

Decoding the Italian Wine Market: A Quantitative Macro-Economic Examination of Price and Expert Rating Influences

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Abstract

This quantitative analysis explores the key determinants affecting the price per bottle and expert ratings within the Italian wine market. It posits that collective reputation, as signified by Geographic Indicators (GIs), Protected Designation of Origin (PDOs), and certification, primarily drive these factors. The study presents a comprehensive contextual backdrop and literature review to address this hypothesis. This conceptual overview is followed by a novel research design, incorporating significant elements influencing wine pricing and expert evaluations. The investigation employs dual multivariate regression models, thereby corroborating and enriching existing literature on the impact of collective reputation in the wine industry. Key findings reveal that PDO ratings and specific certifications such as classico, riserva, millesimato, or organic production significantly influence Italian wines' price and expert ratings. The analysis further quantifies these impacts, suggesting that specific certifications can predict notable increases in wine prices and expert evaluations, underlining the importance of geographic origin and diverse certifications in shaping the market dynamics of the Italian wine industry.

Keywords: Wine Pricing Determinants, Collective Reputation, Expert Wine Rating, Wine Certifications and Quality Assurance Programs, Italian Wine Market, Product Differentiation.

INTRODUCTION

In the agricultural sector, the origin of a product is crucial as it embodies a story of culture, quality, and tradition, significantly impacting consumer perception and decision-making. This is particularly pronounced in the wine industry, where the concept of geographical indications (GIs) and related legal frameworks and quality assurance mechanisms are at the leading edge of branding and marketing tactics. These indicators, pivotal in certifying origin and assuring quality, significantly influence consumer decisions in a complex industry with information asymmetry. Wine, as an experiential agricultural product, reveals its true quality only after consumption, thus placing a substantial emphasis on the reputation of its region of origin or its collective reputation for guiding consumer preferences and decisions (Nelson, 1970; Tirole, 1996; O'Connor, 2004; Caracciolo et al., 2015).

This study quantitatively analyzes the relationship between geographical origin and wine's perceived quality and pricing. Specifically, the study focuses on Italian wine regions to explore the influence of GIs on wine pricing and perceived quality. It investigates whether well-recognized GIs have a differential impact on wine prices compared to lesser-known counterparts. In addition, this study delves into the impact of wine certifications on expert assessments and their subsequent influence on market valuation. It explores how these certifications, as markers of quality and authenticity, shape the perceptions of industry experts and, in turn, affect the financial value placed on wines in the market.

This study seeks to shed light on these complexities in the global wine market, which is characterized by diverse influencing factors across different nations and regions. It aims to augment the existing literature by offering new insights into how geographical origin and collective reputation play a pivotal role in the wine industry's market dynamics, especially within the rich and varied backdrop of Italy's winemaking tradition. Italy, with its deep-rooted wine heritage and emphasis on regional distinction, presents a unique laboratory for this exploration. It offers a blend of history, culture, and regulatory frameworks essential for a comprehensive understanding of these market dynamics.

In further detail, this research paper expands upon existing scholarship by analyzing the Geographic Indications (GIs) of major Italian wine regions and their impact on wine prices and perceived quality. The study aims to ascertain whether there are significant differences in the influence of well-established, high-quality GIs compared to lesser-known ones on bottle prices. It also seeks to enrich the current literature by examining the effects of various wine certifications, including reserve, classico, or broader certifications like organic, on wine quality as evaluated by experts, and how these certifications affect pricing dynamics.

Italy is chosen as the primary focus of this study for several compelling reasons. First, the Italian wine industry, with its rich heritage and predominance of small-scale production, significantly emphasizes regional influences over global brand recognition. This unique focus positions Italy as an ideal natural laboratory for examining the interplay between collective reputation and GIs, with inherent controls in place. Second, the consistent excellence of the Italian terroir, encompassing climate, soil, and viticultural expertise, offers a uniform backdrop for the study. Despite variations in quality and reputation across different GIs, these differences are relatively subtle compared to other nations, providing further natural controls. Third, the diversity of the Italian wine market, featuring over 377 distinct varieties in production, minimizes the dominance of any single varietal and acts as an additional control factor in pricing and rating strategies (Robinson & Harding, 2013). A nuanced and contextual analysis of each element is essential to comprehensively understand how geographic indicators and wine certifications

influence consumer decisions, the collective reputation of wines, and the broader economics of the wine industry.

CONTEXTUAL OVERVIEW AND LITERATURE REVIEW

Contextual Overview

In the wine industry, the geographic origin of the products is not just a detail but a critical aspect that significantly influences market perception and value. This importance stems from the concept of 'terroir' – the unique combination of climate, soil, human capital, and geography that imparts distinct characteristics to the wine (Van Leeuwen & Seguin, 2006). As such, wines from specific regions carry a reputation for quality and unique flavor profiles that are inextricably linked to their origin. This regional identity not only shapes consumer preferences and choice structure and dictates pricing but also plays a pivotal role in branding and marketing strategies within the global wine market.

A GI is an indicator of a product that indicates a specific geographic origin (O'Connor, 2004). These GIs are markers identifying a product's geographical origin and “possess qualities or a reputation that are due to that origin” (WIPO, 2017, p.8). Products across sectors like agriculture, cheese, wine, and artisan items ensure that a product's traits are linked to its origin. These GIs are protected through various methods, including unique systems, quality assurance programs, and certification marks. GIs differ by region and include concepts like appellation of origin and protected designation of origin, governed by international treaties and regional laws within the wine industry (O'Connor, 2004; WIPO, 2024). The markers of origin, serving as quality indicators, are a form of intellectual property (IP) and have been acknowledged in international legal frameworks and treaties since the 19th century (O'Connor, 2004; Porter, 2022). In this context, Geographical Indications GIs are referred to as indications of source and, more specifically concerning the wine industry, historically known and discussed as appellations of origin—although that is evolving (O'Connor, 2004; WIPO, 2017; WIPO, 2024).

GIs have been protected under international law for over a century and serve a multifaceted role beyond their intellectual property status. They are essential for quality assurance, control, and marketing, enhancing the collective reputation of products and ensuring that the product possesses distinct qualities that are inherently embedded with the associative GI (O'Connor, 2004).

GIs signify the unique attributes of a product's origin and incorporate specific production methods, quality standards, and networked administration. They capture the distinct character of their geographical source, symbolizing a location's spirit and even taste and aiding in product differentiation in the market (O'Connor, 2004; Porter, 2022; WIPO, 2024). Their effectiveness hinges on national and local legislation and consumer recognition, requiring a solid link between the product and its geographical origin. This association, where a product's characteristics and reputation are intimately tied to a specific region, is a fundamental principle upheld in international law (Raustiala & Munzer, 2007; WIPO, 2017, p.9).

The World Trade Organization (WTO) governs the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement. This crucial international treaty establishes global standards for various intellectual property (IP) regulation facets. Within this framework, Articles 22 and 23 specifically focus on safeguarding geographical indications GIs for wines and spirits (WTO, 1994). The issue of recognizing and protecting GIs has not only been a subject of international interest but has also frequently led to contentious disputes between countries as they navigate the complexities of IP rights in the global market (Josling, 2006; Raustiala & Munzer, 2007).

In Italy, the approach to managing GIs is distinct. The country employs traditional appellations like Denominazione di Origine Controllata (DOC), Denominazione di Origine Controllata e Garantita (DOCG), and Indicazione Geografica Tipica (IGT). Governed by Italian Law 238/2016, these labels certify the origin and assure the quality of wines, forming an integral component of Italy's GI framework (Italian Ministry of Agricultural, Food and Forestry Policies, 2016).

Considering these factors, a thorough analysis of the wine industry must include an understanding of international intellectual property laws and treaties. It is vital to recognize the pivotal role of geographical indications and to consider the varying levels of their recognition and protection (Raustiala & Munzer, 2007). Such an understanding is key to developing effective strategies to navigate the complexities and challenges prevalent in the global wine industry and to understand and represent terroir's importance. Although the exact influence of terroir on wine is a subject of ongoing scholarly discussion, it is undeniably a cornerstone in the international wine market, particularly illustrated through the widespread use of appellations of origin (Joy, 2007; Cross et al., 2011; Steinman, 2014).

Appellations of origin, first emerging from the French wine industry, are crucial legal frameworks establishing benchmarks or quality assurance programs. These programs are designed to maintain consistent standards in production and farming practices, encompassing factors like grape variety, production volume, aging requirements, cultivation methods, and alcohol levels, all focusing on ensuring quality and facilitating market differentiation. These appellations represent a refined form of Geographical Indication GI, aimed to illustrate the concept of terroir within the wine market (Delmastro, 2005; Lee & Sumner, 2013; WIPO, 2017; Porter, 2022).

As we consider the significance of appellations in defining and preserving the unique characteristics of wines, it is essential to note the evolution of these classification systems, particularly in the European Union. Before 2011, the European Union (EU) utilized a wine classification system with the following two classifications: QWPSR (Quality Wine Produced in a Specific Region) and Table Wine (Camin et al., 2018; Vinifero, n.d.). Seeking to simplify and better protect regional and traditional products, the EU transitioned to a new system comprising PDO (Protected Designation of Origin) and PGI (Protected Geographical Indication) (Agostino, & Trivieri 2014; Wine Searcher, n.d.).

PDO signifies products produced, processed, and prepared within a specific geographical area, with their unique characteristics shaped mainly by natural and human elements. Each EU country has its equivalent PDO, such as AOC in France, DOC and DOCG in Italy, and DO and DOC in Spain. These PDO goods exemplify a deep-seated relationship to their environment, reflecting recognized expertise and regional attributes (Wine Searcher, n.d.). On the other hand, PGI represents products with a significant link to the area where they are produced, processed, or prepared. These products have qualities and traits attributable to their geographical location. Although PGI production criteria are less stringent than PDOs, some PGI wines, especially from regions like Tuscany, can garner higher respect and prices than certain PDO wines.

Prior to 2011, the wine classification system featured the QWPSR category, akin to the current PDO, which encompassed quality wines from specific regions. In contrast, Table Wine represented a more general and basic category. With the introduction of PGI, the Table Wine category was phased out, rectifying its association with lower quality and aligning classification standards between Europe and the United States. Currently, each EU country has distinct categories that align with PDO and PGI, underscoring the significance of geographical origin in determining wine quality and unique traits (Agostino & Trivieri, 2014; Wine Searcher, n.d.).

As detailed above, the governance structure of GIs is intricate. Nowhere is this more

complex than in Italy, which has a deep history of this type of regulatory framework. They have historically and continue to do so in the present, had geographic indicators known as Denominazione di origine controllata e garantita (DOCG), Denominazione di origine controllata (DOC), Indicazione geografica tipica (IGT), (Delmastro, 2005; Caracciolo et al., 2016). Recently, to be aligned with the European Union, Italy began to use the PDO (Protected Designation of Origin) and PGI (Protected Geographical Indication) standards. PDO wines, often referred to as DOC or DOCG in Italy, are tied intrinsically to their specific geographical regions, ensuring distinct regional characteristics in the wine. PGI wines, labeled IGT in Italy, are also linked to their production region but with more lenient criteria (European Commission, 2018). In Italy, these are regulated by law.

While these GIs are still considered appellations within the Italian wine market, they are divided further into the aforementioned denominations, which can roughly be seen as a quality hierarchy, with DOCG and DOC at the top of the pyramid. This study uses only DOCG and DOC GIs as they are the highest-quality appellations, collectively referred to as PDO henceforth. (Delmastro & Castriota, 2014). In addition to this classification of Italian appellations, additional informal classifications and certifications are applied locally to Italian wine from certain areas and wine production methods. An example is differing aging and wine production methods that further differentiate the product through additional classifications and certifications such as superior, classico, riserva, and millesimato (Puckette & Hammack, 2018; Vine & Cork, 2021; Day, 2024). To illustrate, the reserve certification refers to wines aged in barrels for at least a minimum amount of time regulated by the relevant appellations—oak aging provides the wine with unique oenological characteristics. Superior refers to wine with a higher alcohol content than the regulated amount within the relevant appellation (Delmastro, 2005). The pertinent appellation typically governs this certification.

This certification plays a crucial role in distinguishing products in consumer choice, offering an additional avenue for collective and individual reputation branding in the market (Delmastro, 2005; Corsinovi & Gaeta, 2015). Moreover, the unofficial classification and certification of specific wines can significantly impact their reputation and pricing. A prime example is the Super Tuscan wines from Tuscany, which deliberately ignored established legal frameworks like DOCG and DOC. These red wines emerged as vintners started creating Bordeaux-style wines, using non-native Italian grapes like Merlot and Cabernet Sauvignon, with native varieties like Sangiovese. Initially labeled as table wines, they swiftly gained recognition and esteem in the market (Robinson et al., 2013; Corsinovi & Gaeta, 2015).

Although DOCG and DOC represent the highest tiers of geographic indications (GIs) or appellations in Italy, there exists a notable diversity in collective reputation for quality within these subgroups. Geographic indications or appellations in the wine industry signify the origin of production. Certifications like 'classico' or 'riserva', or informal designations such as 'Super Tuscan', or organic, are essential for brand differentiation in a saturated market (Corsinovi & Gaeta, 2015). These labels, acting as quality assurance mechanisms, aid in fostering customer understanding and differentiation of products based on assumed quality.

Literature Review

This literature review aims to analyze the concept of collective reputation in the wine industry, particularly regarding experience goods and its role in addressing the challenges posed by information asymmetry to consumers. This theme, significant in the literature, is especially

pertinent in the context of experience goods like wine, where the intrinsic value and quality are only discernible post-consumption (Hutter, 2011).

In the literature, wine is classified as a non-perishable experience good, defined by its intricate relationship between sensory experience, pre-consumption expectations, and post-consumption quality assessment. This complexity is accentuated in the market context, where wine evaluation extends beyond simple aesthetic judgment to include factors such as expectations, perceived value, and assumed quality, all of which underscore the significance of collective reputation in the dynamic evaluation process. Such a reputation serves as a pivotal guide for consumer choices in an environment marked by information asymmetry and the challenge of immediate quality appraisal—a subject of considerable interest in policy and market analysis studies (Rogerson, 1983; Laffont & Martimort, 2002; Rindova et al., 2005; Onur et al., 2020; Porter, 2022).

For experience goods, the value and pricing information are linked to the product's quality. However, achieving this efficiency is challenging and often results in discrepancies between consumer expectations and the product experience. Consumer expectations typically fall into two categories: optimistic, where the anticipated quality is high, and pessimistic, where it is low. These expectations significantly influence consumer choices as well as price infrastructure. As consumers use the product and expend resources, their initial assumptions are adjusted based on their experience with the product (Shapiro, 1983). These goods require consumers to invest time and resources to understand their quality, with the true attributes only becoming apparent after consumption, shaping future purchasing decisions (Laffont & Martimort, 2002). This is detailed in depth by Nelson (1970):

Consumers are continually making choices among products, the consequences of which they are but dimly aware. Not only do consumers lack complete information about the prices of goods, but their information is probably even poorer about the quality variation of products simply because the latter information is more difficult to obtain. One can, for example, readily determine the price of a television set; it is more difficult to determine its performance characteristics under various conditions or its expected need for repairs (p.1).

Reflecting on the nature of experience goods as detailed previously, it is evident that the disparity in product quality knowledge is a critical driver in the reliance on reputation for consumer decision-making, both at the point of purchase and moving forward (Caracciolo et al., 2015; Ugochukwu, 2015). In this area, the product differentiation between individual and collective reputation gains prominence. While individual brands build their reputation on the quality history of a single entity, collective brands, like GIs, are shaped by the perceived quality of a collective organization (Schamel, 2000). This distinction is especially relevant in agricultural markets, where brand recognition is typically low, and there is intense competition, making collective reputation a vital factor for standing out. As wine is also a consumer product with a broader market presence, it offers more significant opportunities for individual brand salience and reputation development than many other agricultural products (Winfrey & McCluskey, 2005; Neeman et al., 2019). This is compounded further as the price is often used as a proxy for quality (Nelson, 1970; Schnabel & Storchmann, 2010).

Consumers frequently use price as a proxy for quality, particularly with experience goods like wine, where quality becomes evident only after consumption (Schnabel & Storchmann, 2010). However, this practice can lead to reduced satisfaction, as the actual quality may not meet the

expectations set by the price, creating a gap between perceived and actual value, often resulting in diminished consumer happiness with the product (Nelson, 1970). This issue is accentuated by the significant perceived risk inherent in these types of goods, making risk mitigation strategies extremely valuable in the market (Onur et al., 2020). Additionally, the evaluation of wine quality before purchase is complex, influenced by factors such as limited brand recognition, a plethora of alternative options, intricate labeling, and a choice structure that varies by country and region of origin, all of which add layers of complexity to the consumer's decision-making process (Loureiro, 2003; Hutter, 2011).

In the crowded wine market, collective reputation is essential, as it enhances product recognition and instills a sense of quality and authenticity with consumers. While there is room for the development of individual reputation through marketing, quality, and critical acclaim, the overall prominence of the industry predominantly relies on collective reputation elements like geographic indicators or wine certifications to signal quality (Landon & Smith, 1998; Ugochukwu, 2015; Heun, 2019). This reputation significantly influences consumer choices during the purchase process, as buyers often associate wines from renowned regions like Burgundy or Barolo with higher quality than unknown regions (Tirole, 1996; Landon & Smith, 1998; Frick & Simmons, 2013; Caracciolo et al., 2015; Porter, 2022). There is some evidence of the compounding and correlated value of both collective and individual reputation, further illustrating the need for macro and micro brand equity and salience (Frick & Simmons, 2013).

While companies strive to develop individual solid brands through reputational salience, marketing, branding, and critical awareness, the use of a shared or collective brand is common, where all contributing entities shape the reputation—this holds particular significance in the Old World (Frick & Simmons, 2013). This collective reputation, acting as a shared resource for all firms, necessitates careful management to prevent bad actors from being dependent on quality inputs from others without input, which could erode their value. In the wine industry, this involves maintaining quality standards. Typically, these collective reputation elements are enforced through GIs. However, they may also be managed through other administrative frameworks, including certification systems or non-profit collectives—which then assist in quality assurances and improve overall quality and branding (Delmastro, 2005; Winfree & McCluskey, 2005; Ritchie, 2007; López-Bayón et al., 2020).

The literature underscores the significant impact of collective reputation, mainly through GIs and appellations, on consumer behavior, price determination, and producer profit (Poetschki, et al., 2021). Though there is agreement on its influence on pricing and perceived quality, the extent and nature of this impact are debated. The effect of collective reputation varies across different markets. For example, in Spain, appellations and regional branding have been found to influence consumer choices significantly, with appellations often being critical in differentiating price points (López-Bayón et al., 2020). Perceived quality linked to GIs is also shown to positively influence pricing, although these effects are not universally consistent (Angulo et al., 2000; Costanigro et al., 2010; Roma et al., 2013; Caracciolo et al., 2015; Di Vita et al., 2015).

Research indicates that while GI and collective reputation significantly influence pricing and quality in the wine market, including within the lucrative and expansive export market, the degree of this impact varies across different regions and countries (Agostino & Trivieri, 2014; Dal Bianco et al., 2018). Although a strong relationship between GI and pricing strategies is widely acknowledged, the specifics of this link are not fully understood in every segment of the intricate wine market, signaling a need for further detailed research. Additionally, studies on the role of GI in Italian wines typically focus on particular regions, export products, grape varieties, and vintages, although there is less research on the macro influences within Italy (Beltratello et al., 2009; Stasi

et al., 2011; Agostino, & Trivieri 2014). Moreover, factors like the wine's production methods, alcohol content, color, label/bottle design, brand identity, and critical ratings/awards are often found to have a more significant influence on both pricing and quality perception than geographic origin alone (Barber et al., 2007; Carsana & Jolibert, 2017; Dal Bianco et al., 2018).

Certification introduces additional layers to the understanding of wine pricing and perceived quality. Various experimental research has been conducted on the impact of wine certification on pricing concerning organic winemaking. This area demonstrates a trend towards increased prices, attributed to the more labor-intensive and less price-efficient organic processes (Delmas & Grant, 2014). The rationale here is straightforward: more demanding production methods, reflected in the price, lead to higher costs. Evidence from differing regions suggests that sensory certification frameworks significantly enhance quality control and assurance, bolstering the overall collective reputation and price (Etaio et al., 2010; Ugochukwu, 2015). However, the implications of other types of certifications remain less understood. Furthermore, research examining the influence of wine certification on professional ratings, especially in the context of Italian wines, is scarce and lacks depth (Cacchiarelli et al., 2014).

Given the intricacies of both the local and international wine markets and the existing ambiguities regarding pricing dynamics, this research seeks to contribute to the evolving body of knowledge on collective reputation. It focuses specifically on exploring the impact of geographical indicators on both pricing and perceived quality within the expansive landscape of the Italian wine market. Additionally, despite the evolving understanding of the influence of GI on pricing, the research on how wine certification affects expert evaluations of individual Italian wines on a broad scale remains minimal. This study is designed to assist in bridging this gap, thereby enriching the broader discourse on wine evaluations and the role of collective reputation in markets for experiential products.

DATA AND METHODS

Hypothesis

This study examines the impact of Protected Designation of Origin (PDO) as a geographic indicator on the pricing of Italian wines. It aims to delve deeper into the unique influence of collective reputation within the experience good market, particularly in the context of wine. Additionally, the research investigates how wine certification, as a form of designation, affects expert assessments of wine quality. The hypothesis to be rigorously explored is as follows:

Hypothesis 1a: In the Italian wine industry, a Protected Designation of Origin (PDO) as a Geographic Indication will significantly influence the price per bottle. It is expected that wines from PDOs with higher rankings will command statistically notable higher prices compared to those from lower-rated PDOs.

Hypothesis 1b: The certification of wine firms is hypothesized to exert a statistically significant positive impact on expert wine rating.

The examination of Hypothesis 1a, though extensive, has encountered constraints due to market variations across countries and the limited scope of studies assessing the PDO effect on pricing on a larger scale. Furthermore, within the Italian context, experimental research has predominantly focused on small-scale studies of specific PDOs, without a comprehensive analysis of the country's entire wine market. This leaves a gap in understanding the broader impacts of

PDO. Meanwhile, the scarcity of experimental literature examining the influence of wine certification on expert ratings, especially on a larger scale within the Italian wine market, presents unresolved queries. Hypothesis 1b aims to address these gaps and contribute to a more nuanced understanding of these dynamics.

Data Description

This analysis aims to examine the influence of collective reputation, as demonstrated through geographic indications and wine certification, on the pricing and expert ratings in the Italian wine market. This was achieved by synthesizing, collecting, and analyzing diverse data from multiple datasets, catalogs, and reference materials.

The initial phase of the investigation utilized a comprehensive dataset from *Wine Spectator* magazine, known for its authoritative information on wine origins, ratings, and broader industry trends (Wine Spectator, 2021). This dataset provided extensive data on Italian wines, encompassing variables like vintage/year, country, region DOC/DOCG (PDO), certification, expert scores (100-point scale), price in USD, wine names, wineries, and grape varieties.

Despite the richness of the Italian Wines dataset, it did not offer a direct empirical basis for evaluating the reputation of DOC/DOCG represented as PDOs within this analysis. To bridge this gap, the study incorporated work by Italian wine experts Delmastro and Castriota (2014). They had compiled a database from *The Hugh Johnson Wine Guide*, which has rated major Italian denominations (GIs or PDOs) on a scale of 0 to 4 stars for over three decades. *The Hugh Johnson Wine Guide*, a highly regarded and frequently used wine reference, presented rankings for over 700 denominations, excluding regions with minimal collective reputation or those not meeting the quality standards set by Hugh Johnson. Delmastro and Castriota (2014) generously provided access to a segment of their dataset, encompassing the rankings of over 700 different Italian DOC/DOCGs. This portion was designated as the PDO dataset. Though expert wine rating is a valuable proxy for assessing value, it is crucial to remember that these evaluations remain inherently subjective (Oczkowski, 2016).

Next, the Italian Wines Data and the PDO dataset were combined to form a comprehensive dataset that provides a reference point for examining the impact of PDO on price and ratings. This integration was facilitated by creating a "region" variable in the PDO dataset and aligning it with the "denominazione" variable in the Italian Wines Data. This alignment ensured a standard variable across both datasets. Although initially represented by different terms – "region" and "denominazione" – both variables function as geographic indicators, explicitly designating a wine's Denominazione di Origine Controllata (DOC) or Denominazione di Origine Controllata e Garantita (DOCG) classification. For simplicity in the subsequent analysis, these classifications will be collectively referred to as PDOs.

The PDO Rating dataset was subsequently aggregated by Region and Year, yielding an average rating for each PDO over time, spanning from 1978 to 2016. Each region's ratings displayed remarkable consistency over the years, ensuring minimal data distortion. For instance, Brunello di Montalcino maintained a 4-star rating in 1978, 1983, and 1988, shifted to 3.5 stars from 1993 to 2008, and returned to 4 stars from 2008 to 2016. In the case of the 52 varieties of Alto Adige assessed over seven years, rankings fluctuated between 1 and 3, with an average of 2.03 and a standard deviation of 0.31. This demonstrates the stability and reliability of the PDO ratings, irrespective of the year selected. Notably, this stability was exclusive to the PDO data and did not extend to individual wines' yearly expert ratings and prices.

The consolidated PDO ratings were then integrated with the Italian Wines dataset based on corresponding PDOs and Years. This integration resulted in N=212 overlapping cases between the two datasets, creating a unified dataset wherein the Italian Wine data now included consistent matching ratings for the geographic indicators/PDOs under study. There was initially missing price data for 17 wines following the merger. The author addressed this by conducting targeted searches for the release prices of each of these 17 wine labels through *Wine Spectator*, subsequently entering the data manually (Wine Spectator, 2021).

Variables

This study empirically examines the effect of geographic indication represented by PDO and wine certification on the price and rating of wine. The dependent variables under study are price per bottle (DV1) and expert ratings represented by points (DV2). The first dependent variable is the price point per bottle (DVI) and is an indicator of how the market and consumers view the quality of the wine. This is an effective empirical measurement of the wine's reputation in the market and assumed quality.

The second dependent variable is the expert rating of wine (DV2). The expert ratings are vital proxy variables for the overall quality of the product and represent an external marker for reputation in the market. Both dependent variables are vital empirical proxy variables for a region's overall assumed quality and reputation, individual wines, and the quality assurances represented by certification.

The first explanatory variable is PDO Rating (IV1), which is the compilation of Hugh Johnson PDO ratings represented with a 0-to-4-star spectrum, with four stars being the highest rating and 0 the lowest. This explanatory variable is a proxy for the overall quality and reputation of geographic indication/PDO.

The second explanatory variable is Year/Vintage (IV2). The vintage of wine can significantly affect the perceived quality and price of an individual bottle of wine because of the variation in climate and other natural effects from year to year (Ashenfelter, 2008). Because of this potential complication, the author manually researched the overall reputation of each vintage listed through the reputable industry magazines *Decanter* and *Wine Spectator* and transformed Year/Vintage (IV2) into a dummy variable that labeled the vintage as either a 1 representing a high-quality vintage or a 0 representing a low-quality vintage (Decanter, 2021; Wine Spectator, 2022). This will serve as a proxy and a control for the effect of weather or other complicating natural effects.

The third explanatory variable is Designation/Certified (IV3). The third explanatory variable represents whether the wine under study is further certified with superior, classico, riserva, millesimato, or if organic methods were used in production. The author transformed IV3 into a dummy variable that labeled each wine in the data set, with 1 representing yes if the wine is certified and 0 representing that the wine is not certified. This explanatory variable will serve as a proxy for brand differentiation through certification and other environmental complications, such as product production methods.

The fourth explanatory variable is the wine Varietal (IV4). The varietal of wine, or the type of grape used, is a crucial element influencing wine ratings, pricing, and consumer purchasing decisions (Olsen et al., 2015). To explore and control for this effect, the author referenced the *World Atlas of Wine* to retrieve the most well-known and popular Italian wine varieties and created a reference sheet of the top ten (Johnson, 2019). Based upon this reference sheet, the author transformed IV4 into a dummy variable that labeled each varietal as either a 1 representing a well-

known and popular Italian wine varietal or a 0 representing a less well-known and less popular Italian wine varietal. This explanatory variable will serve as a proxy for wine varietal and its effect alone on the price and rating of wine.

The fifth and final explanatory variable is Wineries (IV5). Individual wineries often influence the price of wine greatly, as brand recognition, brand loyalty, and individual reputation informed by past purchases inform consumer behavior (Ashenfelter, 2008). To explore and control for this effect, the author referenced a *Wine Spectator* list of Italy's top 100 wine producers (Wine Industry, 2019). Utilizing the referenced list, the author converted IV5 into a dummy variable, assigning a value of 1 to wineries ranked among the top 100 in the country and a value of 0 to those not featured on this list of elite wine producers. This approach effectively uses IV5 as an indicator to gauge the general reputation of individual wineries and to assess their influence on both the pricing and expert ratings of wines.

With its array of explanatory factors, this model offers a comprehensive representation of the myriad influences on wine reputation and quality as reflected in bottle price points and expert ratings. The following section will delve into a detailed analysis of this model and the impact of these factors.

Analysis and Results

Initially, a stepwise multiple regression analysis was conducted to determine a regression model best predicting the price of Italian wine. This model incorporated five factors historically influencing wine prices: PDO rating, wine vintage, designation certification, wine varietal popularity, and winery reputation (Abu-Bader, 2016). The analysis aimed to ascertain the extent of geographic indication's impact on wine prices.

Following this, a similar stepwise multiple regression analysis was employed to predict expert ratings of individual Italian wines. This model also used the same five factors: PDO rating, wine vintage, designation certification, wine varietal popularity, and winery reputation (Abu-Bader, 2016). The analysis primarily explored the significance of certification on wine brands in expert assessments.

Preceding the dual regression models, several descriptive statistics and visualizations were generated to investigate the analysis assumptions for both regression models. This included normality of distribution, linear relationships between both dependent variables and the explanatory variables, normality of residuals, homoscedasticity, and multicollinearity (Abu-Bader, 2016). The different measures, including skewness and kurtosis, histograms, and Q-Q plots, illustrated that the distribution shape for all factors in both models approaches a normal curve of distribution (Abu-Bader, 2016).

In both models, Pearson's correlation coefficients and scatterplots illustrate a linear relationship between the price point per bottle and all explanatory factors and, subsequently, the expert rating of individual wines and all explanatory factors (Abu-Bader, 2016). Moreover, in both models, inspections of histograms and the normal probability plots of the residuals indicate that all errors were normally distributed. In addition, inspections of both models' scatterplots of predicted scores against the residuals confirm that the assumptions of homoscedasticity were met. In the end, evaluating the correlation matrix and both VIF and tolerance values suggests that no multicollinearity exists among any explanatory factors (Abu-Bader, 2016).

Empirical Results

The results of the stepwise multiple regression analysis for hypothesis 1a, analyzing what influences the price point per bottle (DV1), reveal that two of the five factors emerged as significant predictors of price point per bottle ($F= 69.6, p <.001$). With a beta of .52 ($p <.001$) and B of 23.97 ($p <.001$), the GI or PDO rating (IV1) emerged as the strongest predictor of price point per bottle in the model, accounting for 55.7 percent of the variance in price point per bottle. The other contributing factor was certification of designation (IV3) with a Beta of .27 ($p <.05$) and a B of 17.96 ($p <.05$), accounting for only 2 percent of the variance in price point per bottle.

These results indicate that the price point per bottle is a function of the perceived quality and reputation of the geographic indicator more than any other factor, with certification of wine contributing a small positive effect on the price point per bottle. The model explains almost 58 percent of the variance ($R=.76$), with 42 percent of the price point per bottle still unaccounted for.

Table 1

Results of Multiple Regression Analysis—Predictors of Price Point Per Bottle (DVI)

Factor	R	R ²	Beta	B	T	P	F	P
GI/PDO Rating (IV1)	.75	.56a	.52	23.97	4.35	<.001	129.6	<.001
Certification (IV3)	.76	.58b	.27	17.96	2.2	<.05	69.63	<.05

Note: All coefficients are rounded to the nearest two decimals.

aGI/PDO Rating explains 55.7% of the variance in price point per bottle.

bCertification explains 2% of the variance in price point per bottle.

The model explains 58% of the variance ($R=.76$), with 42% unaccounted for.

The results of the stepwise multiple regression analysis for hypothesis 1b, analyzing what significantly influences expert ratings (DV2), reveal that two of the five factors under analysis emerged as significant predictors of expert ratings ($F= 41.23, p <.001$). With a beta of .54 ($p <.001$) and B of 3.1 ($p <.001$), while the certification of designation (IV3) emerged as the strongest predictor of expert rating, accounting for 31.5 percent of the variance in expert rating. The other contributing factor was the quality of the vintage (IV2), with a Beta of .36 ($p <.001$) and a B of 2.2 ($p <.001$), accounting for 13.2 percent of the variance in expert ratings.

These results indicate that expert rating is a function of the certification process more than any other factor included in this model, with the quality of the vintage contributing a small positive effect on expert rating. Overall, the model explains almost 45 percent of the variance ($R=.67$). With 55 percent of the variance in expert rating still unaccounted for.

Table 2

Results of Multiple Regression Analysis—Predictors of Expert Ratings (DV2)

Factor	R	R²	Beta	B	T	P	F	P
Certification (IV3)	.56	.32c	.54	3.1	7.36	<.001	47.34	<.001
Vintage (IV2)	.67	.45d	.36	2.2	4.94	<.001	41.23	<.001

Note: All coefficients are rounded to the nearest two decimals.

cCertification accounts for 31.5% of the variance in expert ratings.

dVintage quality accounts for 13.2% of the variance in expert ratings.

The model explains 45% of the variance (R=.67), with 55% unaccounted for.

Discussion & Market Insights

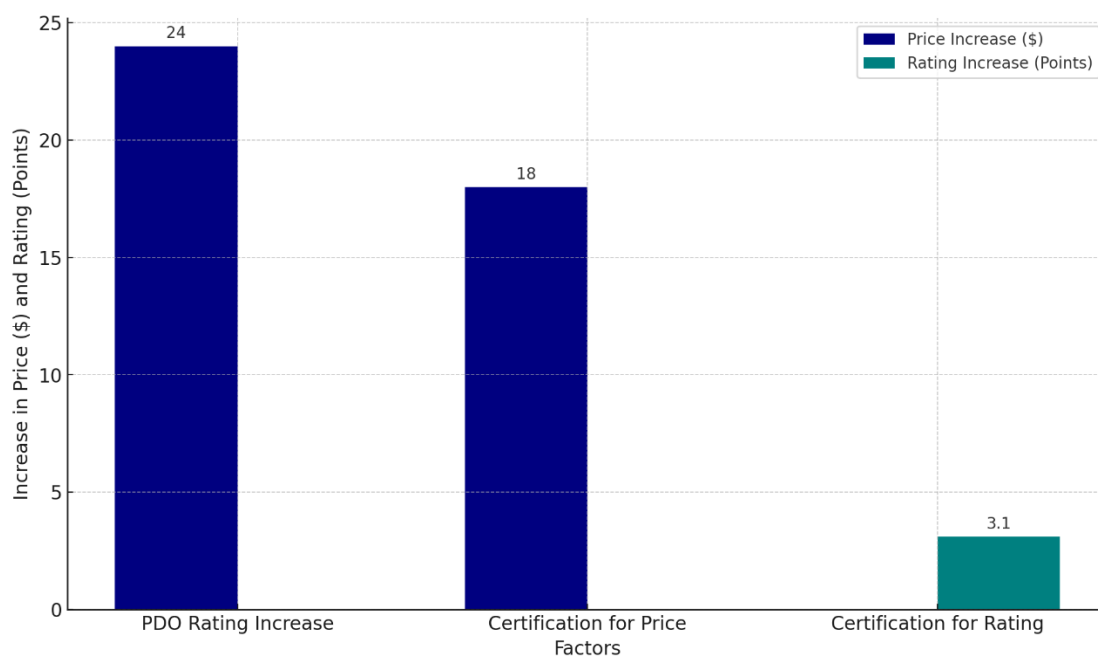
This comprehensive model's empirical results build upon the previous research on the effect of geographic indicators and PDO on the price point per bottle in the Italian wine market (Stasi et al., 2011; Di Vita et al., 2015). In addition, it extends the research of collective reputation and quality signals to the market through the empirical analysis of the effect of quality assurance signals represented by further certification in the wine market.

The findings reveal that the perceived quality of the geographic indicator or PDO is the strongest predictor of price per bottle of wine in the Italian wine market. While this is aligned with much of the previous literature, this analysis additionally illustrates the strength of this relationship. On average, holding all other variables constant, a one-star increase in the Hugh Johnson Ratings of geographic indicator or PDO leads to a \$24 increase in price point per bottle. The second significant finding in this model reveals that on average, holding all other variables constant if a wine is certified as, classico, riserva, millesimato, or if organic methods were used in production, this leads to an \$18 increase in price point per bottle. These are significant findings because the model controls for many of the known influences on the price point of wine and extends the literature on the value of collective reputation in the Italian wine market.

The third significant finding reveals that, on average, holding all other variables constant, if a wine is certified as, classico, riserva, millesimato, or if organic methods were used in production, this leads to a 3.1-point increase on the industry standard 100-point scale in expert ratings of wine. This is an intriguing finding as it illustrates that either experts can diagnose the wine-making processes and reward the wine accordingly or are affected by the quality assurances through the collective reputation process. Notably, the quality of the vintage affected the expert ratings, which again, seems to indicate that the expert palate can diagnose a high-quality vintage, which results in a higher rating, or the experts know the vintage was supposedly a high-quality vintage, and this informs their decision-making process (Ashenfelter et al., 1995). To accurately quantify the price and expert rating increases, addressing and controlling the limitations outlined in the following section is crucial. Figure 1 below illustrates the impacts of PDO ratings and certification on wine prices and expert ratings, highlighting these key findings:

Figure 1

Impact of PDO Rating and Certification on Price and Expert Rating



Notes: The navy bars represent the dollar increase in price per bottle associated with a one-star increase in the Hugh Johnson Ratings of geographic indicator or PDO, and the price per bottle associated with obtaining certification (classico, riserva, millesimato, or organic methods).

The teal bar shows the increase in expert rating points due to certification on the standard 100-point scale.

This study's reliance on binary dummy variables and sample size may not fully capture the nuanced factors influencing wine pricing and ratings, potentially exaggerating the impacts of geographic origin and certifications; further, reliance on expert ratings introduces subjective biases, necessitating broader and more detailed future research to refine these findings.

In summary, this study provides an empirical analysis of the key factors influencing both the price and ratings of wine. This evidence strongly supports the notion that the GI/Protected Designation of Origin rating and certification significantly contribute to wine pricing and quality perception, underscoring the critical role of geographic indicators and quality assurance programs in enhancing the market value and expert assessments of Italian wines. This study's findings have implications for stakeholders in the Italian wine market. Leveraging GIs, quality assurance programs, certification, and collective reputation for producers and marketers can enhance pricing, expert ratings, and marketing effectiveness. Policymakers can use these insights to uphold high PDO standards and certifications, bolstering market perception and regional economic health. Additionally, this knowledge can inform policies for marketing and exporting to continue the global positioning of Italian wines. These findings validate existing research and deepen our understanding of market dynamics in the wine industry, guiding more strategic decision-making to promote industry growth and reputation.

Limitations

This study attempts to create a model that is as comprehensive as possible, representing the known influences on wine pricing structures and rating models; many of these proxy explanatory factors were binary dummy variables that potentially could have missed other explanatory factors that were more gradients of cause and effect. These variables can effectively simplify reality into a dataset for analysis, yet they may not fully capture the complexities of the

entire model. For instance, categorizing vintages as simply 'good' or 'bad' may not always accurately reflect their nuanced characteristics. Further research should adopt a similar but more advanced model and create categorical proxy variables to tease out distribution effects to minimize the unaccounted-for variance and potentially investigate these effects through canonical correlation analysis to reduce error.

Moreover, the limited sample size is a constraint for macro generalization, as it may exaggerate specific findings. Such a sample might not fully capture the diverse influences on wine pricing and ratings across the broader market. This is a moderate limitation when considering the varied and nuanced factors contributing to wine valuation. Consequently, while the study provides valuable insights, especially regarding the impact of geographic origin and certifications on wine prices and expert ratings, its conclusions should be interpreted with an understanding of the potential overemphasis of these effects due to the sample size. Further research with a more expansive sample size would be essential to validate and refine these findings further.

In addition, this study utilizes expert ratings to evaluate certain aspects, but it is essential to acknowledge the inherent limitations due to potential biases. Expert ratings, while valuable, can be subjective and influenced by individual preferences, experiences, and cultural backgrounds (Oczkowski, 2016). These biases can affect the objectivity and reliability of the evaluations, potentially skewing the study's findings. Therefore, while expert opinions are informative, they should be considered with an understanding of their subjective nature and the possibility of inherent biases (Storchmann, 2015; Oczkowski, 2016). It is essential to highlight that the potential omission of related variables not present in the data and the limited sample, as well as the diffusion of varietal in PDO, could result in an overestimation of the effects and pricing impacts.

CONCLUSION

This quantitative analysis advances the existing empirical research on the influence of collective reputation on wine pricing, as denoted by geographic indicators and Protected Designation of Origin PDO. Utilizing a comprehensive dataset and model encompassing the rankings of all major Italian PDOs, this research applies a multifaceted quantitative multiple regression analysis while accounting for known price-influencing factors. The analysis confirms a significant positive impact of certification on wine prices. It enriches the collective reputation literature by conducting an additional regression analysis to explore the primary factors affecting expert wine ratings. These findings demonstrate that wine certification, an aspect of collective reputation and quality assurance programs, markedly enhances these ratings.

The study's findings reinforce the importance of geographic origin as a key market signal in the Italian wine market, echoing previous research while offering new insights into the efficacy of comprehensive certification methods. Notably, an improvement in PDO ratings corresponds with a noticeable uptick in wine price per bottle. Additionally, certifications such as *classico*, *reserva*, *millesimato*, or organic production are linked with a marked increase in bottle prices and expert ratings. These findings emphasize the substantial influence that geographic indicators and a range of certifications have on wine pricing and expert evaluations. This underscores their role in bolstering collective reputation and quality assurances in the wine market.

In sum, this research provides robust evidence of the pivotal role of quality indicators and assurances via collective reputation in the Italian wine market. It suggests that other wine regions and individual wineries could benefit from this expanded understanding, using it as a strategic

guide in quality assurance programmatic development and resource allocation for branding and marketing initiatives.

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