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The Costs and Benefits of Collective Reputation: Who gains and who loses from generic promotion programs?*

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Abstract

In this paper we develop an original approach to evaluate the costs and benefits associated to a generic promotion program using an application to Bordeaux wines. The benefit is computed from the marginal impact of the collective reputation of the program on the individual reputation of its members. These different marginal impacts are estimated using detailed survey data about the image of Bordeaux wines in seven European countries. We find positive and significant spillover effects from the umbrella reputation (Bordeaux) that moreover increase with the individual reputation level of the wine. Controlling for the natural endogeneity of the collective reputation in this setup, we capture the important fact that this relationship is faced with marginal diminishing returns. These spillover effects, when significantly positive, vary from a minimum of 5% to a maximum of 15% of additional favorable quality opinions. We then show that some subregions are more likely to benefit from generic promotion programs, suggesting that fees should be established on a benefit-cost basis.

Key Words: Benefit-cost analysis, Individual reputation, Collective reputation, Bordeaux wines, Appellations.

JEL Classification: L15 - L66 - Q13 - Z13

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1 Introduction

Agricultural economists have a long tradition of evaluating the net benefits of both domestic and export promotion programs. This is typically done using time series data to estimate demand for the commodity in question as a function of prices, income, seasonality constraints, and promotion expenditures. The estimated coefficient for promotion expenditures is used to quantify the additional revenue generated by the promotion efforts. Given the fees associated with the check-off program, a benefit-cost ratio (BCR) can subsequently be calculated to show the net economic benefits for a specific promotion effort. In a review of a wide range of agricultural commodities, Kaiser (2011) reports that the median BCR for generic promotion programs in the United States has been approximately 6.0. That is, for each dollar invested in promotion, the average increase in industry-wide profits was 6.00, and in many cases it has been found that producers could have profitably invested more in promotion, not less. Examples of estimated average BCRs for major commodities include 5.7 for beef (Ward, 1996), 16.0 for pork (Davis et al., 2000), 3.4 for dairy (Kaiser, 1997), and between 2.9 and 7.0 for orange juice (Williams et al., 2004). The overwhelming bulk of empirical evidence supports the notion that generic advertising has a positive and statistically significant impact on the demand for agricultural commodities and that there are gains to producers from these programs net of costs.

In this paper, we conduct a BCR analysis for the generic promotion program of Bordeaux wines. Because producers are required to fund these programs, it is important to conduct the appropriate economic analysis to better understand their net benefits for producers. Different subregions within Bordeaux pay different per unit fees towards the greater promotion effort. The variety of fees suggests that some subregions may have greater capacity to contribute, but it also suggests that some subregions earn a disproportionally greater share of the benefits from the promotion effort. Also, in the case of generic advertising for Bordeaux wines, there is much greater differentiation across the products being promoted that what is typically done. In some ways, the generic promotion efforts for Bordeaux wines may face the same inequity issues that are prevalent in the generic programs that have been proposed to promote fruits and vegetables collectively (Rickard et al. 2011; Capacci and Mazzocchi 2011).

We propose here an original estimation strategy to assess the marginal benefits of this specific promotion program. Indeed, we first estimate the impact of the reputation of the group – the collective reputation premium - on the reputation of its members.

Using a detailed survey about the image of Bordeaux wines in seven European countries, we show that the magnitude of this reputation premium varies positively with the individual reputation level. In this specific context, the most reputed wine appellations are those that enjoy the highest reputation returns from the collective reputation, or the Bordeaux umbrella.

In a second stage, we compute the estimated monetary reward from increased reputation and relate these estimates to the observed costs of promotion programs.

Our main theoretical inspiration comes from Tirole's (1996) collective reputation theory, where the collective reputation emerges as an aggregate of individual reputations, and belonging to a higher reputation group generates higher rents. While his analysis focuses on the incentives effects, the aim of our empirical work is to measure asymmetric benefits from collective reputation and what it implies. Besides Tirole, our paper is also related to the umbrella branding literature, where collective reputation effects are analyzed from the point of view of the multi-product firm. This literature is mostly concerned with brand extension, i.e. the use of an established brand name to launch a product in a new market in order to reduce introductory costs (see Tauber, 1988). A collective brand or name may also act as a quality signal through spillovers that create reputation linkages among various products or individuals (Choi et al., 1995). In this context, individual incentives are associated with those of the group, and this mechanism provides a strong commitment to maintain a high quality level for each product.

Closer to us, Winfree and McCluskey (2005) explore, both theoretically and empirically, a market situation where several producers of a differentiated product (apples) are concerned with a single collective name at the regional level (Washington State). In such a context, where a single name is used by several producers, the collective reputation becomes a public good and the incentives to provide quality decrease as the size of the group increases (free riding on quality). Indeed, it is impossible to exclude a producer from the benefits of the umbrella and there is non-rivalry in the sense that the use of the collective name from one producer does not prevent another one from using the same name at the same time. Rickard, McCluskey, and Patterson (2015) use an experiment to understand how references to French umbrella reputations by U.S. wine regions influence consumers; it is quite common to see U.S. wine regions informally compare themselves to famous French wine appellations. They find that such references have the capacity to increase consumer valuation for wines in burgeoning U.S. wine regions, and the research highlights how collective reputations can even affect individual reputations outside of the umbrella region.

In a seminal application to Bordeaux wines, Landon and Smith (1997, 1998) show that both individual and collective reputations account for a substantial fraction of price variations observed for this product. Here, the collective reputation refers to the appellation name and individual reputations at the firm level are proxied by the average ratings the wines have received from a popular wine guide. In the Californian wine industry, Costanigro et al. (2010) show that consumers are willing to pay for more information to form accurate quality expectations on specific names when prices (i.e. opportunity costs) are high, while they accept to use aggregated names for inexpensive products. For Mosel Valley wines, Frick (2010) finds statis-

tically significant non-linear returns for individual reputation as well as significant returns for collective reputation. However, none of these studies carefully look at the interaction between individual and collective reputation, and this is the main contribution of our paper.

The rest of the paper is organized as follows. Section 2 is a brief survey of the various evaluation methods used to evaluate generic promotion programs. Section 3 describes the empirical model, while section 4 introduces our survey data. Section 5 discusses our empirical strategy and main results on the interaction between individual and collective reputation. Section 6 details our costs and benefits analysis. Section 7 concludes.

2 Economic evaluation of generic promotion programs

The primary purpose for generic promotion programs is to generate net benefits to those that fund the efforts, which in most cases in a group of producers that pay a check-off or a promotion fee (Alston et al., 2007; Kinnucan and Myrland, 2008; Zhao, Anderson, and Wittwer, 2003). Generic (or umbrella) advertising is a cooperative effort among producers of a nearly homogeneous product to disseminate information about the underlying attributes of the product to existing and potential consumers for the purpose of strengthening demand for the commodity (Forker and Ward, 1993). These programs have evolved from relying on voluntary contributions to requiring mandatory participation. The reason for the switch is that voluntary programs, while generally successful immediately after the programs are established, have been plagued by free-rider problems over time (Messer, Kaiser, and Schulze, 2008). Such promotion or check-off programs exist for a wide range of agricultural commodities in the EU, in the United States, and elsewhere (Carman and Alston, 2005). Assessments are typically applied per unit of output and therefore larger firms contribute a larger share of the total promotion budget. Larger agricultural firms may also use branded advertising efforts to promote their products, and as a result there have been a number of controversial legal cases in the United States where large firms have requested to leave the mandatory generic program (Crespi, 2003).

It is difficult to evaluate the effects of promotion for Bordeaux wines following the approach that has been employed in the agricultural economics literature given the data constraints. It is complicated because the quantity of wines produced in each subregion in Bordeaux each year is relatively constant, and therefore it is difficult to directly estimate the effect of the promotion expenditures on demand (i.e., the promotion elasticity measure).

Instead, we propose a novel approach to examine the net returns to wine producers from the generic promotion effort. We start by describing the profits to a producer of wine in appellation i as $\Pi_i = P_i Q_i - C_i - fee_i$, where revenue is equal to the product of the wine's price, denoted P_i, and quantity, denoted Q_i. The term C_i describes costs for wine i including all production and marketing costs and fee_i refer to the additional costs used to support the generic promotion

program. For our purposes, we assume that Q_i and C_i are fixed and outside the scope of this analysis, and we focus on P_i and fee_i.

Following Landon and Smith (1998), Costanigro, McCluskey and Goemans (2010) and Rickard, McCluskey and Patterson (2015), we model the differentiated wine products in Bordeaux in a hedonic price framework to value bundled product attributes that are not marketed individually. The model is in the form $P_i = \Psi(q_i, z_i)$, where Ψ is the hedonic function relating product prices and attributes, q_i is a measure of quality that exists and is known to consumers, and z_i is a vector of other product attributes. For experience goods, consumers approximate q_i with reputation associated with a particular product. The quality expectation is partly driven by the reputation of subregion i, denoted as r_i, and the collective reputation associated with the k-th region of production is denoted as R_k. Introducing a time dimension by using the subscript t, we express the price as a function of subregional reputation, the collective reputation, and product attributes as $P_i = \Psi(r_{it}, R_{kt}, z_i)$. Adding a vector of parameters, β , and an independently and identically distributed stochastic error term, we can express the equilibrium hedonic price as $P_{ikt} = \Psi(r_{it}, R_{kt}, z_i; \beta) + \epsilon_{it}$.

It is widely agreed that agents form quality expectations based on past performance and signals of past performance (e.g., Shapiro 1982; Winfree and McCluskey 2005). The exact relationship linking quality performance, reputation and prices remains unknown, so here we assume that reputation (the joint effect of subregional reputation and the collective reputation) contributes to a share of the average price of wines in each subregion. We can approximate this share of the average price of wines in each subregion using the reputation estimates generated from our survey data.

3 Empirical Reputation Model

Denoting h as an index for individual survey respondents, $i = 1, ..., n$ as an index for the various appellations and g as a group index (which in our case is the Bordeaux region), we can write the perceived quality of the group and each sub-appellation i by individual h (q_g^h and q_i^h) as:

$$\begin{cases} q_g^h = X_g^h \beta_g + \sum_{i=1}^{n} q_i^h \gamma_i + \varepsilon_g^h & (0) \\ q_1^h = X_1^h \beta_1 + \delta_1 q_g^h + \varepsilon_1^h & (1) \\ \quad \cdots & \\ q_n^h = X_n^h \beta_n + \delta_n q_g^h + \varepsilon_n^h & (n) \end{cases}$$

where X_g^h and X_i^h are vectors of exogenous variables including the characteristics of individual h like his/her self-assessed degree of knowledge of wine, his/her region of origin and their

socio-professional category (upper, medium, lower incomes). These two vectors also contain information on past consumption (whether consumer h experienced i or g at least once in the past 12 months or not) and a dummy variable which informs us whether consumer h is familiar with the wine or not.

The parameters $\delta_1 ... \delta_n$ capture the average impact of q_g^h, the collective reputation, on the various individual reputations (q_i^h). The parameters $\gamma_1 ... \gamma_n$ measure the contribution of each individual reputation to q_g^h.

By construction, q_g^h and q_i^h are endogenous variables. This means that ε_g^h is potentially correlated to every q_i^h and ε_i^h is not independent of q_g^h. We would therefore need valid instruments for q_g^h and each q_i^h. To simplify the problem, we focus exclusively on the estimation of equations (1) to (n) for which we only require instruments for q_g^h.

We use as instrument (Z_g^h) the answer to what surveyed consumers think about the quality of other famous French appellations such as Alsace (q_{Al}^h), Beaujolais (q_{Be}^h), Burgundy (q_{Bu}^h), Côtes du Rhône (q_{Cr}^h), Languedoc-Roussillon (q_{Lr}^h) and Loire Valley (q_{Lv}^h) (see Map 1).

These appellations are umbrella brands in the same way as q_g^h. The intuition for the validity of these instruments is that wine consumers imagine the quality of a Bordeaux wine by comparing it with the quality of some of its closest competitors. Indeed, it appears reasonable to assume that these opinions on Bordeaux wines will be based, among other things, on a sort of ranking of the main wines produced in France. On the other hand, while it makes sense to believe that wine consumers will compare a Bordeaux with a Beaujolais for instance (which are two regional appellations), they will not compare so naturally (i.e. frequently) a Côtes-de-Bourg which is a sub-appellation in the Bordeaux region with a regional appellation such as Burgundy. The main reason for this intuition is that Côtes-de-Bourg and Burgundy are not at the same level in the French wine classification system which is based on two types of appellations: regional (Burgundy, Bordeaux, etc.) and local/village (Côtes de Bourg, Margaux, etc.). For all of these reasons we expect these variables (q_{Al}^h, q_{Be}^h, q_{Bu}^h, q_{Cr}^h, q_{Lr}^h, q_{Lv}^h) to be correlated to q_g^h and independent of every q_i^h.

4 Data

Survey data[1] were collected in seven European countries: Belgium (1,028 wine consumers), Denmark (613 wine consumers), Germany (1,133 wine consumers), France (819 wine consumers), the Netherlands (1,258 wine consumers), Switzerland (584 wine consumers), United Kingdom (959 wine consumers). The survey was conducted in 2001 by *Sociovision* on behalf of the *Comité Interprofessionnel des vins de Bordeaux* and includes information from 6,394

[1] In this survey, wine consumers were selected only if they drank wine at least once a quarter.

respondents.

Respondents were on average 46 years old and 51% of them were women. Nearly one-third (32%) of the sample participants perceive themselves as wine connoisseurs, while 66% estimate that they are not knowledgeable in wine and 2% have no opinion. People were first invited to give their opinion on French wines in general (Alsace, Beaujolais, Bordeaux, Bourgogne, Côtes du Rhône, Languedoc-Roussillon, etc.) then on 9 Bordeaux sub-appellations: Bordeaux Supérieur (BSUP), Côtes de Bourg (CBG), Entre-deux-Mers (E2M), Graves (GR), Margaux (MGX), Médoc (MDC), Premières Côtes de Bordeaux (PCB), Saint-Emilion (SEM) and Sauternes (SAU).

Table 1 shows the share of favorable opinions for each wine (q_i^h and q_g^h) including the instrumental variables (q_{Al}^h, q_{Be}^h, q_{Bu}^h, q_{Cr}^h, q_{Lr}^h, q_{Lv}^h). This informs us about the way the quality of these wines is perceived on average among the subjects in our sample.

With a level of agreement on quality higher than 50%, Bordeaux is clearly the most appreciated French wine appellation in all Western Europe, followed by Saint-Emilion, Bordeaux Supérieur, Sauternes, Médoc. These appellations have a score of more than 20% of favorable quality opinions. The other wine regions appear to be far less well reputed, with their reputation level not exceeding 20%. With the exception of Beaujolais (17.91%), the other wines produced in France have reputation levels lower than 10%.

5 Estimation Procedure and Results

5.1 2-Stage Least Squares

We first estimate a series of recursive models using a simple 2SLS estimation procedure[2]:

$$\begin{cases} q_i^h = X_i^h \beta_i + \delta_i q_g^h + \varepsilon_i^h & (i) \\ q_g^h = X_g^h \beta_g + Z_g^h \theta_i + \varepsilon_g^h & (0) \end{cases}$$

In this setup, q_g^h is regressed in the collective reputation equation (0) against X_g^h and the instruments Z_g^h ; whereas q_i^h is regressed against X_i^h and q_g^h in the individual reputation equation (i). A system like this has been estimated for each of the 9 appellations beneath the Bordeaux umbrella ($i = 1, ..., 9$).

The results are listed within Table 2 along with those of a battery of tests for the endogeneity of q_g^h, the validity or weakness of the instruments (Hansen's J, Stock and Yogo) in Table 3. Whenever necessary we tested the exogeneity of one or more questionable instruments using the "Difference-in-Sargan" statistic also known as the C-Statistic. Figure 2 summarizes the results

[2]For simplicity, we assume that there is no image spillovers between the different individual reputations and focus on the relationship with the group reputation.

of the 2SLS procedure which does not allow us to control for the fact that the quality variables are of the binary type.

The instruments Z_g^h turned out to be reasonable predictors of what people think about Bordeaux as a generic appellation. Among these, Beaujolais and Languedoc-Roussillon turned out to be the most predictive (significant).[3] The highest relative bias that we get (20-30%) concerns only one regression (Côtes-de-Bourg) in which q_g^h were not found endogenous. In the other regressions, the relative bias potentially induced by the weakness of the instruments is quite acceptable (between 10% and 20% in two regressions and lower than 10% in the others). The results of the various Hansen's overidentification tests failed to reject the hypothesis that the instruments are exogenous in every regression.

5.2 Robustness check

As a robustness check, we ran a second series of regressions using a Recursive Bivariate Probit (RBP) procedure which is more appropriate given that both q_i^h and q_g^h are of the binary type. The RBP results (Table 4) are then compared to those obtained after a regular ML probit estimation procedure (Table 5) which ignores the potential endogeneity of q_g^h in each equation.

The results are striking. Notably, q_g^h came out endogenous in most systems we estimated. Indeed, in most regressions the exogeneity tests rejected the hypothesis that q_g^h is exogenous. The exceptions are Côtes-de-Bourg and Entre-deux-Mers, the two less well reputed appellations (7.57% and 7.65% respectively). Not controlling for this endogeneity pitfall results in a downward bias in the estimated returns to collective reputation. From Figure 3 we observe that ML Probit tend to systematically underestimate the various impacts compared with those obtained from an appropriate RBP estimation procedure. Moreover, it fails to capture the fact that this relationship exhibits marginal diminishing returns (concave shape with RBP versus more linear shape with ML Probit). In other words, the marginal impact of the Bordeaux reputation (the "umbrella brand") actually tends to decrease to zero (and not to increase in a linear way) as the reputation level of its entities goes up.

We get positive and significant spillover effects from the umbrella reputation for 8 individual appellations out of 9. Highly-reputed appellations are found to enjoy larger umbrella impacts than less-reputed appellations. These image spillover effects when positive vary from a minimum of 5% to a maximum of 15% of additional favorable quality opinions (see Figure 4 which reproduces on the vertical axis the marginal effects in percentage points for the RBP estimates).

In this group, only the leaders take a significant advantage from the high level of reputation of Bordeaux. For the followers, there is no advantage in being part of this group as they are

[3]The results for the first step equations are available from the authors upon request.

not clearly associated to Bordeaux in the consumer's mind. This is particularly true for Entre-deux-Mers and Côtes de Bourg which do not enjoy any benefits from the fact that they fall in the Bordeaux region.

6 Cost and Benefit Analysis and Industry implications

6.1 The Cost Dimension: How are Fees Determined

The Bordeaux Wine Council (CIVB in French), founded in 1948, represents the three entities of the Bordeaux wine industry: winegrowers, wine merchants and brokers. The missions are the following ones (Source: CIVB):

- Marketing: develop the reputation of Bordeaux wines, in France and abroad, through advertising campaigns, digital communications, public and press relations, and training.
- Economic: acquiring data and improving knowledge relating to the production, the markets and the sale of Bordeaux wines throughout the world.
- Technical: improve the industry's understanding of various technical issues relating to the production and quality of Bordeaux wines and anticipate new environment - and health-related requirements.

These missions are all costly activities that are funded through appellation fees. The amount of this fee varies substantially from €5.65 per hectoliter in Entre-deux-Mers up to €12.43 per hectoliter for wines produced in the Margaux area (see Table 6 for further details). The fee is positively associated with the level of reputation of the wines produced in each region (Pearson correlation coefficient = 0.51) but also with market prices (Pearson correlation coefficient = 0.35). It is revised every four years.

We use the econometric results estimated using our survey data that were reported in section 5 to calculate a measure of the benefits in euros per hectoliter (Hl) for producers in each sub-appellation. The measure calculates a proportion of the average prices for wines in the sub-appellations that can be attributed to that sub-appellation's reputation. We compare this measure of the benefits of promotion to the fees for the generic promotion paid by producers (also in euros per Hl) to calculate the overall BCR by sub-appellation.

Table 6 summarizes our econometric estimates for the reputation effects in columns three and four, the fees paid by Bordeaux producers during the 2011-2014 period in the fifth column, and the average market price for wine in the sixth column. We use these data to calculate our BCR that measures the net benefits of promotion efforts for the nine sub-appellations in Bordeaux. In our application, we take the product of the estimate for the individual reputation

and the estimate for the collective reputation to generate an aggregate reputation score by sub-appellation; we then multiply the aggregate reputation score by the average market price for wine in each sub-appellation to calculate the benefits of the promotion efforts (in euros per Hl). This corresponds to the marginal benefit coming from the generic promotion program for each sub-appellation (seventh column).

6.2 Findings and policy implications

Here we present the results for our measure of the net benefits from the generic promotion efforts for Bordeaux wines across the nine sub-appellations. The final column in Table 6 shows the calculated BCRs by sub-appellation ; this measure is the ratio of the benefits reported in the seventh column to the fees shown in the fifth column. For the following discussion we assume that the benefits from promotion in the Côtes de Bourg and Entre-deux Mers sub-appellations are zero given that the reputation estimates were not statistically significant for these sub-appellations. The bulk of our discussion below focuses on the BCR calculations for the remaining seven sub-appellations.

As shown in Table 6, the fees range between €5.65 and €12.43 (taxes included) per Hl, and the average market prices of the wines range between €111 and €842 per Hl; in general, the sub-appellations with higher fees also experience higher average market prices, but in the middle group with fees of €9.32 per Hl we see a wide range of average market prices. Because there is no estimated effect from the umbrella advertising program for Côtes de Bourg and in Entre-Deux Mers, these regions have no calculated benefits and the BCR is zero in both cases. For the next four regions in the list - Premieres Côtes de Bordeaux, Bordeaux Supérieur, Graves, and Médoc - we calculate a benefit of between €1.26 and €4.70 per Hl that is associated with the umbrella promotion program; however, in all four cases the costs outweigh the benefits and each sub-appellation shows a BCR less than one. Within this group, the Bordeaux Supérieur sub-appellation has the highest BCR (at 0.63) and this is largely driven by its higher regional reputation effect (probably due to a favorable name that closely associates itself to the umbrella name. The final three regions in the list - Sauternes, Saint-Emilion, and Margaux - have higher average market prices and subsequently higher calculated benefits per Hl. Two of these regions also have fees of €9.32 per Hl and Margaux has a slightly higher fee of €12.43 per Hl, and all three regions have BCRs that exceed 1.0. The highest BCR is for Sauternes given the estimate for its sub-regional reputation and its relatively low fee structure.

Results in Table 6 highlight some interesting differences concerning the net benefits of the promotion program across the sub-appellations. In addition, our findings may have important implications for wine producers and the other stakeholders that manage the structure of the funds collected and used to promote Bordeaux wines. First, the non-weighted average BCR

across all nine sub-appellations is 0.7 (it is 0.9 for the seven regions with strictly positive BCRs) indicating that the promotion program may not be generating net benefits to the region overall. Second, some of the sub-appellations, namely those with relatively lower fees compared to average market prices, are the ones receiving the net benefits from the promotion program. Our calculation of the BCR indicates that only three of the nine sub-appellations are benefiting from the program; the other six regions that appear to be cross-subsidizing the promotion program may be better off if they left the program. Third, our results give us some sense for how the fees might be adjusted across regions as a way to realign the fee structure with the benefits of the promotion efforts. In particular, the seventh column in Table 6 (labeled Marginal Benefit) outlines the maximum fee that producers should be willing to pay per Hl in each sub-appellation. However, the fees that are charged in each sub-appellation appear to be sticky as they have not changed for any sub-appellation in the most recent fee schedule for the period 2014 to 2017[4]. Although we expect that there would be much resistance to any changes in the fee structure, our findings suggest that the current arrangement may not be optimal for individual wineries or for the Bordeaux region more generally.

7 Conclusion

The success and stability of generic promotion programs depend to a large extent on their effectiveness and cost to participants. In this paper, we measured the influence of Bordeaux as a brand on a series of 9 appellations beneath its umbrella to assess the marginal benefit of this generic promotion program and then compare it with their respective marginal cost. Controlling for the fact that both types of reputation are released simultaneously, we get significant positive spillover effects from the umbrella, the magnitude of which depends positively on the individual reputation level of the wine under the umbrella. The reputation of this prestigious wine appellation would thus also act as a positive quality signal among a significant fraction of surveyed people in Western Europe.

While collective reputation generally provides some benefits to individual group members, we find that these gains do not always compensate the costs of membership. Our results therefore suggest that promotion programs should take this cost-benefit consideration into account, and possibly better target their potential customers in various markets on an individual basis.

[4]See $https://info.agriculture.gouv.fr/gedei/site/bo-agri/document_administratif-987ec417-5c6d-4b7c-85c1-59faa6dd7606/telechargement$

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Table 1: Summary statistics about reputation levels from the survey data*

Bordeaux (umbrella)	50.08
Sub-Appellations within the Bordeaux Region:	
Bordeaux Supérieur	25.21
Entre-deux-Mers	7.65
Margaux	19.21
Médoc	21.14
Saint-Emilion	25.6
Côtes de Bourg	7.57
Graves	19.32
Premières Côtes de Bordeaux	13.85
Sauternes	23.02
French wine regions (Instruments):	
Alsace	3.17
Beaujolais	17.91
Bourgogne	6.99
Languedoc-Roussillon	8.52
Côtes du Rhône	0.2
Loire	6.05

* Average levels of agreement on quality (percentages)

Table 2: Main determinants of the individual reputation level (Two-Stage Least Squares)

	Saint Emilion	Bordeaux Supérieur	Médoc	Margaux	Entre-deux -mers	Côtes de Bourg	Sauternes	Prem. Côtes de Bordeaux	Graves
Opinion on Bordeaux Wines	0.555***	0.293***	0.346***	0.547***	0.0920**	-0.0777	0.393***	0.341***	0.362**
(Good = 1 ; Bad = 0)	(0.0918)	(0.0740)	(0.0743)	(0.0728)	(0.0439)	(0.105)	(0.130)	(0.0884)	(0.141)
Past consumption :	0.148***	-0.0290	0.112***	0.176***	0.0298*	0.0575*	0.125***	-0.00747	0.0616
Has consumed wine i last year	(0.0202)	(0.0232)	(0.0184)	(0.0303)	(0.0153)	(0.0323)	(0.0326)	(0.0495)	(0.0419)
Recognition:	0.0509**	0.0515	0.0700***	0.222***	0.0142	0.0374	0.104**	0.0684	0.125*
Respondent knows wine i	(0.0249)	(0.0372)	(0.0207)	(0.0381)	(0.0252)	(0.0600)	(0.0502)	(0.0814)	(0.0661)
Constant	-0.0683	0.0746**	-0.0428	-0.123***	0.0237	0.160**	0.0843	-0.0360	0.105
	(0.0443)	(0.0376)	(0.0369)	(0.0377)	(0.0235)	(0.0804)	(0.0946)	(0.0399)	(0.0713)
Instruments:									
Alsace	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Beaujolais	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Bourgogne	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C. du Rhône	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Languedoc	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loire	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Excluded instruments (C-stat):	7.662	8.740			4.083	-	-	-	-
C-stat.	(0.0056)	(0.0031)			(0.0433)	-	-	-	-
Observations	6,307	6,307	6,307	6,307	6,307	819	1,382	3,667	1,258
F stat	20.77	11.51	16.88	17.46	6.90	1.60	8.44	6.67	2.88
P-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0500)	(0.0000)	(0.0000)	(0.0000)

Exogenous controls include age, gender, region of origin of the respondent, socio-economic category and level of self-assessed wine-knowledge. Robust standard errors in parentheses ; *** p<0.01, ** p<0.05, * p<0.1

Table 3: Exogeneity Tests and Weak Identification Tests

	Saint Emilion	Bordeaux Supérieur	Médoc	Margaux	Entre-deux -mers	Côtes de Bourg	Sauternes	Prem. Côtes de Bordeaux	Graves
Exogeneity test (Umbrella)	33.866	3.668	14.457	52.612	2.352	1.496	7.666	8.193	3.723
	(0.0000)	(0.0555)	(0.0001)	(0.0000)	(0.1251)	(0.2213)	(0.0056)	(0.0042)	(0.0537)
Weak identification test:									
Kleibergen-Paap stat.	18.071	21.509	23.137	28.261	23.850	6.454	7.642	11.119	7.410
Relative bias	5-10%	0	0	0	0	20-30%	10-20%	10-20%	10-20%
Hansen's overid. test	5.107	7.011	5.465	5.649	8.050	2.118	1.128	6.105	0.321
	(0.5302)	(0.3198)	(0.3618)	(0.3419)	(0.2345)	(0.7140)	(0.9803)	(0.4115)	(0.9884)
Observations	6,307	6,307	6,307	6,307	6,307	819	1,382	3,667	1,258
F stat	20.77	11.51	16.88	17.46	6.90	1.60	8.44	6.67	2.88
P-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0500)	(0.0000)	(0.0000)	(0.0000)

Robust standard errors in parentheses ; *** p<0.01, ** p<0.05, * p<0.1 Tests based on 2SLS estimates

Table 4: Main determinants of the individual reputation level (Recursive Bivariate Probit)

	Saint Emilion	Bordeaux Supérieur	Médoc	Margaux	Entre-deux -mers	Côtes de Bourg	Sauternes	Prem. Côtes de Bordeaux	Graves
Opinion on Bordeaux Wines	0.13***	0.1173***	0.1013***	0.1152***	0.0248	-0.1072	0.1314**	0.082***	0.1522**
(Good = 1 ; Bad = 0)	(0.0216)	(0.0356)	(0.0237)	(0.017)	(0.016)	(0.1533)	(0.0517)	(0.0289)	(0.0769)
Past consumption :	0.0652***	-0.008	0.0509***	0.0648***	0.0173**	0.053*	0.0581***	0.0069	0.0286
Has consumed wine i last year	(0.0071)	(0.0094)	(0.007)	(0.0098)	(0.0077)	(0.0308)	(0.0141)	(0.0167)	(0.0178)
Recognition :	0.0336***	0.0227	0.0278***	0.0719***	0.0056	0.0303	0.0518**	0.0116	0.0585**
Respondent knows wine i	(0.0078)	(0.0174)	(0.0078)	(0.0129)	(0.0102)	(0.0516)	(0.0204)	(0.0277)	(0.0283)
Instruments :									
Alsace	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Beaujolais	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Bourgogne	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C. du Rhône	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Languedoc	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loire	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Observations	6,307	6,307	6,307	6,307	6,307	819	1,382	3,667	1,258
Wald test of rho = 0	33.6415	2.97198	16.342	61.8815	2.3219	0.4397	7.0031	11.9136	3.0959
P-value	(0.0000)	(0.0847)	(0.0001)	(0.0000)	(0.1276)	(0.5073)	(0.0081)	(0.0006)	(0.0785)
Wald Chi-Sq.	2454.82	1393.72	1860.17	35057.09	34525.19	140.02	491.23	30687.25	1881.09
P-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Note: See table 2. Coefficients correspond to marginal impacts

Table 5: Main determinants of the individual reputation level (ML Probit)

	Saint Emilion	Bordeaux Supérieur	Médoc	Margaux	Entre-deux -mers	Côtes de Bourg	Sauternes	Prem. Côtes de Bordeaux	Graves
Opinion on Bordeaux Wines	0.0734***	0.1467***	0.0697***	0.0668***	0.0156**	0.0092	0.0713***	0.0768***	0.1339***
(Good = 1 ; Bad = 0)	(0.0114)	(0.0127)	(0.0111)	(0.0105)	(0.0075)	(0.023)	(0.0271)	(0.0147)	(0.0325)
Past consumption :	0.1668***	-0.011	0 .1194	0.1670***	0.0389**	0.0548	0.1425***	0.0224	0.0782*
Has consumed wine i last year	(0.0162)	(0.0194)	(0.0154)	(0.0243)	(0.0167)	(0.0349)	(0.0312)	(0.0406)	(0.0454)
Recognition	0.0817***	0.0451	0.0616***	0.1807***	0.0126	0.0321	0.1212**	0.0265	0.1526**
Respondent knows wine i	(0.0188)	(0.0362)	(0.0174)	(0.0327)	(0.022)	(0.0559)	(0.0471)	(0.0659)	(0.0700)
Observations	6,307	6,307	6,307	6,307	6,307	819	1,382	3,667	1,258
Wald Chi-Sq.	962.47	563.30	737.73	807.04	203.71	29.82	146.68	213.44	66.63
P-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0541)	(0.0000)	(0.0000)	(0.0000)

Note: See table 4.

Table 6: Calculating a measure of the net benefits of promotion by subregion

Appellation	Individual Reputation %	Coll. Rep Marg. Effect %	Significance Level	Fees 2011-2014 € per Hl (tax included)	Av. market price € per Hl °	Marginal Benefit	Net flow	Ratio BCR
Côtes de Bourg	7.57	0	NS	5.65	130	0	-5.65	0
Entre-Deux-Mers	7.65	0	NS	5.65	119	0	-5.65	0
Premières Côtes de Bordeaux	13.85	8.2	***	5.65	111	1.26	-4.39	0.22
Bordeaux Superieur	25.21	11.73	***	5.65	120	3.55	-2.10	0.63
Graves	19.32	15.22	**	9.32	160	4.70	-4.62	0.50
Médoc	21.14	10.13	***	9.32	194	4.15	-5.17	0.45
Sauternes	23.02	13.14	**	9.32	511	15.46	6.14	1.66
Saint-Emilion	25.6	13	***	9.32	369	12.28	2.96	1.32
Margaux	19.21	11.52	***	12.43	842	18.63	6.20	1.50
Non-weighted average	18.06	9.22		8.03	284	6.67	-1.36	0.7
Non-weighted average (seven significant subregions)	21.05	11.85		8.72	329.57	8.58	-0.14	0.9

Note: the fees includes in the table were computed based on an average for the years 2011-2014.

Figure 1: Wine Appellations, France

Figure 2: Delta coefficients (2SLS)

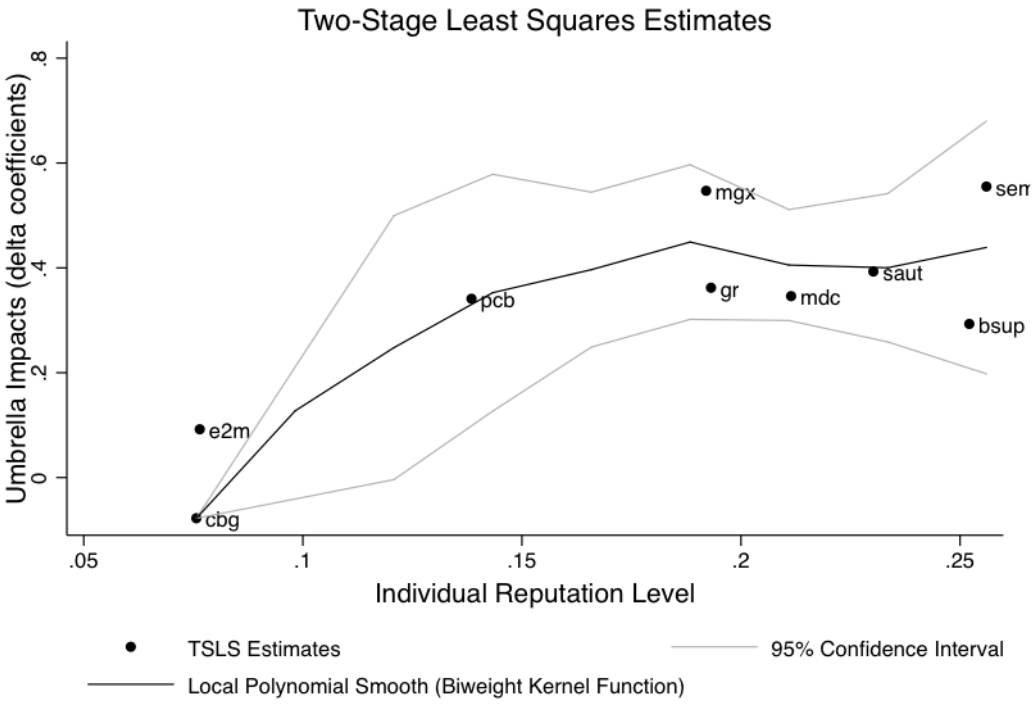

Figure 3: Delta coefficients (RBP vs. ML Probit)

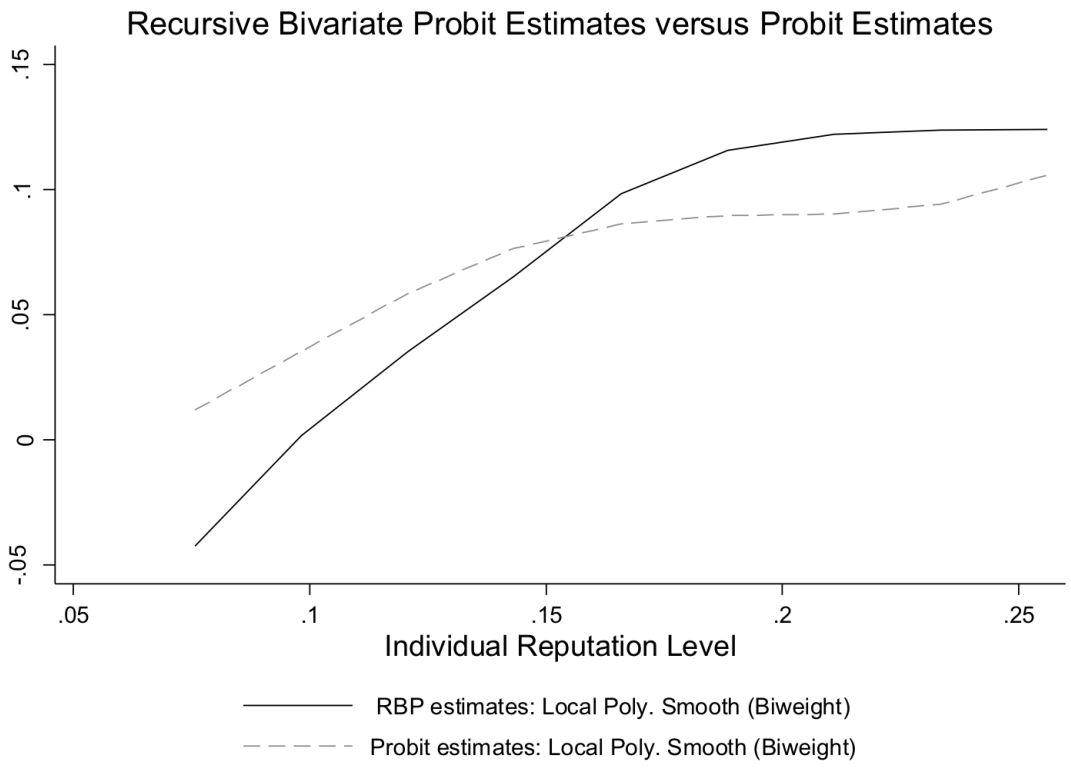

Figure 4: Marginal impacts (RBP))