

## **The Determinants of Wine Prices: A Systematic Literature Review**

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### **Abstract**

Wine is a highly differentiated product sold at a wide range of different prices. This article aims to provide a systematic review of the literature written on the determinants of wine prices globally. The article runs a search on the combination of keywords “wine”, “price”, “determinant” in the Web of Science, Scopus, JSTOR, ProQuest, and Science Direct databases. Based on a final set of 46 articles written between 1998 and 2018, results suggest that terroir and quality ratings are the most significant determinants of wine prices, while objective quality and label data also determines wine prices, though to a different extent and with a different sign in some cases. The hedonic pricing method was the most common way of analyzing the relationship between wines prices and their determinants, and results are similar for most regions and varieties. We believe that our results can be useful for researchers, stakeholders, and even for decision-makers in better understanding the factors lying behind wine prices.

**Keywords: determinants, wine, price, review**

**Journal of Economic Literature (JEL) codes: D12, D40 Q11**

### **1. Introduction**

Analyzing the determinants of prices has a long tradition in economics. Besides basic microeconomic logic suggesting that prices are determined by supply and demand, economists are more interested in concrete factors affecting prices. This is especially true in the wine market as wine is a highly differentiated product sold at an extensive price range. There has been a vast amount of literature analyzing the different determinants of wine prices, though a systematic review of the evidence, at least to our knowledge, is missing from the literature. Therefore, this article aims to systematically analyze the literature written on the determinants of wine prices globally.

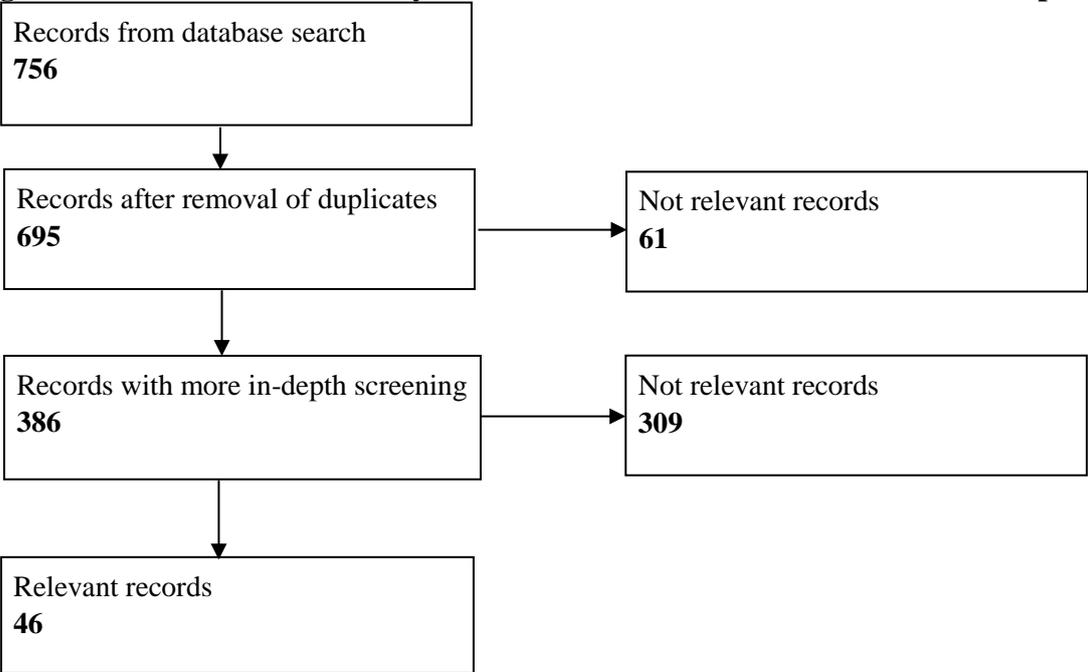
The paper is structured as follows: The second chapter demonstrates how our sample was created together with some basic descriptive statistics, while the third chapter shows our results by different categories. The last chapter concludes.

### **2. Methodology**

In order to get a comprehensive overview of the empirical findings on wine price determinants, a broad online search was conducted using the following databases: Web of Science, Scopus, JSTOR, ProQuest, and Science Direct. The combination of keywords “wine”, “price”, “determinant” were used – these search items had to appear in the title, abstract, or keywords of the sources.

The initial search resulted in 756 findings, and after removing duplicates, 695 entries remained. In order to ensure that only relevant articles are included in the final analysis, Covidence online software was used. The whole screening process is illustrated in Figure 1. All articles were screened independently by each author, and possible conflicts were then discussed personally. In the end, 46 articles remained.

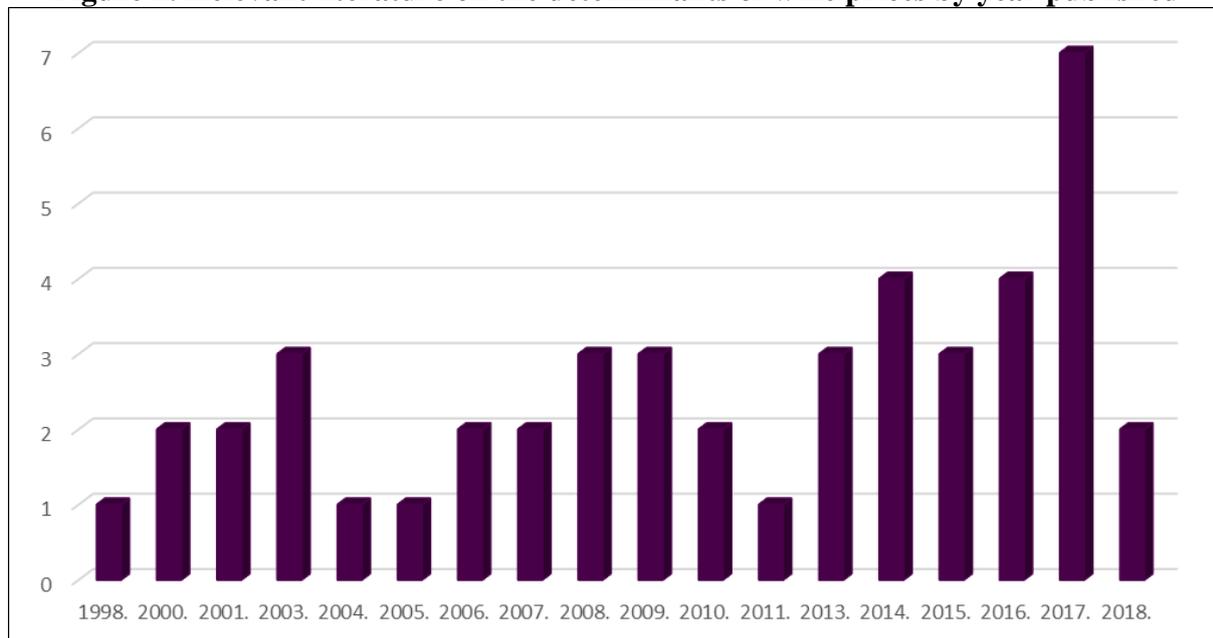
**Figure 1: Process used to identify studies written on the determinants of wine prices**



Source: Own composition

Literature written on the determinants of wine prices is relatively new, as evident from Figure 2. Every second article was written after 2011, and most studies in 2017. It also seems evident that the importance of the topic in the sample was relatively stable in the previous 20 years.

**Figure 2: Relevant literature on the determinants of wine prices by year published**

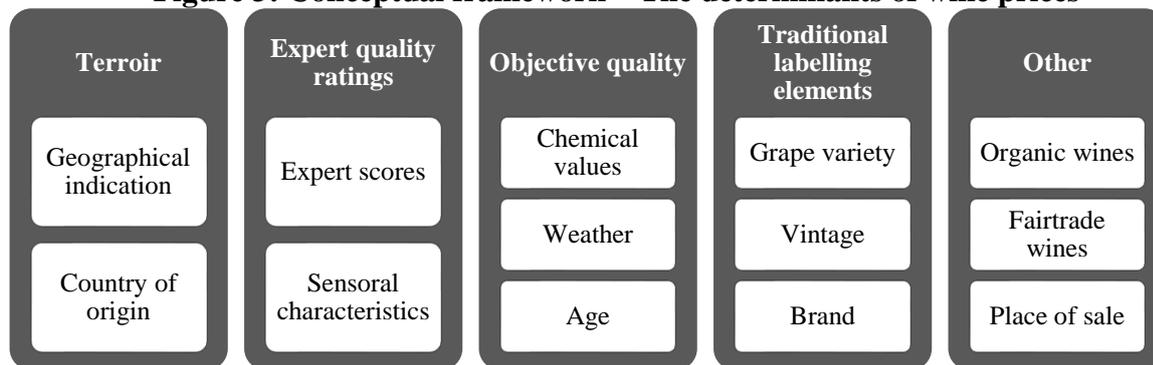


Source: Own composition

These articles were published in 31 different journals between 1998 and 2018 (the average is 1.5 articles/journal). Three journals had more than two articles in the sample: Journal of Wine Economics (five articles), International Journal of Wine Business Research (four articles), and Applied Economics (four articles).

Articles can be classified into five main categories (origin, expert quality ratings, objective quality, label data, and others), giving the conceptual framework of our review (Figure 3).

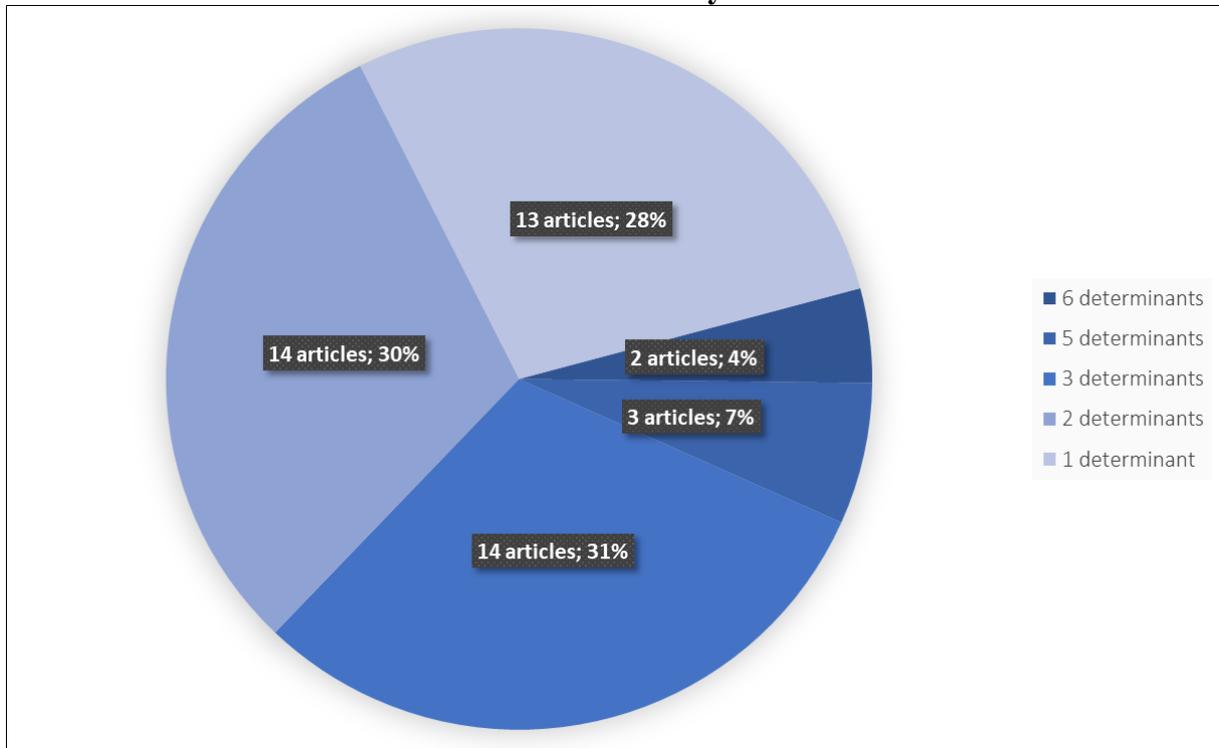
**Figure 3: Conceptual framework – The determinants of wine prices**



Source: Own composition

However, one article does not necessarily correspond to a single topic, as evident from Figure 4. An article generally deals with 2.4 of the above topics, while 17 articles analyzed at least three determinants of wine prices. The ‘hottest’ topics were the origin and expert ratings.

**Figure 4: Literature written on the determinants of wine prices by the number of determinants analyzed**



Source: Own composition

### 3. Review of the literature

#### 3.1. Origin (geographical indications and country of origin)

The place of production has always been an essential factor in the wine market, and accordingly, the practice of designating geographical names on wine labels has a long tradition. More than three-fifths of the literature (28 articles) touched on this topic and somehow confirmed the existence of this relationship. The place of production appears primarily on the label as a geographical indication (such as a wine region), but the country of origin is also listed here.

Ali and Nauges (2007) analyzed Bordeaux *en primeur* wine pricing on a sample of 1153 wines of 132 producers and showed that pricing behavior of producers depends in no small extent on their collective reputation associated with their wine regions, and much less on short-term changes in quality (expert ratings). Angulo et al. (2000) ended up in similar conclusions by analyzing 200 Spanish red wines - they concluded that wine regions were one of the most critical determinants of wine prices. Blair et al. (2017) also reached similar conclusions when analyzing 393 Bordeaux wines, while Di Vita et al. (2015) also ended up in the same when analyzing wine sales in Sicily. The argument above was also underpinned by Ling and Lockshin (2003) for Australian wines, Noev (2005) for Bulgarian wines, and Roma et al. (2013) for Sicilian wines. Moreover, the role of geographical indications was especially strong in price determination in the case of *grand cru* wines, as suggested by Carew and Florkowski (2010) as well as Combris et al. (2000). Pucci et al. (2017), however, found that the role of geographical indications in price determination was rather country-specific.

Arancibia et al. (2015) investigated the determinants of wine prices in Argentina on a sample consisting of more than 1000 wines and showed significant differences in the prices of wines coming from different regions. Ashton (2016) went further when analyzing 1750 different wines and concluded that terroir/geographical indications played a different role, even in the same wine regions. This argument was also underpinned by San Martin et al. (2008), who analyzed market possibilities for Argentine wines in the USA and concluded that vineyard names written on the label had a significant and positive effect on price. Schamel and Anderson (2003) also showed a continuously increasing positive relationship between regional reputation and price, though this relationship was more robust in Australia than in New Zealand.

Benfratello et al. (2009) compared Barolo and Barbaresco wine prices for a sample of 603 wines and showed a 6.8% difference among them. Cardebat and Figuet (2004; 2009) analyzed geographical indications and 254 (140) wines and concluded that regional reputation was a significant determinant of price. Levaggi and Brentari (2014) added that geographic indication written on wine labels was more critical in supermarkets than in specialized wine shops – its primary function was the selection and not making the final decision.

Landon and Smith (1998) analyzed the collective reputation of Bordeaux red wines and found that the reputation of seven out of eleven wine regions had a significant positive effect on the price, which can even reach \$14 per bottle. Shane et al. (2018) estimated this price difference to be £6-7 for UK consumers. Similarly, Thrane (2009) was talking about a 30% difference for French and German wines, while Troncoso and Aguirre (2006) calculated a 20% price difference for Chilean wines sold in the USA. This, according to Landon and Smith (1998), strengthens the snob-effect where consumers prefer a bottle of wine to another based on regional origin and reputation and not on the quality difference.

### 3.2. Expert ratings

The informative power of expert ratings is based on the assumption that some experienced, recognized, qualified wine experts can accurately assess the quality of the wines (either the character or the quality level). The reputation of the expert who carries out the qualification plays a significant role in the credibility of the expert sensory ratings (Masset et al. 2016).

Ali et al. (2008) analyzed 300 Bordeaux *en primeur* wines and found that an extra Parker score meant €2.8 more per bottle, though this effect is non-existent for low-scored wines. Angulo et al. (2000) also found a positive relationship between quality ratings and price for Spanish red wines and concluded that the odds for a wine to present a medium or a high price (instead of a low one) increased by 1.52 and 2.44 times, respectively, with a one-point increase in the quality rating. Schamel and Anderson (2003) found that a single score increase would sell a single bottle of Australian and New Zealand wine A\$1 per bottle more.

Arias-Bolzmann et al. (2003) also supported the idea above – by analyzing Wine Spectator's lists, they found a single point increase to result in a 5.2% price growth. Benfratello et al. (2009) found 8-11% growth in prices for Italian wines, San Martin et al. (2008) calculated a 4.5% increase for Argentinean wines, Combris et al. (2000) concluded 2.4% for Burgundy wines, Kwong et al. (2017) found 4% for Canadian dry red wines, Troncoso and Aguirre (2006) showed 3.5% for Chilean wines, while Haeger and Storchmann (2006) calculated with 4.2-7.6% for Californian and Oregon wines. Price effects were lower for Cardebat and Figuet (2004;

2009) – they found a 0.29-0.44% price increase for a single score change in the sales of Bordeaux wines. Noev (2005) also found a modest price increase (0.8%) for Bulgarian wines.

Ferro and Amato (2018) analyzed the TOP100 list of Wine Spectator for 14 years and found that a 1% increase in expert quality ratings resulted in a 14.1% wine price increase. However, Ashton (2016) analyzed Bordeaux *en primeur* wine sales and found Robert Parker's points had significantly higher effects on wine prices than those of Jancis Robinson, though the two ratings together had the most significant effect. As another aspect, Jones and Storchmann (2001) highlighted that grape varieties also played a role in determining the magnitude of the effects above – subjective ratings were more significant and higher for Cabernet Sauvignon dominated wines than for Merlot dominated ones. Moreover, Ling and Lockshin (2003) found higher price increases (+14.5%) for wines coming from warmer climate regions than on average (+12.5%).

Roma et al. (2013) also found a significantly positive relationship between quality ratings and wine prices, though provided a piece of novel evidence that wines with a spicy aroma are associated with a higher price. Levaggi and Brentari (2014) also showed that most sensorial characteristics had a significantly positive effect on wine prices – their only exception was violet-colored (young) wines, implying a negative relationship.

### 3.3. Objective quality

Objective (inner) quality characteristics have been classified into this group - these characteristics cannot be recognized without consumption (tasting). These factors, unlike the organoleptic qualities, can be easily quantified. In the course of examining the literature, three such factors were identified: chemical composition, the weather of the harvest year, and the age of wines.

In terms of chemical composition, Arancibia et al. (2015) analyzed Argentinean wines and showed that a 1% increase in alcohol content was associated with a 10.3% increase in price (however, when repeating the model runs for high and low-quality wines, 6.8% and 5.2% changes were found, respectively). Roma et al. (2013) reached similar conclusions and found that 1% of alcohol content growth meant a 7-10% price increase for Sicilian wines. On the contrary, Angulo et al. (2000) did not find any relationship between alcohol content and the prices of Spanish wines. Levaggi and Brentari (2014) went further and analyzed various chemical characteristics (alcohol, sugar, acidity, and sulfite contents) of Italian red wines and found significant positive relationships between these characteristics and prices. Thrane (2009), for instance, also found alcohol (sugar) content to increase wine price by 11.3-30% (0.1-4.8%) for French and German wines.

Weather also has significant impacts on wine prices, according to the literature. Ashenfelter (2008) analyzed Bordeaux wine characteristics and prices and found that precipitation levels before the growing season and during harvest had significant impacts on wine prices. These effects, however, are ambiguous as expected – a millimeter growth in rainfall during harvest season decrease prices by 0.4%, while before the growing season, it increases prices by 0.12%. Jones and Storchmann (2001) found that as dry and warm summers made Bordeaux wines richer in sugar content (and higher in quality) and thereby increased their prices. However, they also found Merlot dominated (Right Bank) wines to be more sensitive to weather than Cabernet Sauvignon dominated ones, causing prices of the former to be more volatile. Haeger and Storchmann (2006) found that for Pinot Noir grown in the USA, temperature and precipitation were the main weather-related drivers of prices. Moreover, Chevet et al. (2011) found that

weather has started to play an increasingly important role in the determination of wine prices in line with the growth of the importance of wine quality.

Wine age also has significant effects on wine price, according to the majority of the associated literature. Arias-Bolzmann et al. (2003), for instance, analyzed 420 wines from seven countries and showed that a single year of age means 7% of price increases on average. Ashenfelter (2008) found the same for Bordeaux wines (+3.5%), Ling and Lockshin (2003) for Australian wines (+8-14% for wines older than eight years) and Troncoso and Aguirre for Chilean wines sold in the USA (+5.6%). Shane et al. (2018) for Australian wines sold in the UK (0.8%). When analyzing Oporto wines, Viana and Rodriguez (2007) even found 100-200% price increases for wines above 30-40 years of age. Jones and Storchmann (2001) showed that two reasons exist behind this relationship – taste becomes richer by age, and older wines are scarcer. Moreover, the costs for storing older wines are higher, which is also included in the price. The authors also found that considering prices, Merlot dominated wines are more worth to be matured than Cabernet Sauvignon dominated wines.

### *3.4. Traditional labeling elements*

The fourth group analyzed by the literature as possible determinants of wine prices were information traditionally written on wine labels.

First of all, grape varietal plays a role in this regard. Kwong et al. (2017), for instance, showed that prices for Syrah, Cabernet Franc, Cabernet Sauvignon, Merlot, Pinot Noir, and Baco wines were significantly higher than any other types in Canada. Ling and Lockshin (2003) supported this view and suggested that Shiraz and Cabernet wines sell better than Chardonnay-based wines. Similarly, San Martin et al. (2008) found that Tempranillo and Chardonnay wines, coming from Argentina, are sold at higher prices. As another aspect, Ferro and Amato (2018) analyzed TOP 100 wines from the Wine Spectator list in the US market and showed that white wine prices were 10-16% higher than red wine prices. Similar conclusions were reached by Noev (2005) when analyzing the relationship between Bulgarian grape varieties and prices.

Second, vintage information also seems to play a role. Ashton's (2016) study, for instance, found that the influence of the vintage on wine price was typically positive for Left Bank wines and ambiguous for Right Bank ones. Benfratello et al. (2009) also showed that a vintage wine of a high reputation was significantly associated with higher prices. On the other side of the coin, when analyzing the market position of Burgundy wines in Canada, Carew and Florkowski (2010) suggested that a lousy vintage resulted in significantly lower prices. Kwong et al. (2017) were also in search of the relationship between wine prices and vintage, and by analyzing Canadian red wines, they showed that prices for 2001 and 2005 vintages were 8-10% higher than for other vintages analyzed. Thrane (2009) also showed that 2004 vintages had a 0.1-11.2% price premium.

Third, winery reputation (brand) also seems to play an important role in wine prices, according to the literature. Blair et al. (2017) and Oczkowski (2001; 2016) suggested that wines of similar quality (Parker scores) even had significantly different prices, which were due to differences in reputation. Frick and Simmons (2013) measured winery reputation in different ways and also showed that a high reputation was related to higher prices. The works of Masset et al. (2016) analyzing Bordeaux wines sold in Hong Kong, of Haeger and Storchmann (2006) assessing pinot noir prices in the USA, of Roma et al. (2013) investigating Sicilian wine prices and of Shane et al. (2018) related to Australian wine prices also led to similar conclusions.

Landon and Smith (1998) showed by analyzing the reputation of Bordeaux red wines that at a 95% confidence interval, the reputation of six out of seven companies had significantly positive effects on wine prices and this effect could even account for \$20 price premium for a single bottle of wine. Moreover, the authors argue that increasing reputation leads to far higher prices than price growth coming from Parker scores. Viana and Rodrigues (2007) suggested that reputation can even lead to a 22% price increase for Oporto wines. Schamel (2014) went further and suggested that wine prices sold by cooperatives (collective brands) in South-Tyrol were higher than of those wines sold by individual wineries.

### *3.5. Other factors*

There also exist some other factors potentially determining wine prices not listed above. Organic production, for instance, plays a role, according to Hoang et al. (2016). By analyzing price premiums of Japanese wines using hedonic price models, the authors found that Japanese consumers paid 9-43% more for imported and 1-6% for local wines than traditional ones. Kwong et al. (2017) also suggested that prices of Canadian organic red dry wines were 11-13% higher on average. Abraben et al. (2017) reached a similar conclusion when analyzing the price premium of Tuscan wines sold in Italian and US markets.

Jiao (2017) analyzed several different macroeconomic variables between 1996 and 2015, which affected wine prices. Results suggested that the demand growth of developing countries and the depreciation of the US dollar significantly increased the prices of high-quality Bordeaux wines. On the other hand, slowing economic growth in the developing countries and the depreciation of national currencies had detrimental impacts on the French luxury wine market. Overall, Jiao (2017) proved the significantly strong relationship between wine prices and economic cycles.

As to other determinants, Ling and Lockshin (2003) analyzed winery sizes as potential determinants of wine prices and suggested that prices of small and medium wineries were generally higher than that of large wineries. Moreover, Masset et al. (2016) showed that prices of French wines sold in Hong Kong auctions tended to be higher than sold elsewhere, while Michis and Markidou (2013) suggested that market concentration also had a role increasing price.

## **4. Critical analysis of the literature**

Following our summary of the factors impacting wine prices, it is worth providing a critical analysis of the literature regarding both the results and the methodology.

### *4.1 Methodology*

Approximately 70% of the papers described above applies the method of the hedonic price index, which explains product prices by their intrinsic values (Rosen, 1974). That means that goods are considered a set of their characteristics, so these models consider the observed price differences a difference in the corresponding sets of characteristics.

Unwin (1999) provides a severe critique of the papers using hedonic price indices to analyze the market in wines. The central claim is that Rosen's (1974) assumption of perfect competition does not apply for wine markets; furthermore, the explanatory variables are not independent, and the consumers' knowledge on wine quality is not explored enough scientifically to draw

valid conclusions from a regression analysis on the relation of price and quality. Unwin heavily criticizes the choice of the right-hand side variables as the researchers applying hedonic price indices rely primarily on existing and available data instead of seeking the optimal solution according to his claim. Unreal levels of significance serve as a further problem as explanatory variables are not independent of each other. This stands for the variables describing expert ratings in particular, where inaccuracy and subjectivity arise additionally. Thus, variables related to expert ratings strongly depend on the characteristics of the experts issuing them (previous formation, experience, etc.).

Nevertheless, from a demand-side point of view, the relevance of the most common variables included in hedonic price analysis is uncertain as consumers do not know them. Furthermore, Unwin considers the goal of these analyses uncertain as scientific theory on consumer appreciation of wine quality is insufficient. He suggests hedonic price indices take the information available on the label (origin, varietal, producer, vintage year, the actual content in alcohol) into account as they are available in the moment of purchase. Instead of further detailing hedonic price indices, Unwin suggests putting more emphasis on assessing consumer attitudes using qualitative methods.

In response to the above criticisms, Thrane (2004) gives theoretical and practical guidance for the proper design and execution of hedonic price analyses. He argues that the users of this methodology start from existing data for pragmatic reasons (the ideal variable structure would require a much larger number of elements than usual). In his view, some of Unwin's criticisms stem from the choice of inappropriate econometric methodology.

Thrane acknowledges that hedonic price analyses are not undistorted if Rosen's condition for perfect competition is not met (since consumer preferences also influence the price), but he sees this problem as meaningless if the results are appropriately interpreted. Hedonic price analyses are not intended to measure consumer behavior but are essentially supply-oriented; that is, they examine the relationship between specific characteristics of the supply side and prices. In his view, the criticisms of the econometric solutions used by the researchers cited by Unwin are valid. However, instead of completely abandoning hedonic price analysis as a wine economics methodology, he suggests the right (supply-side) interpretation of the results and the competent application of available econometric tools (two-stage analysis, management of multicollinearity).

Thrane (2004, p.133) positively formulates research questions, too, that he considers the hedonic price analysis as a useful methodology to answer:

- “How does the consumer have to pay extra or less for a wine from district X as opposed to a wine from district Y or the average wine?”
- “How does the wines' vintage affect their price?”
- “How are the subjective qualities of wines associated with their price?”

A review of the literature presented before also confirms the validity of these criticisms. We believe that data-driven model specification is mainly due to the scarcity of expert organoleptic data, as a large part of the articles rely on the databases of various wine magazines, wine journals (primarily Wine Spectator), or various well-known wine critics (primarily Robert Parker). This reduces the scope of the studies to the focus regions of these press products or experts. Accordingly, Bordeaux wines or products, regions, and countries with a strong presence on the US market are the focus of the literature. In several respects, the situation is

somewhat easier when examining markets where commerce flows through a monopoly trader (e.g., Carew and Florkowski, 2010).

#### *4.2 Expert ratings*

Besides Unwin's arguments, several further papers emphasize that expert ratings, and especially scores for measuring quality level, shall be treated cautiously.

Ashton (2012) compared expert judgment in six other disciplines (medicine, clinical psychology, business, auditing, HR, meteorology) to examine the reliability and level of consensus of expert panel decisions. In all cases, the reliability was higher than the consensus, but both were significantly lower for the wine evaluation. There is little evidence that experienced wine reviewers can be considered professional.

Expert ratings can address both dimensions of wine quality. Judgment and description of the character are, in most cases, done verbally, perhaps by determining the intensity of each factor, while the quality level is usually evaluated on a scale.

Several authors question the role of wine experts, and even more so, the validity of their expert ratings. Many of them have doubts about the capabilities of wine experts; Hodgson (2009) points out that only 30% of the observed critics can be considered real experts.

The extent to which consumers can understand expert opinions is questionable. Focus group experiments (Veale and Quester, 2008) have shown that even the most sophisticated wine consumers do not know the organoleptic qualities of wines with certainty. Even those consumers cannot pair expert wine descriptions with the proper wines who otherwise successfully distinguish between two wines (Weil, 2007). Moreover, unskilled wine consumers value cheaper wines (Goldstein et al. 2008). At the same time, the quality surplus represented by more expensive wines is typically appreciated by better-educated wine consumers.

As we described above, the literature, together with these doubts, put great emphasis on exploring the impact of expert ratings on prices. From a total of 46 articles, 25 articles address this topic.

In the vast majority of cases, the literature examines the impact of expert ratings of quality level on prices, yet, there are exceptions. It is quite typical that none of the articles in the literature applies the OIV's (2009) system. In contrast, the scoring systems used by the Anglo-Saxon wine press are widespread: the American lawyer, Robert Parker's (*Wine Advocate*) 100 point system, the *Wine Spectator* 100 point system or the British wine journalist, Jancis Robinson's 20 point system (Ashton [2016] provides an excellent comparative analysis of Parker and Robinson's system).

It is quite apparent to associate the expert ratings of wines with prices, but this procedure has several pitfalls, which, unfortunately, are not mentioned in the majority of the cited works.

The first such trap is the measurement level of scales designed to measure the quality level. The authors of the papers in question, implicitly, consider the scores to be variables on a ratio scale, whereas a brief analysis of the scoring systems provides evidence to the contrary. In fact, none of the scales mentioned before has as many grades as claimed: the OIV's 100-point scale is

actually of 61 points (40-100 points), the Parker scale is of 51 (50-100 points), as is the Wine Spectator's, and Robinson's scale is of 9 grades (12 to 20 points). Thus, their treatment as a ratio scale would be possible only after a transformation similar to that used in converting the temperature value expressed in °C to Kelvin. However, this could only be carried out if these scoring systems were interval scales. Unfortunately, however, with the possible exception of the OIV's system, there are serious concerns about this assumption: minimal information is available on the exact structure of these scales, meaning that in practice, for example, is the difference between wines of 82 and 83 Parker points the same as between wines of 99 and 100 Parker points. Therefore, a reasonably accurate and careful researcher considers these scores as variables on an ordinal scale (and may make exceptions only with the OIV's system).

A further problem with these scales is that results obtained at different times and with different experts are not necessarily consistent. An organoleptic description or scoring of a quality level is, in any case, strictly a snapshot of the wines examined, even if it includes expectations for the future. Therefore, when examining the relationship between price and expert organoleptic judgment, the same date data should always be considered. The problem of inconsistency in expert organoleptic ratings is more pronounced when the sample on which the cross-sectional analysis is conducted contains data from a very long period (for example, more than a decade) as there is no guarantee that the taste perception of the reviewing experts is constant over that period, it would have been calibrated in the same way, or even the composition of the expert panel remained the same. However, to defend research based on such data, it should be noted that the press products concerned are likely to do so in their well-conceived interest

The second trap is the simple incorporation of expert ratings into models explaining price with several independent variables. That poses a severe endogeneity problem (Oczkowski, 2001) as expert ratings reflecting the quality level of wine are not independent of the factors impacting wine quality (origin, variety, analytical data, etc.). Thus, the statistical significance of the explanatory variables may be severely distorted. This problem is simply ignored by a large part of literature reviewed, while others (Combris et al., 2000) use triangulation (comparing the results of models with and without expert ratings) or a two-stage least squares model (San Martín et al., 2008 and Thrane, 2009).

#### *4.3 Chemical composition*

Of the articles presented in the previous chapter, five deal with the relationship between the chemical composition of wine or at least one of its components and price. Each of these models involves alcohol content, three articles only take this into account, and two other cases examine the sugar content, volatile acidity, total acidity, concentration of sulfites, and the ration of free and bound sulfites.

The articles do not always detail the source of the data; however, we highly assume that as the source for alcohol content is its mandatory labeling. It is beneficial on the one hand, as the consumer sees what they are buying, and on the other hand, one shall understand that this data is distorted - whether in the European Union or the US market.

In Europe, the actual alcoholic strength may only be labeled at a rate of 0.5% vol, and a tolerance of 0.5% vol (see Article 44 of Regulation (EU) No 2019/33), i.e., actual alcoholic strength of 12.3% vol shall be indicated as 12.0 % vol or 12.5% vol.

The situation is more complicated in the United States, as this particular can be labeled with a tolerance of 1.5% up to an actual alcoholic strength of 14% vol (TTB, 2018) and above this threshold, the value is 1% vol. In practice, this means that the wine cited may be labeled with an alcohol content of 10.8%-13.8 vol, which is quite a considerable interval.

## **5. Conclusions**

The review of the literature showed that five main factors impact wine prices: origin (geographical indications and country of origin), expert ratings, objective quality (chemical composition, the weather of the harvest year, and the age of the wines), traditional labeling elements (grape variety, vintage year and individual brand) and other factors.

In the case of origin, most of the papers reviewed consider geographical indications, and some of them include country of origin. For GIs, most of the impact strongly depends on the actual geographical name rather than merely using any geographical indication, which implies the importance of collective reputation.

Expert ratings seem very obvious to impact wine prices. Although the intuition proves to be right, major methodological problems arise with that factor that is seldom dealt with correctly. Still, all the papers that study the impact of expert ratings (points) are positive. However, adding character descriptions to the label may associate with lower prices.

Good weather conditions (rainfall before the growing period, low rains before the harvest), higher concentrations of chemical compounds, and the age of wines seem to impact wine prices positively. This means that the effect of these factors on wine quality pays off.

The three traditional labeling elements seem to have a role in wine prices as well. Wines made of different grape varieties are sold at different prices. Harvest years that have a good reputation for the quality may have a severe impact on prices. Winery reputation (or individual brands) may be the reason for price variations between wines with the same GI from the same year and same varietal.

There are some other factors like organic production methods or qualification, macroeconomic cycles, or winery size that may impact wine prices, too.

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