure elasticities, significance levels are referred to the hypothesis of equality to 1. Own-price elasticities in italic

Source: Table by author

Table 4. Uncompensated price elasticities and income elasticities of the cluster models computed at the mean values of the variables

Notes: Asterisks (*) and double asterisks (**) denote statistical significance at the 10 and 5% level. For expenditure elasticities, significance levels are referred to the hypothesis of equality to 1. Own-price elasticities in italic

Source: Table by author

Table 4.
Uncompensated price
elasticities and
income elasticities of
the cluster models
computed at the
mean values of the
variables

avoid reporting the Hicksian elasticities, considering that policymakers and the general public are usually more interested in uncompensated effects (Fogarty, 2010) [4].

It is important to note that, due to the smaller number of observations and of the high proportion of values close to zero in some groups, especially for rosé wines, the estimates in Table 4 should be considered with some caution.

However, it is evident that there are differences between groups of countries in the structure of the demand for wines, as well as similarities. In most groups, red and white wines maintain the unit elasticity observed for the aggregated EU market, while the demand of sparkling and rosé wines increases more than proportionally with the increase in wine expenditure. The only exception to this latter pattern is the “Wine Niches” group, where the opposite is observed (actually, expenditure elasticity of rosé is not statistically different from unity).

Considering the own-price elasticities, most of the estimates indicate inelastic demands, even for sparkling wines. In this respect, we can observe that the own-price elasticity for this kind of wine is lower in the “Sparkling Lovers” and in the “Red Lovers” groups, while it is highest in the “White Lovers” group. Specifically, the estimate for the “Sparkling lovers” cluster is significant only at the 10% level, indicating that consumers in these countries are, on average, little if no sensitive to price changes when buying sparkling wines.

The evidence drawn from expenditure and own-price elasticities confirms our last hypothesis (H4). The two areas with the lowest importance of sparkling wines (namely, “Red Lovers” and “White Lovers”) indeed show higher elasticity values compared to “Sparkling Lovers”, where the consumption of sparkling wine is more widespread. The “Wine niches” group slightly deviates from the general pattern hypothesized in H4 and verified in the other groups. On the one hand, the own-price elasticity of sparkling wines is larger than in the “Red Lovers” group, despite the latter having a lower market share of this wine category. On the other hand, the income elasticity is smaller than in the “Sparkling Lovers” group. As we will discuss in the next section, these results can be considered a hint of this group being a rather “special” market for wine in the EU context.

While own-price and expenditure elasticities showed that it is possible to identify some general features of the demands for distinct wine categories across the different areas, the analysis of cross-price elasticities highlights differences in how these categories are perceived in relation to one another. For example, while red and white wines are usually considered Marshallian complements, in “Wine Niches” group they are only barely related (in a substitution relationship) to one another. Similarly, red and rosé wines are considered substitutes in the “Sparkling Lovers” group, while in the other groups they appear as complements.

Focusing on sparkling wine, the estimates suggest that, as already emerged in the aggregated model, there are not many relevant substitution or complementarity relationships that sparkling wines are involved in. The only significant two-way relationships are the substitution relationship with rosé wines in the “White Lovers” group, which identifies sparkling wines as substitutes for rosé wines, and the complementarity relationship with white wines in the “Sparkling Lovers” group. In many other cases, it seems that the price of sparkling wines may affect the quantity of other wine categories, but the demand of sparkling wine is inelastic to changes in the price of other types of wine.

5. Discussion

In the previous section, we reported the estimated structural parameters of the demand curves of various categories of wine across the entire EU and within specific subareas. In this section, in line with the objectives of this study, we discuss the practical implications of our findings, addressing the issue first from a managerial and business perspective and then adopting a policy point of view. Given the focus on sparkling wine, the discussion is mainly centered on this wine category.

5.1 Implication for management and business

According to Euromonitor data, the prices of sparkling and still wines in the aggregated EU market exhibited distinct trends during the considered period, as shown in Table 5. While the former decreased, the latter progressively grew, despite with different rates for different categories. It is important to note that the decrease in sparkling wine price can mainly be attributed to the COVID-19 pandemic, as the price trend remained relatively stable until 2019. In the post-pandemic year, there was an overall increase in price for all wine categories, with annual growth rates ranging from 5% to 8%.

From a business perspective, an interesting exercise involves simulating potential future scenarios to understand how the quantity and value of wine demand may respond to various price changes. In this respect, we analyze three scenarios:

- (1) a “Sparkling Growth” scenario, based on 2020–2021 average price growth rates, where sparkling wine prices raised faster than the price of other types of wine;

Table 5.
Average annual price growth rate and average 2021 price of the considered wine categories

Wine category	2007–2021 (%)	2007–2019 (%)	2020–2021 (%)	Average price 2021 (€/liter)
Sparkling	−0.6	+0.2	+7.7	15.47
Red	+1.0	+1.9	+6.9	7.60
Rosé	+1.8	+2.5	+5.2	6.24
White	+0.6	+1.3	+8.0	7.46

Source: Table by author based on Euromonitor data (accessed on February 2024)

- (2) an “Other Wines Growth” scenario, based on average 2007–2019 rates, where the growth of sparkling wine prices is the smallest; and
- (3) a “Uniform Growth” scenario, assuming a 5% annual price growth rate for all wine sectors.

Following the approach in [Buccola and VanderZanden \(1997\)](#), we used the estimated uncompensated elasticities to derive volume and value changes, resulting in the findings reported in [Table 6](#).

While the figures in [Table 6](#) are not intended to provide exact predictions of future trends, the focus should be on relative comparisons rather than on absolute magnitudes. Regarding sparkling wines, the industry appears to be particularly sensitive to the realization of different scenarios. In the “Other Wines Growth” and “Uniform Growth” scenarios, sparkling wines emerge as the best performing wine sector, either by better resisting the loss of volumes and value (“Uniform Growth”) or even experiencing an increase in both indicators (“Other Wines Growth”). Conversely, if a scenario similar to the “Sparkling Growth” comes to be realized, the sparkling wine industry should be expected to incur larger losses compared to other wine sectors.

In this context, it is important to recognize that the ultimate effects rest on the relative changes in prices in the different sectors. Therefore, it is important to monitor the potential drivers of future price fluctuations. For instance, in an inflationary environment resulting from increased production costs affecting wine sectors uniformly, the sparkling wine industry is unlikely to suffer particularly, compared to the other wines. However, in scenarios where other factors, such as shifts in consumer preferences, disrupt the uniformity of price changes, the outcomes could vary significantly. If European consumers move toward higher-quality segments of sparkling wines, as observed in post-Covid years, the prices in the sparkling industry may escalate more rapidly than in other wine categories. In such a context, the sparkling wine industry would need to adopt adjustment strategies. While adjusting supply levels might require time, a short-term solution could involve intensifying efforts to explore new export markets to absorb the production that might encounter difficulties in being allocated on the EU market.

The scenario analysis offers useful general guidelines, but another significant outcome for business is the identification of four distinct EU sub-markets with their own demand structures: “Sparkling Lovers”, “Red Lovers”, “White Lovers” and “Wine Niches”. This finding aligns with previous research and considerations ([Fogarty, 2010](#); [Mitchell, 2016](#)). The underlying reasons for these structural differences, as outlined in the literature on wine consumption, vary from demographic characteristics and dynamics of populations ([Anderson and Wittwer, 2015](#)), to different traditions in wine consumption ([Smith and Mitry, 2007](#)), to preferences for different wine segments ([Aylward and Zanko, 2008](#)), to cultural factors ([Agnoli and Outreville, 2021](#)) or even to genetic differences ([Bargain et al., 2023](#)).

Wine category	Sparkling growth		Other wines growth		Uniform growth	
	Volume (%)	Value (%)	Volume (%)	Value (%)	Volume (%)	Value (%)
Sparkling	−8.4	−1.3	+0.7	+0.9	−4.8	+0.0
Red	−7.1	−0.7	−1.9	+0.0	−5.1	−0.3
Rosé	−5.5	−0.6	−3.4	−1.0	−5.3	−0.5
White	−7.5	−0.1	−1.4	−0.1	−5.0	−0.2

Source: Table by author

Table 6.
Volume and value
change simulations
(annual rates) in two
scenarios with
moderate and fast
price growth

Further investigations into how these factors affect wine consumption patterns in the EU could be a potential future extension of this research, offering companies relevant information to build tailored marketing strategies. However, even at this stage, understanding the basic structure of wine demand in different areas can assist companies in identifying promising markets for their business and gaining an initial understanding of markets dynamics. While this broad perspective will need to be complemented by specific market analyses, it remains important for companies to grasp a first general picture and thus inform their investment decisions.

“Sparkling lovers” include two traditional wine countries, namely France and Italy, and three central European countries (Germany, Belgium and Luxembourg). This group is characterized by a high level of individual consumption of all types of wine, but this is especially the case for sparkling wines, whose average consumption is around three times higher than that of the other groups. The absence of clear evidence that sparkling wine is to be considered a luxury good and the highly inelastic demand further suggest that in this market the consumption of sparkling wine is well established. This market can then be considered as a large and stable market for sparkling wine, where consumers have quite consolidated preferences for it. This possibly makes the entrance of a producer less risky, despite price competition might be a factor to carefully consider, as suggested by the lower price levels. However, in markets characterized by low price elasticity, opportunities arise to compete on factors beyond the price exclusively, such as product quality, brand image, advertising and promotion.

Among the “Red lovers”, we can find two important wine countries, such as Spain and Portugal. However, in this group, wine consumption is strongly related, as the name suggests, to still red wine. Sparkling wines represent a very small fraction of the wine market, with the lowest per-capita consumption among the four considered groups. In line with these features, typical of a niche market, sparkling wine has to be considered a luxury category. On the other hand, however, the preference for sparkling wine seems to be quite stable with respect to price variation, considering the low value of price elasticities. This suggests that this market might be an interesting one for premium wines, which do not aim for large volumes of sales, but can rely on a low sensitivity to price.

Sparkling wines constitute a niche market, within the overall wine market, also in the “White lovers” group, among which are mainly eastern European countries. The patterns of consumption, value shares, and values here are exactly the same as those of the “Red lovers”, with the sole difference that in this market the lion’s share is owned by white still wines instead of the red ones. Sparkling wine remains a luxury category, but in these countries, it presents a high elasticity to price, signaling that consumers are likely to heavily change their purchase behavior according to price strategies. Furthermore, this is the only group where the share of sparkling wine seems to depend on the price of other wine categories, namely rosé wines, following a substitutability relationship. This evidence suggests that consumers in this group have less stable preferences for sparkling wines and that a potential entry producer, in addition to facing a limited market, should also pay careful attention to its price strategies.

Finally, the “Wine Niches” emerge as a promising opportunity for the development of the sparkling wine sector. Most of these countries are small in terms of the total number of consumers (except for Poland), and none of them have a tradition in wine consumption. However, in this group, sparkling wine performs well compared to other categories: its per-capita consumption is around 40% of that of red and white wines, and its prices are, on average, the highest among all the four groups. The relative importance of sparkling wine is highlighted by its classification as a necessity category within the wine market, with an

expenditure elasticity smaller than unity. Although the demand in this group is slightly more elastic than in the “Sparkling Lovers” and in the “Red Lovers” groups, it can still be considered relatively inelastic. Stable preferences for sparkling wines could, therefore, compensate for the small total size of the market, making it attractive for producers.

5.2 Implications for policy

Policy interventions in the alcoholic beverages sector have traditionally been in place in several parts of the world as a way to limit alcohol consumption and thus reduce alcohol-related health issues and fatalities. However, the structure of these policies can vary significantly in terms of the mechanisms they employ to deter alcohol consumption.

Tax-based policies, for instance, aim to increase the price of the final product by imposing additional taxes based on the value of the product, its volume or of its alcohol content. Alternative non-price policies are also common, such as laws regulating the alcohol intake before driving or public campaigns informing about the risks associated with alcohol consumption. An example of a non-price intervention is the one currently under analysis in the EU, which would entail the mandatory application of labels on alcoholic beverages warning consumers about the presence of alcohol. This initiative aims to nudge consumers toward alcohol-free beverages by increasing awareness of the potential health risks associated with alcohol consumption.

In Table 7, we replicate the previous simulation exercise, incorporating two policy scenarios. In the first scenario, we consider the introduction of a 10% *ad-valorem* tax on wines. This tax is supposed to modify consumer behavior directly modifying wine prices. In the second scenario, we model the introduction of a warning label for alcohol content. Unlike the tax, the label is assumed to influence consumer preferences stimulating a reduction in total expenditure for wine. For comparison purposes, we assume a 10% reduction in wine expenditure due to the introduction of the label.

In commenting the figures in Table 7, it is essential to recognize that they offer only a partial view of the market dynamics. In the case of a tax, supply chain actors may opt to adjust their production and selling strategies to soften the negative impact of the measure. For example, they might seek to lower costs or relinquish a portion of their margin. Similarly, the effect of the label can be heterogeneous across consumers (e.g. depending on

Wine category	EU (%)	Sparkling lovers (%)	Ad valorem tax			Wine niches (%)
			Red lovers (%)	White lovers (%)		
Sparkling	−9.6	−6.2	−6.5	−11.0		−9.0
Red	−10.1	−9.2	−8.4	−9.7		−12.0
Rosé	−10.5	−14.2	−24.6	−5.8		−10.5
White	−9.9	−15.2	0.0	−9.7		−11.5
Wine category			Warning label			
Sparkling	−10.3	−10.0	−13.0	−11.9		−8.1
Red	−10.0	−9.2	−9.6	−9.7		−10.3
Rosé	−10.9	−14.2	−12.8	−11.6		−10.0
White	−9.9	−9.4	−9.3	−9.8		−10.7

Notes: ¹ Assuming that before-tax prices remain the same and excluding tax revenues, changes in value equate changes in volume in the first scenario. The same happens in the second scenario assuming that price is not affected by the application of the label

Source: Table by author

Table 7.
Volume¹ changes
simulations in the EU
market and the four
Sub-markets in
response to the
introduction of an
alcohol tax and of a
warning label for
alcoholic beverages

their characteristics, attitudes) and products (e.g. depending on the brand image, on marketing strategies).

Considering the EU market as a whole, the estimated effects in both scenarios are proportional to the price and expenditure variations, while only minor differences are observed between wine categories. Sparkling wines seem to be slightly less harmed by the introduction of an *ad-valorem* tax rather than by the warning label. This observation is likely due to the perception of sparkling wines as a luxury wine category.

This difference is more pronounced in areas characterized by a relatively low own-price elasticity of sparkling wines, such as the “Sparkling Lovers” and the “Red Lovers” groups. In both areas, the mandatory application of a label warning about the alcohol content would penalize more the sparkling wine industry compared to the other wine sectors. The same trend is evident in the “White Lovers” group, where most consumed wine categories are expected to resist better the effects of the label. Specifically, this sub-market confirms to be riskier for sparkling wines, as both policy interventions would have a considerable impact on their demand. Conversely, in the “Wine niches” group, the effect of both policy interventions on the quantity of sparkling wines demanded would be less than proportional. This scenario confirms the attractiveness of this EU sub-market for the sparkling wine industry, as discussed in the previous section.

A relevant aspect emerging from Table 7 is the possibility of the policy to induce differential shifts in wine consumption. Different types of interventions are expected to produce varied impacts across different areas, allowing legislators to influence the proportion of different types of wines demanded in various EU regions. While a fair policy intervention ideally should not alter these proportions (Ramsey, 1927), such a policy would be much more complicated to build, likely requiring different tax rates in different areas. The current scenario, as depicted by Table 7, however, opens the way to two main considerations. First, it offers the possibility to the legislator to identify the most pressing issues and devise an intervention specifically tailored to address them. For example, if alcohol-related issues are more acute in certain areas or more closely linked to the consumption of specific types of wine, targeted interventions could be implemented. It is important to note, however, that such considerations should be better drawn on the basis of a more comprehensive model considering also other alcoholic beverages. Second, there is the possibility that these differential effects capture the attention of lobbying activities of operators in a specific wine sector. For instance, sparkling wine producers selling their products in traditional markets may find it more advantageous to oppose the introduction of an alcohol warning label. Conversely, exporters in new wine markets in Eastern Europe, may be more inclined to challenge taxation, as it is expected to have larger negative effects on wine demand in those regions.

6. Limitations and future research

The main limitations of the study come from the data source. As anticipated in the introduction, the analyses performed aimed at providing a general overview of the structure of the demand for different types of wine in the EU and in some EU sub-areas. In this respect, Euromonitor data assure homogeneity in data collection procedures, which allows us to meaningfully aggregate these data into a single analysis. However, on the other hand, these data are in the form of yearly country figures, a format that limits somewhat the analysis. The use of low-frequency data is not a problem in itself. Actually, Fogarty (2010) noticed that high-frequency data (e.g. weekly, monthly) might give rise to issues related to consumers’ and retailers’ inventory behavior, which usually leads to an overestimation of substitutability relations. However, yearly data requires the assumption that all data points

are part of the same demand curve, implying some compromise between the length of the time series and the reliability of the assumption.

Aggregation of data at the country level does not allow to consider within the analysis some individual factors of consumers, like their preferences or characteristics. While this lack is common in demand studies of alcoholic beverages, taking into account these factors can be a valuable avenue for future research, providing much more insights into the characteristics of the demand for wines, especially considering the special consumption behavior observed for sparkling wines. In this respect, while our study provided the basic structure of the EU wine demand, deeper analyses aimed at identifying the factors shaping these demands might be helpful to improve their understanding, to explain differences between EU sub-areas, as well as to better foresee future demand dynamics. In addition, to better inform the policy discourse, it will be important to estimate the potential effects of the introduction of an alcohol warning label on consumers' wine expenditure. In our analysis, we used a hypothetical change in expenditure with the sole purpose of comparing two different policy scenarios. However, a precise forecasting of the effect of such a policy would require reliable figures estimated through the analysis of consumers.

Two more critical limitations, both caused by the relatively low number of observations, are related to the exclusion from the demand system of other alcoholic beverages (namely beers and spirits) and to the impossibility to conduct the analysis at the country level. The latter is partly mitigated by the creation of groups of countries homogeneous in terms of few critical wine market indicators. However, the possibility in future research to conduct country-specific demand analyses would allow to take into account also the differences between countries that we grouped in the same cluster. With respect to the exclusion of other alcohol categories from the estimation, from a theoretical point of view, this is akin to assume the demand for wine to be weakly separable from the demand of other alcoholic beverages. While this assumption is not uncommon in studies focusing on the analysis of specific wine categories (e.g. [Buccola and VanderZanden, 1997](#); [Capitello et al., 2015](#); [Carew et al., 2004](#)), it must be acknowledged that it might imply ignoring some relevant substitution relations of wine with other alcoholic beverages. The issue is partly softened by the use of low-frequency data, since, as recalled above, substitutability relationships are less pronounced in these settings. However, we deem that a critical step in future research is to include other alcoholic beverages in the estimation of the demand system also when the focus is on specific wine categories, provided that data are available to perform such a task.

7. Conclusions

The sparkling wine market has witnessed an important growth in recent years, also as an effect of the increased importance that consumers attach to the experiential and symbolic attributes of wine. The present study performed a first analysis of the aggregated demand for sparkling wine in Europe, with the objective of shedding light on its basic dynamics. Identifying the parameters that define the demand structure of a product is valuable for both the private and public sectors, as it helps them understand how potential shocks, stemming from market events or policy interventions, affect the quantity demanded.

In general, the relatively large own-price elasticity may cause the sparkling wine industry to incur in relevant losses within the EU market, in terms of volume and value, if the price of sparkling wine grows faster than the price of the other wine categories. However, the opposite can be expected to occur if the reverse trend is observed, with still wine prices growing faster. Conversely, from a policy perspective, the impact of a policy intervention (either a tax or an alcohol warning label) on the different types of wine seem not to be dramatically different, at least at the EU level. While this suggests a similar

effectiveness of the two policy measures, the heterogeneity of the impacts in different EU sub-areas indicates that the choice of the type of intervention might be crucial to determine changes in local wine consumption patterns. With specific reference to the sparkling wine industry, this seems to be harmed more by a label system in those countries where the consumption of wine is more traditional, while a taxation system would be less impacting in countries where wine still represents a niche market.

Finally, the identification of different homogeneous European wine submarkets allows for the estimation of differentiated policy effects and provides a preliminary segmentation of the European wine market, which could be particularly valuable for wine exporters. As a result, in face of the considerations made about the overall European market, it is possible for sparkling wine producers to find, within the European area, submarkets that suit their needs best. The demand for sparkling wines appears, in fact, to have quite different (and sometimes contrasting) characteristics from one geographic area to the other. As such, it is possible to find markets where the demand for sparkling wines is relatively inelastic to price, or markets where consumers do not consider sparkling wine a luxury wine category. This evidence, although it should be complemented with analyses at finer scales, implies that sparkling wines producers and exporters can pursue multiple marketing strategies within Europe, provided that the proper market is addressed.

Notes

1. According to data from the International Trade Center, in 2021, the USA, the UK and Germany imported, respectively, 1.97, 1.66, and 0.75 million hectoliters of sparkling wine (for a market value of 1.61, 0.85, and 0.46 billion euros, respectively), while Italy, France, and Spain exported, respectively, 4.91, 2.42, and 1.78 million hectoliters (for a market value of 3.92, 1.82, and 0.47 billion euros, respectively). The two rankings only slightly change when 15-years averages are considered: the USA, the UK and Germany imported, yearly, 1.11, 1.29 and 0.71 million hectoliters, while Italy, France, and Spain exported, yearly, 2.73, 1.84 and 1.74 million hectoliters. (Data accessed on 12 February 2024). It has to be noted that the three leading positions have been highly stable across the last 15 years, both for importing and exporting countries. Only Japan, in some years (including 2021), overcame Germany in terms of value of sparkling wines imports.
2. For a deeper discussion about this last point, see Section 2.2.
3. The estimation was performed using the `aidslls` command in Stata (Lecocq and Robin, 2015). In line with the discussion in Deaton and Muellbauer (1980), to the parameter α_0 a value was assigned just below the minimum value of $\ln(m)$. The cluster analysis was performed with the R software.
4. The compensated elasticities for these models are available from the authors upon request.

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Table A1.
Estimated
parameters of the
aggregated (EU +
UK) QUAIDS model

<i>Parameter</i>	<i>Model equation</i>			
	<i>Sparkling</i>	<i>Red</i>	<i>Rosé</i>	<i>White</i>
α_0	0.12**	0.39**	0.03**	0.46**
β	−0.04**	0.01**	0.00	0.02**
λ	0.02**	−0.01**	0.00**	−0.02**
$\gamma^{Sparkling}$	−0.03**	0.03**	0.03**	−0.03**
γ^{Red}	0.03	0.17**	−0.05**	−0.15**
$\gamma^{Rosé}$	0.03**	−0.05**	0.02**	0.00
γ^{White}	−0.03	−0.15**	0.00	0.18**
Note: Asterisks (*) and double asterisks (**) denote statistical significance at the 10 and 5% level				
Source: Table by author				

					Sparkling wine
Parameter	Sparkling	Model equation			White
		Red	Rosé		
Cluster 1 – White lovers					
α_0	0.08**	0.31**	0.03**		0.58**
β	0.01**	−0.01**	0.01**		−0.01**
λ	0.02**	−0.00	0.01**		−0.02**
$\gamma_{Sparkling}$	−0.03**	0.03**	0.03**		−0.03**
γ_{Red}	0.03	0.19**	−0.05**		−0.18**
$\gamma_{Rosé}$	0.03**	−0.05**	0.04**		−0.01
γ_{White}	−0.03	−0.18**	−0.01		0.22**
Cluster 2 – Sparkling lovers					
α_0	0.09**	0.29**	0.10**		0.51**
β	0.00	0.00*	−0.02**		−0.00*
λ	0.01*	−0.01**	0.01**		−0.00
$\gamma_{Sparkling}$	0.09	0.23**	−0.12**		−0.20**
γ_{Red}	0.23*	0.01	0.17**		−0.41**
$\gamma_{Rosé}$	−0.12	0.17**	−0.21**		0.16**
γ_{White}	−0.20	−0.41**	0.16**		0.51**
Cluster 3 – Red lovers					
α_0	0.06**	0.55**	0.07**		0.33**
β	0.03**	−0.02**	0.01**		−0.01*
λ	0.00	0.00	0.02**		−0.02**
$\gamma_{Sparkling}$	0.03	−0.07	0.01		0.02
γ_{Red}	−0.07	0.89**	−0.16**		−0.67**
$\gamma_{Rosé}$	0.01	−0.16**	0.07**		0.08*
γ_{White}	0.02	−0.67**	0.08		0.57**
Cluster 4 – Wine niches					
α_0	0.19**	0.39**	0.03**		0.39**
β	−0.06**	0.02**	0.01**		0.02**
λ	−0.02**	0.01	0.01**		0.00
$\gamma_{Sparkling}$	0.01	−0.02**	0.03**		−0.02
γ_{Red}	−0.02	0.09**	−0.13**		0.06
$\gamma_{Rosé}$	0.03	−0.13**	0.04**		0.06**
γ_{White}	−0.02	0.06*	0.06**		−0.10**
Note: Asterisks (*) and double asterisks (**) denote statistical significance at the 10 and 5% level Source: Table by author					Table A2. Estimated parameters of the cluster QAIDS models

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