LOCATION ILLUSION IN THE WINE MARKET: THE ERODING EFFECT OF WORD-OF-MOUTH ON THE REGIONAL REPUTATION PREMIUM

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The eroding effect of word-of-mouth on the regional reputation premium

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Abstract:

We develop a model to examine (1) the relationship between initial wine prices, regional reputation and bottle quality, as well as (2) the potential impact of a word-of-mouth effect, particularly via online social wine networks on price discounts. Regression estimation results based on this model provide empirical evidence to support the existence of a premium attached to bottle quality and regional reputation in setting initial prices. Moreover, we find a significant positive effect of regional reputation on discount rates, which indicates the existence of a word-of-mouth effect and its eroding effect on the regional reputation premium.

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1. Introduction

Picking the right cell phone network may mean the difference between getting the call about that new job or missing it, just as opting for the train may get you home in time for Christmas when all flights are grounded. Similarly, though less dramatic, a good dinner often depends on choosing the right bottle of wine. But how do you pick 'the right' bottle of wine? Anecdotal evidence suggests that if you thought Chateau Soandso 2005 was a good choice, chances are that you won't find Chateau Soandso 2006 entirely undrinkable. Quality, hence, may be somewhat stable over time, benefitting the conservative buyer. But assume you decided to try something new and now face the task of choosing a bottle, how do you go about it?

Wine is an experience good whose quality is not directly observable *ex ante*. An average wine buyer therefore faces the task of choosing a bottle of wine based on a set of 'soft' criteria as long as he or she lacks any personal experience with this particular brand and vintage. Such criteria that a risk averse buyer would pay attention to would include signals of the current quality of a particular bottle of wine, for example the price or an expert rating (Schamel 2000). In addition, consumers pay attention to the overall reputation of a wine's origin (Stuart and Smith 1997; 1998). Accordingly, we can assume that in setting initial prices sellers attach a premium to regional reputation as well expert ratings (Lecocq and Visser 2006).

However, the advent of the internet and the emergence of social wine networks offering consumer reviews and ratings might contribute to an erosion of the positive effect of regional reputation. If not in initial price setting, then perhaps it is by changing consumers' relative demand for wines coming from regions with a higher regional reputation once consumer reviews and ratings become available as an alternative indicator of quality for a given wine. As a result of this decreasing information

asymmetry sellers may be forced to cut the prices of wines coming from regions with higher reputations relatively more as the effect of reputation on consumer choice decreases.

In this study, we examine the relationship between initial prices and both regional reputation and bottle quality. We also investigate the potential impact of a word-of-mouth-effect – for example via online social wine networks – on price discounts. We thereby seek to untangle the effect that word-of-mouth has on purchasing decisions and discount rates.

To do so, we develop a model that assumes that a wine retailer maximizes its profits by selling all bottles in stock within two periods of a year. In other words, for a wine retailer, maximizing profit is equivalent to maximizing revenues. In the first period, wineries set the price for a bottle based largely on its current (perceived) quality and the reputation of the region of origin. Consumers try different wines and observe their quality. These impressions are disseminated by word-of-mouth, for example via social networks, blogs, or simply face-to-face. There are two types of wines that would arguably stick out in such word-of-mouth information: those that consumers particularly liked, regardless of origin, price, and reputation, and those that offered a particular "bang for the buck" in that they delivered a surprising level of real quality relative to expected quality and regional reputation. Given the word-of-mouth effect, we would expect to see demand for the latter – let's call them "hidden champions" – to pick up throughout the first period, once their qualities become widely known. At the beginning of the second period wine retailers would generally cut their prices in order to sell off all bottles that remain in stock. Since the size of the discount depends on demand for each wine in period one, we would expect to find that "hidden champions" will see lower relative discounts than other wines. Conversely, since buyers now have access to alternative indicators of quality via social networks, rating websites and blogs, we can expect a diminishing premium derived from regional reputation, and thus higher discount rates on wines from reputable regions.

We test the validity of this model by using data on wine prices and discount rates from a large wine retailer in New Jersey. We use data on (1) initial retail prices and discounts applied in the middle of

a year for 299 wines from 17 different wine regions (or countries); (2) Wine Spectator or Wine Advocate ratings (or a combination of both) for each bottle of wine as an indicator of quality; and (3) evaluations of regional reputation derived from a novel index we construct. Our regression results indicate that there is indeed a significant premium derived from regional reputation. More importantly, we also find that wines from regions with higher reputations tend to see larger price cuts than those from less prestigious regions, perhaps due to the word-of-mouth-effect on consumer choice.

2.   Experience goods, price formation and effects of word-of-mouth

Literature on consumer behavior and choice has long held that consumers tend to make their buying decisions contingent upon expected or perceived quality. Akerlof (1970) showed that in a market with both high and low quality goods, but where quality is not observable, prices cannot be credible signals of quality. As a consequence, sellers of high-quality goods would start to use quality signals in order to distinguish their products from low-quality competitors (Spence, 1974). Nonetheless, for a great number of goods quality remains unobservable even though signaling exists. This is especially true for products whose quality remains unknown until they are consumed: experience goods.

Experience goods have long been a focal point of research into price formation and differentiation. Wolinsky (1983) investigates the role of prices in markets where consumers have imperfect information. He finds that (1) prices can differentiate between levels of quality, and (2) each price-signal is greater than the quality level that it indicates. Wolinsky also argues that the less information or the poorer the information available to consumers, the higher the mark-up on the product. This underlines the importance for consumers to reduce their information disadvantage prior to purchasing. Gergaud and Livat (2007) investigate the way consumers use signals such as the price or their past consumption experiences in their purchasing decisions. Hence, consumers

react to a multitude of signals and devise strategies to create information in order to reduce uncertainty associated with the purchase of experience goods.

With regards to wine, economists have long attempted to shed light on the question of how observable product characteristics, such as region of origin, brand reputation and pricing, are related. One aspect that has emerged from the literature is a positive relationship between regional reputation and pricing, suggesting that regional reputation may be a guide that consumers follow in their decisions (Stuart and Smith 1997; 1998). Lecocq and Visser (2006) assess wine pricing using hedonic price functions where prices are regressed on a number of characteristics in order to establish which factors significantly affect prices. They analyze three different but structurally identical sets of data of Bordeaux (2x) and Burgundy wines to estimate which characteristics determine wine prices. They find that directly observable specifications, such as the appellation, ranking and vintage explain the largest part of price differences. Schamel (2000) estimates a hedonic pricing model for US data on Chardonnay and Cabernet Sauvignon wines from seven regions (Napa and Sonoma Valley, Sonoma County, Oregon, Washington State, Australia, Chile, and South Africa) for a pool of eight vintages between 1988 and 1995. He finds that both regional reputation and individual quality indicators are important price factors, especially for red wine consumers in the US.

Similarly to the effect of regional reputation on prices, the link between expert ratings and prices is rather well established. There is extensive literature on experts' importance in different markets (e.g. Ginsburgh 2003; Lindley 2006; Quandt 2006), underlining the significance of expert reviews on consumer choice and hence price. With regards to wine, Hadj Ali et al. (2010) quantify the effects of Robert Parker's opinion on Bordeaux wine prices. They find that on average the "Parker effect" adds 2.80€ to the price of a bottle of Bordeaux. Schamel and Anderson (2003) estimate hedonic price functions for premium wine from Australia and New Zealand. They include ratings from Halliday's wine guide and the wine magazine *Winestate*, and report a significant effect of these

ratings on price that remains fairly constant over time. Jones and Storchmann (2001) assess among other factors the impact of Parker points on Bordeaux wine prices. Using wine auction prices for 21 prestigious Bordeaux, distinguishing between Merlot-dominated and Cabernet Sauvignon-dominated wines, they find that the effects of Parker ratings on price are stronger for the latter ones.

In addition to such expert ratings, the advent of the internet and social media has generally amplified the relevance of consumer ratings and word-of-mouth effects on purchasing decisions and prices. "What makes online feedback mechanisms different from the word-of-mouth networks of the past is the combination of…their unprecedented scale, achieved through the exploitation of the Internet's low-cost, bidirectional communication capabilities." (Dellarocas 2003: 1410) The immediate availability of product reviews, ratings and opinions via online rating sites has altered the availability of product information for potential buyers. Consumers no longer depend on information that producers decide to signal, but have access to information that would otherwise often only be available ex post, after a product was purchased and consumed. Arguably, this factor is especially relevant for experience goods which are particularly characterized by a lack of ex ante information and information asymmetry (Zhu and Zhang 2010).

The importance of consumer ratings is underscored by studies analyzing how buying decision are made. McFadden and Train (1996) describe a model of how consumers make choices about new products by either trying the product themselves or by waiting to learn from other consumers. Chevalier and Mayzlin (2006) analyze the effect of word-of-mouth on sales by looking at customer reviews at amazon.com and bn.com. According to their analysis, positive reviews lead to increased sales while negative reviews decrease sales.

We can hence expect an impact of word-of-mouth and consumer ratings on demand for a certain product in markets with imperfect information. This effect should be particularly important for experience goods, where the information deficit the average consumer faces before a purchase is large. Thus, to return to the case of wine prices, we would expect word-of-mouth to have an impact

on the development of demand for and prices of wines. We would hence assume to see larger discounts for wines from regions with relatively high reputation given the decreasing relative importance of regional reputation over time associated with the increasing availability of consumer reviews and ratings as alternative – and possibly more 'credible' or 'persuasive' – indicators of quality.

3. A model

Our model starts from the assumption that a wine retailer maximizes its profits by selling all bottles in stock within two periods of a year. Figure 1 shows the vintage composition of the inventory of the Wine Library, a wine retailer in New Jersey from which we derived our data. The figure suggests that while our assumption is somewhat simplifying, the retailer indeed clears a large share of its inventory in a year, suggesting that profit is maximized by clearing the inventory to as large a degree as possible within a year, perhaps before the arrival of the wines from the next vintage. This is also supported by our data on price cuts that occur throughout the year (see Table 1 below), which underlines the decreasing value of wine for the retailer over time while costs of storage inevitably increase the longer a bottle is kept in the inventory. High quality wines with the potential to increase value over time may be an exception to this assumption. However, they hardly constitute a significant share of the inventory for the average wine retailer. Moreover, betting on increasing prices for a certain wine/vintage would probably be more of a private endeavor than part of a regular retailer's business plan.

Figure 1: Vintage composition of the inventory of the Wine Library in 2011
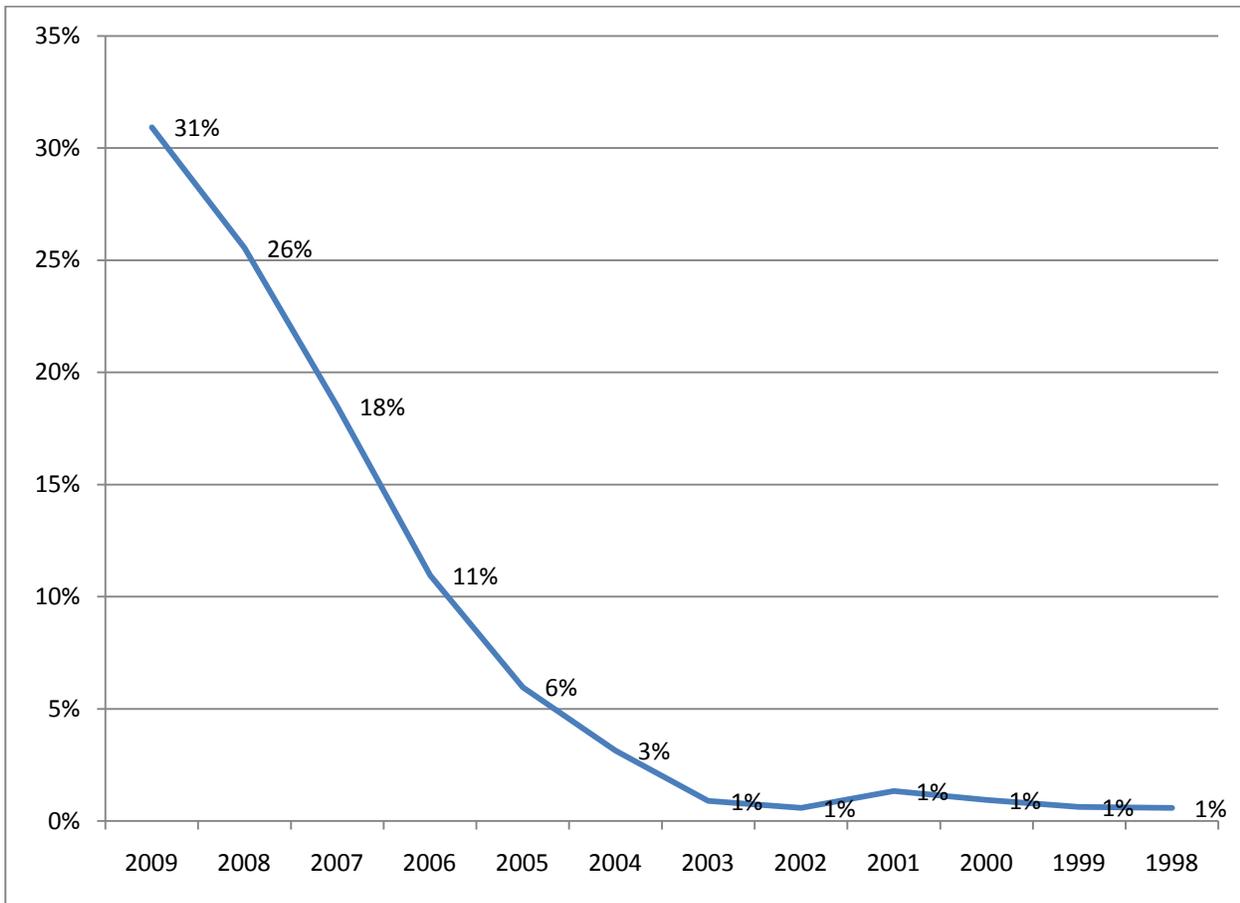
Period 1: Setting the initial price

We divide our model into two periods of a year. During the first period, the price of a wine is determined by the following equation:

$$Price_1 = p(BQ, RR), \tag{1}$$

where $Price_1$ is the initial price, set as a function of BQ (bottle quality) and RR (regional reputation). In line with the existing literature, we expect a positive premium attached to regional reputation and bottle quality:

$$\frac{\partial Price_1}{\partial BQ} > 0, \text{ and } \frac{\partial Price_1}{\partial RR} > 0. \tag{2}$$

In the first period, consumers purchase at the initial price, taste different wines and observe their quality. These impressions are disseminated by word-of-mouth, for example via social networks, blogs, or simply face-to-face. An excellent example of a social network site is CellarTracker, the world's largest social network dedicated to wine, with a database containing more than 1.8 million "community tasting notes". As Chevalier and Mayzlin (2006) suggest, the word-of-mouth effect is likely to have an impact on the perceived overall reputation of a wine among wine drinkers and thereby also on demand. There are two types of wines that would arguably stick out in such word-of-mouth information. First, those that consumers particularly liked, regardless of origin, price, and regional reputation, will likely see increasing demand. Second, and more interestingly, those that offered particular "bang for the buck" in that they delivered a surprising level of real quality relative to expected quality and regional reputation will likely also see increasing demand. Given the word-of-mouth effect, we would expect to see demand for "hidden champions" pick up as consumer ratings become available, and consequently a quickly declining inventory of these wines.

Period 2: Setting the discount rates

At the beginning of the second period wine retailers typically cut their prices in order to sell off all bottles that remain in stock and clear their inventories. Since the size of the discount depends on demand for each wine in period one, we would expect to find that "hidden champions" will see a lower relative discount than other wines given their increased demand during the first period, due to the word-of-mouth-effect:

DISCOUNT = d(RR), (3)

where discount rate, modeled as a function of the regional reputation, RR. The price in period 2 is determined by $Price_2 = Price_1 \times (1- D)$. Due to the word-of-mouth effect, we expect a positive relationship between the discount rate and regional reputation. In other words, we expect to see deeper discounts for the wines coming from regions with higher regional reputation, as explained

previously.

$$\frac{\partial DISCOUNT}{\partial RR} > 0. \tag{4}$$

4. Analysis

Data and descriptive statistics

Our data on prices and discount rates comes from the Wine Library's webpage, www.winelibrary.com. We sorted all wines for each of the seventeen regions based on expert ratings, and to achieve a reasonable sample size, we picked the top 20 wines for each region. As the first column of Table 1 highlights, fewer than 20 wines from the regions of Argentina, Chile, France-Loire, New Zealand, South Africa, and US-Washington were rated by experts. Accordingly, our sample includes only 299 wines (rather than 17 x 20 = 340). Data on initial prices and discount rates was collected on March 25, 2008, well after the holiday season to minimize seasonal disturbances. Additionally, we measure current quality by using expert ratings of the Wine Advocate and/or the Wine Spectator.

Overall, the average price for the 299 wines in our sample is $123, with Loire ($26) and New Zealand ($30) at the lower end and Bordeaux ($490) and Burgundy ($257) at the higher end of the scale in terms of average price per region. In other words regional average prices are varying over a relatively wide range between $26 and $490. On the other hand, as column 3 of Table 1 shows, the average bottle quality per region, measured by way of expert scores, varied within a relatively narrow range with a minimum of 90.7 points for New Zealand and a maximum of 96.1 for Spain; and a sample average of 93. Accordingly, the average price quality ratio for the sample is 1.32. The lowest regional price quality ratio is Loire's at 0.29 (followed closely by both Argentina and South Africa with 0.40); with the highest one for Bordeaux at 5.12 (followed by Burgundy with 2.77 and

Spain with 1.81). The average discount rate for the sample is 22.8% with the lowest rate of 19.3% for South Africa and the highest one of 25.7% for Bordeaux.

Table 1: Summary statistics for initial prices, quality, discount rate, and reputation

Region/Country (number of wines)	Initial price (average)	Bottle quality (average)	Price/Quality ratio (average)	(%) Discount rate (average)	Regional reputation (average)	Regional reputation (standard deviation)
Argentina *(13)*	$36	90.9	0.40	22.6	4.2	1.2
Australia *(20)*	$187	95.8	1.95	23.8	6.4	1.1
Chile *(12)*	$38	90.9	0.41	21.9	5.0	1.1
Fr—Bordeaux *(20)*	$490	95.6	5.12	25.7	9.4	0.8
Fr—Burgundy *(20)*	$257	92.9	2.77	22.2	9.3	0.7
Fr—Loire *(19)*	$26	91.1	0.29	22.6	6.7	1.5
Fr—Rhone *(20)*	$50	91.1	0.55	22.6	7.5	1.3
Germany *(20)*	$116	93.4	1.24	22.8	6.5	1.6
Italy *(20)*	$125	94.2	1.33	20.9	7.6	0.9
New Zealand *(6)*	$30	90.7	0.33	23.3	6.3	1.7
Portugal *(20)*	$82	93.2	0.87	23.4	4.8	1.4
South Africa *(11)*	$37	91.5	0.40	19.3	4.8	1.5
Spain *(20)*	$174	96.1	1.81	21.1	6.1	1.6
US—Napa *(20)*	$133	93.7	1.42	24.1	8.7	0.8
US—Other California *(20)*	$63	92.5	0.68	22.0	5.8	1.7
US—Sonoma *(20)*	$49	91.9	0.53	24.8	7.5	1.2
US—Washington *(18)*	$45	91.3	0.50	22.9	6.5	1.4
TOTAL *(299)*	$125	93.0	1.32	22.8	6.8	1.5

Data sources:
Initial price, Discount rate: www.winelibrary.com.
Quality: Various experts rating(s) average, e.g., Wine Spectator, Wine Advocates ratings
Reputation: Survey sent by Managing Editor to the Editorial Advisory Board of t*he Journal of Wine Economics*

Table 2: Wine reputation index, Pearson correlation matrix

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12
Expert 1	1.00											
Expert 2	0.64	1.00										
Expert 3	0.79	0.63	1.00									
Expert 4	0.55	0.63	0.50	1.00								
Expert 5	0.68	0.69	0.68	0.62	1.00							
Expert 6	0.69	0.47	0.63	0.67	0.62	1.00						
Expert 7	0.82	0.49	0.74	0.49	0.71	0.82	1.00					
Expert 8	0.70	0.73	0.63	0.85	0.77	0.64	0.69	1.00				
Expert 9	0.82	0.79	0.69	0.75	0.68	0.66	0.72	0.86	1.00			
Expert 10	0.85	0.72	0.76	0.64	0.62	0.52	0.63	0.68	0.76	1.00		
Expert 11	0.79	0.64	0.84	0.46	0.72	0.43	0.70	0.70	0.72	0.76	1.00	
Expert 12	0.76	0.65	0.49	0.71	0.68	0.63	0.70	0.82	0.81	0.77	0.63	1.00

Internal consistency reliability: **Cronbach's Alpha = 0.958**

In order to measure regional reputation, we construct a simple, novel index. A survey was sent to the Editorial Advisory Board of the *Journal of Wine Economics* by the Journal's Managing Editor asking these experts to grade the reputation of a number of wine regions on a scale from 1 to 10. We use the average score for the reputation of each wine region/country as our index of regional reputation. Table 1 offers summary statistics on the index. Bordeaux (9.4) and Burgundy (9.3) are awarded the highest average reputation scores, while Argentina (4.2) and South Africa and Portugal (both 4.8) are the regions with the lowest reputation scores. Table 2 shows the correlation matrix of

the ratings of the twelve experts who responded to the survey. We calculate a Cronbach's Alpha in order to measure the internal consistency or reliability of the 12 individual regional reputation scores. According to a commonly accepted rule of thumb for describing internal consistency, a Cronbach's Alpha value exceeding the 0.9 level indicates an "excellent" internal consistency (Cronbach, 1951). Thus, the Cronbach's Alpha value of 0.958 for our index suggests that the internal consistency of the reputation index is very good and we decide to use it as our proxy of choice for regional reputation.

Estimation results

First, we estimate three different versions of equation 1 on the relationship between price and bottle quality and regional reputation: We run OLS regressions of $Price_1$ as a function of bottle quality (BQ) and regional reputation (RR); $\ln(Price_1)$ as a function of $\ln(BQ)$ and $\ln(RR)$; and finally $\ln(Price_1/BQ)$ as a function of $\ln(RR)$. The estimation results presented in Table 3, Columns 2 to 4 suggest that both bottle quality and regional reputation have a significant effect on the initial price. It is particularly interesting to note that even if two bottles of wine have the same bottle quality—i.e., the same expert rating—the wine originating from a reputable region was initially priced significantly higher than the one coming from a region with lower reputation. For instance, as an illustration, take two bottles of wine that both received expert ratings of 90 points. One of these wines comes from a region with high reputation, e.g., 9.0, and the other one is from a region with low reputation, e.g., 4.5. According to the regression results in Column 3, the first wine's price is estimated to be $20 higher than the second one; and according to the regression results in Column 4, the first wine's price is estimated to be $76 higher than the second one.

Table 3: OLS Regression Results

	Column (1)	Column (2)	Column (3)	Column (4)	Column (5)	Column (6)
Dependent Variable:	**Price**	**Ln(Price)**	**Ln(Price/BQ)**	**Discount**	**Discount**
Explanatory Variables:						
Constant	-4337.45	-119.18	-3.60	20.03	17.90
Bottle Quality (BQ)	45.45 (5.3)				
Regional Reputation (RR)	34.71 (2.8)			0.40 (2.4)	
Ln(BQ)		26.78 (16.1)			
Ln(RR)		1.06 (6.3)	1.73 (7.9)		2.58 (2.3)
Adjusted R^2	0.13	0.56	0.17	0.02	0.02
F-statistic	23.26	186.99	62.11	5.77	5.25
No. of observations	299	299	299	299	299

Note: Numbers in parentheses are t-values; and accordingly all estimated coefficients are significant at the 1% level.

Second, we estimate two versions of equation 3 on the relationship between discount rate and regional reputation to check the validity of our word-of-mouth-effect hypothesis. Specifically, we run OLS regressions of DISCOUNT as a function of regional reputation in both linear and logarithmic forms. The results are reported in Columns 5 and 6 of Table 3. In line with our *a priori* expectations, the estimated coefficients in both models are statistically significant at the 0.01 level, i.e., wines from regions with higher reputation get a larger discount. Let's return to the earlier example to illustrate these results. Again, assume that there are two bottles of wine with an expert rating of 90 points each. One of these wines originates from a region with a high reputation score of 9.0 and the other one is from a region with low reputation, e.g., 4.5. According to our results the discount on the first wine would be 1.8 percentage points higher than on the second one.

5. Concluding remarks

Our findings underscore the existence of a premium attached to regional reputation. Using our constructed indicator of regional reputation while controlling for bottle quality as measured by expert ratings, we show that wine sellers indeed charge higher prices for wines from reputable regions. We also demonstrate a significant and sizable impact of regional reputation on discount rates for wine, emphasizing that sellers have to offer a larger discount on wines from more reputable regions in order to clear their inventory. This suggests that the effect of regional reputation decreases from the first to the second period.

We take this as evidence that a word-of-mouth effect helps erode the relevance of the regional reputation premium: Although further research into this effect is certainly called for to manifest this finding, we think it a plausible explanation that in times of relative information abundance in form of reviews, tasting notes and consumer reports, buyers switch from following more traditional ways of quality signaling (e.g. via region of origin or price) to minding assessments and experiences of other consumers. Thus, it seems that more and more consumers make their choice contingent upon experiences of other consumers. Perhaps wine business executives should take a note of the potency of peer influence in making effective managerial decision.

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