The Value of the Certifications of Origin: A Comparison between the Italian Olive Oil and Wine Markets[1]

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1. Introduction

Geographical Indications (GIs) for agricultural products and for processed food have been traditionally adopted in many European Countries for about one century and even more. Based on the idea that the quality of some products is strictly linked to the place of origin, this kind of quality certification has been extensively used in the wine sector before all others. EU Reg. 2081/92 introduced a common framework among Member States. However, up to nowadays wines have been ruled separately, basically following different national schemes for the certification of product origin. Only recently the European legislator is driving a merge between the different schemes with the aim to unify and simplify the rules (Reg. 1151/2012). Over time, the European law has been objected of not being fully effective and not appropriately targeted (Carbone *et al.*, 2014; Deselnicu *et al.*, 2013; London Economics, 2008). It is however out of question that it had the merit of giving a powerful impulse to the creation of many new Protected Designations of Origin (PDO) and Protected Geographical Indications (PGI), overall contributing to raise a wide interest in the issue of product origin. In fact, the number of registered products has almost tripled since the first application of the EU Regulation and it is now above 1200. As for the wines, summing up all the different national schemes the total number of GIs is well higher.

Following these premises, the paper seeks at comparing the role and the effectiveness of the certification of origin in the creation of value in the olive oil and in the wine markets. The certification of origin is here interpreted as a quality clue and its effectiveness is measured by the value of the associated price premium (PP) gained by certified products.

The two sectors under comparison differ in many respects: i) the nature of the product itself, a condiment in one case, and an alcoholic beverage in the other; ii) the time and the extent to which the certifications of origin have been used, much longer and widespread for wines than for olive oils; iii) the degree of differentiation and sophistication of the markets. Despite the many differences, in recent years marketing strategies in the olive oil sector seems to be increasingly inspired by the examples of

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wine, with an increasing role for the place of origin, for the variety of the olives, the packaging, the trials, the experts' evaluations and so forth (Cabrera et al., 2014; Galizzi, 2013; Romo Munoz *et al*., 2015). All in all, well established differences together with arising hints of similarities add reasons of interest in the comparison.

To meet our goal, we build and estimate two separate hedonic price models where the price of the product is regressed over different quality clues some of which are sector specific and some are common to the two sectors and allows for meaningful comparisons (Rosen, 1974; Thrane, 2004, Deselnicu et al., 2013; Schamel and Anderson, 2003; Brentari *et al.*, 2011; Costanigro *et al*., 2010).

To our best knowledge, this is the first time that the hedonic price model has been applied for a direct comparison of the market values of quality clues for olive oils and wines. Results suggest that important quality clues act similarly in the two markets while other play a different role. With respect to the place of origin, our focus interest here, this is a major quality clue for both products. However, the general claim of the area where the product comes from is more important that the EU certification of origin for olive oils while the contrary is true for wines. This seems coherent with the longer and larger use of the certification of origin for wines that make consumers more aware of its meaning and value.

The paper is organized as follows: the second section is devoted to framing the main features of the two markets with a focus on the role of product origin; in section 3 we describe the methodology; results are presented and discussed in the fourth section while section 5 concludes.

2. The role of the place of origin as a quality clue for wine and olive oil

Wine and olive oil are both products with strong roots in the place of origin. This is true at a macro level if we think that two third of world exports of wine comes from Mediterranean European Countries and that over 90% of world exports of olive oil comes from Mediterranean Countries (Anania and Pupo D'Andrea, 2008; Carbone *et al*., 2015; London Economics, 2008). Furthermore, in consumers' minds all over the world, wine and olive oil are fully embedded in the culinary traditions, culture and image of the area as part of the Mediterranean diet (Wahrburg *et al*., 2002).

Narrowing the perspective, it can be seen that, within the wider production area, there is a strong product differentiation at the local level. This is based on climate, on different varieties of the raw material that are best suited for diverse microclimatic conditions (i.e. vine varieties and olive tree cultivars), as well as on production techniques established over time by local producers that have become specific and traditional of each place of origin. Hence, the place of origin is key factor in defining the identity of both products.

Wine is a complex good whose consumption is related with hedonic motivations. Hence, wine market is sophisticated and highly segmented based on a wide range of extrinsic and intrinsic quality attributes

some of which are *experience* while some others are *credence*. Among the last ones, the place of origin plays a major role with nested quality clues where the Country of origin forms the outer layer (e.g. Italy), followed by the Region (e.g. Tuscany) and, as the inner layer, the sub-regional area (e.g. Chianti) (Costanigro et al., 2010). International trade is largely developed in the wine sector since many centuries, thus contributing to a widespread reputation of traditional production areas.

As it is well known, imperfectly competitive markets with asymmetric information extensively rely on reputation as a substitute of the lacking information. The reputation of the most traditional and famous places of origin for wines is so strong that in many cases the geographical name not only indicates a specific product –as it is the rationale for Geographical Indications- but, more generally, over time tends to designate the product typology, as it is the case, for example, of Champagne (for sparkling white wines), Porto (for red sweet fortified wines), Marsala (for white sweet fortified wines). Furthermore, it is worthwhile to recall that wines are presented to consumers on a regional basis in shops as well as in wine guides and magazines. Thus, reputation linked to the place of origin tends to reinforce product differentiation based on the other attributes that, in turn, are related to the place of origin. Everything considered, these are the many reasons why wine has first and more extensively used clues related to the place of origin.

Compared to wine, olive oil is much less differentiated. Olive oil is a vegetable fat used for cooking and as a raw condiment for many different dishes. Its differentiation is mainly vertical and it is based on the degree of acidity (i.e. extra-virgin, virgin, not-virgin, mixes, etc.) that follows the kind of olives' picking and the extraction system. So far, differentiation based on the recalled attribute has been more relevant for consumers in traditional consuming Countries and less relevant for the so called *new consumers*. In Countries such as Italy, where production and consumption of olive oil is traditional, a large share of the market is still locally based and self-consumption plays a non-marginal role. As a consequence, market segmentation linked to place of origin and sensory attributes –that are deeply inter-related- is sharp and strongly based on habits. However, in recent years the number of quality clues that are relevant to consumers is increasing and product differentiation is becoming a key factor in the competitive arena (Anania and Pupo D'Andrea, 2008; Carbone et al. 2015). Marketing strategies in the olive oil sector seems to be increasingly inspired by the examples of wine, with an increasing role for different quality attributes and different kind of clues also related to product and producers' reputation. Among these there are: the certification of the place of origin (Cabrera et al., 2014; Van der Lans et al., 2001; Menapace et al. 2011); the variety of the olives; sensory attributes (Dekhili et al., 2011); different specifications of the production process and the kind of producer; packaging (Romo Munoz et al., 2015); prizes, awards and trials; experts' evaluations and scores obtained in guides; and many more (Cabrera et al., 2014; Galizzi, 2013).

3. Methodology

3.1 The Sources of Data

The data used for the estimation of the models on which the comparison of the wine and olive oil sectors is based come from two Italian products' guides. This means that we are looking at quite peculiar market segments where quality and attention to quality clues are high. This is especially true for the olive oil market where product diversification is more recent and limited, as well as the use of experts' guides. In this market, features on which the guides are focused may indicate recent, or even upcoming, tendencies, as compared to already well established trends of the larger market.

Both Guides have been chosen for their well established reputation and for the richness of information reported for each wine/oil evaluated that allows for a more insightful analysis.Data on olive oils are drawn from the Slow Food guide (2013 Edition), one of the few widespread olive oil guides in Italy. Oils included in this guide are from all Italian Regions and represent the top market segment with a share of less than 3% of national production and an average price that is about 5 times higher than the national average unit value. The analysis covers 704 producers and their 1001, for each producer and his/her oils the guide reports a set of information that are partially comparable with those released by Veronelli for the wines. Information is provided to the guide directly by the producers. Prices are in Euros at consumers' prices for direct sales, VAT included.

Data on wines come from Veronelli (2010 edition), one of the oldest Italian wine guides that has a long and well established reputation. Veronelli provides a number of information that allows for an insightful analysis. Wines reviewed by this guide represent a share of about 5% of national production with an average price that is about 6 times higher than the national average unit value.

Our analysis considers 2,439 wines from three regions (Veneto, a northern region; Lazio, located in Central Italy; and Sicily, a Southern Island). Information is directly given by the producers. Prices are consumers' prices for direct sales, VAT included. In case where prices are not yearly released, the general consumers' price deflator is applied for updating figures.

3.2 The hedonic price models

In the analysis of differentiated products a number of studies have adopted hedonic price model in which the price of any product is described as a function of its characteristics (Deselnicu et al., 2013; Romo Munoz et al., 2015; Oczkowski, 2001; Schamel and Anderson, 2003).

In this study we adopt a hedonic price approach to measure and compare price premium associated to different quality clues in the olive oil and wine sectors.

In order to estimate how the different quality attributes are related to market prices in the two selected sectors we employ the following equations:

$$\text{Log } P_{oil} = \alpha_0 + \alpha_1 R + \alpha_2 Gi + \alpha_3 CuD + \alpha_4 CuM + \alpha_5 Or + \alpha_6 Coop + \alpha_7 Vol + \alpha_8 \text{Control Var} \quad (1)$$

$$\text{Log } P_{wine} = \beta_0 + \beta_1 R + \beta_2 Gi + \beta_3 Dgr + \beta_4 Mgr + \beta_5 Or + \beta_6 Coop + \beta_7 Vol + \beta_8 \text{Control Var} \quad (2)$$

For both equations Ramsey RESET tests have indicated that the log-linear specification performed better than other functional forms. Furthermore, log-linear specification presents a twofold advantage with respect to other ones: i) it allows obtaining residuals that are approximately normally distributed as required by selected regressions; ii) the interpretation of regression coefficients is more immediate: the dependent variable changes by $100*(e^{coef} -1)$ percent for a one-unit increase in one of the regressors, holding all other variables fixed.

In the two equations the dependent variable is the logarithm of price ($LogP_{oil}$ and $LogP_{wine}$, respectively). In the case of the olive oil sector prices are released by values, while for wines we have classes of values (see below for consequences on regression techniques to be utilized).

As shown by equations (1) and (2), the prices are regressed on a number of variables where:

i) R represents the area of origin. For the olive oils this is defined at the macro-region level (i.e. Northern, Central and Southern regions). Stricter definition was not possible due to the small size of the regional sub-samples. For the wines R represents three Italian regions: Veneto (located North-Est), Lazio (a Central region facing Tyrrhenian sea) and Sicily (the major Italian island and the most Sothern).

ii) Gi is the certification of origin. For the olive oil sector, according to the European Regulation, the GI system includes DOP and IGP, while for the wine sector the Italian law establishes three levels that, from the higher to the lower level of quality/typicality are: DOCG (Denominazione di Origine Controllata e Garantita), DOC (Denominazione di Origine Controllata) and IGT (Indicazione Geografica Tipica).

iii) CuD and Dgr, respectively denote the kinds of plant varieties used for producing the final products, in the case of olive oils and in the case of wines. The variety of the raw material in itself is relevant for the nature and quality of both olive oil and wine. Vines and olive cultivars are also related to the area of production as a consequence of the adaptation process to specificities of the local climate and environment. These are classified according to their geographical diffusion; so that we have national cultivars/varieties, regional cultivars/varieties and local ones. Clearly, these variables are directly related to the territorial roots of the product. Furthermore, only for the wine model the origin of the vines

is included, distinguishing Italian vines from the so-called international ones. Here the geographical roots and image of the product is still relevant even if at a wider level.

iv) CuM and Mgr represent, respectively, the oils and the wines made by only one cultivar and one vine: the so-called mono-cultivar olive oils and mono-varietal wines. These are not so common in Italy even though their number is increasing in recent years following the tendency of product segmentation on the basis of sensory features and of territorial typicality. In fact cultivars and grapes usually used for producing mono-varietal products are local traditional varieties that enhance the geographical typicality of the product.

v) Or indicates oils and wines from organic farming. Organic production is better established in the olive oil sector (Aprile *et al*., 2012; Di Vita *et al*., 2013) compared to the wine sector. Actually organic wines used to suffer from a negative reputation as their sensory quality is acknowledged not to be satisfactory (Delmas and Lessem, 2011). However, the literature acknowledges that things seem to be changing in more recent years, as in high market segments a positive PP may arise due to the difficulties existing so far to combine high sensory quality and being organic which render such wines quite rare (Corsi and Strøm, 2013).

vi) COOP assesses whether the processing stage of production is run by a cooperative of farmers. In Italy, especially in some areas of the Country, coops suffer from a negative prejudice, even though, with respect to big industrial processors, they ensure stronger territorial roots. Thus, we thought it might be interesting to assess whether in the highest market segments, as those investigated by our analysis, there is a negative bias on wines from coops and if this is homogenous across different production areas.

vii) Vol indicates the total production volume for the producer. For the olive oil model production volume is expressed in four size classes (1-50 hl, 51-100 hl, 101-500 hl and more than 500 hl). The role of the production volume as a quality clue may be, in principle, quite ambiguous: on the one hand, larger volumes may help the producer to get higher visibility on the market and, hence, to better establish its reputation; on the other hand, small qualities may be associated to a sense of rarity and, hence, increase the PP. In the case of the wine model we have taken into account the number of labels included in wine guide for each producer; based on this we built four classes (1-5 labels, 6-10 labels, 11-15 labels and more than 15 labels). The number of labels reviewed, is also, associated to the visibility of the wine and, again, we are interested to get insight on eventual association with a positive PP.

viii) Finally, the two models include some control variables. These are quality clues which, although they affect the dependent variable of the two models, are sector specific and/or are not directly or indirectly linked to place of origin.

Therefore, these regressors are included in the models specification in order to avoid biased estimates in regression analysis. However, their estimates are reported in the tables without an interpretation of the results in the body of paper because these quality clues neither can be compared between the two markets nor add information related to the role played by place of origin. In the case of olive oils these are: bottle size; the presence of a mill within the farm; the way olives are picked; and the techniques adopted for extracting oil from the olives. In the case of wines these are the kinds of wine (red, white, sparkling and sweet wines); the age of wine; and the score obtained in experts' evaluation; the number of bottles produced for each wine.

Since in Veronelli prices of the wines are reported into intervals of values, while Slow Food shows the actual price for each olive oil bottle, in order to estimate hedonic price models we employed two different regression methods.

For the olive oil sector the estimates were conducted employing Ordinary Least Square (OLS) while for the wine sector through interval regression which represents a generalization of censored regression.

In interval regression the extreme values of the range for each category are either left-censored or right-censored. In other words, we have interval-coded data but we are interested in the population regression $y = x\beta + u$. It is worth noting that the structure of the problem is similar to the ordered probit model. However, one feature of such models is that the "cut-points" (i.e. the values separating different outcomes) are assumed to be unknown parameters requiring estimation. As the cut-points are known in our case (Table 2) we do not use ordered probit model. Moreover, interval regression estimates allow us to interpret the results in the same way as conventional least square method (Wooldridge, 2010) that was used for estimating the hedonic price model for olive oil sector.

The two estimates allow for a comparison of the role played by some focus variables in the olive oil and the wine markets. However, when comparing the values of the estimated coefficients, caution is required due to the different market contexts and, specifically, to differences in the sizes and nature of the samples and to the different accuracy in the specification of the models.

4. Results

4.1 The olive oil sample: descriptive statistics

Starting to describe the olive oil sample from the dependent variable, Table 1 shows that oils included in the sample are sold at a wide range of prices, from a minimum value of 5.5 Euros to a maximum of 100 Euros, with an average of 18.6 Euros and the modal value that worth 16 Euros. Moreover, the prices of the 80^{th} and 90^{th} quantiles are, respectively, 24 and 30 Euros showing that the olive oils sold at very high price represent few cases of sample. With respect to the origin, the data set includes 148 (14.7%) oils from North, 364 from Centre (36.1%) and 496 (49.2%) from South. A distribution reflecting the different production volumes of the areas, but also their different reputation; where the South represent the national bulk production, the Central Regions are the most renowned and the Northern ones forms a niche with small quantities and high quality reputation.

Due to the small number of IGP oils included in the sample−only one IGP olive oil exists in Italy so far (i.e. Toscano IGP)−DOP and IGP oils have been merged in the regression and opposed to oils without certification of origin. The first turned out to be 159 (about 16% of the total) while the latter are the remaining 84% of the sample.

With respect to the cultivar, the sample is featured as follows: about two third of the oils are made with olive trees cultivar that are nationally widespread; regional cultivars are utilized for producing about one half of the oils in the sample (48%) and, eventually, local cultivars accounts for about three out of four oils (74%). It is clear, then, that many of these oils are made out of more than one kind of olives with different territorial diffusion. Actually, about one half of the oils are made by only one cultivar. As this is not so common in Italy (see previous section), the presence of many mono-varietal oils in the guide can be interpreted as an indication of the increasing role that they are gaining in expert's eyes and in the higher market segments.

Oils from organic farming are well represented in our sample with 475 certified products, accounting for almost half of the sample: a very important role compared to the national situation where less than 15% of olive oil production is organic. 134 (13.4%) processors are cooperative owned structure while producers' distribution with respect to production volumes is as follows: more than 50% does not reach 50 hectoliters/year; about 15% range between 50 and 100 hectoliters; 9.4% of them produces volumes between 100 and 500 hectoliters and the remaining produces larger quantities (i.e. more than 500 hl.). Finally, the guide releases information about the control variables. Olive oils included in the selected guide are mainly sold in bottles of 500 ml (57.8%) and 750 ml (32.6%) with respect to bottle of 250 ml (3%) and of 1 liter (5.9%). Concerning the way olives are picked, hand picking accounts for almost three quarters of the oils (778); in the 39% of cases the mill is on farm.

Table 1. Number and frequency of cases for each variable in olive oil sector

4.2 The wine sample: descriptive statistics

Prices of wines are released in classes of value as follows: lower than 7 E. (these wines account for 13.3% of the sample); 7.1-10 E. (24.2%); 10.1-15 E. (27.9%); 15.1-20 E. (11.6%); 20.1-30 E. (13.3); over 30.0 E. (9.7%).

As already said, the wine database includes wines from three Italian regions and the share of each one is as follows: 1544 (63.3%) are from Veneto, 220 (9%) are from Lazio, and 675 (27.3%) Sicily. A distribution reflecting their different role in the Italian wine sector, with Veneto that is a major production area with a high and well established reputation; Lazio that produces smaller quantities and is trying to improve quality and rise its reputation and Sicily that was traditionally producing bulk wine but it is now producing higher quality trendy wines.

The three levels of origin certification settled by the Italian law are present in the sample in the following proportions: DOCG (440) accounts for 18% of the sample, DOC (899) accounts for 37% of the sample, and IGT (with 1100 wines) accounts for about 45%. Only few Table Wines are reviewed by the guide (so that these could not be included in the model), thus confirming the more extensive use of the certifications of origin in the wine sector compared to the olive oil one.

According to the origin of the vine the distribution of the sample is as follows: national grapes are 2075 (85.1%) while international ones are far less: 364 (14.9%). Wines made with vines with different diffusion along the Country are included in the sample with the following shares: those blending national vines are 285 (11.7%), those using vines present in more than one region (i.e. widely diffused) are 287 (11.8%), and wines made with local vines (i.e. present only at sub-regional level) are 1867 and account for 77.5%.

Organic wines are 336 in the sample (13.8%): not a so small group. Nevertheless, when confronted with the olive oil sector figures are confirming that organic production is far less common in the Italian wine sector compared to previous one.

Wines from cooperatives are 105 (4.3%), allowing for detecting whether wines from this kind of producers are associated with significantly different price levels. Among the wine producers included in wine guide, the 23.9% has less than 6 labels, the 48.7% between 6 and 10 labels, the 20% between 11 and 15 labels and, finally, the remaining 7.4% more than 15 labels.

In the sample red wines are 1363 (55.9%), whites 688 (28.2%), sparkling wines 117 (4.8%) and sweet wines 261 (10.7%). According to the age of wine the distribution of the sample is as follows: vintage 2004 (4.7%), vintage 2005 (7.1%), vintage 2006 (14%), vintage 2007 (20.5%), vintage 2008 (25.4) and vintage 2009 (25.3). Veronelli guide has chosen 325 wines (13.3%) to be awarded the highest evaluation of three stars, 1280 wines (52.5%) got two stars, only one star is taken by 509 wines (20.9%) and the *new entry* wines are 298 (12.2%). The production volumes for each wine, expressed by number

of bottles produced, is distributed among the three dimensional classes: less than 7600 bottles (34.9), between 7600 and 15000 bottles (33.9%) and more than 15000 bottles (31.2%).

Table 2. Number and frequency of cases for each variable in wine sector

4.3 Results of the regressions

According to the goal of the paper, the results are here presented with a focus on the comparison between the olive oil and the wine sectors (tables 3 and 4 and Figure 1).

The fit of the regression is similar for the two estimates as it is shown by the R2 that is at 0.502 for the oils and 0.427 for the wines. Quite good values for these kinds of regression; but still, indicating that both markets are well sophisticated with many more attributes potentially influencing the market values.

Starting to analyze the detailed results of the estimates, it can be seen that variables related to the place of origin are associated with significant PPs in both cases. In particular, olive oils from northern and central regions worth more compared with products from southern regions. In particular, the first get + 43.7% and the second +19.1% more than the third (that is the benchmark). Also wines coming from different production areas associate with different prices: while Veneto and Sicilia worth approximately the same, Lazio wines get a negative PP of about -16.2%. These results confirm that the place of origin plays an important role in these markets as extensively showed also by other authors (Panzone and Simões, 2009; Costanigro et al., 2010; Brentari et al., 2011; Schamel and Anderson, 2003).

The certifications of origin are also valuable in both markets, with DOP/IGP oils getting an average PP of +11.5% compared to non-certified oils. It is worth to note that the PP related to the certification of origin in the Italian olive oil market is higher (11.5% vs 5.28%) than that estimated in the Spanish market by Cabrera et al. (2014). As for wines, the DOCG certification gets on average a very high PP (+43.8%) when compared with IGT (the benchmark), while DOC is not more valuable than IGT. It is worthwhile to pinpoint that this result is coherent with those from other authors (Cacchiarelli *et al.*, 2014; Brentari et al., 2011).

Coming to the role of the plant variety, our sample shows mixed results. In the case of olive oils, national cultivars get on average a PP of about +8% while local ones get around -6%, probably as a consequence of a lack of information on the consumers' side about these peculiar varieties. Differently, mono-cultivar oils -regardless to the specific cultivar utilized- get a PP of 14.3% with respect to oils that mixes different kind of olives. Things work differently in the case of wines as those made with local vines worth more (5.8%) than wines made with nationally based vines. Data also show a different, though parallel, tendency: the greater appreciation of international grapes with

respect to the ones that are traditional of the domestic sector (the PP associated to the latter is -8.3%). Finally, also in wine market mono-varietal product is associated to a positive PP (6.1%).

A few more results are worth reporting here, though not related to the place of origin, as they provide interesting comparisons between the two sectors.

First, we see different signs of the coefficients of the variable for organic certification in the two markets. The results confirm the evidence observed in literature (Cabrera et al., 2014; Di Vita et al, 2011) according to which organic production is better established in the olive oil sector, where it presents a positive PP (+7.7) while in the wine sector is associated to a negative PP (-8.9%), showing that organic wines continue to suffer from a negative reputation.

Second, the regressions show that variables related to the producers behave differently one from the other. There is a substantial alignment in price differentials for products from cooperatives: the PP is negative in both cases, though much larger for wines (-10.4%) than for oils (-5.5%). The result is well aligned to the negative reputation of coops in the sector of quality products as showed in other works (Cabrera et al., 2014; Castriota and Del Mastro, 2010). We guess that this result, in turn, follows the prevailing rules for the provision of the raw material from the associates that do not incentive quality.

Diversely, production volumes of the producer relates in different ways to prices in the two sectors. The impact is negative in the case of wine: -8.2, -5.9 and -5.3%, respectively for the three smaller dimensional classes compared to the benchmark; meaning that large producers get higher prices due probably to reputational effect, while is not significant in the case of olive oil.

Table 3. The estimation of hedonic price model for olive oil

Table 4. The estimation of hedonic price model for wine

Figure 1. Comparison of hedonic price estimates for olive oil and wine models

5. Concluding remarks

The analysis presented in the paper shows that product origin and the relative certification schemes play a relevant role in the formation of prices in the higher segments of both wine and olive oil markets. In particular, prices of olive oils reflect the area of origin with high and significant PPs for oils coming from Central (19.1%) and Northern Regions (43.7%) compared to product from Southern Regions. The certifications of origin (DOP/IGP), though valuable, bring a smaller additional value of about 11.5%. Also in the wine sector the area of production -that in the sample is expressed at regional level- is valuable. Coming from Veneto and Sicily, as opposed to Lazio, adds about 16% to the price of the wines. In this market, the value associated to the certification of origin follows a more complex pattern

than what we found for the olive oil one. In particular, the PP gained by the top-level certification (DOCG) is really noticeable, with an average value of +43.8% over the IGT (the benchmark). On the contrary, the problems that many authors acknowledged in the managing of DOC in the Italian wine sector result in no significant PP for these products.

Within the limits of the comparisons made possible by our exercise, it is worth to pinpoint that the olive oil price seems to be more sensitive to farm location than to the certification of origin; while the opposite happens for the wines, at least for the top-level certification of origin (unfortunately, our sample cannot bring insights on the value of certified wines as opposed to uncertified ones). The differences observed between the two sectors seem coherent with the longer and larger use of the certification of origin for wines that make consumers more aware of its meaning and value. At the same time, the comparison of the results for the two sectors seems to indicate that there is scope for future reinforcements of claims based on olive oil origin and the related certifications also at sub-regional levels.

One caveat of our results on the different values associated with the certifications of origin in the two sectors is that a great deal of caution is worth when considering the pros and cons of merging the wine sector into the general scheme for product origin as ruled in EU Reg. 1151/2012.

The estimates provide other interesting evidences among which it is here worth to recall those related to the cultivar as this is indirectly related to the terroir. In fact, plant varieties are associated to a PP in several ways, thus confirming the complexity of the market that features different tendencies. These are sometimes well aligned and sometimes are divergent, confirming the increasing segmentation and sophistication of such markets.

It is also interesting to recall evidences obtained by our estimates on the price response to organic certification. The PP associated to the organic production is positive for olive oils while continues to be negative for wines. This is probably due to a negative quality bias towards organic wines that only recently is starting to be overcome by little segments of the market that may play a decisive role in changing the wider reputation of these wines. This result suggests that in wine market a deeper effort in communicating advances in sensory quality of organic productions may pay in terms of reducing the still in place negative bias towards this production method in higher quality segments.

Last, the comparison proposed in this paper confirms that the higher segments of the Italian olive oil market is increasingly sophisticated and follows the main tendencies established in the quality wine markets where many quality attributes are intensely active. An insightful result of our analysis on this point is that one related to the PP associated to the so called mono-cultivar oils, a novelty in the Italian market that follows the path of varietal wines.

Nonetheless, it is also true that the olive oil market is less diversified, so far, when compared to the wine market. This is clearly shown by different hints such as: the smaller number of guides, the smaller number of producers reviewed in Slow Food and the limited diversification of production at the producers' level, the relatively more limited range of price variation and, last, by the smaller number of attributes reported for each of the reviewed oil.

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Table 1. Number of frequency of cases for each variable in olive oil sector

	Variable	N	%
R	North	148	0.147
	Centre	364	0.361
	South	496	0.492
Gi	Dop	159	0.158
CuD	National Cultivar	670	0.665
	Regional Cultivar	486	0.482
	Local Cultivar	748	0.742
CuM	Mono Cultivar	503	0.499
Or	Organic	475	0.471
Coop	Cooperative mill	135	0.134
Vol	1-50 hl	567	0.563
	51-100 hl	155	0.154
	101-500 hl	95	0.094
	>501 hl	191	0.189
Control Variable	bottle of 250 ml	30	0.030
	bottle of 500 ml	583	0.578
	bottle of 750 ml	329	0.326
	bottle of 1 liter	59	0.059
	Hand picked	778	0.772
	Mill on farm	395	0.392
Poil	Price	1001	0.993
	Observations	1008	1.000

Source: Our elaborations on Slowfood 2013

Table 2. Number of frequency of cases for each variable in wine sector

	Variable	N	%
R	Veneto	1544	0.633
	Lazio	220	0.090
	Sicilia	675	0.277
Gi	DOCG	440	0.180
	DOC	899	0.369
	IGT	1100	0.451
Dgr	National diffusion	285	0.117
	Regional diffusion	287	0.118
	Local diffusion	1867	0.765
Mgr	International vine	364	0.149
	National vine	2075	0.851
	Monovarietal	380	0.156
Or	Organic	336	0.138
C	Cooperative	105	0.043
Vol	1-5 labels	584	0.239
	6-10 labels	1189	0.487
	11-15 labels	487	0.200
	>15 labels	179	0.073
Control Variables	White	688	0.282
	Red	1363	0.559
	Sparkling wine	117	0.048
	Sweet wine	261	0.107
	Vintage 2004	112	0.046
	Vintage 2005	173	0.071
	Vintage 2006	341	0.140
	Vintage 2007	499	0.205
	Vintage 2008	620	0.254
	Vintage 2009	617	0.253
	New entry	298	0.122
	One star	509	0.209
	Two stars	1280	0.525
	Three stars	325	0.133
P_{wine}	<7600 number of bottles	851	0.349
	7600<number of bottles<25000	828	0.339
	>25000 bottles	760	0.312
	Price=<7 E.	325	0.133
	7<Price=<10 E.	590	0.242
	10.1<Price=<15 E.	681	0.279
	15.1<Price=<20 E.	282	0.116
	20.1<Price=<30 E.	324	0.133
	Price>30 E.	237	0.097
	Observations	2439	1.000

Source: Our elaborations on Veronelli 2010

Table 3. The estimation of hedonic price model for olive oil

	Variable	Coefficient	Standard error
R	North	0.437*	0.034530
	Centre	0.191*	0.026656
Gi	Dop	0.115*	0.028284
CuD	National Cultivar	0.080*	0.025452
	Regional Cultivar	-0.022	0.022529
	Local Cultivar	-0.064**	0.029229
CuM	Mono Cultivar	0.143*	0.022427
Or	Organic	-0.077*	0.024871
Coop	Cooperative Mill	-0.056***	0.028345
Vol	1-50 hl	-0.008	0.028686
	51-100 hl	-0.004	0.033965
	101-500 hl	-0.014	0.035320
Control Variable	bottle of 250 ml	0.592*	0.074264
	bottle of 750 ml	-0.291*	0.020063
	bottle of 1 liter	-0.464*	0.030889
	Hand picked	0.060**	0.023782
	Mill on farm	0.041	0.022207
	Cons	2.496*	0.070100
	R^2	0.502	
	Obs	1001	

Source: Our elaborations on Slowfood 2013

1 Table reports coefficients and standard errors

2*means significant at 1%; **means significant at 5%; ***means significant at 10%

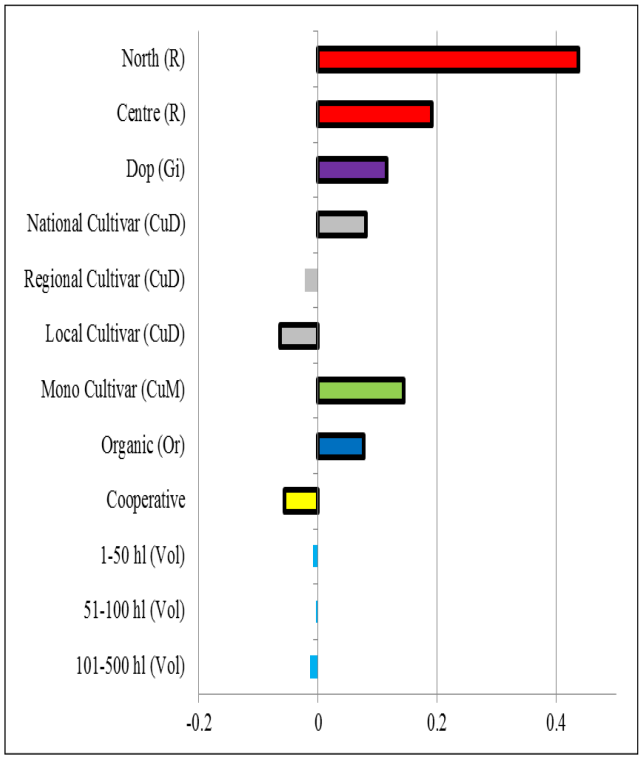
Table 4. The estimation of hedonic price model for wine

	Variable	Coefficient	Standard error
R	Veneto	-0.012	0.02735
	Lazio	-0.162*	0.03629
Gi	DOCG	0.438*	0.03621
	DOC	0.024	0.02731
Or	Organic	-0.089*	0.02711
C	Cooperative	-0.104**	0.04549
Dgr	National diffusion	-0.058**	0.03247
	Regional diffusion	0.040	0.04304
Mgr	National vine	-0.083*	0.03534
	Monovarietal	0.061**	0.02807
Vol	1-5 labels	-0.082*	0.03178
	6-10 labels	-0.059**	0.03273
	11-15 labels	-0.053***	0.031854
Control Variables	White	-0.0558*	0.02160
	Sparkling wine	0.038	0.04630
	Sweet wine	0.222*	0.03179
	Vintage 2004	0.886*	0.05338
	Vintage 2005	0.669*	0.04062
	Vintage 2006	0.477*	0.02903
	Vintage 2007	0.291*	0.02599
	Vintage 2008	0.151*	0.02312
	New entry	0.270*	0.03078
	Two stars	0.253*	0.02212
	Three stars	0.863*	0.03278
	7600<number of bottles<25000	-0.075*	0.02261
	>25000 bottles	-0.177*	0.02422
	Cons	2.213*	0.04688
	McKelvey & Zavoina's R2	0.427	
	Obs	2439	

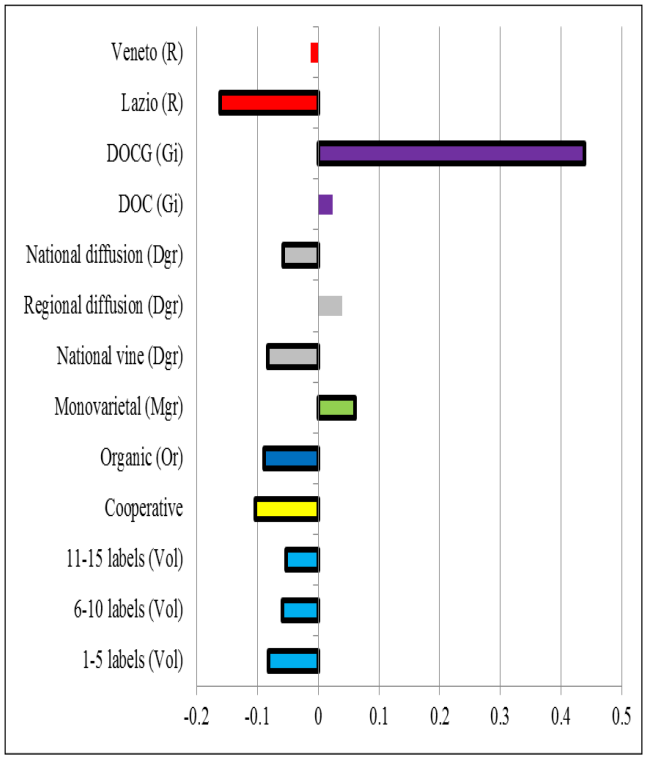
Source: Our elaborations on Veronelli 2010
1 Table reports coefficients and standard errors
2*means significant at 1%; **means significant at 5%; ***means significant at 10%

Figure 1. Comparison of hedonic price estimates for olive oil and wine models

Olive Oil



Wine



The bars without border line denote that the coefficients are not statistically significant