Private vs. Collective Wine Reputation

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Abstract

Using a hedonic pricing model, this paper investigates the pricing implications of two broadly defined wine reputation strategies: private and collective. While the former consists of an individual quality differentiation strategy relying on an individual wine producer's own reputation, the latter mainly relies on the reputation of a group of wineries belonging to a particular geographic denomination. To this aim, wine purchases made by a nationally representative panel of Italian households were analyzed. Estimates based on quantile regression reveal that the effects of the two reputation strategies (private and collective) have a different weight according to the price segment of the wines in question. While private reputation plays a major role in both low and high priced wines, collective reputation in terms of geographical designations seems especially important for high priced wines.

Keywords: hedonic price function, Italian wine sector, quantile regression, geographical indication.

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Introduction

Reputation plays a crucial role in markets where product quality is uncertain until after consumption (Rogerson 1983; Rindova et al. 2005). Products showing such features are defined as credence goods (Nelson 1970; Roe and Sheldon 2007). Company names, individual brands or collective certification contribute to defining signals that affect consumers' expected quality of credence goods (Costanigro et al. 2012). The effects of reputation on food, whether private or collective, have been widely investigated in the literature (Di Vita et al. 2013; Brentari et al. 2011; Costanigro et al. 2010; Benfratello et al. 2009; Landon and Smith 1997; Shapiro 1983). Within the food industry, wine represents a clear example of a credence good[1]. It constitutes a rather complex and sophisticated case where a reputation system is of paramount importance for marketing outcomes. Most wineries have their own brand and at the same time can potentially benefit from a regional, and collective reputation such as that endorsed by a geographical indication (GI) label. Several marketing strategies have been designed worldwide to increase reputation for wines (Louriero 2003). This is due to a particular aspect of wine: drinking a glass or buying a bottle of wine embodies a bundle of choices that depend on attributes that different consumers identify, deem or perceive, in a different way (Ritchie 2007; Caracciolo et al. 2015; Dal Bianco et al. 2016).

Perceived quality and reputation attributes have been widely recognized in the wine industry, leading most scholars to argue that producer/private and regional/collective reputation plays a prominent role in determining wine price (Costanigro et al. 2010; Schamel 2006; Schamel and Anderson 2003). Despite the large number of contributions in the economics literature, the role of a wine's reputation in price formation is still widely debated (Panzone 2011; Costanigro et al. 2010; Goldstein et al. 2008; Tirole 1996; Shapiro 1983) and the effect that private and collective reputation have on price formation is still unclear. To illustrate this point, it has been observed that price allows better evaluation of wine quality than sensory attributes (Almenberg and Dreber 2011; Rao 2005; Rao and Monroe 1989; Monroe 1973), positively influencing the perception of expected quality and possibly contributing to the formation of the product's reputation (Veale and Quester 2008). For this reason, valuing the effect of private and collective reputation on price is far from straightforward.

Initiatives to enhance private reputation (based on producer brand) and collective reputation (such as the Geographical Indication label) may be viewed as two extreme quality differentiation strategies. While the former consists of an individual quality differentiation strategy relying on an individual wine producer's own reputation (Landon and Smith 1997; Shapiro 1983), the latter can be considered the sum of individual reputations, despite that it may be also affected by specific features of the group, such as size of the coalition[2]. Hence consumers might make their choice on the reputation of the region that endorses the particular denomination (Winfree and McCluskey 2005; Chambolle and Giraud-Héraud 2005; Loureiro 2003; Tirole 1996).

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[1] According to Schmit et al (2012) and Castriota and Delmastro (2014), wine can also be considered as an experience good when the consumer has the capability to measure its utility gain or loss after consumption. Thus, if for an expert consumer may prevail the experience side, for the average consumer the credence side is certainly more important. Considering we analyze the average Italian household, we referred to wine as a credence good.

[2] For instance, the size of a coalition could affect group reputation since it may influence its visibility (Castriota and Delmastro 2014).

Both strategies require long-term choices for wineries: adopting a *private brand* reputation strategy entails long-term investments in production/processing/bottling and marketing/promotion, as well as additional costs related to procurement strategies; *Geographical Indication,* or collective reputation, requires compliance with stringent quality schemes that are likely to pre-commit production level (delimited production area, maximum yields per hectare, maximum yield of wine from grapes, minimum density of rootstocks per hectare, etc.) with a loss of production flexibility for the wineries (Malorgio et al. 2013).

Whether either of the two strategies is beneficial for wineries depends on a number of factors. One could be strictly related to the specific segment of wine under investigation, and it cannot be excluded that the two strategies may be complementary and mutually reinforcing or even conflicting.

Indeed, according to Menapace and Moschini (2011), an interaction exists between collective and private reputation, with the former improving the ability of the latter to operate as a mechanism for signaling quality to consumers in a credible way. However, the perception of quality signals, including those related to private and collective reputation may largely vary across consumers, making their effect on the market complex to analyze. For instance, preferences for wine attributes, including the region of production and brand name also depend on consumers' expertise, (or subjective knowledge) differing among experts and novices (Viot 2012). Therefore, the resulting impact of both private and collective reputation strategies may vary according to consumers' characteristics, including wine involvement, geographical distance to the production area, age, etc. (Hristov and Kuhar 2015; Atkin and Thach 2012).

Since this point remains largely unaddressed by the literature, our study aims to partially fill this significant gap by valuing the contribution of both private and collective wine reputation to price. To do so, purchases of wines in 2011 by nearly 8,000 households, statistically representative of the Italian population, were analyzed in an attempt to disarticulate the relationship between price and wine reputation by estimating the hedonic function using quantile regression.

Quantile regression has been widely used in economic research related to consumer studies (Davino et al. 2015) and alcohol consumption (Kerr et al. 2006; Manning et al. 1995). In addition, a recent contribution using quantile regression showed that the importance of reputation varies as product prices change (Costanigro et al. 2010). Nevertheless, to the best of our knowledge, no estimates of hedonic function have been performed which compare private vs. collective reputation in the wine industry.

The paper is organized as follows. In Section 2 the theoretical framework and empirical approach adopted are described. Section 3 presents the sample data while Section 4 presents the estimates of the hedonic function via quantile regression. Some discussions are drawn in Section 5, while Section 6 concludes the paper.

Theoretical and Empirical Framework

Since the seminal study on hedonic modeling carried out by Rosen (1974), several studies have analyzed the quality attributes and characteristics of wine, estimating their implicit prices (Combris et al. 1997; Landon and Smith, 1997; Nerlove 1995; Oczkowski 1994; Golan and Shalit 1993). Hedonic price estimation has continued to be applied worldwide to the wine industry in the 21st century (Kwong et al. 2011; Schamel and Anderson 2003; Ling and Lockshin 2003; Oczkowski 2001; Combris et al. 2000), and some authors have specifically analysed Italian wine (Di Vita et al. 2015; Caracciolo et al. 2013; Brentari et al. 2011; Boatto et al. 2011; Benfratello et al. 2009).

The hedonic pricing method assumes that goods consist of a bundle of characteristics valued by their utility-generating properties. Market price reflects the composition of the attributes that, on the contrary, have no explicit price. To this extent, it is possible to value the attributes that compose the final good by analyzing the systematic variation in the price (Rosen 1974).

One of the crucial choices to make when using a hedonic function concerns the functional form of the hedonic price function (Combris et al. 2000). In the literature, there are many functional forms implemented (Fogarty 2006). Testing non-linearity parameters via Box-Cox transformation mainly drives the choice. That said, the stochastic version of the hedonic equation is generally estimated through ordinary least squares. However, this approach proves to be insufficient when the sample of wines is heterogeneous, and there is a broad distribution of prices (Costanigro and McCluskey 2011). Furthermore, hedonic price estimation with OLS can be cumbersome when quality information (or signaling attributes) change at different price ranges (Oczkowski 2001).

To overcome this limitation, in this work we implemented quantile regression (QR), which produces the estimate conditional upon different price percentiles, allowing analysis of the effect of key variables on different price levels/quantiles (Davino et al. 2015).

Stochastic formulation of the hedonic equation for the *w-th* wine estimated with quantile regression is as follows:

$$(1) \quad Qp_w(\tau \mid \mathbf{x}_w) = \alpha(\tau) + \mathbf{x}_w' \boldsymbol{\beta}(\tau) + \varepsilon(\tau)_w$$

Equation 1 expresses the quantiles of the conditional distribution of wine price as linear functions of $\mathbf{x_w}$, a R-vector of wine attributes $\mathbf{x_w} = \{x_w^1, ... x_w^R\}$, where $0 < \tau < 1$.

The *τ-th* QR estimator of $\boldsymbol{\beta}(\tau)$ minimizes the following objective function through the linear programming algorithm initially proposed by Armstrong et al. (1979) and generalized by Hunter and Lange (2000):

$$(2) \quad \sum_w \left| p_w - \alpha(\tau) + \mathbf{x}_w' \boldsymbol{\beta}(\tau) \right| h_w$$

where h_w is the multiplier defined as:

$$(3) \quad h_w = \begin{cases} 2\tau & \text{if} \quad (p_w - \alpha(\tau) + \mathbf{x}_w' \boldsymbol{\beta}(\tau)) > 0 \\ 2(1-\tau) & \text{otherwise} \end{cases}$$

obtaining different values of $\boldsymbol{\beta}(\tau)$ for different values of τ indicated in the estimation.[3] Regarding the choice of the functional form which best fits the data, we conditioned the choice by the OLS estimates of restricted likelihood ratio tests on the Box-Cox transformation parameters $\boldsymbol{\theta}$ (Cropper et al. 1988):

$$(4) \quad Qp_w^\theta(\tau \mid \mathbf{x}_w) = \alpha(\tau) + \mathbf{x}_w^{\boldsymbol{\theta}}{}' \boldsymbol{\beta}(\tau) + \varepsilon(\tau)_w$$

As for the selection of the appropriate set of attributes, $\mathbf{x}_w$, the literature on hedonic pricing provides important clues that guided our choice. Besides variables representing intrinsic attributes such as alcoholic content, grape variety and color (Oczkowski 1994; Landon and Smith 1997; Angulo et al. 2000; Steiner 2004), and extrinsic attributes such as age, brand, taste, bottle size, packaging, eco-friendly viticulture practices and size of producers (D'Amico et al. 2014; Kwong et al. 2011; Carew et al. 2012; Benfratello et al. 2009; Combris et al. 2000), also reputation has been tested, since pricing behaviour of wineries could depend on their reputation (Ali and Nauges 2007). To this extent, almost all studies were based on expert grading, showing a prominent role in price formation (Caracciolo et al. 2013; Schamel 2006; Jones and Storchmann 2001; Landon and Smith 1997). The drawback is, however, that expert opinions and wine ratings do not cover the whole range of wines on the market, especially non-premium wines and, in several cases, expert opinions differ from the preferences of average consumer since the latter "*...simply does not like the same types of wines as experts*" (Goldstein et al. 2008, 12). Nevertheless, the long-term reputation of wines and producers is more valuable than taste attributes in market price formation (Benfratello et al. 2009), and GI has to be taken into account with regard to the effect on reputation (Teuber and Hermann 2012). In this study, we particularly focus on the contribution of both private and collective wine reputation on price. While the latter can be straightforward—included in a hedonic function, the former presents methodological challenges that need to be properly addressed.

In particular, private reputation can be approximated by means of the share of category requirements (SCR). SCR is one of the most "*...common loyalty measures used by most major market researchers*" (Bhattacharya et al. 1996, 6). For the *b*-th brand, it is defined as each brand's market share among the group of households that bought the brand at least once during the time period under consideration:

$$(5) \quad SCR_b(T) = \frac{\sum_h \sum_{t \in T} (p_{hb} \cdot q_{hb})}{\sum_h \sum_j \sum_{t \in T} (p_{hj} \cdot q_{hj})} \cdot 100 .$$

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[3] The absence of assumptions on the distribution of errors is significantly more robust to anomalous values (or outliers) and is substantially unaffected by heteroskedasticity problems.

where $p_{hb} \cdot q_{hb}$ represents the expenditure for brand b by household h during time period T (one year in our case), while j refers to all the brands purchased by household h during the same time period. SCR reflects the intangible benefits linked to the b-th brand measuring the customer loyalty. Even though customer loyalty is strongly interconnected to private reputation, it might also be affected by other variables, like market price (Selnes 1983). For instance, consumers can be loyal to brands also for their lower prices. Thus the inclusion of SCR_b in a hedonic function may induce ambiguity in the causal direction and introduce endogeneity. Usually, instrumental variable approach (IV) can be evoked to address this source of endogeneity. The use of IV's in quantile regression (IVQ) was recently proposed by Chernozhukov and Hansen (2005; 2006) however, is not exempt from limitations, and it is still rarely used in empirical works. Moreover, we have no access to external exogenous data for obtaining a reliable set of instruments.

Our strategy to avoid endogeneity is as follows, being aware that the adopted approach represents an ad-hoc solution rather than a generalizable solution: firstly, in order to calculate SCR_b we used a separate sample from the one used in the hedonic equation, including data on prices and expenditures referring to the year preceding the one for which hedonic model is estimated[4]. Moreover, we acknowledge the customer loyalty as calculated in time t -1, $SCR_{b,t-1}$, can be decomposed into two parts: the first, $SCR(corr)_{b,t-1}$, potentially depending to the average $p_{b,t-1}$ market price for the b-brand, and the remaining part that captures the variation of $SCR_{b,t-1}$ that results uncorrelated to $p_{b,t-1}$, $SCR(unc)_{b,t-1}$. $SCR(unc)_{b,t-1}$ can be proxied by using the estimated residuals, $S\hat{C}R(unc)_{b,t-1}$ as provided by the OLS estimate of γ_0 and γ_1:

$$(6) \ S\hat{C}R(unc)_{b,t-1} = SCR_{b,t-1} - S\hat{C}R(corr)_{b,t-1} = SCR_{b,t-1} - \hat{\gamma}_0 - \hat{\gamma}_1 \ln(p_{b,t-1})$$

This strategy allows inclusion of exogenous information about private reputation of each b-brand into the hedonic equation, and their role in influencing the price for the single w-th wine in time t.

Data

Our empirical specification is built on the full set of wines marketed for domestic consumption in the year 2010 and 2011 in Italy. The empirical analysis embodies the underlying data generation process straightforwardly. More than 150,000 purchases of wine made by around 8,000 households, statistically representative of the Italian population, were recorded (HomeScan) by A.C Nielsen (a leading market research organization operating worldwide). The database reports around 2,100 brands of wines from about 1,000 wineries which market close to 6,000 different types and formats of wine. For each purchase the following data are recorded: price (€), the volume purchased (liters), product type (white, red or rosé), geographical origin, sales channels, packaging (glass, carton, PET, bag in box and the volume format) and lastly, the presence of geographical indication. As for the latter, it is worth noting that the EU legislation uses the terms PDO and PGI (respectively Protected Designation of Origin and Protected Geographical Indication[5]) to specify geographical indications. In Italy, and only for wine, the designations DOC and DOCG constitute PDOs. [6] Jointly the three certifications of geographical indication can be seen as a quality hierarchy, in which PGI wines have to be considered higher

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[4] Previous year data were used for breaking the temporal "simultaneity" of prices and brand loyalties.
[5] EC Reg. 607/2009
[6] ITA DL 61/2010

quality than simple table wines, although they do not conform to the strict wine laws for their region (DOC).[7] The main difference between a DOC and a DOCG is that the latter must pass a blind taste test for quality in addition to conforming to the strict legal requirements to be designated as a wine from the area in question (Corsi et al. 2004; Cembalo et al. 2014). The Nielsen database does not include consumption which goes through HORECA channels (HOtels, REstaurants and CAfés). However, from a Mediobanca study (2013) it emerges that wine purchased for domestic consumption accounts for about 70% of total consumption in volume.

Purchases made during 2010 were used to obtain exogenous information about the private reputation of each *b*-brand, while those made during 2011 were explicitly included in the hedonic model[8]. Secondary data sources, such as scanner panel data, are particularly appropriate for depicting the structure of the wine market: there is a large variability in wine prices, with a highly asymmetric distribution. The distribution of prices is furthermore extremely skewed to the right (Figure 1). The mean value is 3.3€per liter while the median is 2.44€per liter, interquartile range 1.33€per liter - 4.2€per liter).
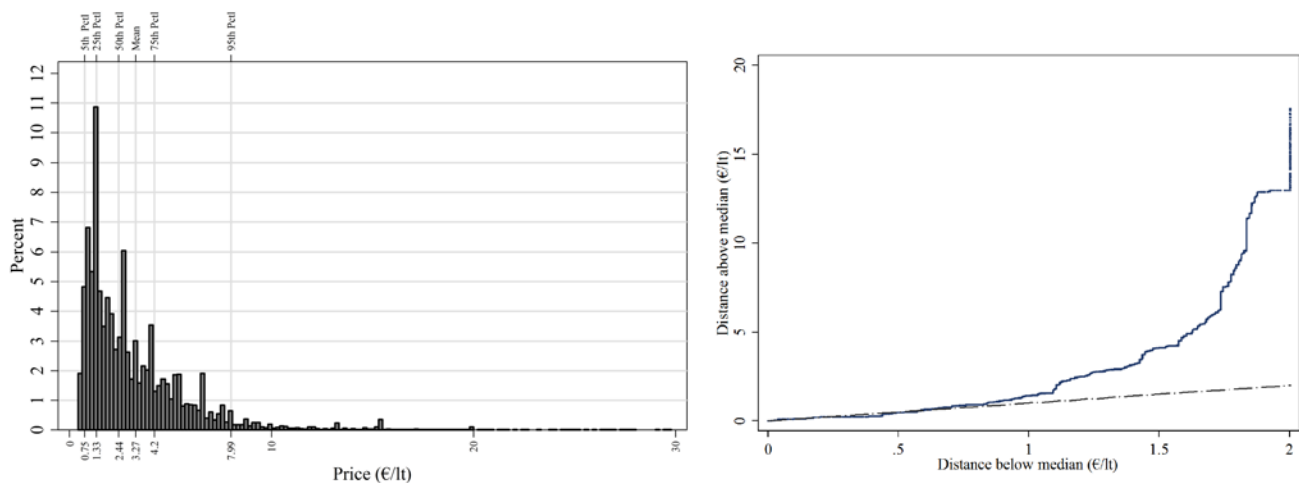

Figure 1. Wine price distribution (histogram and symmetry plot)
Source. AC Nielsen Homescan data 2011

Regarding the adopting of collective or private reputation systems by wine producers, Table 1 reports the position of the top fifteen private Italian wine brands, showing the measures of private and collective reputation as well as a measure of producer market share. Collective reputation, associated with specific production locations, was expressed as the incidence of three GI Italian labeling certifications per brand.

From a preliminary inspection of Table 1, it seems that strong private reputation initiatives (in terms of SCR) are rarely associated with collective initiatives such as adoption of PGI, DOC, and DOCG certifications (Pearson correlations between SCR(*unc*) and GIs are, respectively, -0.49 for PGI, -0.40 for DOC and -0.42 for DOCG).

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[7] Italian wineries on their own initiative may also use EU PGI and PDO indications and the corresponding European logos in place of the traditional domestic acronyms (Corsi et al. 2014). PDO labeled wine was observed in few cases only and handled as DOC in the model.

[8] In 2011, nearly 80,000 purchases of wine were recorded by A.C Nielsen.

As regards market price, thirteen out of fifteen brand leaders have an average market price lower than the sample mean. It is worth noting that private label wines from Coop and Conad benefit high value of SCR(*unc*), being behind only the market leader Tavernello which, since 2002, has been the most popular brand of table wine (Torrisi et al. 2006). Finally, among the top fifteen brands in terms of market penetration, only three premium wines[9] ranked 11th, 13[th,] and 15th, mainly characterized by the adoption of both PGI and DOC labeling.

Table 1. Top fifteen private Italian wine brands ordered by brand market penetration

	Private Reputation		Collective Reputation				
Brand	Brand market penetration[a] (BMP)	Brand share category of requirements (in bracket SCR *unc*)	PGI (%)	DOC (%)	DOCG (%)	Producer market share[b]	Average price (€per liter)
Tavernello	18.5	20.7 (18.6)	2.1	0.0	0.0	5.28[c]	1.43
San Crispino	11.3	12.0 (10.5)	0.0	0.0	0.0	2.06	1.30
Conad	8.2	18.8 (13.0)	7.3	0.2	0.1	1.05	1.03
Quargentan	6.4	14.0 (12.0)	43.1	1.3	0.0	0.53	1.03
La Cacciatora	6.4	7.5 (6.1)	46.7	34.2	6.2	2.60	2.16
Freschello	5.1	10.8 (9.6)	0.0	0.0	0.0	1.06	1.72
Castellino	4.9	10.8 (9.0)	0.0	0.0	0.0	5.28[c]	1.39
Coop	4.9	17.3 (15.3)	0.0	0.0	0.0	0.57	0.98
Carrefour	4.0	12.7 (8.7)	14.9	13.5	1.7	0.56	1.59
Botte Buona	3.8	8.3 (6.6)	100.0	0.0	0.0	5.28[c]	1.91
C.S.Soave	3.6	6.3 (5.6)	25.9	23.2	2.6	1.54	3.28
Caldirola	3.5	6.0 (4.9)	45.3	43.2	0.0	2.60	2.22
Zonin	3.4	6.6 (5.0)	39.9	24.2	1.9	1.54	4.16
Gotto D'oro	3.3	12.6 (10.7)	20.4	76.0	0	0.94	2.07
Cavit	3.3	7.5 (6.9)	0.0	89.2	0	1.57	5.84

[a] Number of purchasers of the specific brand over total purchasers (%)
[b] Total consumer expenditure on wines produced by the specific producer over total expenditure (%)
[c] Tavernello, Castellino and Botte Buona are brands owned by the same company (Caviro).
Source. AC Nielsen Homescan data 2011

Results

In estimating a quantile hedonic function we assume that implicit prices, focusing on those of private (SCR(*unc*)) and collective (GI: PGI, DOC and DOCG) reputation, significantly vary through different percentiles of the marketed price. The dependent variable consists of the logarithm [10] of the wine price. As regards the observable attributes $\mathbf{x}_w$, other than those concerning reputation, we include distribution channels such as discount stores or specialized

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[9] According to a well-established classification (Heijbroeck 2003), premium (popular) wine are those wines sold at least at 3€L.
[10] According the restricted likelihood estimates, the functional form which best fits the data is the double log.

shops, the presence of promotion (in terms of discount sale price), packaging, and wine color[11]. Table 2 shows the full descriptive statistics of the whole set of regressors, while estimation results are reported in Table 3. Figures 2 and 3 show a graphical display of coefficients and confidence intervals for, respectively, private and collective reputation variables as τ varies from 0 to 1. This graphical representation of the estimates allows us to verify the implicit prices of attributes with respect to different price segments of wines. Furthermore, the confidence intervals indicate the robustness of the results.

Table 2. Descriptive statistics of variables in the model

Variable	Mean	Std. Dev.	Min	Max
*ln*Price	1.027	0.691	-0.861	2.919
ln SCR(*unc*)	3.524	0.513	-2.303	4.656
PGI (1 if wine with PGI certification; 0 otherwise)	0.246		0	1
DOC (1 if wine with DOC certification; 0 otherwise)	0.331		0	1
DOCG (1 if wine with DOCG certification; 0 otherwise)	0.045		0	1
Discount (1 if purchased in a grocery outlet; 0 otherwise)	0.104		0	1
Specialized shop (1 if purchased in a specialized shop; 0 otherwise)	0.398		0	1
Promotion (1 if purchased with a promotion; 0 otherwise)	0.366		0	1
Packaging (1 if sold in a glass bottle; 0 otherwise)	0.693		0	1
ln Format (volume L.)	-0.134	0.451	-1.386	1.609
Wine color (1 if red wine; 0 otherwise)	0.525		0	1

Table 3. Hedonic function estimates via quantile regression and OLS

Variable	25		50		75		OLS	
ln SCR(*unc*)	0.017	***	0.001		0.055	***	0.011	***
PGI	0.224	***	0.209	***	0.254	***	0.222	***
DOC	0.500	***	0.499	***	0.497	***	0.489	***
DOCG	0.668	***	0.685	***	0.730	***	0.725	***
Discount	-0.355	***	-0.456	***	-0.624	***	-0.496	***
Specialized shop	0.040	***	0.001		0.012	**	0.025	***
Promotion	-0.109	***	-0.120	***	-0.136	***	-0.138	***
Packaging	0.540	***	0.633	***	0.817	***	0.675	***
Wine color	0.029	***	0.001		-0.004		-0.006	*
ln Format	-0.372	***	-0.367		-0.336	***	-0.382	***
Constant	-0.225	***	0.085	***	0.066		0.035	**
P(τ)	1.33		2.44		4.2		3.27	

Restricted log likelihood
$\theta = -1$ -97,477
$\theta = 0$ -85,251
$\theta = 1$ -123,293

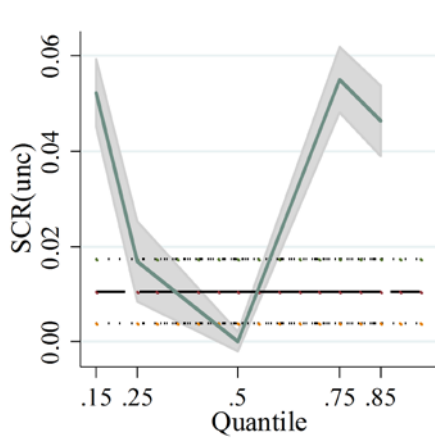[11] Variables included in the model simply reflect the data collected and made available by AC Nielsen.

Figure 2. Coefficients and confidence intervals of OLS and as τ varies from .15 to .85 for private reputation wine attribute - SCR(unc)
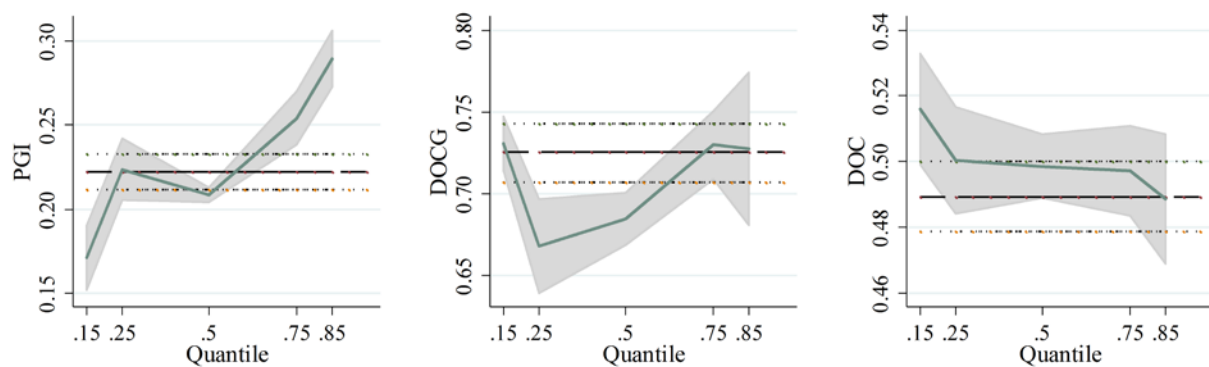

Figure 3. Coefficients and confidence intervals of OLS and as τ varies from .15 to .85 for collective reputation wine attributes (PGI, DOC and DOCG certifications)

SCR(*unc*) was included in the hedonic function as a logarithm, so the estimated coefficients may be directly interpreted as elasticities. More precisely, they represent the effect, in percentage terms, on the price of the *w*-th wine due to a unit percent change in private reputation of the *b*-th brand. Estimated coefficients are positive, thus, the higher the private reputation of the *b*-brand, the higher the price premium received by the *w-th* wine. Coefficient estimated show a u-shaped pattern across quantiles. To illustrate, price premium declines up to the 50th quantile (nadir) and rises afterward with a peak at the 75th quantile. Put differently, the price effect of private reputation seems more relevant for both low-priced and high-priced wines (Table 3 and Figure 2).

As for certifications of origin, the pyramid of quality seems to be confirmed: consumer appreciation of wines increases as the level of origin designation increases from lower (PGI) to higher quality (DOCG) in all quantiles. PGI, DOC and DOCG positively contribute to a price premium in all wine segments, though they show different patterns. While the implicit price of DOC certification, in percentage terms of sold product, may be considered constant among centiles, the implicit price of PGI attribute shows an increasing trend: PGI rewards more, in percentage terms of sold product, those wines that fall in the higher centiles. As for DOCG certification, it seems less rewarding for medium-priced wines. Put in terms of private (SCR(*unc*)) and collective reputation strategies; it seems that non-premium wines that compete

in a crowded market segment, are forced to implement differentiation strategies to compete among suppliers, aiming to convey positive quality attributes.

In evaluating sales channels (discount stores and wine shops) it is advisable to interpret the relative parameters jointly. Wine shops and discount stores represent diametrically opposite sales methods: As a result, the two trends are opposite. This outcome confirms that the price formation mechanism at large-scale retailers is quite different from that of wine shops (Brentari et al. 2011; Levaggi and Brentari 2014 [12]). Greater emphasis is laid on discount stores through which discounts may be obtained for the whole range of wine. Furthermore, discount stores play a negative role on price. For wine shops, the result is diametrically the opposite: all wines sold within this sales channel receive a price premium.

As expected, promotion adversely affects price formation, showing a higher impact on higher priced wines. As regards the other attributes included in the model, our findings suggest that packaging (glass bottle) affects price positively for all types of wines. By contrast, larger bottle size has a negative impact on price determination for all price classes; lastly, red wine has a negative impact on price determination only for lower priced wines.

We finally tested for the interquartile difference of estimated parameters. This is necessary to see whether estimated coefficients vary significantly through different percentiles. Table 4 reports the above estimates and the significance level for the hypothesis of sample homogeneity conditional on selected covariates. Major differences occur across different points in the distribution, showing that implicit prices of selected wine attributes statistically vary among quantiles. In particular, the greatest differences in estimates occur for the differences [50th – 25th quantile] and [75th – 50th quantile] wherein almost all coefficients of differences are significant. This result provides further empirical evidence of hedonic price estimation based upon price classes: since different coefficients refer to a statistically significant difference in the valuation of wine attributes by consumers, it is reasonable to conclude that these wine classes might be considered by consumers as strongly non-homogeneous.

Table 4. Interquartile estimates

Variables	50/25		75/50	
ln SCR(*unc*)	-0.017	***	0.055	***
PGI	-0.015	***	0.046	***
DOC	-0.002		-0.001	
DOCG	0.017		0.045	***
Discount	-0.101	***	-0.168	***
Specialized shop	-0.039	***	-0.013	***
Promotion	-0.011	***	-0.016	***
Packaging	0.093	***	0.184	***
Wine color	-0.028	***	-0.005	
ln Format	0.005		0.031	***
Constant	0.269	***	-0.019	***

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[12] However, while Levaggi and Brentari (2014) demonstrated, using separate hedonic functions, that the main determinants of price formation are quite different into the two distribution channels, we included the role of distribution channels as a fixed effect. In other terms we do not analyze explicitly the interaction of the distribution channels with the other price determinants.

Discussion

From the trend of the coefficients relative to private reputation (SCR(*unc*)) it may be inferred that the impact on price of the latter is lower for the medium price range, thereby enhancing the value of wines in the low and high price ranges. By contrast, when it comes to the trend of the coefficients for collective reputation (PGI, DOC and DOCG), it can be seen that, while DOC certification contributes similarly to price premiums in all wine segments, PGI and DOCG certifications most enhance the value of wines falling in the higher centiles. The latter result confirms the conclusion of Di Vita et al. (2015) and Menival and Charters (2013), showing a highly heterogeneous impact of the collective reputation. While Di Vita et al. (2015) showed that wines certified as PGI achieve prices that are progressively higher as the price level of the wine increases, Menival and Charters (2013) demonstrated the variability of geographical reputation that can be either positive or negative for wineries. Discussing the results by price classes, designation of origin, especially DOC and DOCG certifications, and private reputation play a major role for lower priced wines compared to medium-priced wine segments. The importance of private reputation for lower priced wines seems supporting the results of Carpenter et al. (1994). Brands may successfully differentiate products on the basis of attributes that on closer examination seem irrelevant to experts (*meaningless differentiation*). Similarly, collective reputation for lower priced wines seems to have the same effect. DOCG (and also DOC) certifications would recall to consumers wines of higher prestige (and price), (probably) without having the same intrinsic characteristics. This phenomenon is likely to happen with less involved consumers.

Equally, private reputation is relevant in high priced wines too. This result is not surprising since the importance of brand in non-essential goods have been widely highlighted in literature, especially for consumers with high income (Han et al. 2010). Collective reputation in terms of geographical designation, especially PGI and DOCG, confirms their positive effect also for high priced wines, supporting what has been suggested elsewhere (Schamel 2006; Steiner 2004). Finally, private reputation and DOCG certification result less effective when considering medium-priced wine segments.

The empirical results appear to suggest the possible key to success on the Italian market, for which there has been a historic lack of specific studies. High-quality wineries seem to be stimulated to set their marketing strategies at low volumes and high prices, and in some cases, to follow niche strategies, while industrial wineries could be encouraged to develop private brands, sourcing from multiple production areas, tending towards high volumes with low or medium price tags. These findings are consistent with the results of Malorgio et al. (2013) and depict quite well the structure of the Italian wine market, characterized by the widespread presence of industrial lower priced wine trademarks (such as San Crispino, Freschello, Castellino and Coop) that aim to strengthen the degree of consumer loyalty to their own brand.

From an empirical point of view, we found that a model allowing for the existence of price classes is better at explaining the variability in the data and produces more accurate and interpretable results regarding the implicit prices of the attributes. Moreover, our findings suggest that the wine market in Italy could be considered as segmented into several product classes or market segments, confirming, in this regard, previous findings revealed by Costanigro

et al. (2007), Kwong et al. (2011) and Di Vita et al. (2015). Costanigro et al. (2007) distinguished different price categories, revealing the presence of several market segments (commercial, semi-premium, premium, and ultra-premium) although they took into account wine categories whose prices were, on average, considerably higher than those included in our study. Similarly, Kwong et al. (2011) estimated two separate hedonic models for high and low price wines and demonstrated the presence of price segmentation between two classes of wines. The same authors also showed that the hedonic price function for lower priced wines is strongly influenced by search attributes related to the label. Finally, Di Vita et al. (2015) identifies the wide heterogeneity existing in the Sicilian wines market using quantile regression technique as well.

The present study provided empirical evidence mainly for non-premium (or basic) wine marketing, highlighting important implications for wineries in this segment. The marketing activities of such wineries should be based on enhancing private reputation. This strategy could be achieved by developing promotional strategies, such as participating in wine fairs (Benfratello et al. 2009; Oczowski 1994;), or emphasizing (if appropriate) the expert judgments of wine guides on the label (Caracciolo et al. 2013). In conclusion, initiatives to enhance both private and collective reputations, though valued differently by consumers depending on specific wine classes under examination, have to be considered complementary and mutually reinforcing.

Limitations

Starting with the concept introduced in this study concerning private and collective reputation strategies on price formation, future research could develop a strategy to identify cut-off market prices. Indeed, as results have shown, there are several wine classes. However, the model implemented did not endogenously set specific cut-off prices. Moreover, in order to fully disentangle the contribution of private and collective reputation on price, more dedicated, valid indexes should be computed. SCR is only rough proxies of private reputation, and we believe this index is still at an early stage. At the same time, as regards collective reputation variables, if data were available, proxies of investments in advertising could provide a better understanding of this kind of reputation strategy. Eventually, we did not assess the possible interaction between the two types of reputation, and in particular the effect of collective reputation on the producers' capability of assuring quality through private reputation. The analysis of the effect of distribution channel on price mechanism is here also undeveloped and deserve further investigation. Moreover, the potential presence of omitted variables could result in overestimating the effect of private and collective reputation. Finally, this study did not consider denomination of origin-specific reputation effects so that a further and deeper investigation in this field is also needed.

Conclusions

This study valued the impact of private and collective reputation on Italian wine market prices through a hedonic pricing model, using a dataset including more than 150,000 purchases collected by AC Nielsen. A quantile regression - that produces the estimate conditional upon different percentile—was implemented, to allow analysis of the effect of key variables on different price levels/quantiles. Our results show that implicit price estimates of private, as well as collective reputation vary largely through different percentiles of sale price. Our findings have

implications for the literature on food reputation, providing additional but consistent results with those of earlier studies that observed the presence of a price premium for collective reputation (Menival and Charters, 2013; Oczkowski 2001; Landon and Smith, 1997). Indeed, this study provides empirical evidence that both reputation systems significantly contribute to wine price formation at different price segments.

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