

Platform-Mediated Regional Reputation and Value Capture in Wine Geographical Indications: Evidence from Italy and Spain

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Abstract

This study examines the manifestation of regional reputation in online wine markets and its association with value capture across Geographical Indications (GIs). Using consumer data from Vivino for Italy and Spain, we propose a three-dimensional framework for GI reputation comprising recognition (share of ratings), evaluative reputation (average ratings), and market valuation (average prices). The analysis of 54 Italian and 27 Spanish GIs, as well as segmentation of 2,358 Italian and 1,335 Spanish producers, shows that these three reputation dimensions are analytically distinct. High recognition does not necessarily correspond to higher ratings, and the relationship between market valuation and ratings may be nonlinear. Italian wines generally achieve higher prices than Spanish wines despite comparable ratings. Producer clustering further highlights heterogeneity within GIs. These findings provide a consumer-based perspective on GI reputation and value in platform-mediated wine markets.

Keywords: Wine, Geographical Indication, reputation, Vivino, rating, price, recognition.

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1. Introduction

Reputation is a complex and multifaceted concept deeply rooted in social science, encompassing various dimensions including value, time, and recognition. Ancient and historical perspectives underscore its enduring importance: two millennia ago, Publilius Syrus noted that a good reputation surpasses monetary wealth, while Henry Ford emphasized that reputation is built over time rather than on intention alone. For wine producers, reputation is a critical determinant of success both at the individual and collective level. For the European Union, geographical indications (GIs) are not only tied to individual producers but also to the collective reputation of a wine-producing region or country, which influences economic development and market outcomes. GIs function as “umbrella brands,” aggregating quality standards to signal product excellence and reducing individual firms’ investments in reputation-building efforts. This dual nature of GI reputation, combining collective and private dimensions, affects price premia and quality incentives [1,2,3]. Because wine GIs are a central institutional mechanism through which differentiation, collective reputation, and value appropriation are organized, analysing how digital platforms reshape their recognition, evaluation, and capitalization sheds light on an important dimension of contemporary change in wine value chains.

GIs represent a key European quality certification system that links terroir-based agricultural products to specific geographical areas, providing collective rights to stakeholders operating within defined regions. These schemes are mutually recognized in the EU and internationally through TRIPS agreements, with European regulations granting unlimited *sui generis* protection and *ex officio* action against fraud, imitation, and misleading labels [4,5,6,7]. Two primary GI schemes exist for food and wine: Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI), distinguished primarily by the extent of production within the GI area. For wines with a PGI, at least 85% of the grapes must originate from the delimited geographical area and at least one stage of production must take place there. By contrast, PDO wines must be produced exclusively from grapes harvested in the area, with all production steps occurring within that specific region, thereby emphasizing terroir specificity [8]. Moreover, within each category, country-specific laws may further differentiate between levels. Particularly, Italian and Spanish PDO wines can be granted a higher level of geographical certification, namely the Denomination of Controlled and Guaranteed Origin (DOCG, in Italy) and Qualified Designation of Origin (DOCa, in Spain), which are the most demanding categories within the PDO framework because they involve the most rigorous standards affecting wine traceability, production, and distribution.

Italy and Spain are two of the leading countries in Europe in terms of the number of registered wine GIs. Italy has a total of 522 registered wine GIs, while Spain accounts for 149 GIs [9]. These figures highlight the substantial role that GIs play in the wine sectors of both countries, underlining the importance of regional and terroir-based identity in their wine production and marketing systems. While several papers to date have explored the concept of brands and collective reputation either in general [10,11] or for specific GIs [12], relatively little is known about the overall performance of wine GIs. Moreover, most existing studies in the field of wine economics rely on expert ratings and wine medals as a reputation indicator (e.g. [13,14,15,16]), which implicitly limits the analysis to the small subsample of bottles tasted by wine guides and prize panels, and neglects aspects such as consumers' opinions.

Given these considerations, this study makes three contributions to the analysis of regional reputation in platform-mediated wine markets. First, it conceptualizes GI reputation through a three-dimensional analytical framework that distinguishes evaluative reputation, recognition, and market valuation, operationalized using consumer ratings, relative rating volume, and market prices from the Vivino platform. Second, it applies this framework to 54 Italian and 27 Spanish wine GIs to examine how these dimensions combine into different regional reputation profiles and how these configurations differ across two major European wine-producing countries. Third, it connects collective GI reputation with producer-level heterogeneity by using cluster analysis to identify distinct market segments based on consumer ratings and prices and examining how producers belonging to these segments are distributed across GIs. In doing so, the study provides a consumer-based approach to benchmarking GI reputation and producer positioning, while shedding light on how digital platforms mediate the recognition, evaluation, and capture of value within contemporary wine markets.

The rest of this paper is organized as follows. The next section presents the conceptual framework. The following section describes the research design and the empirical results. The final section offers implications and topics for future research.

2. Theoretical Foundation

2.1. Reputation and Geographical Indications

Reputation is broadly defined as consumers' beliefs regarding the skills and behaviour of a seller or producer [17]. Shapiro [18] theorized the connection between a firm's reputation and the price premium it can command. According to this theory, a firm will only produce above the minimum

quality standards if it expects to receive a price premium that justifies such investment. This relationship is particularly pronounced for experience goods such as food and wine, whose quality can only be assessed post-purchase. Moreover, reputation is inherently linked to quality, serving as a conduit through which firms communicate specific product characteristics to consumers, thereby mitigating information asymmetries [12,14].

In the context of GIs, two reputation levels coexist: the individual reputation of producers and the collective reputation of the appellation. The appellation acts as an “umbrella brand” embodying the collective reputation of a production area, grounded in an aggregated quality standard [19,20]. Tirole’s [21] collective reputation theory highlights that group reputation is an aggregate of the historical behaviour and quality choices of individual members. Thus, individual behaviour depends on both personal and group reputations, and historical successes or failures influence future group reputation and conduct over the long term.

This dual structure has been extensively discussed in the wine literature. Landon and Smith [22], in their seminal study of Bordeaux wines, show that reputation, proxied by expected quality, has a stronger effect on prices than current quality. Both collective and individual reputation play significant roles, provided that the former functions as an effective quality signal. In a similar vein, Castriota and Delmastro [23] observe that collective reputation and institutional regulation positively affect individual reputation. Accordingly, the individual reputations of GI producers and their brands are embedded within the collective reputation, making GIs’ reputation simultaneously collective and private [2,3,16].

Notably, private brands and GI certifications are not necessarily substitutes. Under many conditions, they complement each other in credibly signalling quality in competitive markets [19]. GIs reduce the cost of reputation building by transmitting more precise information, while private brands remain necessary to justify quality improvements beyond the GI’s minimum standards. Consumers also appear willing to pay higher premiums for co-branded products [1,12].

It is crucial to balance collective and private reputations in a GI. Winfree and McCluskey [20] theorized that individual quality choices are often suboptimal for the producer group, particularly when producers can partially free-ride on the collective name [15]. Not all GI producers exert equal influence in collective reputation, nor do they benefit from it to the same degree. Some producers serve as “reputation leaders,” substantially affecting collective reputation, particularly in higher-value segments [3]. In this sense, collective reputation often coexists with marked internal differentiation and with strong private brands that shape the external perception of the territory.

Recent work reinforces this interpretation. Schatt and Weisskopf [24], for instance, show that the benefits associated with collective reputation are not uniformly distributed across French wine regions or firms, suggesting that collective reputation may be more advantageous in some territorial settings than in others. Likewise, Sellers-Rubio, Mas-Ruiz, and Campayo-Sanchez [25], working on Spanish wines, show that perceived quality within collective brands is shaped not only by the collective designation itself but also by competitive dynamics among products. Their results suggest that collective reputation interacts with internal market structure rather than operating as a homogeneous territorial asset.

The value of collective reputation also depends on the institutional and structural characteristics of the GI itself. Castriota and Delmastro [14] modelled determinants of GI reputation, revealing a U-shaped relationship between the size (members) of the GI and collective reputation. Fishman et al. [26] and López-Bayón, Fernández-Barcala, and González-Díaz [27] reported evidence consistent with this pattern. Regarding geographical extension, Deconinck and Swinnen [28] and López-Bayón et al. [27] showed that larger GI areas may reduce quality and harm reputation.

More broadly, the literature agrees that GI labels can generate price premiums, although the magnitude and even the existence of such premia vary by product, region, and governance design [29,30,31,32,33]. For lower-priced wines, collective names may help consumers narrow their choices and reduce search costs, whereas for higher-priced wines private brands and winery reputation may become more decisive [14,34]. This conditionality also implies that the proliferation of geographical names may weaken the signalling value of collective reputation if consumers become less familiar with increasingly numerous territorial distinctions. Recent evidence supports this concern. On the one hand, Delmond and McCluskey [35] show that increasing the number of regional designations may initially strengthen but eventually weaken price effects, suggesting a crowding-out of the benefits of regional specificity once designation systems become too fragmented. This insight is especially relevant in countries such as Italy and Spain, where the number of registered wine GIs is high and where the coexistence of multiple territorial names may affect the visibility and market valuation of individual GIs.

Overall, the literature points to three conclusions that are particularly relevant for this study. First, reputation remains a central mechanism through which wine markets cope with information asymmetries. Second, in GI systems, reputation is inherently multi-layered, as collective and private reputations coexist and interact. Third, the economic effects of collective reputation are heterogeneous and depend on governance, producer composition, internal differentiation, and the

relative strength of individual brands. These features make wine GIs a particularly suitable setting in which to analyse how regional reputation is recognized, evaluated, and economically valorised.

2.2. Consumer ratings as a novel measure of evaluative reputation

Consumer ratings have recently gained recognition as a valuable quality indicator in the wine industry. Anderson and Magruder [36] underscored the critical role of consumer opinions and social learning in shaping product beliefs and purchase decisions for experience goods like wine. Unlike conventional expert ratings, consumer reviews, e.g., from online platforms like Vivino, capture a wider and more varied range of opinions from a large community of wine lovers and connoisseurs. These platforms allow users to evaluate and comment on wines, fostering a dynamic digital reputation environment that complements the established role of professional critics. Consumer ratings reflect not only perceptions of quality but also recognition and levels of consumer engagement, thereby offering insights into wine reputation from a demand perspective.

Compared to expert ratings, consumer ratings display both strengths and limitations. On the one hand, they draw on a broad and diverse base of evaluators and may capture how wines are experienced in the market rather than under controlled tasting conditions. On the other hand, they can also reflect contextual influences that are normally absent from blind expert tastings, including price awareness, prior exposure to existing ratings, social influence, and heterogeneity in tasting settings. Consumer-generated evaluations may therefore capture more than intrinsic quality alone. They also reflect platform dynamics, patterns of recognition, and the social circulation of opinions [37,38,39]. Recent work further shows that online reputation at the firm level is closely associated with digital orientation and communication strategies in the wine sector, confirming that digital environments are now part of the infrastructure through which wine reputation is built and communicated [40].

An increasing number of studies utilize consumer ratings to explore wine reputation from a novel perspective, suggesting that wine platforms are informative and economically relevant. Oczkowski and Pawsey [39] identified discrepancies between consumer and expert ratings, attributing them partly to divergent sensory preferences. Gastaldello et al. [37] examined factors influencing consumer ratings for wines from Trentino-Alto Adige, identifying a significant crowd effect up to €26 per bottle, which positively impacted average ratings. Additionally, they illustrated a linear relationship between average consumer ratings and bottle prices. Further support for the validity of consumer ratings is provided by Kopsacheilis et al. [41], who show that aggregated Vivino scores correlate substantially with professional critics' ratings and respond to weather conditions in ways consistent with viticultural knowledge. This suggests that consumer ratings capture

meaningful information rather than pure noise. At the same time, Janssen and Ribar [38] compare numerical ratings with textual reviews in Vivino and find that, while textual reviews remain stable, numerical scores increase significantly over time for both expert and non-expert reviewers. Consumer ratings should therefore be treated as market signals of evaluative reputation rather than as pure measures of intrinsic quality. Recent work also indicates that consumer ratings have strong economic salience in wine markets. Using Vivino data for Italy and Spain, Bazen and Cardebat [42] show that customer ratings exert a stronger quantitative effect on bottle prices than expert scores, both for red and white wines, although expert evaluations remain relevant. This contribution is especially pertinent because it concerns the same national settings analysed in this paper and supports the view that digital consumer-generated evaluations now play a significant role in the valuation of wine.

Historically, however, the wine sector has relied predominantly on expert reviews from national and international guides such as Parker's Wine Advocate, Wine Spectator, Peñín Guide, or James Suckling [3,13,14,15,16,27,43,44,45,46]. Consumer-generated evaluations have received less attention, even though they increasingly shape wine visibility and perceived quality in digital settings. This evolving context makes platforms such as Vivino particularly relevant for examining regional reputation from a novel perspective, as they allow us to observe not only how wines are evaluated by consumers but also how much attention they receive and how such signals relate to market valuation.

Taken together, this literature suggests that consumer-generated ratings represent a useful basis for analysing platform-mediated evaluative reputation in wine markets. They capture how wines are judged by consumers, while the volume of ratings conveys information on recognition and reach within the platform community. When observed alongside prices, these signals also make it possible to examine how market valuation relates to both evaluative judgments and digital visibility. This is particularly relevant for GIs, where reputation is collective in nature but increasingly mediated by digital platforms in which territorial names, producer brands, and consumer assessments interact in real time.

3. Research design

3.1. Data setup

Data were obtained from Vivino, the largest online wine community, through web scraping at two different points in time: the Italian dataset was collected in late 2023, while the Spanish dataset

was collected in February 2024. The final dataset contains observations at the single bottle level for two countries: Italy ($n=27,256$) and Spain ($n=20,626$). While the two extractions were not conducted on the exact same date, they are sufficiently close in time to allow meaningful comparison. For each observation (i.e., wine bottle), the following information is available: wine (bottle) name, producer/winery identifier as reported by Vivino, vintage, geographical indication (GI) or region of provenance, rating from Vivino users, number of ratings, wine type, and a price variable captured from the Vivino bottle page at the time of scraping. This price variable corresponds to the platform-displayed selling price associated with the listing at that moment. Because Vivino does not present price information in a fully homogeneous way across bottles—some listings show a single price, while others display both a current price and a crossed-out reference price—the variable should be interpreted as the contemporaneously displayed selling price rather than as a standardized distinction between regular and discounted prices. The unit of observation is the bottle-vintage listing as displayed on Vivino. Accordingly, the same wine label may appear multiple times in the dataset whenever different vintages are listed separately and meet the inclusion criteria. Only observations with complete information for the variables used in the empirical analysis were retained in the final sample.

The dataset was rigorously cleaned to ensure quality and reliability. Bottles with fewer than 25 ratings were excluded to focus on items with sufficient consumer feedback. The GI variable was carefully reviewed to correct for erroneous assignments, such as non-existent GI names, regional names incorrectly recorded as GIs, duplicates due to spacing or spelling differences, and incorrectly separated sub-denominations. A random subsample of wines within each GI was manually inspected to estimate the share of misassignments, guiding further correction efforts. Next, we checked for typos in brand names that may cause the same brand to be counted twice. Non-GI and no-vintage wines, except for sparkling bottles, were excluded from the sample. A GI type variable (*gitype*) was generated to classify GIs as PDO or PGI.

To improve the reliability of the results, vintage bottles older than 2015 were further excluded based on the distribution of bottle observations and especially the ratings in both countries. Indeed, both the number of observations and the size of the community sharply increased in 2015 (reaching over 800,000 ratings on approximately 2,000 bottles in Italy, and 400,000 ratings on approximately 1,200 bottles in Spain) and remained stable with positive fluctuations in the following years, ensuring that the dataset includes a diverse range of wine bottles evaluated by the largest possible consumer base. Accordingly, for vintage wines, the common analytical window spans 2015-2022 in both countries. Because the Spanish dataset was collected slightly later, a

small number of Spanish observations from the 2023 vintage were also retained. The sample also includes non-vintage bottles, particularly among sparkling wines, which are not constrained by the vintage window. Therefore, the 2015-2022 interval should be understood as the main comparative window for vintage wines rather than as the full temporal coverage of the sample.

Because GI categories are defined through country-specific institutional systems, some clarification is needed regarding their comparability across Italy and Spain. In both countries, we rely on the registered wine GIs recognized within the broader European distinction between PDO and PGI. However, these categories take different national forms. In Italy, PDO wines include DOCG and DOC denominations, whereas PGI wines correspond to IGTs. In Spain, PDO wines include DOCa and DO denominations, while PGI wines refer to lower-tier geographical indications registered under the PGI framework. For the purposes of the analysis, these national categories were harmonized into the common PDO/PGI distinction, while preserving their more specific national labels where relevant. This makes it possible to compare GIs across countries within a shared institutional framework, while acknowledging that the internal organization, prestige hierarchy, and practical use of GI categories are not fully identical between Italy and Spain.

Within this framework, we then selected eligible GIs with sufficiently large representations of wines and producers. This selection operated as a second reliability filter following the exclusion of bottles with fewer than 25 Vivino ratings, so that all retained GIs were built from observations with a minimum level of consumer feedback. For non-sparkling GIs, we retained those with at least ten observations per vintage in order to ensure a minimum density of eligible bottle-level observations over time. A different threshold was applied to sparkling GIs because they include a much higher share of non-vintage bottles. In their case, imposing the same vintage-based requirement used for non-sparkling wines would have excluded many otherwise relevant GIs for structural reasons linked to product type rather than lack of market presence. We therefore retained sparkling wines with at least thirty total observations as a pragmatic compromise between representativeness and reliability. In a further step, we verified that all selected GIs were represented by multiple producers or wineries, minimizing the risk of individual or collective reputations excessively overlapping.

Ultimately, we retained 54 GIs for Italy (43 PDOs, including 15 DOCGs and 28 DOCs; and 11 PGIs; $n = 13,863$ wines), and 27 for Spain (24 PDOs, including 2 DOCa; and 3 PGIs; $n = 7,725$ wines), from which the reputation dimensions detailed below were derived. In simple counts, this corresponds to approximately 10% of all Italian wine GIs and about 19% of the Spanish ones.

However, these percentages refer only to the number of appellations and do not capture their market weight. Measured in production terms, the selected GIs account for 62% of certified GI wine production in Italy and 76% in Spain¹. This suggests that the final sample is considerably more representative in market terms than the number of retained appellations alone would imply. At the same time, limited representation in Vivino should not be equated with limited market significance in general. Some excluded GIs may be economically relevant in domestic, local, or less digitally mediated channels while remaining weakly visible on this platform. For this reason, the analysis should be understood as referring to platform-mediated visibility and reputation dynamics rather than to the wine market as a whole. Tables 1 and 2 report descriptive statistics.

Table 1 Descriptive statistics of the Italian wine GIs analysed

GI name	GI type	GI rating		Relative GI recognition	GI price	
		mean	s. d.		mean	s. d.
Barbera d'Alba	DOC	3.90	0.19	1.57%	23.3	24.72
Bolgheri	DOC	4.10	0.24	2.84%	53.9	69.48
Cannonau di Sardegna	DOC	3.90	0.25	0.44%	18.9	11.44
Colli Orientali del Friuli	DOC	3.90	0.23	0.46%	20.0	10.29
Collio	DOC	3.90	0.23	0.35%	20.2	11.05
Delle Venezie	DOC	3.80	0.19	0.27%	13.9	6.54
Dolcetto d'Alba	DOC	3.70	0.16	0.35%	17.6	28.56
Etna	DOC	3.90	0.18	1.56%	30.7	24.13
Irpinia	DOC	3.90	0.24	0.24%	19.5	11.62
Langhe	DOC	3.90	0.20	2.55%	28.1	39.98
Lugana	DOC	3.90	0.20	1.12%	14.8	6.25
Maremma Toscana	DOC	4.00	0.25	0.59%	34.2	56.38
Montefalco	DOC	3.90	0.19	0.31%	18.0	12.27
Montepulciano d'Abruzzo	DOC	3.90	0.24	1.28%	19.3	26.11
Nebbiolo d'Alba	DOC	3.90	0.16	0.28%	22.4	11.09
Primitivo di Manduria	DOC	4.10	0.22	2.46%	21.9	19.97
Prosecco	DOC	3.70	0.19	4.88%	10.9	8.20
Romagna	DOC	3.80	0.24	0.30%	18.4	15.28

¹ Production shares were computed from official statistics on certified GI wine production for the 2015–2020 period. For each country, total certified production was first aggregated across all registered wine GIs. The same aggregation was then carried out for the subset of GIs retained in the dataset, and the resulting cumulative volume was expressed as a share of the corresponding national total. This multi-year approach was preferred to single-year measures to smooth annual fluctuations and obtain a more stable estimate of the market weight covered by the selected sample.

GI name	GI type	GI rating		Relative GI recognition	GI price	
		mean	s. d.		mean	s. d.
Rosso di Montalcino	DOC	3.90	0.18	1.36%	22.7	13.09
Sicilia	DOC	3.90	0.22	1.43%	16.1	11.78
Südtirol - Alto Adige	DOC	4.00	0.22	5.04%	23.3	20.18
Trentino	DOC	3.80	0.25	0.26%	16.0	9.34
Trento	DOC	3.90	0.21	1.14%	27.0	15.03
Valle d'Aosta	DOC	3.90	0.23	0.27%	24.0	13.80
Valpolicella	DOC	3.80	0.24	1.27%	16.3	12.20
Valpolicella Ripasso	DOC	4.00	0.16	2.07%	18.6	9.96
Verdicchio dei Castelli di Jesi	DOC	3.80	0.22	0.37%	16.8	10.85
Vermentino di Sardegna	DOC	3.80	0.21	0.39%	12.3	5.26
Alta Langa	DOCG	3.90	0.14	0.09%	30.2	13.05
Amarone della Valpolicella	DOCG	4.30	0.15	2.68%	44.4	30.76
Asti	DOCG	4.00	0.19	1.62%	12.5	5.29
Barbaresco	DOCG	4.10	0.18	1.41%	66.1	64.42
Barbera d'Asti	DOCG	4.00	0.23	1.17%	20.8	15.45
Barolo	DOCG	4.20	0.17	3.53%	75.0	62.62
Brunello di Montalcino	DOCG	4.30	0.16	3.13%	74.4	57.96
Chianti	DOCG	3.70	0.21	1.78%	12.8	9.67
Chianti Classico	DOCG	4.00	0.21	5.89%	27.9	21.27
Conegliano-Valdobbiadene Prosecco	DOCG	3.90	0.18	2.72%	14.0	5.37
Fiano di Avellino	DOCG	3.90	0.18	0.27%	18.9	7.80
Franciacorta	DOCG	4.00	0.20	3.60%	31.4	21.10
Morellino di Scansano	DOCG	3.80	0.23	0.31%	13.9	8.22
Roero	DOCG	3.90	0.18	0.36%	19.8	9.24
Valtellina Superiore	DOCG	3.90	0.18	0.26%	26.7	10.88
Campania	IGT	3.80	0.26	0.17%	20.9	30.12
Isola dei Nuraghi	IGT	4.00	0.26	0.34%	25.4	18.68
Lazio	IGT	3.90	0.24	0.46%	19.4	17.64
Marche	IGT	4.00	0.30	0.22%	31.0	45.36
Salento	IGT	3.90	0.24	2.29%	13.5	9.94
Terre Siciliane	IGT	3.90	0.21	3.12%	17.7	14.71

GI name	GI type	GI rating		Relative GI recognition	GI price	
		mean	s. d.		mean	s. d.
Umbria	IGT	3.90	0.25	0.77%	20.5	21.85
Veneto	IGT	3.90	0.28	1.26%	18.8	18.66
Venezia Giulia	IGT	4.00	0.21	0.92%	26.8	15.94
Verona	IGT	4.00	0.22	0.83%	20.5	15.55
Vigneti delle Dolomiti	IGT	3.90	0.22	0.62%	22.9	18.74
Total Italy		3.95	0.25	75.27%	30.0	36.92

Note: In Italy, DOC and DOCGs are wine PDOs, while IGT is PGI. The totals are calculated based on all Italian GI wines recorded in our database during the review period rather than only on the GIs specified.

Table 2 Descriptive statistics of the Spanish wine GIs analysed

GI name	GI type	GI rating		Relative GI recognition	GI price	
		mean	s.d.		mean	s.d.
Alicante	DO	3.88	0.22	0.85%	13.3	8.12
Bierzo	DO	3.91	0.22	2.16%	24.5	23.58
Campo de Borja	DO	3.91	0.33	1.61%	19.1	24.57
Cataluña	DO	3.67	0.26	1.01%	9.7	6.23
Cava	DO	3.75	0.24	8.77%	14.8	9.73
Costers del Segre	DO	3.88	0.26	0.84%	17.8	15.44
Empordà	DO	3.86	0.25	0.65%	15.7	16.49
Jumilla	DO	3.91	0.26	2.14%	18.8	20.74
Montsant	DO	3.90	0.22	1.15%	20.4	20.46
Navarra	DO	3.78	0.22	0.73%	11.4	7.91
Penedès	DO	3.83	0.24	1.70%	16.1	14.22
Rías Baixas	DO	3.98	0.19	3.16%	20.5	13.34
Ribeira Sacra	DO	3.93	0.2	0.42%	23.6	18.02
Ribeiro	DO	3.99	0.22	0.26%	18.7	10.95
Ribera del Duero	DO	4.07	0.28	20.11%	35.4	48.58
Rueda	DO	3.83	0.19	2.92%	10.6	7
Somontano	DO	3.84	0.26	0.97%	12.9	11.6
Terra Alta	DO	3.84	0.21	0.40%	13.9	7.88
Toro	DO	4.00	0.29	3.35%	27.9	37.81
Valdeorras	DO	3.99	0.22	0.68%	21.1	13.38
Valencia	DO	3.80	0.21	0.52%	12.8	7.65
Vinos de Madrid	DO	3.85	0.16	0.37%	20.3	15.48
Priorat	DOCa	4.12	0.21	3.35%	48.1	65.01
Rioja	DOCa	3.94	0.27	30.68%	25.9	39.63
Castilla	PGI	3.80	0.24	0.67%	12.8	9.43
Castilla y León	PGI	4.04	0.26	2.39%	30.1	30.45
Mallorca	PGI	3.97	0.23	0.45%	23.6	17.17
Total Spain		3.93	0.11	92.31%	23.5	10.08

Note: In Spain, DO and DOCa are wine PDOs. The totals are calculated based on all Spanish GI wines recorded in our database during the review period rather than only on the GIs specified.

3.2. A three-dimensional analytical framework for GI reputation: conceptualization and operationalization

In this study, GI reputation is conceptualized not as a single composite index but as a three-dimensional framework composed of three analytically distinct but related dimensions: evaluative reputation, recognition, and market valuation. Formally, for each GI_i , reputation is represented as $Rep_i = (E_i, R_i, M_i)$, where E_i denotes evaluative reputation, R_i denotes recognition, and M_i denotes market valuation. This formulation makes explicit that the empirical strategy does not collapse reputation into a single weighted score. Instead, it preserves the three-dimensional framework for GI reputation, allowing each dimension to be interpreted separately.

Our three-dimensional reputation framework is also in line with well-established concepts in the reputation and information-economics literature. Moreover, it is highly applicable for collective reputations such as those for wine regions and GIs. First, using average ratings as perceived quality / evaluative reputation follows directly from the view of wine (and many differentiated goods) as an experience good whose quality is learned through consumption and communicated via evaluations. A large body of evidence shows that displayed average ratings shape consumer responses in platform settings, meaning that average ratings function as actionable quality signals in market coordination [47]. This is conceptually aligned with the collective-reputation perspective: group-level reputations emerge as an aggregation of members' observed quality, and they persist through history dependence and social beliefs [19,21].

Treating rating volume (or the relative share of ratings) as a recognition / popularity dimension is consistent with how online-review research conceptualizes "volume" as a proxy for product salience, market traction, and the strength of word-of-mouth diffusion. Empirically, both the valence (average rating) and the volume of reviews have been associated with demand, with volume often interpreted as an awareness, attention or visibility cue that can amplify the influence of evaluative signals [47,48]. In other words, rating counts capture how widely a GI is encountered and chosen (recognition), while average ratings capture how it is judged once experienced (evaluation).

Treating average prices as a distinct market-valuation or capitalized-reputation dimension (rather than a proxy for reputation itself) is also well grounded. In classic reputation models, price premia arise as returns to reputation because they are what make it privately optimal to sustain high quality when consumers cannot perfectly observe it [18]. In GI settings specifically, theory and evidence link origin and certification to collective reputation that may be monetized through price premia, and work on "nested names" shows how collective (region/GI) reputations and more specific names (brands) are capitalized in prices in structured ways [19,49]. Framed this way, price can be interpreted as a temporal capitalization of market confidence, shaped by repeated

evaluation and recognition, while remaining analytically distinct from the evaluative (ratings) and recognition (volume) dimensions that help build and stabilize that confidence over time.

Empirically, the three dimensions are operationalized using all observations retained in the final analytical sample, including both vintage-specific and non-vintage wines. Evaluative reputation (E_i) is measured as the average user rating across wines belonging to GI_i; market valuation (M_i) is measured as the average listed price across wines belonging to GI_i; and recognition (R_i) is measured as the GI's relative share of total ratings within the national sample, such that

$$\text{GI recognition} = \frac{\text{total number of ratings for GI}_i}{\text{total number of ratings for all national GIs}}$$

Thus, rating and price dimensions are computed as averages, whereas the recognition dimension captures the cumulative concentration of user attention attracted by each GI within the platform environment. The number of ratings is used as a measure of recognition because it indicates the extent of platform user engagement with wines from that GI and therefore reflects its visibility and recognition within the Vivino environment. This dimension is intended to capture cumulative platform popularity rather than annualized or per-vintage recognition. A per-vintage normalization would reflect a different concept—average recognition conditional on vintage presence—whereas our objective is to assess the total concentration of consumer attention attracted by each GI within the platform. This definition may partly favour GIs with longer or denser platform histories, or with a larger number of vintage-specific listings. Accordingly, it should be interpreted as a measure of platform-mediated recognition rather than of total market popularity. It should be noted that Vivino data represent only a subset of the wines available in the market.

Based on these three dimensions, two reputation maps were constructed, one for each country. To complement the graphical analysis, we estimate OLS models in which GI-level evaluative reputation is related to market valuation, recognition, and GI category. Two specifications were estimated for each country to test whether the relationship between evaluative reputation and market valuation is better represented in linear or logarithmic form:

$$E_i = \beta_0 + \beta_1 X_i + \beta_2 R_i + \beta_3 PDOC_i + \beta_4 PDO_i + \varepsilon_i$$

Where E_i denotes the evaluative reputation of the GI, X_i its market valuation, and R_i its recognition. In the linear specification, $X_i = M_i$, whereas in the logarithmic specification, $X_i = \ln(M_i)$. $PDOC_i$ is a dummy variable equal to one if the GI belongs to the most restrictive categories (DOCa in Spain and DOCG in Italy). PDO_i is a dummy variable equal to one if the GI

is a less restrictive PDO (DO in Spain and DOC in Italy). Hence, PGI constitutes the reference category and is omitted from the equation.

3.3. Cluster analysis procedure

As previous studies have noted [50,51,52], the wine market comprises distinct segments based on price and consumer preferences.

To identify these wine market segments, a cluster analysis was conducted separately for Spain and Italy using each producer/winery's average price and average consumer rating. More specifically, we use the producer field reported by Vivino as an operational proxy for "brand." Different labels and vintages associated with the same producer/winery are therefore grouped under the same unit in the clustering procedure. The relevant unit of analysis in this part of the paper is thus the producer/winery identifier, not the individual label. This choice aligns with our objective of capturing broader producer-level positioning on price and ratings, rather than label-specific market niches.

Given the highly skewed distribution of wine prices, the price variable was transformed using the natural logarithm. Consumer ratings were retained on their original 1-5 scale. The clustering procedures were subsequently performed using the logarithm of the average price and the average rating. Additionally, in the Spanish market, Vega Sicilia winery consistently appeared as an outlier, due to its high price (€381.40), even if the price variable was transformed. To avoid distortion of the Spanish cluster structure and improve comparability across markets, Vega Sicilia was therefore excluded prior to clustering.

As a first step, a hierarchical cluster analysis was performed using squared Euclidean distances and Ward's minimum variance method [53]. This procedure minimizes within-cluster heterogeneity while maximizing between-cluster differences. The resulting dendrograms were visually inspected to obtain a preliminary assessment of the underlying cluster structure and to identify plausible numbers of market segments.

To complement the hierarchical analysis, Gaussian Mixture Models (GMMs) were estimated using the `mclust` package from the R library [54]. GMMs allow clusters to differ in size, shape, and covariance structure, providing a more flexible representation of the data than distance-based approaches [55]. Models with different numbers of clusters were estimated and compared using the Bayesian Information Criterion (BIC). Following standard practice, the preferred specification was selected as the model with the highest BIC, indicating the best trade-off between goodness-of-fit and model parsimony.

Additional internal validation measures were employed to assess the appropriateness of the cluster solution. First, the Calinski–Harabasz index was computed for alternative cluster solutions [56]. This criterion evaluates the ratio of between-cluster dispersion to within-cluster dispersion, with higher values indicating better cluster separation. Afterward, the Davies–Bouldin index was calculated [57]. This measure simultaneously considers cluster compactness and separation, with lower values indicating a superior partition.

Finally, the stability of the selected cluster solution was evaluated through a bootstrap resampling procedure. Following Hennig [58], 1,000 bootstrap samples were generated, and the cluster solution was re-estimated for each sample. Cluster stability was assessed using Jaccard similarity coefficients, which measure the extent to which observations remain assigned to the same cluster across bootstrap replications. According to established guidelines, Jaccard values above 0.75 indicate stable clusters, while values above 0.85 suggest highly stable and reliable cluster structures. This procedure provides an additional robustness check and ensures that the identified market segments are not driven by sampling variability.

To compare country markets, Mann-Whitney U tests were performed for each cluster and for both variables (price and rating), along with the r-equivalent effect size for the Mann-Whitney U test. Given the bounded nature of the rating variable (1-5) and its substantial departures from normality, a nonparametric approach was considered more appropriate than a t-test. Several transformations were explored without substantially improving the distributional properties of the data. Therefore, the best option was the nonparametric Mann-Whitney U test, which does not require normality assumptions [59]. To assess the magnitude of the observed differences, an r-equivalent effect size was computed for each cluster and variable [60]. This effect size measure allows us to assess more precisely the magnitude of differences between samples, as the number of observations in each cluster is large, making the Mann-Whitney U test highly sensitive to small differences in prices and ratings.

4. Results

4.1. GI Wine Reputation Maps and Regressions

Based on the three dimensions defined in Section 3.2, GI reputation maps were developed for Italian and Spanish wine GIs. The purpose of these maps is not to estimate causal relationships, but to provide a transparent comparative representation of how GIs are positioned across the three dimensions of reputation within each national sample.

Bubble graphs plot average GI price on the x-axis against average GI rating on the y-axis, while bubble size represents relative GI recognition, measured as the GI's share of total ratings within the corresponding national sample.

Mean sample values are indicated with orange axis lines to facilitate interpretation of each GI's relative position with respect to the overall national averages. This graphical representation allows the joint visualization of evaluative reputation, recognition, and market valuation, thereby offering a synthetic comparative view of the reputation profiles of GIs in Italy and Spain. The graphical analysis was complemented by the regressions reported in Table 3.

The choice between the linear-price and log-price specifications was based on model fit. Table 3 reports the AIC, BIC, and adjusted R-squared for both alternatives. The log-price specification provides a clearly better fit for Spain and a modestly better fit for Italy. Because all three model-selection criteria favor the same functional form in both samples, we retain the log-price specification for the subsequent cross-country analysis. As Figure 1 shows, Italian GIs appear to be divided into two broad blocks: a first larger block of GIs having an average price ranging from about €10 up to €35 per bottle, and a second smaller block of premium GIs ranging from €40 to €75 per bottle. As expected, red-oriented GIs from Piedmont, Veneto, and Tuscany exclusively constitute the latter group, most of which are DOCGs.

Overall, average GI ratings exhibit a positive association with average prices, with the relationship better captured by the log-price specification (Table 3). This descriptive pattern is consistent with a positive association between product pricing and consumers' perceived quality, suggesting that higher-priced GIs also tend to receive higher average ratings on Vivino (Table 3). Nevertheless, some exceptions can be observed. For example, *Primitivo di Manduria* DOC reds show a comparable rating to *Bolgheri* DOC ones, which are sold at more than double the price. Similarly, the perceived quality of *Asti* DOCG wines is higher than the average of GI wines in the same price range. These cases suggest that dimensions other than price and consumer evaluations may also contribute to the relative positioning of GIs in the reputation space.

Looking at GIs by type, DOCGs show the greatest variance in terms of both price range and average rating, ranging from about €13 per bottle for Chianti wines, rated below 3.75, to the much more expensive Barolo and Brunello di Montalcino which also record the highest average evaluations among all the GIs analysed. The related tendency line seems to show DOCGs occupying positions associated with higher average perceived quality than DOCs, although the corresponding coefficient is not statistically distinguishable from zero in this sample (Table 3).

DOC wines (except Bolgheri) start at €10 but tend to remain below €35 per bottle, covering lower-end segments. Their average rating and recognition also vary markedly. Interestingly, there are almost no IGTs in the lowest price segment (i.e., below €15 a bottle) despite it being the least restrictive type of GI certification in terms of link with terroir and method of production. IGTs receive higher average ratings from Vivino users than some DOCs and DOCGs in similar price segments. This descriptive evidence suggests that more restrictive certification schemes (i.e., DOCs) are not systematically associated with higher perceived quality at middle- and lower-priced points within the sample. One possible interpretation is that less restrictive GIs may have greater room to adopt innovative production practices or to adapt more flexibly to evolving consumer preferences, although this mechanism cannot be established from the present analysis alone.

By contrast, GI recognition among Vivino users (represented by the bubble size in Figure 1) does not follow a clear monotonic relationship with price. Considerable variability can be observed within the same price range, especially in the first GI block, where GIs with similar prices display quite different average ratings and recognition levels. For example, *Prosecco DOC* appears to be comparably popular to other sparkling GIs like *Asti DOCG* and *Franciacorta DOCG*, but its average price and rating are considerably lower (€10.9 and €3.7, respectively; Table 1).

Similarly, in the €20-35 range, several relatively unpopular GIs on Vivino, such as *Isola dei Nuraghi*, *Verona*, and *Marche* IGTs as well as *Maremma Toscana* DOC (recognition below 1%; Table 1) received higher average evaluations than more popular GIs such as *Langhe* and *South-Tyrol* DOC, or *Chianti Classico* DOCG. Conversely, GIs belonging to the more expensive block appear to be more similar in terms of recognition on Vivino, with the partial exception of *Barbaresco*, which still records a relative recognition index close to 1.5% (Table 1).

The Spanish reputation map (Figure 2) also shows a logarithmic pattern between average GI wine prices and average ratings from Vivino users (Table 3), with a visually stronger association than in the Italian sample. The graph does not reveal major outliers. Looking at the data by GI type, PDOs cover the widest price range, from €10 per bottle to approximately €35. These GIs also display pronounced variability in terms of average consumer ratings, and in relative recognition on Vivino, as indicated by the bubble size.

Unsurprisingly, the two DOCas in the sample, being the only two Spanish GIs of this kind, focus on a higher price segment (approximately €25-50 per bottle) while receiving markedly different consumer evaluations. The three PGIs are priced between €13 and €30 per bottle and vary considerably in terms of average ratings. Nevertheless, none of them seems to be particularly popular on the platform. The two most popular GIs analysed are instead the cheaper DOCa, *Rioja*,

and the most expensive DO, *Ribera del Duero*. *Cava* DO sparkling wines record one of the lowest average quality ratings in the sample (see Table 2) despite being the third most popular Spanish GI on Vivino (Table 2). In line with this positioning, their average price is also relatively low (€14.8 per bottle; Table 2).

The dotted trend line suggests that DOs generally occupy positions with slightly lower average ratings than PGIs, although the regression shows no difference in ratings between the two in the sample. Nevertheless, some DOs such as *Valdeorras*, *Ribeiro*, and *Rias Baixas* show stronger average evaluations than competing GIs in the segment below €30 per bottle. The fact that these comparatively well-evaluated GIs also appear to be relatively less popular on Vivino suggests that higher recognition is not systematically associated with higher perceived quality. In line with this, the highly popular DOCa *Rioja* (recognition index = 30.7%; Table 2) is positioned below most PGIs and DOs sold at €20-30 per bottle in terms of average rating, while *Priorat* DOCa, with a relative recognition index of 3.4% (Table 2), receives the highest average ratings in the sample. At the same time, *Ribera del Duero* is both the second most popular GI and the second highest-rated GI. Taken together, these patterns point to a heterogeneous relationship between recognition, evaluative reputation and market valuation (Table 3), suggesting that additional factors not captured in the present descriptive analysis may also shape GI positioning on the platform.

Figure 1: Wine GIs reputation map by GI type: Italy

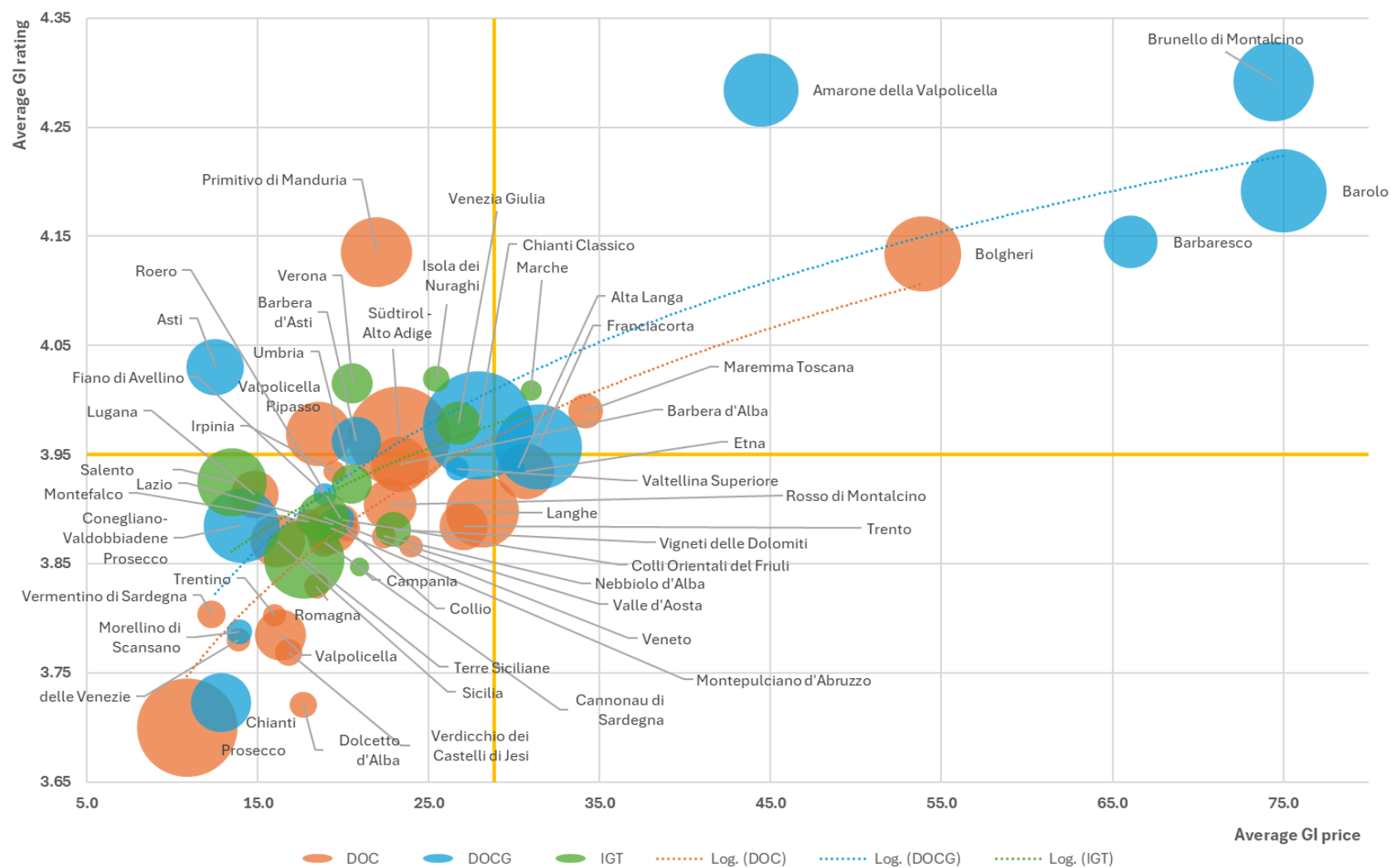


Figure 2: Wine GIs reputation map by GI type: Spain

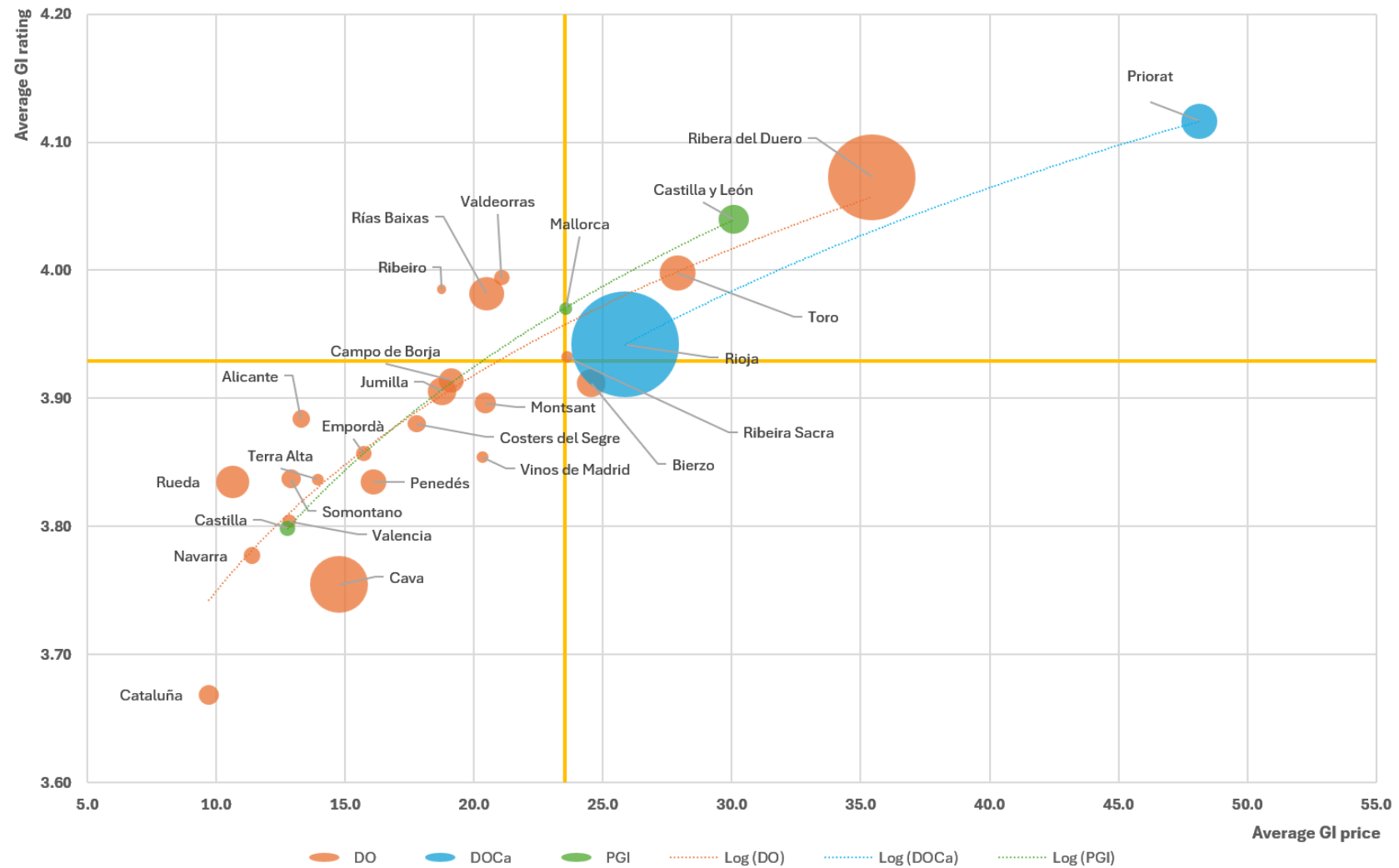


Table 3: OLS estimates of GI average ratings

	Model 1 (Spain) Linear price specification	Model 2 (Spain) Log-price specification	Model 3 (Italy) Linear price specification	Model 4 (Italy) Log-price specification
Dependent Variable	Avg. Rating	Avg. Rating	Avg. Rating	Avg. Rating
Avg. Price	0.011742***		0.0046645***	
Ln (Avg. Price)		0.252624***		0.1708489***
PDO	-0.007845	-0.005299	-0.0435835	-0.0416290
PDOC	-0.090243	-0.027483	-0.0188626	0.0017494
Recognition	0.054553	-0.079430	0.0004276	0.0012229
Intercept	3.675716***	3.170028***	3.8081903***	3.3762463***
R ²	0.7784	0.8184	0.6654	0.6766
R ² Adjusted	0.7381	0.7854	0.6381	0.6502
F-statistic	19.32 ***	24.79***	24.36***	25.62***
AIC	-76.69090	-82.06796	-113.7214	-115.5552
BIC	-68.91588	-74.29293	-101.7875	-103.6213
N	27		54	

Significance levels are based on robust *t*-statistics. **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

4.2. Differences in quality and price between countries: a preliminary analysis

A comparison of average price and rating in both countries indicates that Italian wines are, on average, €6.5 more expensive and 0.02 points higher in ratings. These findings show, at first sight, a visible average price gap and only a marginal difference in perceived quality between the two countries in the sample.

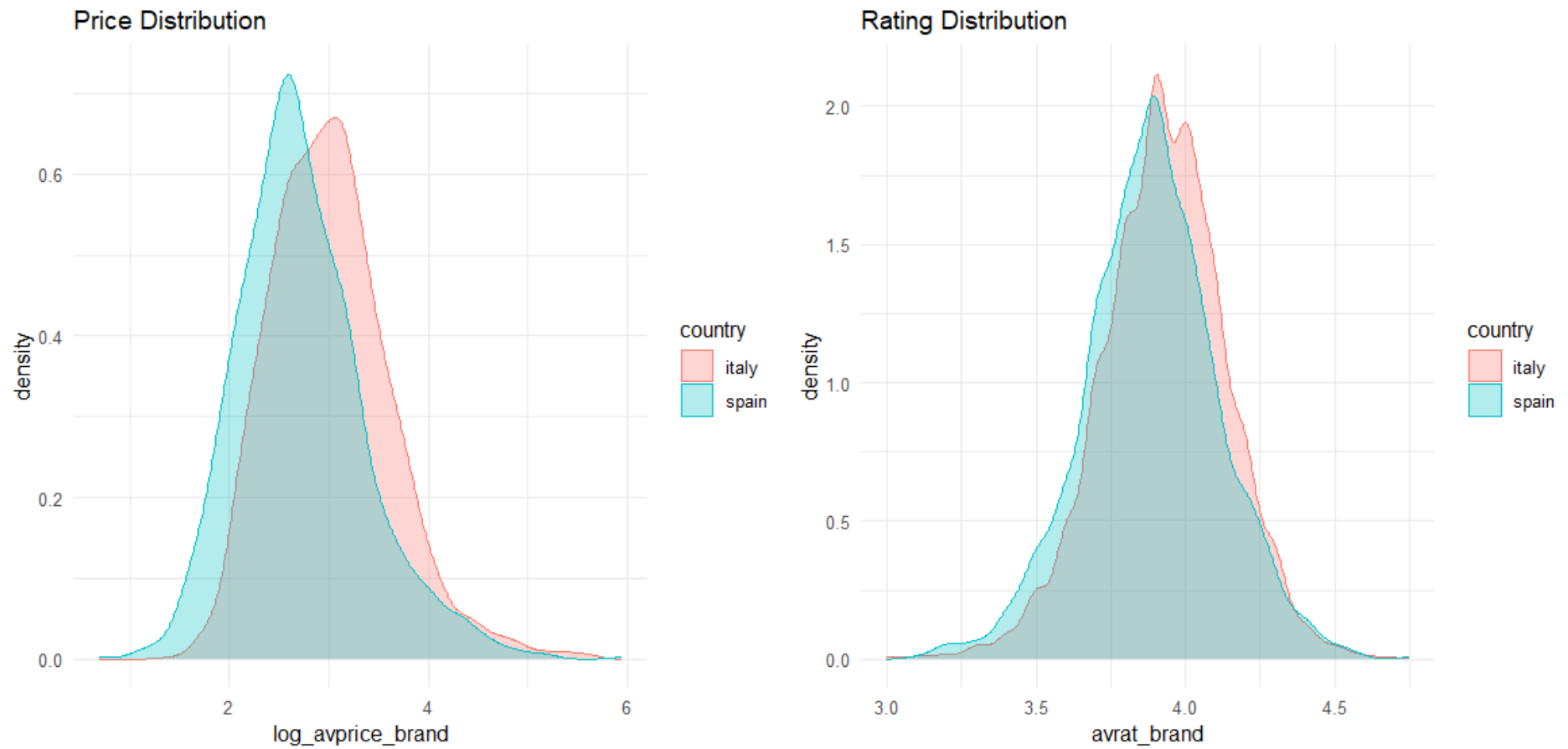
Figure 3 shows that most wine observations are concentrated at lower price points, with a long tail extending toward higher prices. The price distribution in Spain (teal curve) peaks at lower values, whereas in Italy (red curve), it peaks at higher values. The Spanish distribution, which is slightly shifted to the left, demonstrates a greater concentration of lower-priced wines compared to the Italian distribution. In contrast, the Italian distribution contains a higher proportion of wines priced between €20 and €60, indicating a trend toward higher price points.

The rating distributions for both countries overlap substantially and are approximately bell-shaped. The Italian distribution (red) peaks marginally to the right and is slightly taller, suggesting a higher mean or median rating and less variability. Overall, perceived quality is similar across both countries, although Italy demonstrates a slight advantage and greater consistency.

To quantify the differences between countries, the r effect size for the Mann-Whitney test was calculated. The results indicate negligible differences in perceived quality and a small difference in price between the countries, in favour of Italy.

Just Accepted

Figure 3: Wine price and quality distribution by country



However, such aggregate comparisons may conceal substantial heterogeneity across market segments. To explore this possibility, we extend the analysis by segmenting wineries into homogeneous clusters. This approach allows us to examine whether country-level differences emerge within specific market segments, rather than uniformly across the entire sample. By conducting cross-country comparisons within each cluster, we further assess whether country effects vary across price-quality segments and whether certain segments display more pronounced cross-country differences than others.

4.3. Clustering of producers and configuration of GIs

After processing all proposed clustering methods, the results from hierarchical clustering, Gaussian Mixture Models, the Calinski–Harabasz index, and the Davies–Bouldin index suggested a four-cluster solution (Table 4). Consequently, a K-means clustering algorithm with $K = 4$ was estimated to obtain the final segmentation [61]. K-means was chosen for its computational efficiency and for producing clearly interpretable market segments once the optimal number of clusters had been established. To conclude, the stability of the 4-cluster solution was assessed through a bootstrap resampling procedure, obtaining Jaccard similarity coefficients above 0.85 for all clusters except one (Table 4). Because this methodology yields a 4-cluster solution, we use the Costanigro, McCluskey, and Mittelhammer [51] segment names for our clusters, as they were classified as Commercial, Semi-premium, Premium, and Ultra-premium. The 4-cluster model procedure retained 2,358 producers for Italy and 1,335 for Spain. The cluster analysis is conducted at the producer/winery level rather than at the level of individual wine labels.

Table 4: Cluster analysis results

	Italy		Spain	
Method	Number of Clusters Suggested			
Gaussian Mixture Models	4		3	
Calinski–Harabasz index	5		4	
Davies–Bouldin index	3		4	
Jaccard similarity coefficients	Cluster	Coefficient	Cluster	Coefficient
	Cluster 1	0.94**	Cluster 1	0.94**
	Cluster 2	0.87**	Cluster 2	0.94**
	Cluster 3	0.90**	Cluster 3	0.96**
	Cluster 4	0.83*	Cluster 4	0.94**

Jaccard similarity coefficients 0.75* stable cluster, 0.85** highly stable cluster.

Table 5 presents the cluster results by country for the Vivino sample. As previously discussed, there are notable price differences between countries within each cluster, although reputational differences are minimal. Both countries exhibit right-skewed distributions, indicating that Commercial and Semi-premium wines are most prevalent, while Ultra-premium wines are rare. The resulting clusters provide comparable price–rating segments for the subsequent cross-country analysis.

Table 5: K-means cluster results for Italy and Spain

Italy Cluster Centers				
Cluster	Commercial	Semi-premium	Premium	Ultra-premium
av. rating brand	3.77	3.92	4.05	4.22
Log. av. price brand (Av. price brand)	2.36 (€10.59)	2.96 (€19.29)	3.54 (€34.47)	4.44 (€84.77)
Number of Cases in each Cluster				
Cluster	Commercial	Semi-premium	Premium	Ultra-premium
n. brands	710	903	607	138
Total		2358		
Spain Cluster Centers				
Cluster	Commercial	Semi-premium	Premium	Ultra-premium
av. rating brand	3.67	3.86	4.04	4.25
Log. av. price brand (Av. price brand)	1.99 (€7.31)	2.62 (€13.73)	3.25 (€25.80)	4.15 (€63.43)
Number of Cases in each Cluster				
Cluster	Commercial	Semi-premium	Premium	Ultra-premium
n. brands	342	578	320	95
Total		1335		

Table 6 presents the country-comparison results for each market segment and across countries. The price differences between segments are large, except in the Ultra-premium market, where they are medium-sized and heterogeneous in ratings. In the commercial and Semi-premium segments, Vivino consumers value Italian wines more; in the Premium segment, there is no difference between them; and in the Ultra-premium segment, Spanish wines are valued slightly more, even though they are cheaper. Overall, Italian wines appear to be priced higher and receive slightly higher ratings, suggesting a modest difference in perceived quality from the perspective of Vivino users.

Table 6: Mann-Whitney U tests results

Cluster		Test Mann-Whitney U W	R Effect R		N
			R-value	Effect Size	
Commercial	Price	211579***	0.74	Large	1052
	Rating	158729***	0.31	Medium	
Semi-Premium	Price	471791***	0.81	Large	1481
	Rating	322500***	0.24	Small	
Premium	Price	163877***	0.69	Large	927
	Rating	101497	0.05	Negligible	

Ultra-Premium	Price	9550***	0.46	Medium	
	Rating	5627*	-0.14	Small	233
Global	Price	2021625***	0.28	Small	
	Rating	1772795***	0.13	Small	3693

Significance levels are based on robust *t*-statistics. **p* < 0.10, ***p* < 0.05, ****p* < 0.01.

Figure 4 displays the distribution of Commercial wine prices and ratings. In the Commercial tier, wines from Spanish producers (blue) tend to be less expensive, whereas Italian wines (red) show higher typical prices and a more pronounced upper tail in the price distribution. Regarding ratings, evaluative reputation is broadly comparable, although Italy holds an advantage. An r-equivalent estimation confirmed these findings, indicating a large effect size for price and a much more moderate effect for ratings. Thus, in the Commercial tier, Italian wines are, on average, more expensive and receive higher average consumer ratings than Spanish wines.

Figure 4: Commercial cluster price and quality distribution by country

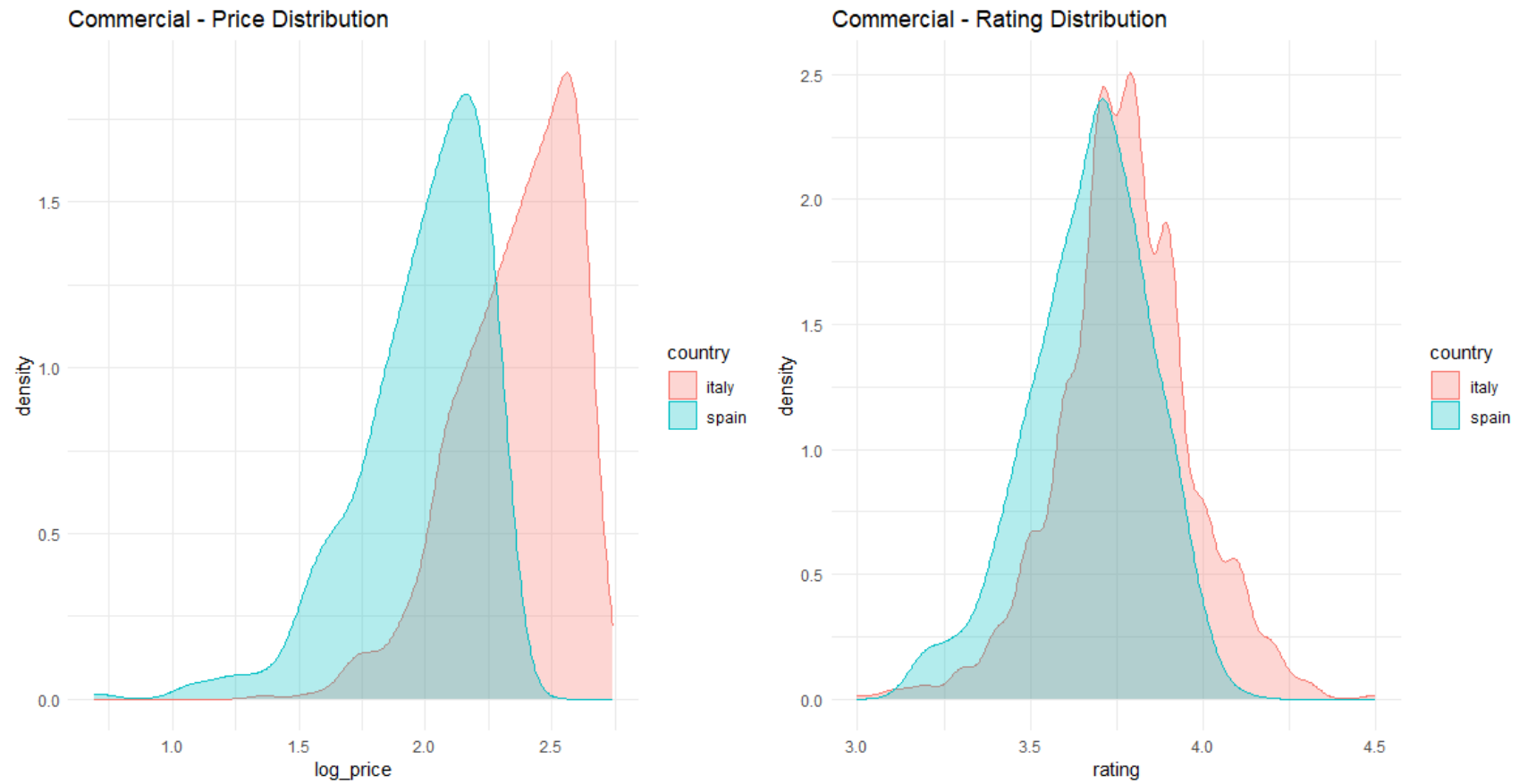


Figure 5 illustrates the price and rating distributions in the Semi-premium wine market. The Italian Semi-premium segment (red) is characterized by higher prices, whereas the Spanish segment (blue) is less expensive. Ratings are more similar between the two countries. The effect size for price is large, even larger than in the Commercial tier, while the difference in quality is small. These results indicate a significant price gap without a corresponding difference in evaluative reputation.

Figure 6 presents the price and rating distributions in the Premium wine market. Italian Premium wines (red) are associated with higher prices and a broader price range, while Spanish Premium wines (blue) are priced lower and are more tightly clustered. Ratings appear similar between the two countries. The r-equivalent effect size for price is medium, with no statistically significant difference in evaluative reputation perceived by consumers.

Figure 7 shows the distribution of price and ratings across the Ultra-premium segment. In the Ultra-premium tier, Italy (red) is priced higher and offers more extreme options; meanwhile, Spain sits closer to lower-priced Ultra-premium bottles, with prices concentrated near the lower bound. Spanish wines receive slightly higher average ratings, with a more concentrated distribution. The effect size for price in this market segment is medium across countries, higher for Italian wines, but with a small difference in ratings, favouring Spain.

Figure 5: Semi-Premium cluster price and quality Distribution by country

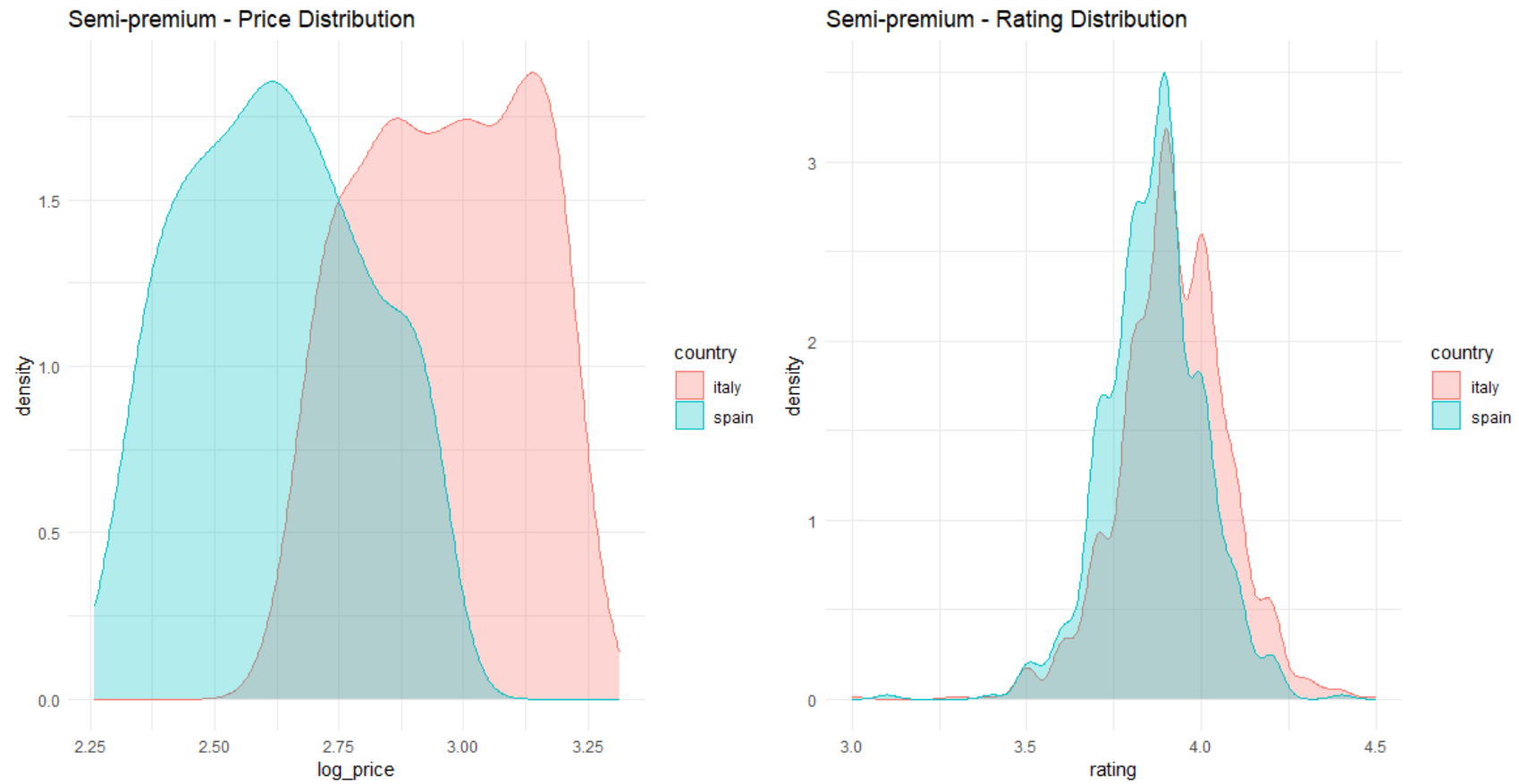


Figure 6: Premium cluster price and quality distribution by country

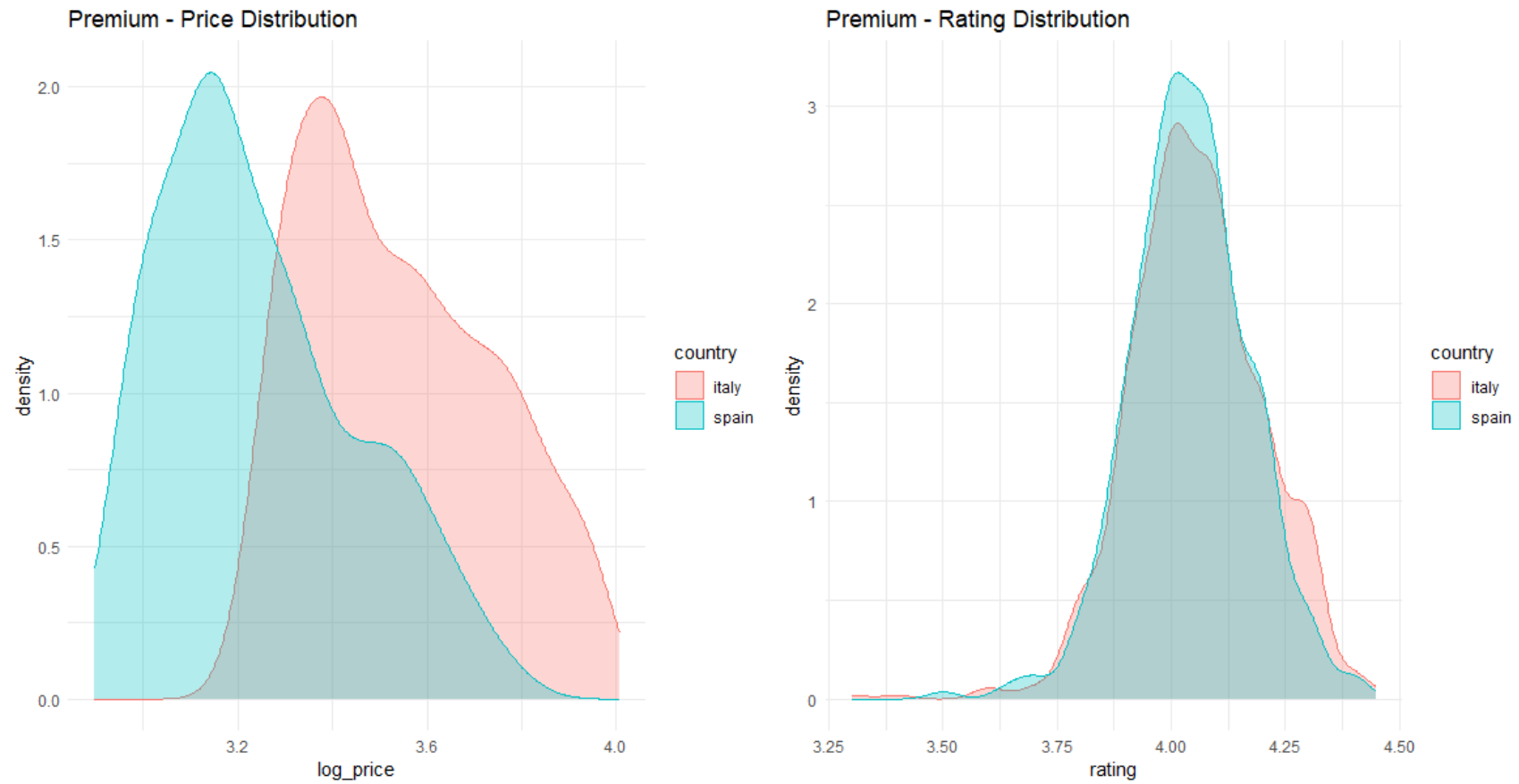
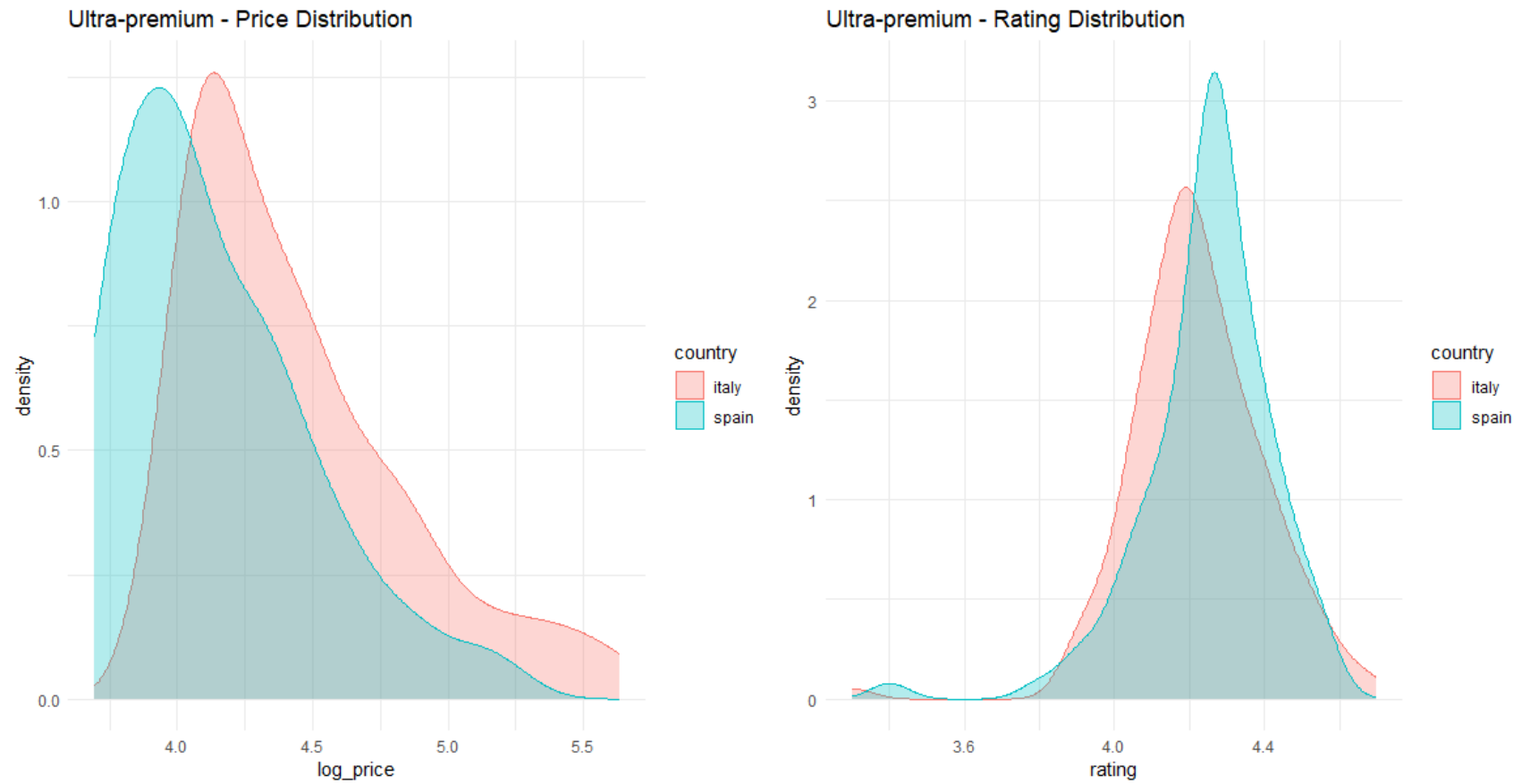


Figure 7: Ultra-Premium cluster price and quality distribution by country



In summary, segmenting the Vivino wine market by price and perceived quality reveals that the gap between prices and ratings varies across tiers. As the market shifts toward premium segments, the price gap narrows, while the direction of the ratings gap reverses. At the upper market tiers, Spanish wines receive comparable or slightly higher consumer ratings despite lower prices. Thus, the observed cross-country price differentials are not matched by corresponding differences in platform-based evaluative reputation, a pattern consistent with stronger market valuation of Italian origin.

Building on these results, a further step consists in examining whether the observed price-quality dynamics are linked to the geographical identity of wines. Specifically, we investigate how wineries belonging to different GIs are distributed across the previously defined clusters. By mapping clusters to GIs, we can determine whether the premium-price segments where the price gap narrows and the ratings gap reverses are disproportionately populated by denominations in each country.

4.4. Configuration of GIs after clustering

In this section, the distribution of producers' clusters across the selected GIs was tabulated. A bar chart ranking the GIs from most to least popular was created for each country (Figure 8 for Italy and Figure 9 for Spain), utilizing the relative recognition dimension previously calculated for the bubble plots. Figure 8 shows that most Italian GIs in the sample are dominated by Commercial and Semi-premium wineries. This trend is particularly pronounced in large, high-volume denominations such as Prosecco. The Premium segment is especially significant in the “prestige red” category (e.g., Barolo, Brunello di Montalcino, or Amarone della Valpolicella), where more producers are positioned in the Premium tier. The Ultra-premium segment is less common but with high proportions in a few luxury-oriented denominations (like Brunello di Montalcino or Rosso di Montalcino).

Figure 9 presents the distribution for Spain, where the Commercial and Semi-Premium segments are the most prevalent in the sample. Spain has a higher proportion of wineries in the Semi-premium (4.96% more) and Ultra-premium segments (1.26% more). Italy has a higher proportion (1.79% more) in the Premium segment. These differences indicate a somewhat different distribution of producers across premium market segments in the two countries.

Figure 8: Wine market segments distribution across GIs in Italy

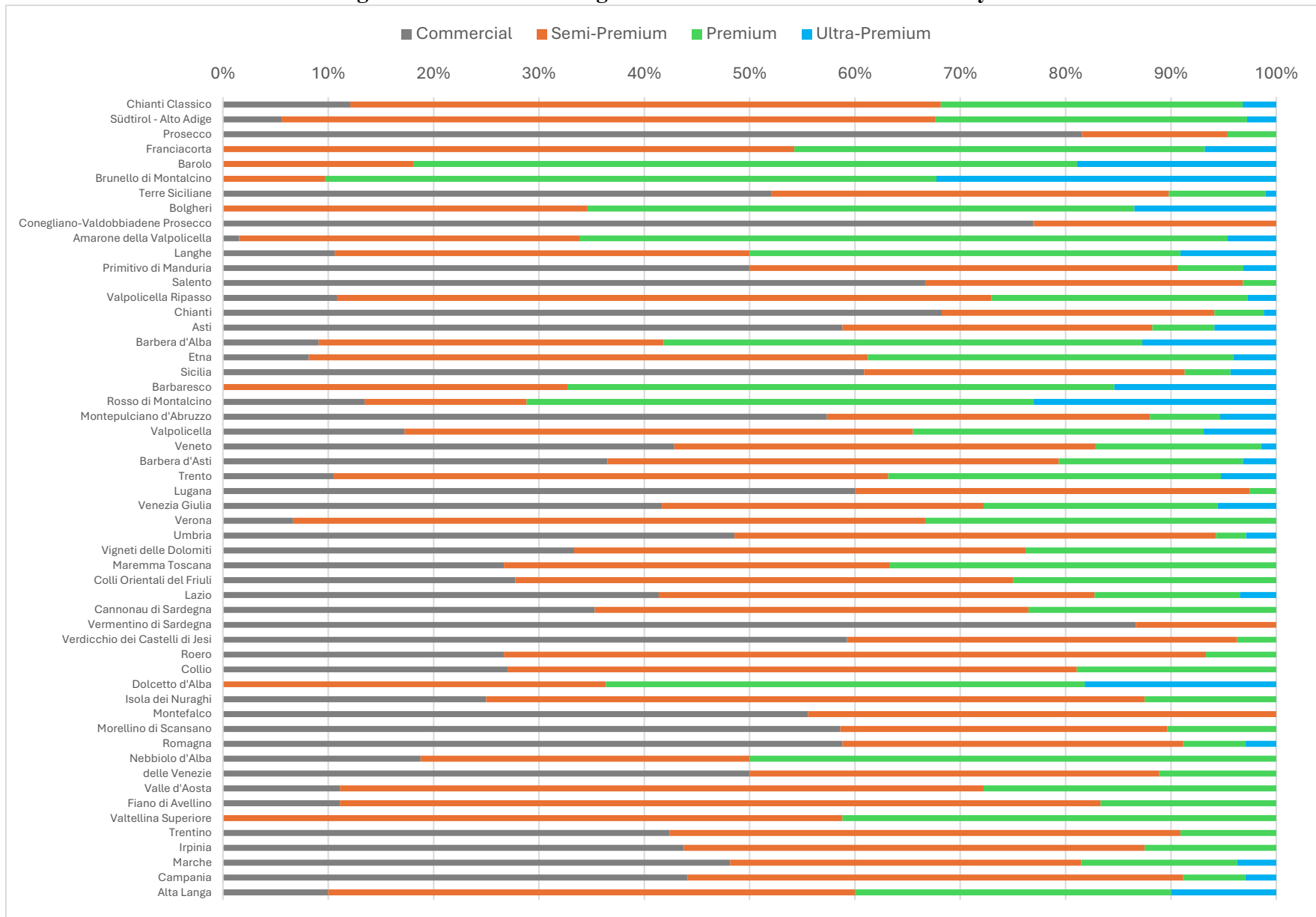
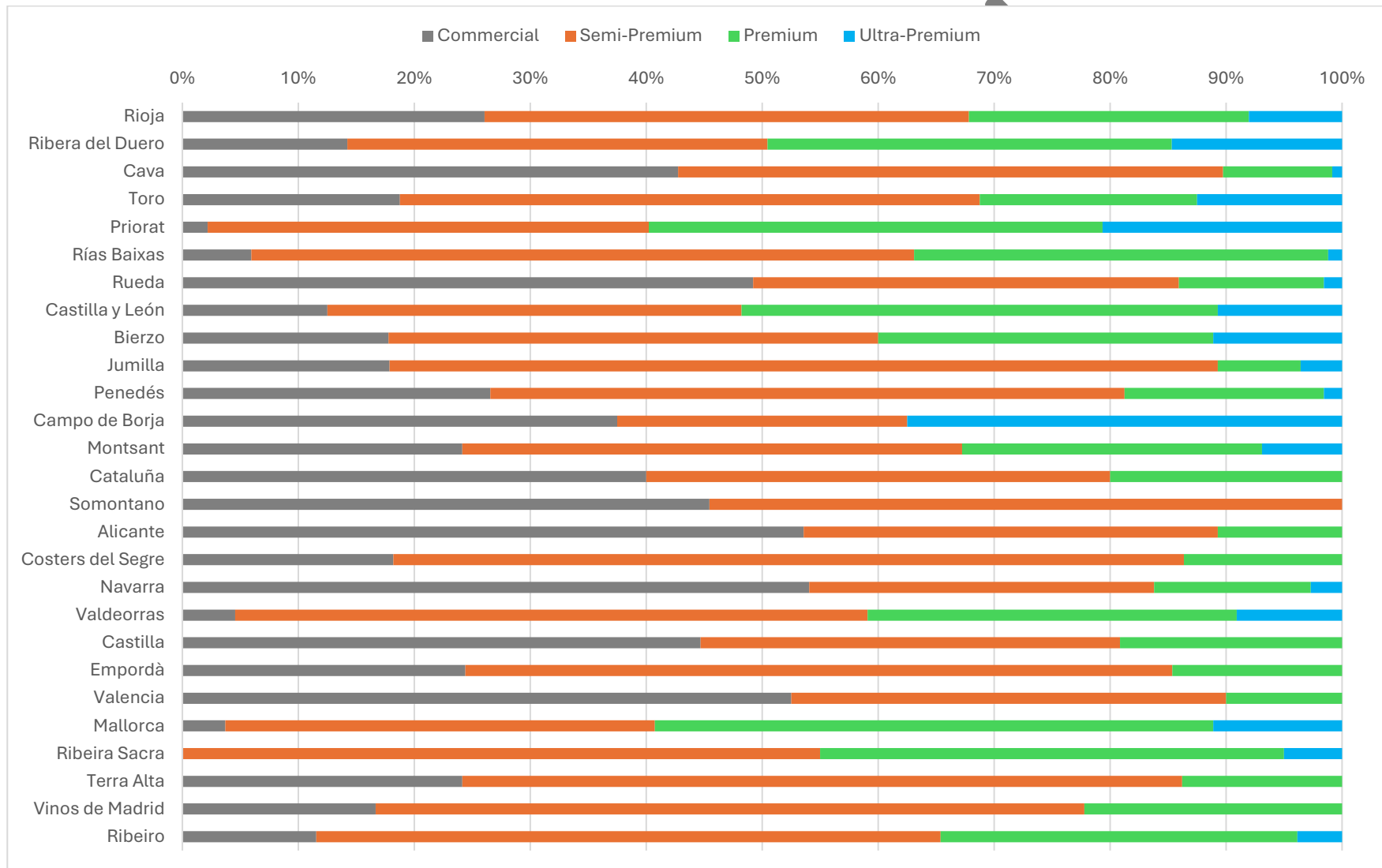


Figure 9: Wine market segments distribution across GIs in Spain



The Italian sample features a flagship group of highly popular GIs supported by a long tail, with Commercial and Semi-premium wines dominating most denominations. However, Premium tiers are present across several iconic GIs, including leading red and premium sparkling wines. In contrast, Spain's market is more concentrated in a few popular GIs (notably Rioja, Ribera del Duero, and Cava), which hold significant market share. The cluster composition in Spain is generally less commercial-led, and premiumization (Premium and Ultra-premium) is more widespread, appearing in a higher percentage of regions.

5. Conclusions

Our comparative analysis of Italy and Spain shows that regional reputation in platform-mediated wine markets is inherently three-dimensional. Across both countries, recognition (or popularity based on relative rating volume), evaluative reputation (or average ratings), and market valuation (average price levels, interpreted as the capitalized dimension of GI reputation) emerge as analytically and empirically distinct dimensions.

A central finding concerns the uneven digital visibility of registered GIs on the Vivino platform. Only 54 out of 522 Italian GIs (approximately 10%) and 27 out of 149 Spanish GIs (19%) reach sufficient rating volume to allow statistically meaningful analysis during the common vintage reference period. However, these percentages based on the number of GIs understate the effective market relevance of the retained sample. In production terms, the selected GIs account for 62% of certified GI wine production in Italy and 76% in Spain, indicating that the dataset captures a substantially larger share of the certified wine market than simple counts of appellations alone would suggest. At the same time, a substantial number of officially recognized GIs remains weakly represented or absent on the platform. This should not be interpreted as evidence of limited market importance in general, since some excluded GIs may remain economically relevant in domestic, local, or less digitally mediated channels. Rather, it points to an uneven capacity to generate visibility within platform-mediated attention markets where digital attention and familiarity with appellations become part of the reputational process itself [35,37]. Given the increasing role of online platforms in shaping consumer search, evaluation, and purchase decisions [47,48], this limited representation raises important questions about the communicative effectiveness of many GIs as collective marketing tools. Platform absence may reflect limited market orientation, small production scale, or insufficient digital engagement rather than quality deficiencies per se; nevertheless, from a demand-side perspective, invisibility constrains recognition and reduces the capacity for collective reputation formation in digitally mediated environments. Our results suggest that digital presence is increasingly important for participation

in platform-mediated reputation markets, even if this should not be read as a general condition for market relevance across all wine channels [40].

Our analysis also reveals a positive association between average ratings (i.e., perceived quality by the online crowd of consumers) and average prices, a result that aligns with previous studies and recent evidence based on Vivino data for Italy and Spain [39,42]. As prices increase, the average rating for GIs also rises, albeit at a decreasing rate, suggesting diminishing marginal returns of perceived quality at higher price levels. In upper market segments, rating dispersion compresses, while price dispersion continues to expand. This pattern is consistent with the interpretation of price as the capitalized dimension of GI reputation [18,22]. Once a threshold of perceived quality has been achieved, additional price differentiation reflects accumulated symbolic capital, scarcity, historical positioning, and consumer expectations rather than proportional improvements in sensory evaluation.

Contrary to some prior research finding that stricter GI schemes are associated with higher quality and price premia [15,62], our study does not identify a systematic positive relationship between institutional restrictiveness and average consumer ratings. In Italy, DOCGs do not uniformly outperform DOCs or PGIs in terms of perceived quality despite being popular and spanning a wide range of prices. Notably, certain PGIs perform comparably to PDOs within similar price segments. In Spain, the small number of DOCa regions (Rioja and Priorat) and the limited presence of PGIs in the data constrain broader generalizations. Overall, our findings suggest that regulatory strictness does not automatically translate into higher crowd-perceived quality. Institutional certification appears more strongly associated with price positioning and historical signalling than with systematic differences in consumer ratings, which is consistent with recent evidence showing that the benefits of collective reputation are distributed unevenly across wine regions and firms [24].

Platform recognition, measured as relative rating volume within each country, does not correlate with higher perceived quality. Several of the most frequently rated GIs display only moderate average ratings. At the same time, GIs with higher average prices and ratings typically exhibit at least medium-to-high levels of recognition. This asymmetry reinforces the multidimensional nature of reputation. Recognition represents visibility, while evaluative reputation captures perceived quality. High recognition does not guarantee superior quality perception by consumers; however sustained high price positioning rarely occurs in the absence of a minimum threshold of recognition. This finding aligns with literature emphasizing the independent but interacting effects of review volume and valence on demand [63] and with more recent evidence showing that

recognition within Vivino may affect ratings without collapsing recognition into perceived quality [37].

The cross-country comparison further shows that the primary differences between Italy and Spain are driven by prices rather than by perceived quality. While Italian wines are consistently priced higher across all segments, differences in average consumer ratings are small, and Spain even outperforms Italy in the Ultra-premium segment. Non-parametric tests confirm that the country effect is economically meaningful for price but weaker for perceived quality. Italian wines command higher prices despite relatively small differences in platform ratings, a pattern consistent with a country-of-origin (COO) price premium [64] and with recent Vivino-based evidence for Italy and Spain [42]. This supports the interpretation of price as the capitalized dimension of GI reputation embedded not only at GI but also at national level. One plausible interpretation, consistent with COO and reputation theory, is that accumulated historical positioning and consumer expectations contribute to this differential.

Clustering-based segmentation shows that both countries have a broadly similar structure, with most wineries concentrated in the more commercial segments and only a few in the most premium range. Across clusters, price and expected quality increase together. However, price differences between countries are not matched by proportional differences in consumer ratings. In higher segments, the price gap between Italy and Spain seems to reduce, while perceived quality is the same or even better for the latter. This pattern is consistent with the possibility that country-of-origin and accumulated capitalized dimension of GI reputation exert increasing influence as market prices rise. Italian wines appear to benefit from stronger price-based differentiation, whereas Spanish wines seem to compete more closely on perceived quality relative to price.

Segment distribution across GIs reveals substantial heterogeneity within both countries. Most denominations are strongly associated with Commercial and Semi-premium wines, including several highly recognized GIs, above all sparkling-orientated GIs such as Prosecco and Cava. Premium and Ultra-premium segments are concentrated within a limited number of emblematic regions. In Italy, the GI system exhibits a pyramidal structure: a broad base of Commercial and Semi-premium denominations supports recognition, while iconic GIs maintain significant representation in higher segments. Regions with a highly capitalized dimension of GI reputation often span multiple segments from commercial presence to premium differentiation. The Spanish market is characterized by a smaller number of dominant GIs, and recognition is concentrated in high-volume denominations. Premium and Ultra-premium wineries are present across denominations but remain closely tied to a limited set of reputation leaders. Compared to Italy,

Spain exhibits a stronger horizontal concentration of recognition and a less pronounced vertical price hierarchy.

Taken together, these findings reinforce the multidimensional nature of GI reputation. Consumer perceptions of quality are shaped not only by ratings and regional affiliation but also by capitalized price structures and country-of-origin effects. The observed platform-mediated recognition asymmetries coexist with historically embedded prestige hierarchies and differ across the national institutional contexts examined, yielding distinct configurations of recognition concentration, premiumization, and value capture within wine value chains.

Several limitations must be acknowledged. The dataset may exclude less-engaged wine consumers who are unlikely to use Vivino yet may represent a relevant audience for certain GIs. Additionally, Vivino data may under-represent or omit GIs that are primarily marketed locally, as habitual consumers may not participate in rating these wines, which are often not recognized or valued outside their regions. Yet, the crowdsourced nature of quality evaluations partially mitigates this limitation compared to expert ratings. At the same time, platform-based numerical ratings may themselves be affected by specific sources of distortion, including reputation inflation over time, which should be borne in mind when interpreting digitally mediated evaluative signals [38]. The reputation map covers only a subset of GIs in each country, limiting the generalizability of reputation performance. Moreover, with only three PGIs included in the Spanish data, a comprehensive assessment of national PGI performance relative to PDOs is not possible. Comparing the findings for the two countries studied with those from another complex GI context, such as France, would further help validate the identified reputation framework.

Future research should employ hedonic price models and longitudinal analyses to disentangle the causal interplay between ratings, popularity, price formation, and country-of-origin premia. Nonetheless, the present study provides a structured empirical foundation for understanding how digital reputation systems intersect with collective and individual reputational capital in transforming wine markets.

6. Managerial and Policy Implications

Our findings carry several managerial and policy implications for operators in online platform-mediated wine markets, including producers, brand managers, and regional consortia. By distinguishing between recognition, evaluative reputation, and the capitalized dimension of GI reputation, they can better understand how digital visibility does, or does not, translate into sustainable valorisation.

One key implication concerns the need to distinguish between recognition and capitalization strategies. Operators should define more explicitly whether their strategic objective is volume-driven recognition, the capitalized dimension of GI reputation, or a combination of both. Our results show that platform visibility (recognition) and price positioning (capitalized dimension of GI reputation) follow distinct logics. A high volume of ratings increases platform visibility and, potentially, its commercial relevance to downstream actors, but recognition alone does not guarantee higher prices. Wineries operating in high-visibility, Commercial-dominant GIs must prevent that visibility from anchoring them in low-price segments. Conversely, producers in premium-oriented regions should ensure that limited commercial presence does not reduce broader market awareness. Strategic clarity regarding segment positioning is essential to avoid value dilution.

Another implication follows from the fact that price and rating differentiation diverge at the top of the market. In Premium and Ultra-premium segments, rating dispersion narrows while price dispersion increases. This suggests that once a threshold of perceived quality has been achieved, marginal improvements in ratings yield diminishing returns. Although these mechanisms are not directly tested here, the observed divergence between ratings and prices at the upper end suggests that managers should consider other sources of differentiation identified in the wine-marketing literature, including narrative coherence, brand heritage, scarcity management, and distribution control. Accordingly, operators in these segments may benefit more from long-term brand building, allocation discipline, and consistency than from short-term rating optimization. Relatedly, the three-dimensional reputation framework can serve as a practical diagnostic tool: misalignment between recognition, ratings and prices may reveal under-capitalization, limited market penetration, or reputational fragility.

The findings also point to the importance of adapting strategies to national and institutional contexts. The comparative results indicate that platform effects are mediated by institutional and historical contexts in Italy and Spain, so strategies should not be transferred mechanically across countries. Premiumization in high-volume regions requires conscious product and brand differentiation strategies, while any commercial expansion in historically capitalized regions must be carefully balanced to preserve capitalized value and long-term pricing integrity. Moreover, institutional restrictiveness alone (IGT vs DOC) may not guarantee higher perceived quality, which implies that quality perception needs to be actively managed and continuously reinforced.

More broadly, digital platforms should be understood as arenas of reputation formation rather than as mere marketing tools. Platform-based recognition can amplify visibility, but it does not

automatically modify long-term pricing hierarchies or substitute for accumulated reputation capital. Digital recognition can contribute to the capitalized dimension of GI reputation, but it cannot replace it. Strategically mapping the interplay between recognition, evaluative reputation, and price positioning may help operators navigate the evolving competitive landscape of platform-mediated wine value chains and enhance their valorisation capacity.

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7. References

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