

Article

POTENTIAL MARKET FAILURES IN THE PORTUGUESE WINE INDUSTRY

POTENCIAIS FALHAS DE MERCADO NO VINHO EM PORTUGAL

João Rebelo*, Alberto Baptista

Department of Economics, Sociology, and Management (DESG), Centre for Transdisciplinary Development Studies (CETRAD), University of Trás-os-Montes and Alto Douro (UTAD), Quinta de Prados. 5001-801 Vila Real, Portugal.

* Corresponding author: Tel.: +351 917209890; e-mail: jrebelo@utad.pt

(Received 12.05.2023. Accepted 27.11.2023)

SUMMARY

The wine industry is characterized by a monopolistic competition market structure, with high product differentiation. In this study, based on the predictions of microeconomic theory as applied to market equilibrium and market failure, the statistical data on production, trade and domestic consumption, as well as the governance model adopted, were analyzed. The main goal was to examine potential market failures in the Portuguese wine industry, concentrating mainly on those related to information asymmetry and transaction costs. The analysis shows that while Portugal constitutes a significant source of low-priced wines, both for its home consumers as well as for those abroad, most wines lack reputation and therefore have little potential to transfer value to upstream economic agents, and almost no possibility of increasing consumers' willingness to pay. Though there is detailed information on production, exports and trade, limited information exists on domestic consumption. Given the small dimension of some wine regions, the governance model adopted does not benefit from scale economies and requires higher transaction costs.

RESUMO

O setor do vinho é caracterizado por uma estrutura de mercado de concorrência monopolística, com elevada diferenciação de produtos. Neste estudo, baseado nas predições da teoria microeconómica aplicadas ao equilíbrio do mercado e a falhas de mercado, foram analisados dados estatísticos sobre produção, comércio e consumo interno, bem como o modelo de governação adotado. O principal objetivo foi detetar potenciais falhas de mercado na indústria vinícola portuguesa, concentrando-se principalmente naquelas relacionadas com assimetrias de informação e custos de transação. Os resultados mostram que Portugal é, sobretudo, um mercado de vinhos de baixo preço, tanto no consumo interno como nas exportações, com a maioria dos vinhos a carecer de reputação e, portanto, com pouco potencial para gerar e transferir valor para os agentes económicos a montante, e fracas possibilidades de os consumidores aumentarem a disposição a pagar. Embora exista informação detalhada sobre a produção, as exportações e o comércio, a mesma é limitada no consumo interno. Dada a pequena dimensão de algumas regiões vitivinícolas, o modelo de governação adotado não beneficia de economias de escala e suporta elevados custos de transação.

Keywords: Wine, monopolistic competition, information asymmetries, transaction costs.

Palavras-chave: Vinho; concorrência monopolística, informação assimétrica, custos de transação.

INTRODUCTION

Over the last four decades, following successive waves of globalization, the worldwide wine market has changed, with profound changes being observable in the basic conditions, structure, behavior and performance, both on the supply and demand sides, and increasing competitiveness in international markets (Ugaglia *et al.*, 2019). However, despite these changes, producers of so-called Old World wine countries, located in the European Union (EU), continue to dominate the worldwide industry despite losses in vineyard area, production, wine consumption, and trade.

Regarding the institutional environment, the EU wine production system is characterized by a regulatory model based on the use of the geographical indication (GI), a device legally protecting a given wine from misrepresentation and fraud, guaranteeing its quality attributes and reputation, and providing a means of reducing transaction costs by delivering scale economies to producers via collective promotion.

In general, GIs are divided into two categories: Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI). Any wine not fitting into these categories is simply known as "wine".

According to article 93° of the (EU) Regulation 1308/2013, a PDO wine should fulfill the following requirements: (a) the quality and characteristics of the wine are essentially or exclusively due to a particular geographical environment with its natural and human factors; (b) the grapes from which the wine is produced come exclusively from that geographical area; (c) the production takes place in that geographical area; (d) the product is obtained from grapevine varieties belonging to the *Vitis vinifera* species.

Wine designated as PGI should fulfill the following requirements: (a) it possesses a specific quality, reputation, or other attributable to that geographical origin; (b) at least 85% of the grapes used for its production come exclusively from that geographical area; (c) its production takes place in that geographical area; (d) it is made from grapevine varieties belonging to the *Vitis vinifera* species or a cross between *Vitis vinifera* and other species of the genus *Vitis*.

To summarize, while a PGI wine's reputation is primarily derived from the territory, the characteristics of PDO wines are also affected by natural and/or human factors inherent to the geographical location in question, that is, its linkage to the *terroir* is higher. From a wider perspective and considering that *terroir* also covers social, cultural and heritage elements, wine regions work as a relevant asset for tourism (da Silva *et al.*, 2018)

The EU provides a system of regulating supply applicable both horizontally (i.e., to different categories of wine, such as still wine, fortified wine and sparkling) and vertically (i.e. to different categories of the same type wine, such as PDO, PGI still wine, reserve, grand-reserve, among others). Wine differentiation is the driving force behind wineries being able to influence the price, as represented by a sloping demand curve, typical of a monopoly; the higher the price, the greater the differentiation and the lower the price elasticity of demand. On the other hand, unrestricted market entry and exit of firms result in perfect competition. When product differentiation is combined with an absence of entry/exit barriers, the market is characterized by monopolistic competition.

At present, more than 70% of the wine produced in Europe benefits from a certified quality label: 1,172 with PDO and 437 with PGI (Onofre, 2021). However, despite the regional diversity, to assure fair competition in the single market, the EU has established a basic regulatory framework common to all regions, covering how operators are defined and registered, the rules for authorizing new plantings, oenological practices, labeling, and the use of traditional terms. Simultaneously, the EU has introduced public financial support for vineyard reconversion, technological modernization of

wineries, and promotion in third markets, all aimed at assuring the industry's long-term competitiveness.

Indicators of the industry's performance concerning production and international trade suggest that EU public policies have contributed positively to the competitiveness and economic and social sustainability of the wine industry in the main producing countries, including Portugal, leading to suggest that once won the challenge of competitiveness, the future should be directed to sustainability and responding to citizens' concerns regarding the environment, food, and health (Onofre, 2021). Nevertheless, some doubts persist concerning the positive impacts of the regulation (EC, 2014; Alston and Gaeta, 2021; Rico, 2021), notably how effective EU regulation has been in achieving higher value and distributional equity.

In its study of international European wine competitiveness (EC, 2014: 145), the European Commission underlined the issues relating to asymmetrical information, in the following terms: *regarding European PDO/PGI wines, the analysis has highlighted the low level of knowledge, but above all lack of use of these labels by distributors/retailers for communication. One important reason is the generation of confusion: European GI wines appear on foreign markets with a multitude of acronyms depending on the language of the Member State of origin (AOP, DOP, PGI, etc.). In addition, the confusion for non-expert consumers (but not only) further increases due to the co-existence of new definitions and related acronyms (i.e. PDO/PGI) with the old ones (DOC-DOCG wines in Italy, AOC in France, etc.). Finally, a further critical point is the preservation of the difference between terroir (PDO wines) and territory (PGI wines). Although the difference is clear in the regulations, it is not so clear for non-expert consumers, thus generating confusion. In essence, the very articulated regulations concerning GI labels seem to be in place more to meet the needs of producers oriented to the internal market (i.e. the market of wine producer countries) rather than to satisfy the information needs of consumers in non-producer countries (who demand more simplified information, especially concerning premium wines).*

Alston and Gaeta (2021) raise concerns about the applicability of technical restrictions, given (1) the potential for alternative sources of information to solve the “lemons” problem in the wine market, (2) evidence that the appellation system *per se* might not be effectively serving that purpose as well as it once did, and (3) evidence that some of the regulations impose significant social costs. Regarding the first issue, the so-called “market of lemons” problem, a term coined by Akerlof (1970), and common in the second-hand car market, refers also to a situation where it is uncertain about the quality of goods (Mas-Collel *et al.*, 1995), which lower consumers’

willingness to pay, that is the price, and leading to market breakdown or suboptimal outcomes.

The “market of lemons” issue can be overcome by market signals, such as expert and consumer platform ratings (e.g. ‘Robert Parkers Wine Advocate’, ‘Wine Spectator’, ‘Wine Enthusiast’, ‘Wine Spectator’, ‘Decanter’, ‘Jancis Robinson’, ‘Wine & Spirits’, ‘Cellar Tracker’, ‘Vivino’) and collective reputation by region (e.g. Bordeaux, Burgundy, Chianti, Douro, Alentejo, Dão), country (e.g. Wines of Portugal), wine recognized classification (e.g. reserve, vintage) and individual brands (e.g. ‘Chateau Laffite’, ‘Barca Velha’, ‘Monte Velho’, ‘Planalto’, ‘Cabriz’).

As is shown, in studies of price determinants (Gonçalves *et al.*, 2021), besides the so-called objective and sensory attributes, the willingness to pay by consumers, measured by the observed price, is influenced by variables that address the influence of ratings and collective and individual reputation, and varies between countries and consumer segments. For instance, in traditional wine-consumer countries (Portugal, Spain, France and Italy), the production region and individual brands have a large influence, while in new wine-consumer countries, such as the USA, the influence of expert raters is highlighted.

Reflecting on the Portuguese wine industry, Rico (2021) identified market failures that hinder the creation and distribution of value along the supply chain and highlights distortions due to imperfect information access, a lack of comprehensiveness and equity in public sector support, the subversion of the purpose of public taxes (fees), and obstacles to the premiumization of foodstuffs.

In summary, there seems to be no doubt that the public policies adopted by the EU have contributed positively to the competitiveness and economic and social sustainability of the wine industry in the main producing countries, including Portugal. However, there are doubts about the effectiveness of these public policies due to information asymmetry (adverse selection and moral hazard) and extra transaction costs linked to the governance model which lead to a deviation from the Pareto optimum or maximum social welfare. Therefore, these market failures deserve to be investigated to better understand the industry's economic, environmental, and social sustainability and how public policy may better support the firm's strategic decisions.

Thus, the main goal of this paper is to analyze potential market failures in the Portuguese wine industry, concentrating mainly on those related to information asymmetry and transaction costs.

From a methodological perspective, i.e., material and methods, in order to fulfill this goal, tools derived from the microeconomic theory regarding the nature and equilibrium of markets characterized by

monopolistic competition are used, as well as those developed to assess the impact of information asymmetry and transaction costs on market failure.

MATERIAL AND METHODS

In the rather heterogeneous European wine industry, a large number of wineries often adopt a strategy of product differentiation, so that each wine develops its following of consumers, which enhances wine producers' market power, allowing them to charge higher prices than would be the case under perfect competition, and thereby favoring the transfer of additional surpluses from consumers to wineries.

Moreover, wine is an experience good in which consumers, who learn from experience the utility of previous consumption, generally know more about a given brand, the region or country of origin, the grape varieties involved, or at least some of these attributes. It is to be expected that these consumers do not treat as to be similar wines they have experienced and those they have not, and display a greater willingness to pay (i.e. will accept a higher price) for wines they have experienced or know. From this market dynamics emerge interesting questions, such as: How do consumers come to try collective or individual brands, i.e., what role is played by the reputations of wines from a given DOP/PGI designation and the brand(s) of a specific winery? Do pioneering and incumbent brands have an advantage over late arrivals/new entrants? Regardless of the objective quality of the wines, can the different levels of information available to the potential buyer constitute a barrier to entry due to consumers tending to be loyal to the incumbents?

The answer to the above questions should be sought using a market structure based on monopolistic competition, in which each firm faces a downward-sloping demand curve, whose slope increases with the degree of product differentiation or monopoly power. In such a market structure, firms compete in setting prices and production levels to achieve market equilibrium.

In a monopolistic market structure (Hart, 1985; Varian, 2014;) and assuming that there are n wineries that produce similar wines, but imperfect substitutes, the price of the wine of the firm i (p_i) will also depend on the other wineries' production, y_{n-i} (Equation 1):

$$p_i(y_i, y) \text{ and } y = (y_i, Y_{(n-i)}) \quad \text{Eq. 1}$$

The profit (π) is given by $\pi_i = p_i(y_i, y)y_i - C(y_i)$, where $p_i(y_i, y)y_i$, $C(y_i)$ are the total revenue and the total production cost, respectively.

In the short term, the equilibrium of each firm is given by Equation 2

$$p_i(y_i^*, y) + \frac{\partial p_i(y_i^*, y)}{\partial y_i} y_i^* = c(y_i^*) \quad \text{Eq. 2}$$

being the left-hand side of this equation the marginal revenue and $c(y_i^*)$ the marginal cost. For each combination of the production levels of the other firms, there is an optimum (equilibrium) production of each firm i . The equilibrium can also be expressed through demand-price elasticity (ϵ_i) and markup (Equation 3).

$$\frac{1}{\epsilon_i} = \frac{p_i - c(y_i^*)}{p_i} \quad \text{Eq. 3}$$

with both sides of the equation measuring market power, allowing them to charge higher prices than would be the case under perfect competition, and thereby favoring the transfer of additional surpluses from consumers to wineries. This equation shows that, in the short run and a certain level of marginal cost, the price and markup will move in the opposite direction to the price elasticity of demand. Umbrella brands, or collective reputational attributes such as the PDO and PGI, as well as individual factors such as brands and ratings, provide wineries with a means of raising their markup, as long as they can rely on relatively weak consumer responses, that is, low demand-price elasticity, translating into larger difference between price and marginal cost.

However, in the long term, the entry of firms into the wine industry and their exit from it lead each winery

to zero normal profit, producing a y^* such as (Equation 4)

$$0 = p_i^* y_i^* - C(y_i^*) \quad \text{wikt } p_i(y_i^*) = \frac{c(y_i^*)}{y_i^*} \quad \text{Eq.4}$$

The equation 4 means that a stable monopolistic competition equilibrium (MCE) for each winery is reached when the price is equal to the average cost (AC), as represented in Figure 1 (Hart, 1985). In Figure 1a the demand curve touches the AC to p_1 , p_2 , and p_3 , which are zero profit prices for wineries, which to be a MCE there must be probability weights in p_1 , p_2 , and p_3 to generate a demand curve given by $y=f(p)$, while Figure 1b identifies a special case of equilibrium when all wineries charge the same price (p^*) and produce a similar level of output. Both also show that the greater the slope of the demand curve (lower demand-price elasticity), the higher the price charged and the bigger the deviation from what happens in perfect competition, where MCE will occur at the minimum AC. This gap represents the excess capacity that is associated with monopolistic competition and will tend towards zero when there is low or no differentiation between wines, tending the demand curve to be horizontal, due to perfect substitution between wines. In the limit, the situation is similar to perfect competition, being the price equal to the minimum AC.

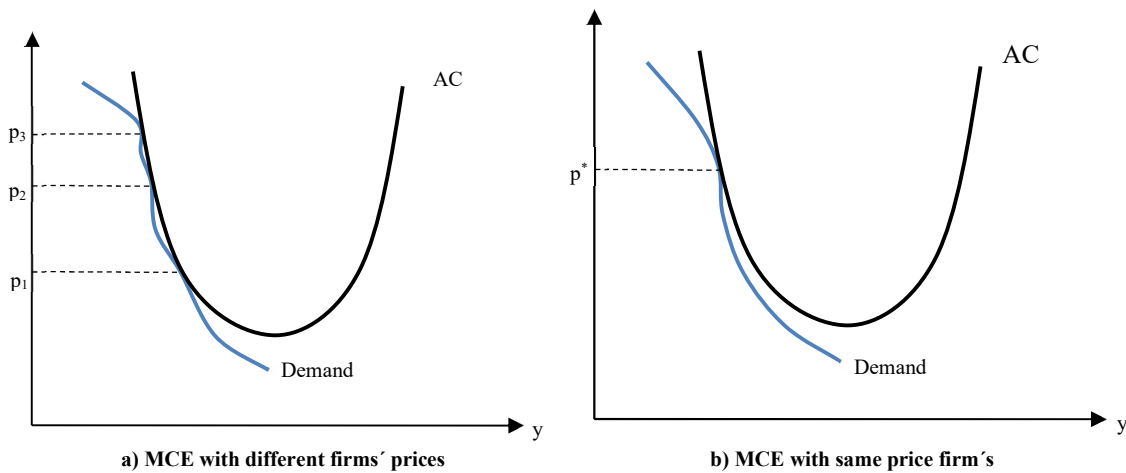


Figure 1. Firm monopolistic competition equilibrium (MCE) at firms' different and same prices.

In conclusion, wine prices will be higher since the greater a firm's capacity for wine differentiation, i.e., the lower the degree of substitutability. If consumers do not endogenize quality differentiation and show a high propensity to substitute between PDO/PGI and low-priced wines, the total average wine price will tend to decrease, a situation that seems to be observed in Portugal, which is similar to the "market of lemons" and can drive to a growing perception of similarity of classified and unclassified wines.

Stiglitz (2008) provides the tools for the analysis of the quality differentiation by consumers arising from asymmetric information. Based on this author, only graphic representations are used to explain the consequences of imperfect (asymmetrical) information on the demand curve representing a market structure characterized by monopolistic competition, as in the case under scrutiny in the present article. Figure 2 shows the different ways in which the demand curve of wine can behave. Figure

2a represents the case of a winery that does not lose all of its customers when it raises its price a little or does not conquer the entire market when it lowers it a little. The second possibility (Figure 2b) is when, beyond a certain level of wine sales, a firm attracts no additional customers by lowering the price. The behavior shown in Figure 2c occurs when, under the assumption that all wineries charge the same price, there is a kink in the demand curve, where the elasticity of demand corresponding to a price decrease exceeds that detected when the price increases. This type of kink is not a surprise, being part of the natural asymmetry of information, as, for example, at a given moment, the consumer may know the price of certain producers' wines, but not those of others. In these circumstances, there can be no zero profit single price equilibrium and the winery

could increase its profits either by lowering or raising prices. By contrast, Figure 2d illustrates the case in which, with the same assumption that all firms charge the same price, there is a kink in the demand curve, with the elasticity demand for price increases exceeding that for price decreases. In this case, there can be no zero profit single price equilibrium, and the profit of the winery could decrease either by lowering or raising prices. Finally, Figure 2e shows the effect of all wineries charging the same price: the demand curve facing any firm may contain a discontinuity. Also, under these circumstances, a zero profit single price (Nash) equilibrium cannot exist, except to a price at a price equal to the minimum AC. The development and availability of web platforms dedicated to wine consumers reduce such market failures.

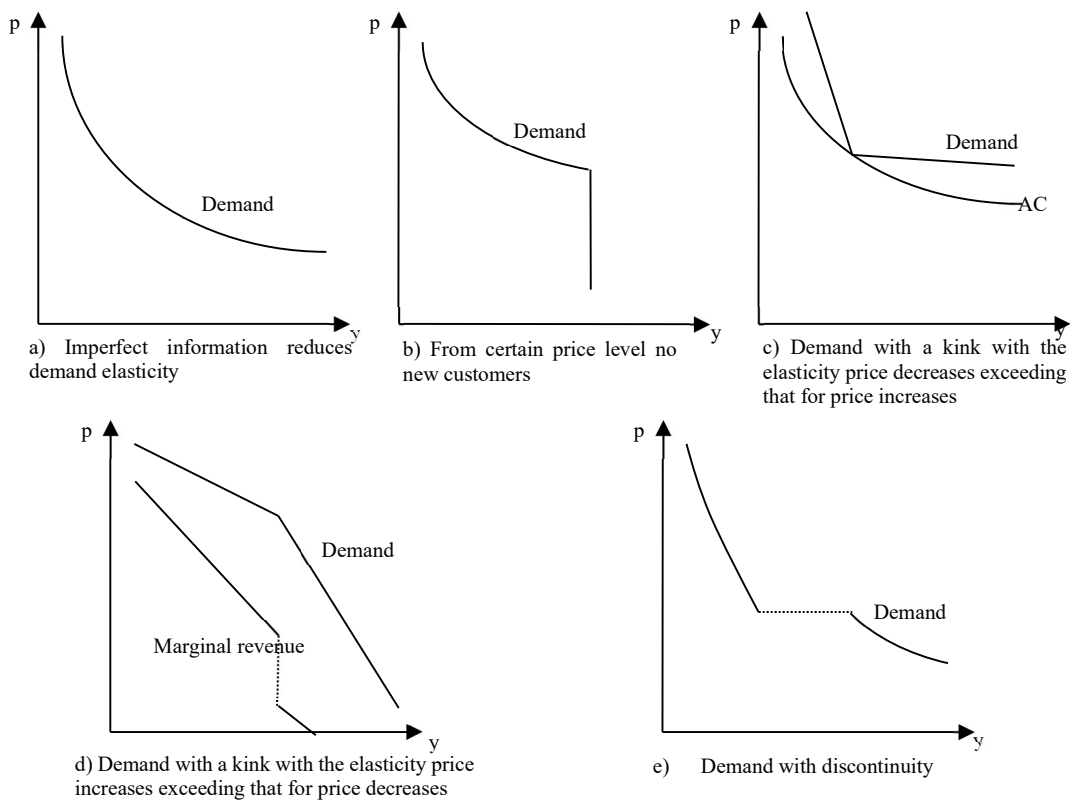


Figure 2. Different monopolistic competition demands under imperfect information and all firms charging the same price.

Transaction costs exist due to the uncertainty in the contractual relationships between upstream and downstream parties to a business operation. From a behavioral point of view, Williamson (1989) argues that uncertainty is a consequence of (a) the limited rationality of agents, that is, agents having different levels of knowledge and different interpretations of the likelihood of exogenous events taking place (i.e. so-called adverse selection); and (b) the opportunism of economic agents who, due to the incompleteness of the information they have, experience difficulties

in monitoring transactions (i.e., so-called moral hazard).

Transaction costs (Williamson, 1989) are influenced by three factors: 1) transactional frequency - how often transactions are repeated; 2) uncertainty about the future; 3) how specific the assets are to the type of transaction proposed. To reduce transaction costs, the organizational arrangements that develop between economic agents are determined either by the price system or by coordination mechanisms (Williamson, 1991). Therefore, when analyzing transaction cost analysis, it is necessary to

understand the variables influencing transaction costs and how they may affect the decisions of governance structures.

In agricultural markets, one way of overcoming information asymmetry is through a collective certification mechanism, such as the GI. Regardless of the precise mechanism adopted, GIs act as an important mean by which producers, consumers, and communities, in general, can make informed decisions. For producers, the seal of quality provided by a GI helps to increase consumers' willingness to pay, thereby generating higher producer markups. For consumers, a GI contributes to reducing adverse selection, above all in so-called experience goods, facilitating decision-making, and reducing transaction costs. A GI can also contribute to reducing rural exodus. The GI involves costs related to the establishment of the governance structure and definition of geographical boundaries, but it also promotes the development of other activities, such as tourism, contributing to the reduction of rural-to-urban out-migration. Cost-benefit analysis – which takes into account the transaction costs discussed above – should provide the *leitmotiv* for choosing the best model of GI governance.

RESULTS AND DISCUSSION

Production and trade

Portugal is the fourth largest wine producer in the EU, representing, in 2020/2021, around 6.5% of its production, and the 11th largest worldwide, with 2.6% of production. It has an area of 192,029 ha of vines, of which 189,029 ha are on the mainland and 2,389 ha on the Azores and Madeira islands. As shown in Table I, the above area is split between 14 demarcated wine regions, 12 spread over the mainland and 2 on the aforementioned islands, with very different sizes. The Douro region is the largest (with 23% of the total area) and Madeira is the smallest one (0.35% area). Wine production is divided between 30 PDOs and 14 PGIs. Almost all the GIs include still wines (red, white, and rosé) and sparkling wines, with some of them also including fortified wines, wine-based spirits, and even vinegar.

Regarding vines, it should also be highlighted that in the framework of the Common Market Organisation (CMO), to improve quality and reduce production costs, Portugal established a Support Plan for the Reconversion and Restructuring of Vineyards (VITIS) which, between 2000 and 2021, with 44,412 applications being approved in a sequence of tenders, allowed an area of 89,750 ha to be restructured, close to 47% of the country's vineyard area, and 868.9 million euros to be disbursed (Gouvêa, 2021).

Table I
Portuguese Demarcated Wine Regions: Area and PDO/PGI denominations, 2020/21

Regions	Area (ha)	PDO denomination	PGI denomination
Alentejo	25,461	Alentejo	Alentejano
Algarve	1,427	Lagoa, Lagos, Portimão, Tavira	Algarve
Bairrada	13,259	Bairrada	Beira Atlântico
Beira Interior	13,874	Beira Interior	Terras da Beira
Dão	13,409	Dão, Lafões	Terras do Dão
Douro	44,180	Douro, Porto	Duriense
Lisboa	19,869	Alenquer, Arruda, Bucelas, Carcavelos, Colares, Encostas d' Aire, Óbidos, Torres Vedras	Lisboa
Península de Setúbal	8,027	Setúbal, Palmela	Península de Setúbal
Tejo	12,847	Tejo	Tejo
Távora-Varosa	2,215	Távora-Varosa	Terras de Cister
Trás-os-Montes	10,701	Trás-os-Montes	Transmontano
Vinhos Verdes	24,371	Vinho Verde	Minho
Total mainland	189,640		
Islands	2,389		
Azores	1,708	Biscoitos, Graciosa, Pico	Açores
Madeira	681	Madeira	Madeirense
Total (1+2)	192,029		
Total of PDO and PGI		30	14

Source: IVV (2021).

Benefiting from this program, the regions of Alentejo (78%), Douro (60%), Lisboa (57%), Peninsula de Setúbal (54%), Minho (52%), and Açores (50%), restructured at least 50% of their viticultural surface area, meaning that a large share of old, low productive and non-mechanized vineyards are replaced by new vineyards, with new grapevine varieties and more productive and mechanized.

In the 2020/2021 harvest, with productivity of 33.42 hl/ha, production totalled 6,418,030 hl (Table II), which is close to the annual recorded over the preceding decade. From this production, 41.1% is still wine PDO, 12.3% fortified wine PDO (93.4% of which is Port wine), 36.8% still wine PGI, 0.4% with the nomination of the year of harvest or the grapevine variety, and 9.4% without certification. That is, in this harvest, almost 90% was declared as a quality wine. The three bigger wine production regions are

Douro (19.7%), Lisboa (19.5%), and Alentejo (18.1%), with Douro's productivity (28.6 hL/ha) being much lower than that of Lisboa (61.1 hL/ha) and Alentejo (45.5 hL/ha).

Regarding trade, Tables III, IV, and V present data on exports, imports, and domestic market, which together with data on production (Table II), provide an overview of the Portuguese wine market. In 2021, Portugal exported about 51% (about 3.3 million hL) of its domestic production (Table III), at an average price of 2.82 €/L. By category of wine, 718 thousand hL of PDO still wine (27.2% of declared production) was exported at an average price of 2.45 €/L, 714 thousand hL of PGI (30.2% of declared production) at an average price of 2.45 €/L, and 1,094 hL of non-certified wine (18.2% of declared production) at an average price of 1.32 €/L.

Table II

Portuguese Demarcated Wine Regions: Production by type of wine (hl), 2020/2021

Regions	Total	PDO still wine	PDO fortified	PGI still wine	Harvest/ Variety	Wine
Alentejo	1,159,067	599,873	304	537,902	85	20,904
Algarve	13,043	323	0	12,146	23	551
Bairrada	174,391	79,553	88	24,522	2,770	67,458
Beira Interior	219,298	97,052	109	64,118	0	58,019
Dão	189,197	170,683	0	3,374	324	14,816
Douro	1,264,349	478,706	736,953	4,424	162	44,105
Lisboa	1,253,303	44,057	467	1,037,097	10,972	160,891
Península de Setúbal	475,135	192,232	15,050	228,548	124	39,181
Tejo	644,153	119,526	710	418,305	2,543	103,070
Távora-Varosa	37,744	18,480	0	1,600	19	17,645
Tras-os-Montes	94,425	16,125	0	5,234	10,612	7,665
Vinhos Verdes	848,311	818,669	0	21,575	403	7,665
Total mainland:	6,372,416	2,635,278	753,679	2,358,844	27,855	596,759
In %	100	41.4	11.8	37.0	0.4	
Islands:	45,514	4,089	35,217	1,829	0	4,471
Azores	8,350	2,945	114	1,810	0	3,482
Madeira	37,264	1,153	35,103	20	0	988
Total:	6,418,030	2,639,375	788,896	2,360,874	27,885	601,230
In %	100	41.1	12.3	36.8	0.4	9.4

Source: IVV (2021).

The high share of non-GI products in exports means that a significant part of exported wine either comes from grapes that have been declared as PDO/PGI at harvest and subsequently declassified at the marketing stage, and/or has been imported for blending purpose to produce wines for local consumption and, potentially, for re-exportation (as in the case of "EU wines"). Of the PDO fortified wines (essentially Port wine), 87.4% are exported, at an average price of 5.15 €/L.

It should be underlined that COVID-19 did not materially influence exports: In 2019, 2.963 million

hL were exported and 3.151 million hL in 2020, with the average price varying from 2.76 €/L to 2.72 €/L. Moreover, comparing 2021 with 2010, exports increased by 25% in volume and around 50% in value, with the average price varying positively by 23%, although still below the EU average (around 5.00 €/L).

In addition, Portugal exports wines to more than 100 countries, although the greatest concentration is in Europe. In 2021 (IVV, 2021), the four main destination countries were France (13% in volume, 12.9% in value, and an average price of 2.73 €/L), the

USA (6.8% in volume, 10.8% in value and 3.58 €/L), the United Kingdom (7.4% in volume, 11.1% in value and an average price of 3.28 €/L), Brazil (8.2% in volume, 7.9% in value with an average price of 2.69 €/L).

In summary, excluding fortified wines, unclassified wine has a high share (42.4%) of the exports of still wines, commanding an average price that scarcely covers the production costs in low-productivity regions such as the Douro (Hogg and Rebelo, 2018)

Table III
Exports in 2021

Type of wine	Volume (hL) and (%)	Value (10 ³ €) and (%)	Price (€/L)
PDO wine	717,959 (21.9)	228,376 (24.7)	3.18
PGI wine	713,574 (21.8)	174,965 (18.9)	2.45
Wine	1,093,906 (33.4)	144,304 (15,6)	1.32
PDO-Porto	655,658 (20,0)	337,619 (36.5)	5.15
PDO-Madeira	25,811 (0.8)	16,608 (1.8)	6.43
Other Fortified	16,678 (0.5)	5,985 (0.6)	3.59
Sparkling wine	18,547 (0,6)	10,482 (1.1)	5.65
Other wines	37,021 (1.0)	7,307 (0.8)	1.97
Total	3,279,134 (100)	925,646 (100)	2.82

Source: IVV estatísticas (<https://www.ivv.gov.pt/np4/estatistica/>)

To fully meet market demand, and to be able to export more domestic production, Portugal imports a significant amount of mainly unclassified wines (Table IV). In 2021, Portugal's imports reached around 2.8 million hL of wine (43.8% of domestic production), of which 2.6 million hL was still wine, corresponding to 46.4% of declared domestic production and 90.7% of total wine imports. Almost 92.3% of the imports are unclassified wine at an average price of 0.41 €/L, well below the 1.32 €/L this category of Portuguese wine earns if exported.

The main countries of origin are Spain, with 95% in volume, 71.1% in value, and an average price of 0.44 €/L, followed by Italy (2.9% in volume, 8.6% in value, and an average price of 1.74 €/L) and France (0.8% in volume, 15% in value and an average price of 10.41 €/L). In 2021, the export-import ratio was 1.16 by volume and 5.57 by value.

Regarding domestic consumption, the information provided by the IVV is not as detailed as that on production, exports, and imports. These data are based on information collected by the consultant Nielsen at different points along the distribution channel over the country and do not cover all market agents, thereby leading to an underestimation of the wine consumed. This situation may explain the wide discrepancy between apparent domestic consumption (production + imports - exports) of around 5.964 million hL and that provided by the IVV (Table V) of 2.486 million hL.

Table V shows that, in Nielsen's data on domestic consumption, wines are aggregated into certified (PDO and PGI) and non-certified and by distribution circuit, the on-trade (bars, restaurants, hotels, and clubs) and off-trade (supermarkets, shops, online suppliers and dedicated beverage retailers). In 2021,

Portugal consumed around 2.5 million hL, of which 1.2 million hL were certified (46%) and 1.3 million hL were non-certified (54%). Around 1.2 million hL of non-certified wine were of domestic origin, despite only 0.61 million hL of production being declared, which means there has been a significant declassification of PDO and PGI wines. Off-trade distribution accounts for 83% of the total and on-trade accounts for 17%. In off-trade, i.e., the so-called hospitality sector, almost half (48%) of the total is sold as certified wine, while in on-trade transactions, the percentage is a little over a third (38%). Average prices paid by consumers in off-trade circuits are lower (2.58 €/L) than in on-trade transactions (6.71 €/L), due mainly to the continued proliferation of small, low-cost cafés and restaurants. Unsurprisingly, the price of certified wine is much higher than non-certified, regardless of the point of sale: 3.92 €/L in off-trade circuits and 10.60 €/L in on-trade transactions (a ratio well under 3:1), while the average price of non-certified wine is 4.31 €/L and 1.34 €/L, respectively, in off-trade circuits and on-trade transactions (a ratio well over 3:1).

In summary, in 2021, the declared harvest was 5,747 thousand hL of certified wine and 671 thousand hL of non-certified wine, while imports were 178 thousand hL and 2,647 thousand hL, respectively, giving a total of 5,925 thousand hL of certified wine and 3,318 thousand hL of non-certified wine, i.e., a supply totaling 9,243 thousand hL. On the demand side, exports were 2,163 thousand hL of certified wine and 1,116 thousand hL of non-certified wine, a total of 3,217 thousand hL, while data on domestic consumption collected by Nielsen was 1,154 thousand hL and 1,332 thousand hL of certified and non-certified, respectively, a total of 2,486 thousand

hL, which was much lower than the figures for apparent domestic consumption (5,964 thousand hL).

Taking Nielsen’s published data on domestic consumption and comparing supply with demand, it can be seen that only 58% of the wine declared as certified in the vinification phase is sold as such, indicating that there was a significant loss of value due to the decision not to realize the earnings inherent in the collective reputation the PDO and PGI designations.

Therefore, the average low sales price of domestic wines reflects a business model based on the transfer of surpluses from the producers (grape growers and wineries) to the consumer (Rico, 2021). Moreover, if the value of apparent domestic consumption is considered, a double effect is observed: first, a substantial part of the demand is filled with low-priced wine imports, with profits being absorbed by traders; second, except for wines recognized as

distinctive by consumers, the high demand elasticity of substitution between wines leads to a reduction in the slope of the demand curve and the establishment of a long term equilibrium with higher quantity and lower price, reducing the normal profit of grape-growers and wineries.

Illustrative of this downward pressure on prices is the fact that PDO wines usually retail at around 3.00 €/bottle, which suggests that wineries’ marketing strategy is to popularize wines with a GI and to deploy terms traditionally associated with high-quality wine (such as “reserve”), making it difficult to pursue the differentiation and premiumization of PDOs (Rico, 2021). This conduct promotes convergence between PDO and PGI wines, causing both to be undervalued by the market because, before purchase, consumers find themselves unable to distinguish between them.

Table IV
Imports in 2021

Type of wine	Volume (hL) and (%)	Value (10 ³ €) and (%)	Price (€/L)
PDO wine	43.208 (1,5)	16,216 (9.8)	3.75
PGI wine	73.633 (2.6)	3,599 (2.2)	0.49
Wine	2,446,704 (86.6)	101,333 (61.0)	0.41
Other fortified	14,140 (0.7)	3,484 (2.1)	1,72
Sparkling wine	47,728 (1,7)	24,391 (14.7)	5.11
Other wines	193,845 (6.9)	17,194 (10,3)	0.89
Total	2,825,352 (100)	166,215 (100)	0.59

Source: IVV statistics (<https://www.ivv.gov.pt/np4/estatistica/>).

Table V
Domestic consumption in 2021

Type of wine	Volume (hL) and (%)	Value (10 ³ €) and (%)	Price (€/L)
On trade	417,988 (16.81)	280,554 (34.46)	6.71
Certified	159,692 (38.20)	169,258 (60.33)	10.60
Non-certified	258,296 (61.80)	111,296 (61.80)	4.31
Off-trade	2,068,437 (83.19)	533,701 (65.54)	2.58
Certified	994,516 (48.08)	390,056 (73.09)	3.92
Non-certified	1,073,921 (51.92)	143,645 (26.91)	1.34
Total certified	1,154,208 (46.42)	559,314 (68.69)	4.85
Total non-certified	1,332,216 (53.58)	254,914 (31.31)	1.91
Imported	93,179 (6.99)	10,677 (4.19)	1.15
Domestic	1,239,039 (93.01)	244,237 (95.80)	1.97
Total	2,486,426 (100,00)	814,228 (100,00)	3.27

Source: IVV estatísticas (<https://www.ivv.gov.pt/np4/estatistica/>).

Governance

From the standpoint of economic theory, public intervention or regulation arises to mitigate market failures or social inefficiencies as a consequence of

market power (monopoly or monopsony), information asymmetry (adverse selection and moral hazard), positive or negative externalities, and the existence of public goods. In the wine industry, the

EU assumes that these inefficiencies exist, *albeit* to different degrees, emphasizing that the historical, cultural, social, environmental, as well as economic importance of wine should be valued, particularly in southern European countries.

To mitigate market failure, especially concerning externalities and information asymmetries, the EU has applied to the wine industry perhaps the most extensive and complex regulatory framework, aimed at establishing a balance between supply and demand for wine with prices that respond to consumers' willingness to pay and simultaneously provides a fair distribution of value along the wine supply chain.

The legal framework for EU intervention of this sort can be found in the Common Market Organization (CMO) for agricultural products, in particular, Regulation (EU) 2021/2117 of the European Parliament and Council of 2 December 2021, which amended Regulations (EU) No. 1308/2013 and (EU) 2019/34 of 17 October 2018, describing the rules for the application of Regulation (EU) No. 1308/2013 of the European Parliament and Council regarding applications for the protection of designations of origin, geographical indications and traditional terms, objection procedures, cancellation of protection, amendments to product specifications, the register of protected names, and the use of symbols. Moreover, Regulation (EU) No. 1306/2013 of the European Parliament and Council requires an appropriate system of accounting to be in operation. This set of regulations should be adopted by member countries and integrated into a governance model that takes country-level specificities into account.

Portugal applies the EU's wine rules through a governance model in which the top organization is the *Instituto da Vinha e do Vinho* (IVV) and the operating units are the regional viticulture commissions (CVR) of each demarcated region.

The IVV is a public institution within the State's indirect administration, endowed with administrative and financial autonomy and its own assets. Its public nature requires it to be managed according to the national rules of public funding. The board of directors (president and vice-president) is appointed by the Government and is advised by a consultative council including representatives of production and trade associations. The board's mission is to (a) coordinate and control the institutional organization of the wine sector; (b) monitor EU policy and draw up the rules for its application; (c) coordinate and supervise the promotion of wine products; (d) audit the quality certification system; (e) ensure the operation of the National Commission (CN) of the International Organisation of Vine and Wine (OIV).

Each of the fourteen demarcated regions is governed by its CVR, two of which are of a hybrid public nature, i.e., they are a mix of public interprofessional institutions. The *Instituto de Vinhos do Douro e*

Porto (IVDP) regulates wines from the Douro region and the *Instituto do Vinho, do Bordado, Artesanato e Bebidas Espirituosas da Madeira* (IVBAM) regulates both Madeira wines and artisanal crafts. The remaining twelve are associations governed by private bylaws to represent the interests of production and trade.

The hybrid nature of two of the CVRs means that, as management bodies, the interprofessional public institutes have a board of directors (president and vice-president) nominated by the government, an interprofessional council nominated by production and trade associations, and an optional body, the consultative council, which participates in strategic decision-making. The rules of public resource management are applied in these institutes, including the responsibility to conduct annual fiscal audits. In all the other CVRs, the governance model is based on private associations that represent the interests of production and trade, and are responsible for appointing the members of the CVR general council, the members' main deliberative body, which in turn elects the board of directors and the tax auditor.

EU rules assume a separation between the management of the PDO and PGI and the control/certification of the wines, this last function is assured by a set of specifications previously approved by the national regulatory body, the IVV. The regulatory framework also allows GI management entities to combine both functions, as long as impartiality and internal segregation of functions are guaranteed. If they do not opt for this model they may outsource the certification, through a consortium with other CVRs or contract an external service provider. In Portugal, all CVRs have established their certification systems, previously approved by the IVV through compliance with the minimum levels of requirements common to all PDOs and PGIs.

In addition to the role of the professional and interprofessional associations, cooperation from VINIPORTUGAL deserves mention; it is a private interprofessional organization of national scope, responsible for the overseas promotion of Portuguese wines, under the aegis of *Wines of Portugal*, the collective brand it created in 2010.

The funding of the governance model is based on fees, paid by the economic agents in return for services provided. Specifically, the following fees and taxes are charged (IVV, 2021):

(i) *Coordination and control fee*. This is the IVV's income for performing functions related to the general coordination and control of the wine supply chain. It is levied on wines and wine products produced in the national territory, including those shipped and exported, and on wine produced in other countries and commercialized in Portugal.

(ii) *Promotion fee*. This component of the IVV's income is used to finance support for the promotion of Portuguese wine. It is charged on wines, sparkling wines, wine-based spirits, and wine vinegar produced in Portugal, including those shipped or exported. (iii) *Certification fee*. This income derives from payments made for the certification of the quality and provenance of wines and wine products produced in the national territory and is employed in the defense and promotion of the respective denomination of origin and/or GI. It is charged on wines with PDO and PGI certification, as well as on wines apt to be certified in this way.

(iii) *Certification fee*. This income derives from payments made for the certification of the quality and provenance of wines and wine products produced in the national territory and is employed in the defense and promotion of the respective denomination of origin and/or GI. It is charged on wines with PDO and PGI certification, as well as on wines apt to be certified in this way.

(iv) *Verification fee*. This is charged on spirits prepared from distilled wine products without the right to a designation of origin or geographical indication and is paid to the Food and Economic Safety Authority (ASAE).

Given the delegation of certain IVV functions to the CVRs, 20% of the annual amount of *the coordination and control and promotion fees* that each CVR collects is returned to them in line with the specific and individualized costs they incur, calculated according to their scale of operations and the resultant costs of collection, settlement, and transfer of the fees they receive. From January 2023, an additional 10% of the total annual revenue from the coordination and control fee payable to the IVV is transferred and divided equally among all the CVRs, which is intended to compensate for the minimum fixed cost necessary to perform the service of collection, settlement, and transfer of these fees.

For Rico (2021), the annual fees payable by the wineries constitute an obstacle to the strengthening of self-regulation in the sector, which is hampered in its capacity for investment and initiative by successive retentions of its revenues and their diversion from the sector to purposes not provided for in the law. In other words, there seems to be no correspondence between the value of the fees paid by the wineries and the services they receive, which imposes higher transaction costs on them and consequently promotes inefficiencies in resource allocation.

Additionally, while detailed information on production, exports, and trade exist, the information on domestic consumption is limited. Around 50% of national consumption remains 'off the radar' and information is virtually inexistent on the first link of the supply chain, namely production costs and prices of grapes, wine processing, wine bottling, and

packaging, as well as the environmental costs involved (Rico, 2021). This situation promotes the dangers of adverse selection and moral hazard with their attendant negative economic and social consequences.

CONCLUSIONS

The wine market is characterized by a monopolistic competitive market structure, where the demand displays a high degree of horizontal and vertical differentiation, and the supply side is fulfilled by a heterogeneous economic structure of grape growers and wineries. Simultaneously, especially in Southern European countries, viticulture provides spill-over effects resulting from its historical, patrimonial, cultural, social, and economic attributes.

In order to promote the correction of market failures essentially related to information asymmetries and externalities and to boost the competitiveness and economic and social sustainability of the industry, the EU adopted a complex regulatory system, mainly focused on the valorization of GI (PDO and PGI) and financial support to competitiveness, through the modernization of vineyards and wineries, as well as through promotion in third country markets. The aim of valorizing GIs is to reduce information asymmetries and to promote the collective reputation of wine and thus increase consumers' willingness to pay, thus improving the economic surpluses transferred to producers.

Based on production and international trade indicators, there seems to be no doubt that the public policies adopted by the EU have contributed positively to the competitiveness and economic and social sustainability of the wine industry in the main producing countries, including Portugal. Despite the positive results, doubts remain over the effectiveness of EU regulation in achieving higher value and, above all, on equity in value distribution. From an overview of Portuguese production, trade, domestic consumption, and governance, it can be concluded that market failures seem to emerge mainly as a result of information asymmetries and excessive transaction costs.

Portugal is organized into 14 demarcated regions of widely differing dimensions, with 30 recognized PDOs and 14 PGIs, all of which produce white, red, rosé, and sparkling wines, and some of which also have fortified wines and vinegar. Given this diversity, it is difficult for the less well-informed consumer, especially the overseas consumer, to link a specific wine to its *terroir*, gain a general sense of a given GI's reputation, and thereby be encouraged to increase their willingness to pay.

Portugal is very open to the foreign wine trade. In 2021, the relation between the country's exports and imports of total wines was 51% and 44% of national production, respectively. The data also shows that Portugal constitutes a significant source of low-

priced wines for both domestic and foreign consumers. However, most wines lack reputation and therefore have little potential to transfer value to upstream economic agents, and almost no possibility of increasing consumers' willingness to pay. If wineries adopt marketing strategies that focus on popularizing GI wines, the distinction between PDO and PGI wines is undermined, with both products being squeezed into the same wine category, thereby causing better wines to be undervalued. The fact that import and export volumes are relatively similar raises the question of how to sustainably increase the wine industry's value-added; will growth come from valorizing Portuguese grapes and wine, by increasing imports of cheap wine, and/or through efficiency gains and economies of scale in cultivation, vinification, and commercialization? The regulatory framework has an important role in answering these questions.

Furthermore, though there is detailed information on production, exports, and trade, limited information exists on domestic consumption, leaving the details of more than 50% of national consumption unknown. Worse still, these first links in the supply chain remain a statistical *terra incognita* concerning production costs and the payments received by producers (e.g., the prices paid to small farmers for grapes, and to private and cooperative wineries for bulk, bottled or boxed wine for the national market).

The governance model adopted in Portugal is consistent with EU rules. However, given the small dimension of some wine regions, they do not benefit from scale economies and therefore are obliged to bear higher transaction costs. Moreover, it seems that the fees charged to wineries are high concerning the standard of service received, which contradicts the ostensible purpose of a public tax and acts as a brake on the industry's development.

This paper provides only an overview of market failures in the Portuguese wine sector. For better decision-making by industry stakeholders, key issues need to be researched regarding the regulatory framework, such as: the economic impact of environmental sustainability; the effect of payments for environmental services by grape growers; the economic and competitiveness consequences of public support to the industry; the perception by companies and consumers of the economic impact of GI status; how those producing and selling GI wines might address the behavior of younger consumers, be they "millennials" or generation Z, who together make up the majority of the world's population; and the future market perspectives of newly-emerged styles of wine, such as organic, biodynamic, low or zero alcohol. While recognizing that other disciplines and subdisciplines, such as microeconomics, consumer behavior, artificial intelligence, data science, and international trade, will undoubtedly make their contribution to finding answers to these

questions, it is meaningful that the foundational analysis of many of them can be undertaken using the existing tools provided by the economics of industrial organization.

ACKNOWLEDGMENTS

This study was financed by the "VINCI - Wine, Innovation and International Competitiveness" project (SOE3/P2/F0917), co-financed by the European Regional Development Fund (ERDF) through the Interreg Sudoe Programme and FCT – Portuguese Foundation for Science and Technology, project UIDB/04011/2020.

CONFLICTS OF INTEREST: The authors declare no conflict of interest.

REFERENCES

- Akerlof G.A., 1970. Quality Uncertainty and the Market Mechanism. *Q. J. Econ.*, **84**, 488-500.
- Alston A., Gaeta D., 2021. Reflections on the Political Economy of European Wine Appellations. *Ital. Econ. J.*, **7**, 219-258.
- Da Silva A.L., Maria João F.P., Bianchi-de-Aguiar F., 2018. Portuguese vines and wines: heritage, quality, symbol, tourism asset. *Ciência Téc. Vitiv.*, **33**, 31-46.
- European Commission-EC, 2014. Study on the Competitiveness of European wines. Written by COGEA https://ec.europa.eu/agriculture/sites/agriculture/files/external-studies/2014/eu-ines/exec-sum_en.pdf, accessed on 08-03-2023.
- Gonçalves T., Rebelo J., Lourenço-Gomes L., Caldas J., 2021. Wine price determinants. Is there a homogeneous international standard? *Wine Econ. Policy*, **10**, 33-55.
- Gouvêa B., 2021. O setor vitivinícola nacional e a estratégia de aplicação dos instrumentos de política europeus. *CULTIVAR - Cadernos de Análise e Prospetiva*, **24**, 47-52.
- Hart O.D., 1985. Monopolistic competition in the Spirit of Chamberlain: A General Model. *Rev. Econ. Stud.*, **LII**, 529-546.
- Hogg T., Rebelo J., 2018. Rumo Estratégico para os Vinhos do Douro e Porto. Universidade de Trás-os-Montes e Alto Douro (UTAD), Vila Real
- Instituto da Vinha e do Vinho – IVV, 2021. Vinhos e aguardentes de Portugal, Anuário 2020/2021. <https://www.ivv.gov.pt/np4/Anu%C3%A1rio>, accessed on 06-04-2023
- Instituto da Vinha e do Vinho – IVV. Estatísticas, (<https://www.ivv.gov.pt/np4/estatistica>, accessed on 06-04-2023.
- Mas-Colell A., Whinston M.D., Green J.F., 1995. *Microeconomic Theory*, Oxford University Press, Inc.
- Onofre J., 2021. O setor vitivinícola europeu e os desafios da sustentabilidade. *CULTIVAR Cadernos de Análise e Prospetiva*, **24**, 15-22.
- Rico T., 2021. As falhas de mercado na fileira do vinho. *CULTIVAR - Cadernos de Análise e Prospetiva*, **24**, 23-30.

Stiglitz J.E., 2008. Imperfect information in the product market, *In: Handbook of Industrial Organization, Chapter 13*. 769-847.

Ugaglia A.A., Cardebat J.M., Corsi A., 2019. The Palgrave Handbook of Wine Industry Economics. Palgrave, eBook (<https://doi.org/10.1007/978-3-319-98633-3>)

Varian H.R., 2014. Intermediate Microeconomics, WW Norton & Co.

Williamson O., 1989. Transaction cost economics. *In: Handbook of Industrial Organization*, Schmalensee R. & Willig R. (Eds.), 135-182.

Williamson O., 1991. Comparative economic organization: the analysis of discrete structural alternatives. *Adm. Sci. Q.*, **36**, 269-296.