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Factors of collective reputation of the Italian PDO wines: An analysis on central Italy

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Abstract

As many research studies confirm, the importance of collective reputation is increasing, especially in the agro-food chain. Currently, the reputation of firms and brands is the main key driver for companies' competitiveness and success in modern markets.

This paper empirically investigates the determinants of reputation of PDO wines in Central Italy. In particular, it uses the qualitative assessment expressed by the National Association of Sommeliers and proposes a synthetic indicator of reputation. By using different statistical sources, we also evaluate the impact of some variables on the reputation levels of individual PDO areas. We looked at the structural characteristics of the designation (number of producers, age of the designation, etc.), the minimum quality standards, and the characteristics of the economic vitality of the territories. The study aims to contribute to the debate on the role of the quality proposed by firms and reputation built over time. © 2015 UniCeSV, University of Florence. Production and hosting by Elsevier B.V. All rights reserved.

Keywords: Collective reputation; DOC wines; Ordered logit; Italian wines

1. Introduction

Value proposition is essential to the firm's competitiveness and success (Lindgreen and Wynstra, 2005; Porter and Kramer, 2011). Within the food market, value is traditionally interpreted in terms of nutritional value or value for money. However, some marketing research has repeatedly questioned the consistency of the product attribute to the consumers' perception of "value" (Gallarza et al., 2011; Sanchez-Fernandez and Iniesta-Bonillo, 2007).

Studying value is of great interest because it has a direct bearing on the management of companies and on agro-food

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policies. In fact, research projects have sought to identify and manage the drivers of food value over time. All drivers are interrelated and contribute to the value proposition of the company - or companies - involved in the system of the product (supply chains, forms of association, etc.).

Moreover, value is central to food marketing because it analyse the value perceived by consumers and it finds systems to generate and offers value to customers (Albrecht, 1992; Anderson, 1982; Lindgreen and Wynstra, 2005; Anderson and Narus, 1999; Woodruff, 1997; Doyle, 2000).

According to Lindgreen et al. (2012), the literature on value is huge and, despite recent attempts to better understand and unambiguously define this concept, academics and practitioners still disagree on the real meaning of "value" (Anderson and Narus, 1998).

The literature on value shows that there are currently two, more or less distinct, research streams, one focusing on the value of the object of exchange (goods and services), and one focusing on the value of the process of exchange (the relationships, networks, and interactions the company is embedded in).

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In particular, FCV (Food Consumption Value) is consumercentred (Dagevos and Ophem, 2013) and it incorporates physical product characteristics, emotional associations evoked by the food brand, the site or moment of food consumption, and consumer ethical concerns about certain production practices in the food system.

This study aims to give value to the food consumption research by empirically analysing the "collective reputation" of quality wines. This reputation helped change the intangible value of wines and is influenced by many factors: the structure and behaviour of firms in the PDO area, their strategy to enhance quality, the social and economic characteristics of the territories, etc.

This paper proceeds as follows. In Sections 2 and 3, we introduce the concept of reputation and we elaborate on the theoretical elements used to develop our hypotheses. Section 4 describes the dataset and gives some descriptive statistics. Empirical results are discussed in Section 5, and conclusions are drawn in Section 6.

2. Drivers of collective wine reputation

The theoretical debate on reputation is wide ranging, but the mechanisms used to build reputation have not been fully explored from an empirical viewpoint (Castriota and Delmastro, 2010). According to international literature, collective reputation can be considered a multivariable phenomenon, resulting from the interaction of complex dynamics defined by managing some variables in space and in time (Castriota and Delmastro, 2010).

The literature on collective reputation is still in its infancy. So far, theoretical research has focused on modelling the collective reputation building process, while the empirical model has measured the consequences of positive group reputation on customers' willingness to pay by using the hedonic price models (e.g. Landon and Smith, 1998). Despite a number of valuable theoretical works that study the collective reputation building process, there is still no study testing group reputation determinants, due to data limitation (Castriota and Delmastro, 2009).

In their study, Gergaud and Livat (2004) propose an empirical strategy to assess both umbrella-brand¹ impacts (the impact of collective reputation on a given individual reputation) and contributions to the umbrella (its contrary). Empirically, the notion of collective reputation has received less attention. Erdem (1998) finds that "consumers of oral-hygiene products expect the quality levels of umbrella branded products to be highly correlated". Sullivan (1990) provides empirical evidence for the existence of positive and negative image spillovers between the demand for products sold under the same brand name in the case of automobiles.

Jarrell and Peltzman (1985) assess the effect of a product recall on the demand for this product and on the demand for its substitutes in the case of drugs and cars. The responsible producer bears losses greater than the strict recall costs because of a loss of goodwill, and those losses spill over to competitors. Due to a negative externality, any favourable effect of a recall on the demand for substitutes is swamped by a more general negative effect on the industry. Borenstein and Zimmerman (1988) examine a similar effect in the case of airlines. They find that a decrease in demand resulting from a specific crash affects the airline involved as well as competing airlines.

Reputation is a basic resource of typical production and an essential element in value creation process, since a good reputation allows producers to predict, and expect, future (positive) incomes (Belletti, 2002). When a firm has a good reputation, it attracts customers, which often leads to higher prices and larger profit margins, while the good reputation of an individual may result in better careers (see Levin, 2001; Tadelis, 2002, 2003).

The literature also presents reputation as a mechanism to provide incentives to agents in order to exert greater efforts (Mailath and Samuelson, 2002; Tadelis, 2002), if they can reap the benefits in the future.

Studies have shown that there is "brand confusion" in the wine sector. Several mistakes are made during the consumer inference process which unconsciously lead him/her to an inaccurate assessment of the attributes or benefits of lesserknown products, since assessments are based on attributes or performances of the most popular products (Faraoni, 2005). This can occur even if the consumer links the corporate brand to the product brand, or vice versa (Foxman et al., 1992). Therefore, this confusion can give rise to a distortion of the results of studies performed on various types of wine, one of the causes being the informational asymmetry (Akerlof, 1970) affecting the wine sector. On the other hand, the consumer daily objective is to save time, so he/she takes into account the brand and territory reputation to verify the quality of the products to purchase (Andersson, 2002). If properly exploited, the relationship between the brand and the territory may provide companies an opportunity to obtain a solid competitive advantage and it may turn into a distinguishing factor for the brand as well. Companies may take this into consideration at different levels and use it in the brand identity building process (Agrawal and Kamakura, 1999). In a recent study on Italian consumers' preferences regarding dealcoholised wine information and price, Stasi et al. (2014) underline that common results confirm that origin, vintner, vintage, and brand reputation significantly affect consumers' preferences and their perception of the product.

A single producer of a PDO^2 wine can enjoy reputation benefits thanks to the consumer past purchases, even if other firms of the same PDO produce that wine. Hence, reputation

¹Umbrella branding is one of the terms used to describe the common practice of selling several products under the same brand name (Miklós-Thal, 2012).

²Wines with a Protected Designation of Origin (PDO wines) in the EU are wines produced in a delimitated area following specified production rules reported in an official document called product specification (Reg. 1308/2013) and presented with the name of the producing area (Designation of Origin) which is protected by law. According to the Italian regulation PDO wines are presented on the market as wines with Denominazione di Origine Controllata (DOC wines) or Denominazione di Origine Controllata e Garantita (DOCG

can be considered a dynamic signal of quality for the collective designation of origin. The history of the production area and the wine membership to a designation of origin prove to be synonymous with increased accountability and consumer protection (Pastore, 2002).

Malorgio et al. (2008) evaluate the efficiency of PDO system in the international wine market as an instrument that can satisfy the needs of both producers and consumers, and give advice on how to improve future market performance. They (2008) show the increasing appreciation of wine consumers in terms of reputation and origin attributes through descriptive statistics and economic literature review; on the supply side, they identify the main quality strategies implemented in the international wine market and illustrate the increasingly important role that origin attributes play on strategic choices made by firms worldwide.

The concept of reputation can be better understood in the imperfect information context (Stiglitz, 1989), as previously mentioned. According to Andersson (2002), the reputation phenomenon concerns many experience goods or services, whose quality is difficult to ascertain at reasonable costs before consumption. Andersson shows that the profits generated by a firm with a pooled reputation for producing two high quality goods are "not lower" than the sum of the profits generated by two separate firms, each producing a high quality good and having its own individual reputation. Collective reputation is important because many markets have a huge variety of products and abundance of information. Consumers willing to economise on the costs of ascertaining quality often rely on the reputation of firms or groups for their purchases (Andersson, 2002). When forming expectations, consumers have to choose the sources of information to use and the level of informational knowledge they are willing to accept (Costanigro et al., 2009). Gergaud et al., (2012) underline that a good reputation is often crucial in attracting and retaining customers, and it can also be associated with a significant price premium. The first source of information is usually related to geographical brands, information on the firm and bottle/vintage requiring a higher level of expertise (Castriota and Delmastro, 2009).

While the impact of group reputation on individual reputation has been analysed, no empirical work has thus far tested the determinants of the collective reputation building process. Actually, some papers evaluate the impact of group reputation on individual reputation and/or prices; in particular, due to the large availability of data from prestigious wine guides, some empirical papers deal with (the consequences of) collective reputation referring to the wine sector. The studies by Landon and Smith (1998), Schamel and Anderson (2003), Castriota and Delmastro (2008), and Costanigro et al. (2009) analyse – among other things – the impact of collective reputation on the reputations of wineries or on wine prices.

3. Research hypotheses

Nevertheless, some studies allow to set some hypotheses on specific determinants of reputation in the case of PDO wines and the current research had the objective to test such hypotheses.

Tirole (1996) argues that an individual member of the chain decides on his effort level on the basis of the value of collective reputation, which is established by former and existing members of the umbrella brand, before the individual's entry. In other words, the effort level of an individual member is likely to be affected by past behaviours of other members in the umbrella. In a study on wine produced in the Bordeaux areas, Gergaud and Livat (2004, 2010) supported Tirole's view and empirically showed that collective reputation is affected by individual reputation, and vice versa. Specifically, their model (2004; 2010) has strong connections with the umbrella branding literature (see Gergaud et al., 2012 or Miklós-Thal, 2012 for a recent and more detailed survey). This literature shows that a collective brand or name may be a quality signal through image spillovers which create reputation linkages among various firms or individuals (Choi et al., 1995). In this context, individual incentives are associated with group incentives; such a connection provides a strong commitment to maintain a high level of quality for each product and could, in turn, serve as a competitive advantage. Actually, the possibility for consumers to identify a range of products with the group can provide the firm substantial economies of scope.

For these reasons, it is interesting to investigate some aspects related to the structure of the Designation. The analysis of the links between these aspects and reputation can lead to a better understanding of which of the main structural aspects of a collective brand play a significant role in the level of reputation of a wine. So, the following hypothesis is formulated.

 H_1 . The structural aspects of Designation have an impact on wine reputation.

As suggested by Shapiro (1983), reputation means the expected quality as assessed by peers or consumers. According to Shapiro (1983), "a firm has a good reputation if consumers believe its products are high in quality". In our study, collective reputation is a property of the Designation, it is shared between producers and, despite its expansiveness in excluding others from use, it can be restored in time (Ostrom, 1996). This mechanism is theorised by Shapiro (1983): in the case of repeated purchasing, reputation increases when the attributes defining the quality of a product are not detectable before purchase.

According to Fleckinger (2007), the reputation building process requires the establishment of a lasting relationship between the territory, its producers and potential buyers. The stable agreement among producers in the promise of certified quality allows a stable quality level of the production within the collective brand and, thus, a well-established level of reputation. We have therefore identified a second research

⁽footnote continued)

wine). The latter are PDO wines with a longer tradition and stricter production rules (D. Leg. 61/2010).

hypothesis which relates the level of reputation to the minimum quality standards.

H₂. The minimum quality standards have an impact on wine reputation.

Wernerfelt (1988) demonstrates that brand extension is efficient only when all products under the umbrella are of good quality and, therefore, contribute to the reputation of the umbrella. Brand extension practices (Tauber Edward, 1988) and, more generally, bundling a product of established quality with one of unknown quality can also be seen as a mechanism for informational leverage, where a firm leverages off a good's reputation in one market to mitigate the problem of informational asymmetry encountered in other markets (Choi, 1998, 2003).

When looking at the differentiation strategy of a wine, its association with a specific territory and the sharing of meaning are to be considered too. They actually represent an advantage for the firm that exploits this relationship to enhance its reputation and make the brand more attractive to consumer (Vescovi and Gazzola, 2007). Hertzberg and Malorgio (2008) examine consumer preferences for wine attributes through a choice experiment carried out on 444 wine buyers in North-Eastern Italy. Results indicate that the presence of PDO, a known brand and the indication of the grapevine variety on the label increase the choice probability and they are all associated with a positive WTP (Willingness To pay). Price has a smaller influence than other attributes and its relationship with utility is quadratic. The private label only slightly affects consumer choices, with a negative or positive effect depending on the initial price of the wine.

For these reasons, we also consider the impact of the several types of differentiation on the reputation level. Hence, we define a specific research hypothesis.

H₃. A differentiation has an impact on wine reputation.

Within the wine market, it is important to take into account the strong interaction between different systems (tourist, environmental, social, cultural and others), and to consider them as being strictly related to the wine system in order to transfer the suitable reputation created by all these factors to consumers (Lopolito et al., 2010). Several studies focus on these aspects to define the dynamics of rural development and the agro-food market (Belletti, 2001). Other works analyse the impact of different factors on wine reputation: for example Gokcekus and Finnegan (2013) examine the relationship between regional reputation and the price-quality ratio of wine during the Great Recession (September 2008 until June 2009). Their study (2013) shows that a substantial decline in income and a rise in information sharing via the internet and social media had a dampening effect on the regional reputation premium and lowered the price-quality ratio differences among different wine regions.

When a local system establishes a local product, it uses the collective reputation, which seems to play a major role in defining the final notoriety of the product. A product with a PDO can actually be considered as an institutional and juridical process to control and preserve collective reputation. The advantage consists in the possibility for producers to achieve some benefits – deriving from collective reputation – in order to obtain better incomes for the entire geographical region (Sisto et al., 2006). Bureau and Valceschini (2003) claim that "the appellation of origin has proved successful in allowing even small producer groups to benefit from a well-established reputation". In products, tradition does not merely coincide with their territorial origin and/or PDO label, but it also reflects real local roots as well as the historical, cultural and material aspects of the territory (Antonioli Corignano, 1999; Pacciani et al., 2001).

Further, analysing the social and economic environment by evaluating the quality and quantity of services allows to identify the communication level of the territory and to determine whether this can be considered or not a "marginal area" (*Methods and Objectives for and effective use of Community Founds 2014–2020*, 2012). Moreover, the cultural component of an area is increasingly contributing to the process of economic value creation (Sacco and Ferilli, 2006).

Specific (territorial) resources, due to their selective nature (i.e. they are used only in specific geographical areas), play an important role: on the one hand, they increase the competitiveness of local systems, thanks to their ability to improve the strength of relationship and trade systems; on the other, they promote the specific quality of traditional food products (Belletti, 2002).

For this reason, it is interesting to study contextual factors in the wine reputation building process.

H₄. Contextual factors have an impact on wine reputation.

4. Material and method

The study moves from the (simplified) assumption that the reputation of a wine with PDO is closely related to its structural aspects, minimum quality standards, level of differentiation and contextual factors. These contribute, along with the reputation of the winery, to the collective reputation of the whole production area. Therefore, reputation is related to a vague and subjective perception of quality, often shaped by "opinion leaders", who have the power to influence the general public on the quality of wines and their production areas. These aspects are critical also to the success of wine tourism.

The starting point of the analysis is the definition of reputation adopted in this study, on the basis of the literature on model exchange with quality premium (Shapiro, 1983; Klein and Leffler, 1981). In particular, reputation is interpreted as accumulation at the time *t* of the levels of quality offered at the time t-n (past value proposition), and it is perceived by consumers through the consumption experience and the knowledge of the area of origin. At the same time, the different reputation levels represent the promise of quality products for the future t+1 (new value proposition) (Stiglitz, 1989; Belletti, 2001).

Several studies have been carried out on wine notoriety by analysing both the collective and the individual notoriety and their impact on wine prices, and by using the information published by prestigious wine guides as reputation indicators (Landon and Smith, 1998; Schamel and Anderson, 2003; Castriota and Delmastro, 2008; Costanigro et al., 2009).

In the past, many studies evaluating the "hedonic prices" of wines have used the scores assigned by guides as a proxy variable for objective quality (Schamel, 2006; Costanigro et al., 2007; Angulo et al., 2000). However, the evaluations of experts in charge for wine evaluation for the guides cannot be compared to the results of a real testing jury operating, for example, applying recognised international standards for blind quality assessment. Indeed, the evaluations used for guides' ranking are formulated knowing, the wine brand, the story of the PDO, the geographical site of production, and previous years' assessments. For these reasons, this evaluation can be more realistically assimilated to a judgement of the reputation than to an evaluation of the objective quality of the tasted wines.

This study intends to investigate the relationships between qualitative and context indicators on, and the PDO (DOC or DOCG) reputation levels of PDO wine belonging to different areas. Research has been carried out on the PDO in four regions of Central Italy, Tuscany, Umbria, Marche and Lazio. These four regions are considered among the most important ones in terms of tradition and innovation in the wine sector at the national level. In order to empirically analyse data, we created, for each PDO, database variables that were considered relevant in increasing notoriety in 2012. Our final database refers to 100 wine designations.

The first stage of the empirical analysis involved the construction of a synthetic indicator as a proxy variable for the collective reputation of the PDO wines. To this end, we used the qualitative assessments of individual wines made by the Bibenda Guide 2012, where every evaluated wine is assigned a number of "grapes" expressing the assessed quality. For each PDO area we calculated the sum of total "grapes". This sum variable was then categorised into five levels, from 0 to 5.³

In order to answer to the hypotheses formulated above, we choose the explanatory variables that represent them. These variables are related to several aspects of wine. Some of them are linked to organoleptic aspects, chemical standards and production technology explicitly imposed by the product specification (all of this information is available in each DO Production Specification). Other variables describe some relevant social and economic aspects, mainly obtained from census of population, industry and agriculture. So, all variables can be classified into four main groups.

H1. The set of variables representing the first hypothesis describes the characteristics of each PDO: the wine DOC or

DOCG membership, the PDO establishment year, and the number of producers.⁴

H2. The second set of variables represents the "minimum quality standards" parameters, describing the maximum production and grape yield, the minimum alcoholic content (%), the minimum total acidity value, and the minimum aging.⁵

H3. The third set of variables considers the differentiation of wine. Some of these parameters (vertical differentiation) are more severely set on a voluntary basis with respect to technical aspects such as the selection of vineyards (classic and subzone), the agronomical procedures (passito - raisined wine, late harvest and vin santo), and the oenological standards (superior for alcoholic content, and reserve for wine aging). We also consider other variables – not compulsory for producers, but allowed by national decrees – in order to create a horizontal differentiation. We take into account the wine processing systems and the organoleptic properties of different wine typologies for the different product specifications (White, Rose, Red, Dry, slightly sweet, sweet, Novello, Semi-sparkling and Sparkling).

H4. We complete the information set by collecting data on average social and economic indicators for the wine designation regions examined that capture the context aspects. In particular, we considered variables linked to the reputation hypothesis; in other words, variables that explain a "tourist, economic and consumer flow" in the areas. We considered the following parameters: total population (up to 2010), area surfaces, number of ATMs per 1000 inhabitants, number of authorised hotels and holiday farm houses, number of museums and archaeological sites. Moreover, to take into account the "agricultural-rural" propensity of territories, the following indicators have been reported: degree of urbanisation, agriculture employment level, population dispersion index (calculated as the percentage ratio of the population living in scattered houses and settlements on the total resident population), and female population employed in non-agricultural sectors.

Table 1 shows the variables considered in the analysis. Table 2 presents descriptive statistics for the variables used in the model.

Therefore, the equation model will be structured as follows:

Reputation_i = $\beta_0 + \beta_1$ Structural aspects of Designation_i + β_2 Minimum quality standards_i + β_3 Differentation_i + β_4 Context_i + ε_i

where the subscript i refers to the different designations.

³In a first stage of the analysis we have also considered dependent variables that take into account the number of awards and the number of producer within each Designation. However, these did not provide satisfactory results. Therefore, we continued the analysis considering as dependent variable the reputation categorised in the five levels.

⁴This is the number of producers considering the admission on the register of Designation.

⁵To avoid confusion in the interpretation of the variables, we should clarify how they were included in the dataset. Within each PDO's product specification, different types of wines can be included; for each of these types of wine, individual characteristics and different values for the qualitative parameters are specified. In order to provide a single representative value for the different variables on a PDO wine, we adopted the result of the arithmetic mean calculated on the qualitative parameter values expressed in the product specification.

Table 1	
Description of variables.	
Source: Our elaboration from different databases,	2013.

Variable	Source	Description
Reputation		
"Bibenda Guide" Reputation	Bibenda Guide 2012 Edition	Number of "Grapes" for each Designation
H1: Characteristics of Design	nation	
DOC or DOCG	National decrees	Type of Designation – DV equal to 1 if the Designation is a DOCG
Age	Product specification	Age of Designation (years)
Producers	Code of Designation	No. of Designation producers
H2: Minimun Quality Stando	urds	
Grapes yield	Product specification	Max. tonnes of grapes per hectare
Grapes/wine	Product specification	Max. conversion ratio of grapes used in wine
Wine alcoholic content	Product specification	Min. wine alcoholic content (%)
Wine total acidity	Product specification	Min. total acidity
Wine aging	Product specification	Min. wine aging
H3: Differentation		
Classic	Product specification	DV equal to 1 if the Designation is from a historical restricted area within the limits of Designation
Subsite	Product specification	DV equal to 1 if the Designation includes wines that belong to a restricted area of the Designation
Passito	Product specification	DV equal to 1 if the Designation includes wines that are strong, mostly sweet, from dried grapes
Late harvest	Product specification	DV equal to 1 if the Designation includes wines that are late-harvest
Vin Santo	Product specification	DV equal to 1 if the Designation includes wines that are strong and sweet, from "passito" grapes, using traditional methods
Superiore	Product specification	DV equal to 1 if the Designation includes wines that are age and contain 0.5-1% more alcohol
Reserve	Product specification	DV equal to 1 if the Designation includes wines that are aged for statutory period, usually in casks or barrels
White	Product specification	DV equal to 1 if the Designation includes wines that are white
Rose	Product specification	DV equal to 1 if the Designation includes wines that are rose
Red	Product specification	DV equal to 1 if the Designation includes wines that are red
Dry	Product specification	DV equal to 1 if the Designation includes wines that are dry
Slightly sweet	Product specification	DV equal to 1 if the Designation includes wines that are slightly sweet
Sweet	Product specification	DV equal to 1 if the Designation includes wines that are sweet
Novello	Product specification	DV equal to 1 if the Designation includes wines that are early vintage with carbonic fermentation
Semi-sparkling	Product specification	DV equal to 1 if the Designation includes wines with excess pressure, due to CO_2 in solution between 1 and 2.5 bar
Sparkling	Product specification	DV equal to 1 if the Designation includes wine with excess pressure, due to CO_2 in solution, not less than 3 bar
H4: Context		
2010 tot. pop.	National Census	Number of inhabitants
Surface (square km)	National Census	Surface of the production area
No. ATMs/1000 inhabitants	National Census	Ratio between number of ATM machines and 1000 inhabitants
No. hotels	National Census	Number of hotels
No. holiday farm houses	National Census	Number of holiday farm houses
No. museums	National Census	Number of museums
No. archaeological sites	National Census	Number of archaeological sites
Degree of urbanisation	National Census	Number of inhabitants per 1000 m ²
Level of employment in agriculture	National Census	Number of employees in agriculture
Level of female employment	National Census	Number of female employees
Index of population dispersion	National Census	Dispersion of the population

DV: Dummy Variable.

We chose an econometric analysis which takes into account the categorical nature of the dependent variable (Agresti, 1996, 2002). Such a characteristic, indeed, arises problems in the use of OLS modelling, because its assumptions are violated. Further, due to the ordinal nature of the outcome variable, an ordered logit is preferred to the multinomial logistic regression (Greene, 2011; Dobson and Barnett, 2008). Given that, the parameters of the equation can be estimated with an ordered logit regression model. The statistical analysis is performed with STATA, version 12.

Table 2Descriptive statistics.Source: Our elaboration from database, 2013.

Variable	Obs.	Mean	Std. Err.	Min.	Max.
"Bibenda Guide" Reputation	100	1.28	0.149	0	5
Designation	100	0.11	0.031	0	1
Age	100	21.31	1.272	2	43
Producers	100	193.24	44.450	0	3881
Grapes yield	100	11.02	0.257	1	17
Grapes/wine	100	67.78	0.678	35	73
Wine alcoholic content	100	11.54	0.137	9.5	18
Wine total acidity	100	4.69	0.034	4	5.5
Wine aging	100	8.70	1.186	0	42
Classic	100	0.06	0.024	0	1
Subsite	100	0.20	0.040	0	1
Passito	100	0.15	0.036	0	1
Late harvest	100	0.05	0.022	0	1
Vin Santo	100	0.27	0.045	0	1
Superiore	100	0.25	0.043	0	1
Reserve	100	0.41	0.049	0	1
White	100	0.68	0.047	0	1
Rose	100	0.30	0.046	0	1
Red	100	0.67	0.047	0	1
Dry	100	0.20	0.040	0	1
Slightly sweet	100	0.12	0.033	0	1
Sweet	100	0.12	0.033	0	1
Novello	100	0.20	0.040	0	1
Sparkling	100	0.14	0.035	0	1
Spumante	100	0.22	0.042	0	1
2010 tot. pop.	100	112,617.20	16,018.480	2800	773,987
Surface (square km)	100	707.68	90.080	37.88	4587.69
No. ATMs/1000 inhabitants	100	0.65	0.023	0.20	1.22
No. hotels	100	85.32	16.023	1	1007
No. holiday farm houses	100	78.64	14.833	0	813
No. museums	100	1.24	0.427	0	31
No. archaeological sites	100	0.69	0.213	0	16
Degree of urbanisation	100	1.55	0.054	1	3
Level of employment in agriculture	100	9.21	1.203	1.48	104.35
Level of female employment	100	31.19	0.607	17.41	41.48
Index of population dispersion	100	20.00	1.160	0.26	66.21

5. Empirical results and discussion

Given the high number of explanatory variables and the lack of prior knowledge on which variables should be included in the model, a subset of variables was chosen using a model selection method based on deviance test and comparison of nested models. This selection allows us to obtain the final model of analysis.

Moreover, we checked for potential multicollinearity. There are two ways to handle this. One is to test for pairwise correlation between the variables included in the model: only one variable has a value larger than 0.5 (i.e., -0.60), suggesting that there is no strong correlation between the variables of the analysis. The second way is the evaluation of the Variance Inflation Factor (VIF), by estimating the equation using OLS (Menard, 2002). The highest value obtained is 3.22 (average 1.64), which is lower than the usual threshold value (Hill and Adkins, 2001). Thus, we can exclude multicollinearity problems in our econometric model.

In Table 3 we show the estimated ordered logit model with STATA 2012,⁶ considering the variables obtained from model selection.

Based on the research hypotheses previously established, we now report the results of the estimate.

H1. The hypothesis is confirmed for all the variables belonging to the set "characteristics of designation". Two of them (*Age* and *Producers*) have low but significant beta values. The variable *Designation* shows a significant and considerable impact on wine reputation. All betas are significant (at the 5% level) and positive, so the presence of a DOCG and the

⁶The STATA software computes the ordered logit through the dichotomisation of the outcome variable and by using a cumulative function. Furthermore, a simplifying hypothesis is assumed: the effect of explanatory variables is not dependent on response mode, hence we assume that the coefficient values are constant (proportional-odds model). Generally, this is a reasonable assumption, but in our analysis we confirmed it by running the *omodel* (Wolfe, 1997) and the *brant* tests (Long and Freese, 2006).

Table 3
Results of logit model: β_j estimates.
Source: Our elaboration from STATA, 2013.

Hypothesis	Variable						
	Reputation	Coeff.	Std. Err.	Z	P > z	[95% Conf. interval]	
H ₁	Designation	1.721	0.727	2.37	0.018	0.295	3.146
	Age	0.050	0.020	2.53	0.011	0.011	0.090
	Producers	0.004	0.001	3.57	0.000	0.002	0.006
H_2	Grapes_yield	-0.132	0.122	-1.08	0.279	-0.370	0.107
	Grapes/wine	0.084	0.051	1.66	0.097	-0.015	0.183
	Wine_alcoholic_content	1.037	0.339	3.06	0.002	0.373	1.702
H ₃	Subsite	1.200	0.528	2.27	0.023	0.165	2.235
	Passito	1.259	0.556	2.26	0.024	0.168	2.349
H_4	No. ATMs/1000 Inhabitants	3.608	1.080	3.34	0.001	1.491	5.726
	No. Museums	-0.446	0.240	-1.86	0.063	-0.917	0.025
H_4	/cut1	20.141	7.637			5.172	35.109
	/cut2	21.066	7.664			6.045	36.087
	/cut3	22.710	7.715			7.589	37.831
	/cut4	24.320	7.766			9.099	39.542
	/cut5	26.637	7.911			11.130	42.143
Log likelihood=	= - 103.33148						
Number of obs.	=100						
LR χ^2 (10)=88	.53						
$\operatorname{Prob} > \chi^2 = 0.00$	000						
Preudo $R^2 = 0.2$	999						
$\frac{\text{Prob} > \chi^2 = 0.00}{\text{Preudo } R^2 = 0.2}$	000 999						

increase of the designation age and of the number of producers lead to a propensity to have a better reputation.

H2. In the set of variables representing the "minimum quality standards", two show a statistical significance. The variable *Grapes/wine* has a weak significance at the 10% level and a positive sign. The variable *Wine_alcoholic_content* has a significant (at the 1% level) and positive beta coefficient, so its value can be taken into account. The result shows that a one unit increase in the wine alcoholic content leads to a wine propensity for a better reputation.

H3. The hypothesis is confirmed by two of the variables belonging to the set "Vertical differentiation", in particular *Subsite* and *Passito*. The former has a significant (at the 5% level), positive and considerable beta coefficient: this result shows how Designations that include wines belonging to a restricted area of designation have a propensity to get a higher reputation level than those not belonging. The variable *Passito* as well has a significant (at the 5% level), positive and considerable relevance in wine reputation: *Designations* that include wines belonging to this vertical differentiation have a propensity to get a higher reputation level than those not belonging.

H4. The hypothesis related to contextual factors finds support in two of its variables, in particular *No. ATMs/1000 Inhabitants* and *No. Museums*. The former shows a positive, significant and considerable beta coefficient: an increase in the ratio between the number of ATM machines and 1000 inhabitants leads to a wine

propensity for better reputation. The variable *No. Museums* has, on the contrary, a weak significance.

In terms of estimates of the predicted probability, Table 4 shows the results. In the estimate of marginal effects we consider the success odds of a wine so that its reputation level is 5 (max. threshold). Given that our database contains both factor and continuous variables, we decided to estimate the marginal effects setting the second ones equal to their means. Therefore we explain the marginal effects between the highest level of reputation and specific attributes.

H1. The predicted probability of being in the highest level of reputation is 7%, if the wine has a DOCG designation; however, this predicted probability decreases at 3%, if the designation is DOC. The predicted probability of being in the highest level of reputation is 4%, if the age of designation is at its mean value. The predicted probability of being in the highest level of reputation is 3%, if the value for the number of producers is at its mean value.

H2. The predicted probability of being in the highest level of reputation is 5%, if the value of the maximum conversion ratio of grapes used in wine is at its mean value. The predicted probability of being in the highest level of reputation is 3%, if the value of the minimum wine alcoholic content is at its mean value.

H3. The predicted probability of being in the highest level of reputation is 6%, if the designation includes wines that belong to a restricted area of designation; this predicted probability

Table 4 Marginal effects. *Source*: Our elaboration from STATA, 2013.

Hypothesis	Variable	Margin	Std. Err.	<i>p</i> -Value
H ₁	Designation			
	1 - DOCG designation	0.068	0.029	0.020
	0 - DOC designation	0.029	0.011	0.015
	Age	0.037	0.012	0.004
	Producers	0.028	0.013	0.030
H ₂	Grapes/wine	0.050	0.014	0.000
H2 Grapes/wine Wine_alcoholic_content H3 Subsite	0.029	0.010	0.005	
H ₃	Subsite			
	1 - Designation includes wines that belong to a restricted area	0.060	0.021	0.005
	Designation0.0681 - DOCG designation0.029Age0.037Producers0.028Grapes/wine0.050Wine_alcoholic_content0.029Subsite0.0291 - Designation includes wines that belong to a restricted area0.0600 - Designation includes wines that do not belong to a restricted area0.0600 - Designation includes wines that are strong, mostly sweet, from dried grapes0.0610 - Designation includes wines that are not strong, mostly sweet, from dried grapes0.0610 - Designation includes wines that are not strong, mostly sweet, from dried grapes0.036No. ATMs/1000 Inhabitants0.0290.035	0.012	0.005	
	1 - Designation includes wines that are strong, mostly sweet, from dried grapes	0.061	0.023	0.008
	0 - Designation includes wines that are not strong, mostly sweet, from dried grapes	0.036	0.011	0.002
H_4	No. ATMs/1000 Inhabitants	0.029	0.009	0.003
	No. Museums	0.035	0.011	0.002

decreases at 4%, if the wine does not belong to the restricted area. The predicted probability of being in the highest level of reputation is 6%, if the wine is a passito; again, this predicted probability decreases at 4%, if the wine is not a passito.

H4. The predicted probability of being in the highest level of reputation is 3%, if the value of the ratio between the number of ATM machines and 1000 inhabitants is at its mean value. The predicted probability of being in the highest level of reputation is 4%, if the number of museums is at its mean value.

6. Conclusions

The present research investigated the factors that determine the level of collective reputation of DOC brands. However, it is important to consider the limits of this empirical analysis. In our analysis, we examined only some of the factors that may affect the reputation of a wine. A parallel study which takes into account other interesting variables could certainly lead to a more comprehensive analysis. Nevertheless, relevant aspects emerge from the study.

As for hypothesis H1, the study confirms the expected result. The higher the number of firms, the higher the investments in marketing, which increase the collective reputation of the DOC. Similarly, the older the DOC designation, the greater its reputation, due to the accumulation effect of investments in marketing and consumer experiences.

Collective reputation is related to the quality proposed by the companies in the past (H2) and it represents the promise of quality for the future. Product differentiation within the DOC areas (subzones, variants of the product, the presence of sweet wine, etc.) represents a growth factor for the reputation of the DOC, which is able to offer a wide range of consumer experiences (H3).

The analysis of the role of the economic characteristics of the territory is the most difficult aspect to investigate, and many of the variables are not significant (H4). The only significant variable (*ATM/1000 Hab.*) potentially expresses the level of economic vitality of the area, as well as the level of development of services, which is linked to the level of social interaction and economic attractiveness of territories. However, these aspects require further studies and investigations.

The results obtained offer useful ideas for future interventions and political instruments in the regions analysed; the great number of high quality wines in guides demonstrates that the wine value chain can be considered the main structure in the social and economic context. However, the development of collective reputation is closely related to the system of rules and quality standards defined by the specification. Despite the great number of criticisms to the system of DOC wines, the presence of shared and mandatory rules resulted in a collective value that can support SMEs in building their own individual reputation.

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