

# ENOMETRICA

REVIEW OF THE VINEYARD DATA QUANTIFICATION SOCIETY  
AND THE EUROPEAN ASSOCIATION OF WINE ECONOMISTS

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Review of the European Association of Wine Economists [EuAWE]  
and Vineyard Data Quantification Society [VDQS]

half-yearly journal

Volume 1, number 1, March 2008

ISSN 1974-4730

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In attesa di registrazione presso il Tribunale di Macerata

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EUM-Edizioni Università di Macerata, Palazzo

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*Distributor*

BDL, Corso della Repubblica Italiana, 9

62100 Macerata, Italy

e-mail: bottegadellibro@bdl.it

*Printing*

Stampalibri.it

Macerata

Finito di stampare nel mese di marzo 2008

ISBN 978-88-6056-118-3

Single issue: current issue €12

Yearly issue: (two numbers) €20

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## Editorial

From time immemorial *wine* is recognized as a tool of mediation both among men and between them and the deity. This happens in the classic antiquity where the state of inebriation is considered as a manifestation of the *sympathy* with god, and in the Christian tradition where wine is either a symbol or the very substance of the divinity. That primeval perspective puts the emphasis on the noblest and most transcendental aspects of the communicative function of *wine*, with scarce interest for its intrinsic characteristics, given that wine is wine and provided that it is obtained according the proper practice: *ex genimine vitis* - from the fruit of the vine.

At the beginning of the contemporary times, the discovery of the *homo oeconomicus*, made by the merit of the anglo-saxon empiricism, overcomes the difficulty of explaining the whole of the human conducts which would imply providing the most intimate and hidden motivations. It stylizes the human behaviours only with respect to some of the inescapable motivations - the economic ones - which rule the human intercourse, and entitle us to be satisfied with a more reductive explanation of human behaviours but more discreet and less pretentious.

Also in this new perspective *wine*, or better, the *wine commodity* does not loose its mediation function which is, on the contrary, specially amplified within the context of modern economic systems, which have to face the challenge of local problems in a global framework. It is not a case that the first attempts of systematizing the concept of wealth produced and distributed - the *Produit Net* in the *Tableau Economique* by *François Quesnay*, leader and inspirer of the *Physiocrats* - occur in the same cultural milieu where a vast communication deal was taking place. Its aim was the promotion of the *quality wine commodity* and was operated by the wine producers of the French region of Champagne with respect to the French Court. Both operations were patronized by the Marquise de Pompadour, patroness of the arts and the sciences.

In the beginning, i.e. at the times of Dom Pérignon, the in-bottle re-fermentation, that gives sparkling wine, was an immense problem for winemakers, as we have been said in our meeting in Reims-Epernay, some years ago. In cool autumns, fermentation sometimes didn't succeed in converting all fermentable sugars into alcohol. If the wine was bottled in this state, it became a real time bomb. Since in warm spring, dormant yeast roused and began generating carbon dioxide that would cause the explosion of the bottle. This fact could start a chain reaction: nearby bottles, which were also under pressure, would break from the shock of the first breakage, and so on, which put under risk that year's production. The original question was, then, how to avoid re-fermentation and its consequences,

including the feature for which Champagne is now so renowned.

In a way probably not completely aware of the long term exceptional results, the attempt was made - which turned out to be extraordinarily successful only in the lapse of two centuries - of transforming a fermentation problem into a national, at first, and then world-wide booming business. This was done through a watchful protection of the denomination, the construction of a solid reputation, the careful respect of rules and regulations in the procedures for obtaining the product, and through, we would say to day, convenient communication policies.

On the other hand the Ricardo's corn model takes its notion of economic surplus from the *Physiocrats*. A consistent value theory has, then, allowed to consider the *Produit Net* in value terms rather than in physical terms, leading to the idea of *Value Added*, which is today the fundamental aggregate of the System of National Accounts which quantifies, in the world, the new wealth produced every year in each country. This broadening of the concept of production allows for the introduction, within the commodities produced, of immaterial products: the services, whose role is increasingly relevant in the production process of our days. This is the case of communication within the production process of the wine commodity, whose role is becoming strategic in the era of globalization.

To day wine, but we should say the *quality-wine commodity*, must enjoy of those features that characterize a great share of commodities, through which many countries hope to compete on the global market. The *quality-wine commodity* needs to incorporate distinguishing traits that are more and more immaterial, related not only to its intrinsic quality but also to those evoked by production methodologies and by the cultural background where it originates.

The sharp and clear stability of its features comes from the concentration of a great historical tradition on a geographically limited territory, on the part of a human group, limited in its members. In many cases the local identity is prevailing with respect to the firm image. For these reasons the increasing percentage share of the value that composes the commodity value is made up by *intermediate immaterial goods* - for what regards the services employed in the production and - for what refers to *value added* - by the higher incomes that can be distributed for the reason that the commodity is allocated on the global market.

However the result is not warranted once and for all: new producers and new regions emerge ready and qualified to compete both on the intrinsic quality and on the image. This fact stresses the relevance of strategic phenomena, sometimes apparently contradictory, as for example, collaboration among competing producers, typicality, communication strategy, evaluation system and market, whose meaning has to be investigated through analysis and comparison with the daily practice.

The double topic wine and economics, in the light of a further twin issue which

is communication and globalization, make up a subject matter capable of inspiring the discussion on attainable targets and able to stimulate the emergence of new ideas and strategies. Along this line of thought *Enometrica* provides a symposium on the art of wine-making, tradition, communication and diffusion. It offers a forum for analysis and debate of a wide set of topics regarding wine as production, winery activities, marketing, consumption, as well as sector value added formation, public and health expenditure, tourism and regional development policies. Its inspiring subjects, wine and economics - so strictly tied to contemporary history and culture - will greatly profit of the emerging contributions of successful new countries.

*Maurizio Ciaschini*





# Expert and Peer Pressure in Food and Wine Tasting: Evidence from a Pilot Experiment

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## Abstract

We investigate experimentally the role of experts and peer pressure on food and wine tasting, in order to assess whether individual blind tasting might be affected and biased by the judgements expressed either by peer reviewers or by experts. We design and run a four-stages experiment in which 60 non-expert consumers are assigned to either a food or a wine treatment and, for either treatment, to a variant in which evaluation are announced either by peers or by experts. We find that, while peer pressure plays some role in food tasting, experts' opinions are significant in wine tasting.

**JEL classification:** C91, C93, L66.

**Keywords:** experimental economics, wine and food tasting, social pressure.

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## 1 Motivation: Food and Wine as Cultural and Social Products

Food and wine are the outcomes of cultural and social evolution. Along the centuries of modern history in developed countries, food has gradually abandoned the primary mission of pure nutritional intake to assume the higher dimension of gastronomical product aiming at matching consumers' satisfaction. As tastes, olfaction and perception evolve over time, across countries and according to trends and waves, also food and wine have evolved, accompanying the changes in cultural and social attitudes<sup>2</sup>.

Hence, if on the one hand, quoting Feuerbach, "*we are what we eat*", on the other hand, what (and how) we eat can be regarded as external manifestations of the evolution and the variety in our tastes, possibly reflecting some deeper heterogeneity - in terms of behavioral attitudes, social values, cognitive and psychological profiles<sup>3</sup> – so that an endogeneity problem would typically arise in analyzing the co-evolution of human tastes, on the one side, and gastronomical and oenological products, on the other.

Being food and wine nowadays strictly embedded in interpersonal and convivial dimensions<sup>4</sup>, their perception and evaluation by consumers are also likely to be affected by some of the forms of social pressure that the growing literature in behavioral economics is disentangling and that we briefly revise in the next section. Among all, we claim that two pressures seem particularly in force concerning human perception of food and wine, namely experts' reputation and peer pressure.

In fact, any one can have experienced how many times word-of-mouth communication from our friends or colleagues has induced us to try a new dish or wine, a different restaurant, a new recipe, a specific producer of wine, a genuine or exotic brand of food and so on. On the other hand, in practically all communication media, from the newspapers to the internet, from television to professional guides<sup>5</sup>,

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<sup>2</sup>Two extremely documented surveys from a historical perspective are Grappe (2006) and Montanari (2004).

<sup>3</sup>See Galizzi and Miraldo (2008) for an experimental Trust game controlling for health habits, nutritional indexes, behavioral attitudes and psychometric variables.

<sup>4</sup>Indeed going out for dinner or for a drink are almost universally associated with some social dimension. The strict link among drinking and social life is described in Buonanno and Vanin (2007), who investigate whether alcohol consumption is a complement or a substitute for social relations, and by the works by DeSimone (2007, 2008) on the relationship between fraternity membership and drinking behavior.)

<sup>5</sup>As observed by Chossat and Gergaud (2003) and Gergaud, Guzman and Verardi (2007), professional guides has nowadays a prominent role in the gastronomy market and are able to significantly affect not only the general perception of the quality of restaurants, but also their prices. The role of professional guides for wines is less explored. An exception is Caggiano, Galizzi and Leonida (2008) who notice that every year almost a dozen of professional guides for wines come out in Italy, and explore whether the selection of the "best" italian wines made by

every day we come across suggestions on recipes, restaurants, “regionally typical” foods, good quality-price ratio bottles of wines from thousands of well-known chefs and sommelier, as well as of self-pretending “experts”. Therefore, both anecdotal evidence seem to suggest that, when deciding which wine or food to consume and to buy, we often pay attention to the opinions expressed by our peers or by experts.

From an economist’s point of view, however, it is of interest to rigorously raise such a point and to qualitatively assess the exact impact of opinions on consumers decisions. While this issue has already been explored for consumption choices and economic decisions in several other contexts the case of food and wine indeed seems particularly interesting for its peculiar features.

In fact, it can be argued that one of the most effective empirical approximation to capture the underlying heterogeneity in individual tastes and personal idiosyncrasies pass through a close look at its reflection on individual preferences for basic, daily used commodities, such as food and wine. These indeed are often regarded as more genuine and deeply rooted individual preferences and as more immune to the influence of other-regarding effects such as status, fashion, imitation, consumption externalities and so on. Therefore, if there is some direct experimental evidence showing that individual choices, and, possibly, preferences and perception, are indeed affected by social effects (namely experts’ opinions or peer pressure) even when food and wine are concerned, one could then argue *a fortiori* that such effects must be present at least at the same extent when individual economic decisions and consumption choices are characterized by even higher social dimensions.

We designed an experiment to empirically assess the extent at which evaluations and preferences over food and wine can be affected by experts’ opinions and peer pressure. In particular, the main questions we had in mind were:

- When deciding which food or wine to have, are consumers really affected by opinions expressed by other people; or, rather, are they driven by genuine preferences only?
- Are the opinions expressed by peers as strong as the ones released by experts?
- Do opinions induce consumers to revise their consumption choices only; or are they also able to affect individual preferences?
- Is the effect of expressed opinions the same for food and wine?

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each guide tend to identify the same subset of wines, or, at the opposite, is affected by some “bias” by the different experts. Using microeconomic analysis on the data of the three leading guides, they find that the latter seems indeed to be the case.

The aim of this paper is to illustrate the experimental methodology, the empirical strategy and the preliminary results obtained from a pilot experiment. The experimental results from the pilot suggest that, while peer pressure seems to play some role, although not particularly strong, on individual evaluation of food, influence by experts' opinion is significantly in action in wine tasting. These findings are clearly preliminary and need to be supported by more evidence. However, they are of interest and seem to suggest that further experimental investigation in this direction can be promising.

The rest of the paper is organized as follows. Section 2 discuss some issues on social pressure in the economic literature, while Section 3 reviews previous experimental findings in wine and food tasting. Section 4 discuss the main questions and the hypotheses at test in our experiment. Section 5 describes the experimental methodology, while section 6 discuss the main results from the pilot experiment. Finally, section 7 concludes.

## 2 Peer and Social Pressure in Economics

Textbook economic models treat preferences as primitives. Explanations of economic behaviour based on differences in tastes, rather than on prices and income, are usually perceived by economists as *ad hoc*. Stigler and Becker (1977) clearly spell out why the assumption of stable preferences is indeed useful, even to explain situations such as addiction, in which preferences seem to change over time.<sup>6</sup> By contrast, the recent literature on endogenous preferences emphasises the fact that tastes change over time in systematic way. Much attention in this recent literature has been devoted to intergenerational transmission of either values<sup>7</sup> or priors<sup>8</sup>. Akerlof and Kranton (2000, 2002, 2005) focus on social rather than intergenerational influences and argue that endogeneity and interdependence of agents' preferences are structured by their choices of a social category. Benabou and Tirole (2007) make such categories endogenous and treat beliefs as assets. Recent related work includes, among others, Benabou and Tirole (2006) and Lyndbeck and Nyberg (2006). The issue of whether preferences are exogenous or can be manipulated has

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<sup>6</sup>They re-define commodities in such a way that preferences over them may be assumed to be stable, and then investigate changes in taste for specific market goods as simply due to changes in these commodities. For instance, preferences may be stable with respect to 'euphoria' and yet the taste for alcohol may rise over time in an addictive way due to the fact that current consumption reduces the future ability of alcohol to generate euphoria (and therefore raises its need over time if the demand for euphoria is inelastic).

<sup>7</sup>See, for instance, Bisin and Verdier (2000, 2001); Bisin, Topa and Verdier (2004); Corneo and Jeanne (2007).

<sup>8</sup>See e.g. Guiso, Sapienza and Zingales (2007).

also been at the centre of the debates on advertising, with the consensus among economists shifting over the twentieth century from the view that it is manipulative to the view that it is informative (either about product characteristics or even merely about the fact that the firm is spending a great amount of money, which it evidently counts to recoup)<sup>9</sup>.

While there is no doubt about the theoretical usefulness of the assumption of stable preferences and on the valuable insights provided by the literature on endogenous preferences, the issue of whether and how individual preferences can be influenced remains ultimately an empirical one. The main challenge to empirical exercises in this direction is that it is generally hard to disentangle social influence from changes in the environment. Indeed, the econometric problems are similar to those faced by the literature on social interaction, which has tried to assess the role of social influence in a number of contexts<sup>10</sup> but with the additional complication that preferences are harder to measure than behavior. Our strategy is therefore to resort to an experimental design, where we can clearly measure preferences and we can control the social environment in such a way that we can precisely identify the effects of social influence. In particular, we address the question of whether peers are more influential than experts or the other way around, that is, whether individual preferences are more responsive to the taste expressed by peers or by experts.

The literature on peer effects has so far mainly concerned actual behavior rather than preferences. In particular, peer effects have been found to be relevant for different issues such as work effort<sup>11</sup>, crime<sup>12</sup>, substance use and abuse, and, more generally, deviant behaviour<sup>13</sup>. By contrast, we want to investigate the direct effect of other people's preferences on individual preferences.

There is a smaller economic literature on the influence of experts. In particular, this strand of literature focuses on the role of expert witness at trial<sup>14</sup>, while little attention has been devoted to the influence of experts' opinion on individual preferences. Experts are likely to be influential when the public lacks pre-existing ideas or the subject matter is not easily analyzed with intuition (such as complex scientific or technical issues). However, the role of experts is becoming more and more influential in many types of markets such as cultural goods and services (ranging from dance to theatre and from music to wine) and non-cultural services

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<sup>9</sup>An excellent review of this literature is contained in Bagwell (2007).

<sup>10</sup>See e.g. Manski (1993).

<sup>11</sup>See, for instance, Kandel and Lazear (1992); Ichino and Maggi (2000); Falk and Ichino (2006); Mas and Moretti (2008).

<sup>12</sup>See e.g. Glaeser et al. (1996); Patacchini and Zenou (2005).

<sup>13</sup>See, among others, Clark and Lohéac (2007); Loureiro et al. (2006); DeSimone (2007, 2008).

<sup>14</sup>See Posner (1999).

(the stock market, sports betting and art auctions). For instance, Ginsburg (2003) analyzes the role of experts for three types of artistic productions (movies, books and musical interpretation) and shows evidence that prizes awarded shortly after the production of an artwork, or rankings from official competitions are correlated with economic success and may even influence or predict it, but are often poor predictors of true aesthetic quality or of survival of the work<sup>15</sup>.

### **3 Previous Experiments on Food and Wine Tasting**

In the last years, there has been an increasing number of experimental studies on food and wine tasting. Here we just sketch the salient methodological issues and the results of the main previous experiments.

Concerning food tasting, Fevrier and Visser (2004) invited 60 subjects randomly drawn from the population of Dijon, recording their socio-demographic variables, to take part to a study on consumers' purchase behavior of orange juice. First, subjects had to evaluate 6 orange juices, bought in a supermarket on the basis of being different under four criteria: sensorial profile, the nature of the products, the packaging and the prices. Subjects were presented each of the 6 juices in a random order, through two phases: first some characteristics of the product (but neither its brand nor its price) were showed to the subjects via an image; then the juice was tasted. Subjects evaluated each juice in a 0-10 scale and were then told that they could buy the orange juices they had just evaluated. In particular, confronting 5 different price/budget situations, they had to state their demand for the juices. The authors checked the consistency of the products choices with the Generalized Axiom of Revealed Preferences (*GARP*) and found that almost one-third of the subjects were *GARP*-inconsistent. They also found that the gender, the degree of switching between different products and the time spent on performing the experimental task all have significant impact on the likelihood of *GARP*-inconsistency.

Combris, Lange and Issanchou (2007) ran another experiment involving food in which two randomly sampled groups of subjects were endowed with real budgets and placed in 5 different budget/price situations. In each situation they had to evaluate 6 orange juices and complete a demand schedule. At the end of the experiment, one demand schedule was randomly selected and subjects had to buy the corresponding products. In one group, subjects chose after having looked at the packaging. In the other group, they could also taste the products. Their results

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<sup>15</sup>Differently, Avery and Chevalier (1999) focus on the role of opinion leaders in the football betting markets.

show that subjects who chose without tasting made quicker decisions, selected a larger set of varieties and were more influenced by prices than those who could taste the products.

A previous study on wine and food tasting is the pilot experiment by Galizzi and Miraldo (2007) which focused on food-wine matching and aimed at exploring the type of cognitive reasoning, either inductive or deductive, guiding professionals and non-expert consumers when matching dishes and wines. They invited 5 expert wine-tasters, along with 5 non-experts, to participate to a four-stages experiment in Bergamo in which they were asked to taste 6 different sparkling wines from Franciacorta<sup>16</sup>, and, for each of them, to describe the aromas they perceived; to match each wine with one specific dish among a list of 12, containing the 6 dishes that were suggested to be ideal matches by the official AIS guide by professional sommelier; and, finally, to express their willingness-to-pay (WTP) for a bottle.

The four stages differ for the information conveyed to participants. In the first stage, subjects went through a blind tasting session with no further information. In the second, during blind tasting they were allowed to use “*les Nez du Vin*” kit of wine aromas by Jean Lenoir (1981), in order to get helped in the task of aromas identification. Before the third stage, they were announced all the aromas perceived in the wines by professional sommelier. In the last stage, subjects were allowed to actually taste all the 12 dishes before deciding the matching.

Their results suggest that the use of the kit of wine aromas radically increased the ability of non-expert subjects in the aromas identification task. Expert subjects, however, identified a significantly larger range of correct aromas in all stages, while the contribution of the kit of aromas was smaller, although still significant. Concerning the task to match wines with food, it turned out that the likelihood to guess the correct wine-food matches according to the official guide by professional sommeliers was significantly much higher in the second and third stage for experts, while in the last stage for non-experts, signalling that the two types of subjects may follow different cognitive reasoning process in the wine-food matching task.

Moving to experiments on wine tasting, Combris, Lange and Issanchou (2006) performed two series of Vickrey auctions to assess the effect of packaging information (bottle and label) on the reservation prices of non-expert consumers for 5 brut non-vintage Champagne sparkling wines. Packaging information was found to explain much more of the variation in WTP than sensory information. Subjects were unable to evaluate differently the wines after blind tasting, but they expressed significantly different WTP when labels were disclosed.

In a field experiment run at the 2007 ESA World Congress in Rome, Galizzi

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<sup>16</sup>They were 6 leading *Satèn*, equivalent to the traditional *Cremant* method.

and Reiley (2008) asked to a hundred of experimental economists to participate to a two-stages wine-tasting experiment. Subjects were asked to sit in front of three glasses of white wines and were told that the aim of the experiment was to undertake a simple task, for which they would have a 50% probability to be rewarded (with a bottle of their preferred wine) in case of a correct performance. At the first stage of the experiment, subjects were asked to taste the three glasses of wines, to describe their perceived aromas, to evaluate their quality, and to express their willingness to pay for a bottle of each wine. At the beginning of the second stage, they were announced that two out of three glasses in front of them were actually containing *exactly the same wine*. This was indeed the case.

In fact, the wines (three renowned Sauvignon from the same area in Sud-Tirol) were awarded high evaluations by the most prestigious professional guides and showed similar, but not identical, aromatic profiles and very different prices: wine G, the one with highest experts' evaluation, was sold for about 24 €, wine M and B, with relatively close evaluations, were sold for 15 and 8 €, respectively. The three wines were poured into glasses in such a way to alternate only two wines for each subject, covering, in 18 different treatments, all the possible combinations of wines and their relative positions<sup>17</sup>. At the second stage, subjects were asked to perform the task for which they could win the bottle of wine, namely to identify the two glasses actually containing the same wine.

The authors found quite striking results. Only about 42% of the subjects managed to correctly identify the glasses with the same wine, and the proportion was closer to one-third in the treatments where differences in experts' evaluations were smaller. In direct comparisons between two wines of different quality and prices, about 23% of subjects did not perceive any difference, while as many as 44% perceived differences, but in a direction opposite to the actual ones. Moreover, most subjects perceived differences in prices among wines much smaller as the actual ones. The fact to have been selected to be rewarded in case of a correct performance showed significant effect only in treatments where aromatic differences were relatively large. Finally, and interestingly, probit estimation shows that the order of the glasses did matter: if the glasses containing the same wine were close each other<sup>18</sup>, the identification task was significantly more difficult.

In another experiment, Plassman, O'Doherty, Shiv and Rangell (2008) analysed a similar, but reverse, problem. They recruited 11 male Caltech graduate students who said they liked red wine and that they drank it occasionally. These subjects were told that they would be tasting five different Cabernet Sauvignon, identified by

<sup>17</sup>For instance, subjects in a row were tasting glasses of wine according to the (left to right) order GGB, GMG, MMB and so on.

<sup>18</sup>Alike in GGB or MMB treatments, for instance.



price, in order to study the effect of sampling time on perceived flavor. However, only three wines were actually used, since two were given twice.

The first wine was marked by its real price of 5 \$ for a bottle, and by a fake price tag of 45 \$. The second wine was identified with its actual price of 90 \$ a bottle, and with a fictitious tag of 10 \$ a bottle. The third wine, used to distract the subjects, was marked by its real price of 35 \$ a bottle. The wines were given in random order and the students were asked to focus on flavor and to rate its pleasantness and taste intensity in a 0-6 rating scale. Subjects were electronically monitored through a fMRI (functional magnetic resonance imaging).

Even in this experiment the results were striking. The subjects said they could taste five different wines, even though there were only three. They also said that the wines marked as more expensive tasted much better. In particular, the reported pleasantness rating for the first two wines, when administered with different prices, were significantly different. Moreover, the reported pleasantness was highly correlated with wine prices. Using fMRI, the authors also found that the sensation of pleasantness that people experience when tasting wine is directly linked to its price: in particular, with the higher priced wine, more blood and oxygen was sent to an area of the brain, called medial orbitofrontal cortex, which is widely thought to encode for experienced pleasure during experiential tasks.

#### **4 The Models at Test and the Experimental Questions**

Food and wine are two products which, on the one hand, share the same bulk of similar features, but, on the other, are also rather different, at least under one perspective. Indeed, it is often argued that tasting a wine requires an extent of technical education and expertise higher than tasting a dish and, that, as a consequence, a complete appreciation of quality, tastes and aromatic profiles is much more difficult in the case of wines than of foods.

It is not by chance that all experimental studies described above implicitly assume that the market of quality wines is characterized by a very peculiar process of price formation. Indeed, before setting their selling prices, many producers send samples of their wines to some selected panels of qualified experts, for “horizontal” sessions of blind wine-tasting (same wine, same region, same year) and then use the average outcomes of such refereeing process as guidance and support for the formulation of their pricing strategies, also in light of the relative assessment in comparison with the analogous products by their direct competitors.

This suggest that the price of quality wines is affected not only by the grape characteristics and by the oenological process, as usually assumed by the empirical analysis using standard hedonic price estimation techniques, but also by the eval-

uations of the wines by professional wine-tasters and experts<sup>19</sup>. Therefore, prices of quality wines can be seen by consumers as reflecting the oenological quality perceived by wine experts, although such relation is a rather noisy, and imperfect, signalling. This, in turn, implies that non-expert consumers, thus with a limited ability to evaluate wine only by tasting, may be tempted to rely on price signals as a guidance to indirectly assess the quality. Analogously, they can formulate their decisions on which bottles of wine to buy or to consume based on the quality evaluations by experts, as published in newsletter, specialized magazine or professional guides.

However, moving a step further, one can wonder whether non-expert consumers can be affected by experts' evaluation not just at the actual consumption stage, but even in the expression of their own preferences. This would clearly be a much stronger effect on consumers and would suggest that, in blind wine-tasting, even independent evaluations can be affected by the opinion expressed by an expert, or a *primus inter pares*. Such a finding would go into the direction of the above discussed experiments and would suggest that quality assessment by wine-tasting is a task that can be crucially affected not only by several framing and external elements, such as the price tags or the order of glasses, but also by the expression of experts' opinion.

On the other hand, it is often argued that sensorial perceptions for aromas and tastes, and therefore quality appreciation, are much easier tasks for foods than for wines, and that preferences for different tastes are more likely to genuinely reflect individual heterogeneity. Hence, it is generally believed that, concerning food, individual preferences should tend to be immune from adaptation to judgement by experts, while influence from social pressure by peers and acquaintance could not be ruled out. In fact, one can argue that, while peer pressure and conformity seem to play some role on both food and wine assessing, imitation of experts' opinions is much more likely in wine tasting.

Thus, we are interested in questions such as:

- Is food and wine evaluation a genuine elicitation of individual tastes or is rather affected by other subjects' opinions?
- If the latter is the case, has an opinion expressed by peers the same influence of a one by an expert?

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<sup>19</sup>Several empirical studies have provided evidence that this is indeed the case: among the others, Hadj Ali, Lecocq and Visser (2005) for the influence by wine critic Robert Parker on the prices of Bordeaux, Benfratello, Piacenza and Sacchetto (2008) for the premium Piedmont wines, Galizzi (2008) for the Franciacorta traditional method sparkling wines.

- Are such opinions able to induce consumers to revise their preferences? And, if so, in which direction?
- Which differences and similarities do emerge between food and wine evaluation through blind tasting?

## 5 The Experiment

To empirically test such hypotheses, we design a four-stages experiment in which a pool of 60 non-expert consumers were called, in different waves, for an experimental session in Bergamo, and assigned to either a food ( $f$ ) or a wine ( $w$ ) treatment. For either treatment, subjects were assigned to a variant in which, at the second stage, the expressed opinion was announced either as an average of the evaluations by all subjects in the session (*peer* treatments,  $fp$  and  $wp$ ) or as the evaluations by well-known and prestigious experts (*experts* treatments,  $fe$  and  $we$ ).

The experts for the  $w$  treatments were four leading professional sommelier guides in Italy<sup>20</sup>, while for the  $f$  treatments were the experts' evaluations reported in a renowned publication focused on italian cured ham<sup>21</sup>. Previous to being exposed to the proper experiment, subjects were asked to answer a questionnaire in which their individual preferences on an exhaustive list of foods, drinks and aromas were elicited. On average each session lasted approximately half an hour.

In the first stage, subjects were then blindly presented, in  $fe$  and  $fp$  treatments, samples of 3 renowned cured hams (*Prosciutto crudo*) from 3 different italian regions<sup>22</sup>; while in  $we$  and  $wp$  treatments, 3 glasses of the same type of wine (*Dolcetto*), from 3 leading areas in North Italy<sup>23</sup>. All hams and wines were awarded

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<sup>20</sup>Associazione Italiana Sommelier AIS, Seminario Veronelli, Gambero Rosso-Slow Food and L'Espresso.

<sup>21</sup>Slow Food (2007).

<sup>22</sup>The three hams were Prosciutto Crudo di Parma DOP (from Emilia), Prosciutto Crudo San Daniele DOP (from Friuli) and Prosciutto Crudo Toscano DOP (from Tuscany).

<sup>23</sup>We selected 3 Dolcetto wines, from 3 different regions and terroirs (Alba, Dogliani and Ovada), with comparable evaluations by experts, sufficiently different prices, same year (2006), same indigenous grape (Dolcetto), similar oenological blend and process (varietal wines with no period in oak), close but different tasting style and aromatic profiles (some cherry, plum, berry, grass and sweet spices). The first reason why we selected three Dolcetto is that, despite being quite rich in aromatic profiles, they present a smooth and rounded structure and they should be better drunk relatively young. Both circumstances, in fact, makes the identification, and appreciation, of their aromas and tastes not too complicated even for non-expert consumers. The main reason why we selected Dolcetto, however, is mostly due to our explicit intention of choosing a classical and typical italian wine, made by a minor, indigenous, peculiar grape, not perfectly in tune with the current international trends in red wines' tasting profiles. This is in line with the insights by Luigi Veronelli (our most esteemed wine expert in Italy) who used to

good evaluations by experts and presented slightly different tasting characteristics and aromatic profiles. Subjects were then asked to evaluate each of the hams (treatments  $f$ ) or of the wines (treatments  $w$ ) on a 0-100 scale and to express their willingness to pay, in euro, for a portion of 100 grams ( $f$ ) or a bottle ( $w$ ) of them.

In the second stage, in the *peer* treatments ( $fp$  and  $wp$ ), participants were announced the average evaluations on hams ( $fp$ ) or wines ( $wp$ ) computed from the opinions expressed by all subjects who tasted the same hams and wines, respectively<sup>24</sup>. On the other hand, in the expert treatments ( $fe$  and  $we$ ), subjects were announced the evaluations on hams ( $fe$ ) or wines ( $we$ ) expressed by experts.

In the third stage, at any treatment, subjects were asked whether they wanted to change or to review the evaluations for the hams ( $fe$  and  $fp$ ) or the wines ( $we$  and  $wp$ ) expressed at the first stage and, if so, to correct them and to confirm the final choice.

At the fourth and last stage, random selection took place to determine which subjects were selected to win a portion of 250 grams of their preferred ham ( $fe$  and  $fp$ ) or a bottle of their preferred wine ( $we$  and  $wp$ ), all the selected subjects received their award, while the non-selected were paid a show-up fee<sup>25</sup>.

The present design allows us to directly assess the extent of influence of opinions by peers or experts on the revision of individual preferences, by looking at the differences on the evaluations expressed by subjects between the first and the third stage in  $fp/wp$  or  $fe/we$  treatments, respectively.

## 6 The Results

The next four Tables summarize the main results of our pilot experiment. They report the individual behavior for treatments  $fe$ ,  $fp$ ,  $we$  and  $wp$ , respectively. Each treatment is composed by 15 individuals. The second and fourth column of each Table reports the average evaluation for each products expressed at the first and the third stage, respectively. The third column of each Table reports in  $fe$  and

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support policies and practices promoting the defence of local grape species and the conservation of the widest variety of different grapes. For a complete discussion, a formal analysis and an empirical assessment of the issues about grapes variety see Di Corato and Galizzi (2008).

<sup>24</sup>Actually, in order to avoid co-movements of averages and evaluations, and to elicit clearer identification of observed changes in evaluations expressed by subjects, at the second stage, we announced to subjects of the  $fp$  and  $wp$  treatments, the average final evaluations expressed by subjects in treatments  $fe$  and  $we$ , respectively, who tasted the same hams and wines in previous sessions.

<sup>25</sup>It was an “in kind” show-up fee: subjects were offered a sumptuous *aperitivo* with many small portions of nice foods and several wines to taste.

Table 1: Food tasting - Treatment  $fe$ 

	<i>Stage 1</i>	Expert evaluation	<i>Stage 3</i>	Wilcoxon signed ranks test ( <i>p-values</i> )
<i>Ham 1</i>	70,33	91	73,33	0,55
<i>Ham 2</i>	73,00	90	72,00	0,90
<i>Ham 3</i>	57,67	84	58,67	0,85

Table 2: Food tasting - Treatment  $fp$ 

	<i>Stage 1</i>	Peer evaluation	<i>Stage 3</i>	Wilcoxon signed ranks test ( <i>p-values</i> )
<i>Ham 1</i>	62,60	73,33	72,53	0,03
<i>Ham 2</i>	69,00	72,00	77,33	0,15
<i>Ham 3</i>	65,80	58,67	62,47	0,42

we treatments, the experts' opinions, while in  $fp$  and  $wp$  the average evaluations expressed by their peers, announced at the second stage. The last column of each Table just reports the *p-values* of the Wilcoxon signed rank tests on the differences among evaluations in the first and the third stage, under the null hypothesis that they are not significantly different from zero<sup>26</sup>.

Concerning food tasting, at the first stage subjects in both treatment  $fe$  and  $fp$  ranked the three products similarly. By comparing subjects' evaluations in the first and the third stage of  $fe$  treatment, we notice that experts' evaluation of food had some effect on ranking, but very little on evaluations. Indeed, a Wilcoxon sign ranks test on the mean evaluations suggest such that effect by experts' opinion is

<sup>26</sup>The Wilcoxon signed rank test is a non-parametric test for equality of measures of central tendencies in two independent samples, which is used whenever the distributional assumptions that underlie the paired Student-t test are not satisfied. The rationale of the test is as follows. Suppose we collect 2 observations for each of the  $n$  subjects, denoted  $y(i)$  and  $x(i)$  respectively, for  $i=1,2,\dots,n$ . Calculate  $z(i)=y(i)-x(i)$  and rank their absolute values,  $|z(i)|$ , from high to low. Let  $R(i)$  be the rank assigned to  $|z(i)|$ . Then, under the assumptions that: (i)  $z(i)$  are independent, and (ii)  $z(i)$  come from a continuous population and is symmetric around a common median  $m$ , the Wilcoxon test statistic is given by  $W=f(i)*R(i)$ , where  $f(i)=I(z(i)>0)$  and  $I()$  is the indicator function. Standard econometric software usually report the asymptotic normal approximation to  $W$ , which is usually used when  $n_i \geq 20$ .

Table 3: Wine tasting - Treatment *we*

	<i>Stage 1</i>	Expert evaluation	<i>Stage 3</i>	Wilcoxon signed ranks test ( <i>p-values</i> )
<i>Wine 1</i>	65,13	84	73,33	0,08
<i>Wine 2</i>	56,33	88	74,00	0,00
<i>Wine 3</i>	53,40	86	67,87	0,02

Table 4: Wine tasting - Treatment *wp*

	<i>Stage 1</i>	Peer evaluation	<i>Stage 3</i>	Wilcoxon signed ranks test ( <i>p-values</i> )
<i>Wine 1</i>	59,33	73,33	62,67	0,44
<i>Wine 2</i>	66,00	74,00	68,00	0,74
<i>Wine 3</i>	54,53	67,87	52,87	0,87

not significant in food tasting.

On the other hand, by comparing corresponding stages in the *fp* treatment, we notice that peer judgement had a substantial effect on evaluations, even though not in ranking: in particular, evaluations of products 1 and 2 were strongly revised upwards, and the Wilcoxon sign ranks test is significant for product 1 and marginally significant for product 2.

As far as wine tasting is concerned, we notice that the effect was reversed, and magnified: whereas we do not find any relevant change in judgement due to peer pressure, we do find a substantial effect both on the ranking of wines and on the absolute judgements after the experts' evaluations had been disclosed. In all cases, subjects' evaluations were revised upwards, and the Wilcoxon sign ranks tests are always significant. In addition, at stage 3 wine 2 was ranked first, according to the opinions expressed by experts.

We interpret these results as some evidence that peer pressure is able to affect at some extent individual preferences in foods, while experts' opinions seem significant in wine tasting.

## 7 Concluding Remarks and Future Research

The experimental results from the pilot suggest that, while peer pressure seems to play some role, although not particularly strong, on individual evaluation of food, influence by experts' opinions is a force significantly in action in wine tasting. These findings are clearly preliminary and need to be supported by more evidence. However, they are of interest and seem to suggest that further experimental investigation in this direction can be promising.

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