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Focussing on Consumer Attention: Price-Quality Relationships and Reputation Indicators

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Abstract:

In Germany, the focus of agricultural policy is now "the consumer". In the aftermath of the BSE crisis,

farmers are encouraged to produce higher quality "ecological" food for which consumers are willing to pay more. Food is an experience good and quality signals are becoming a more important

determinant of the prices received. However, given consumers' cognitive limitations, all signals can

not receive equal attention. We argue that consumer attention to product quality signals increases with its producer's quality performance, and given attention spillovers (collective reputation), with

the expertise of associated producers. Over time, collective reputations should have an effect on price

when attention (or quality performance) is low, but should lose their impact as attention increases.

We illustrate our consumer attention argument with an empirical application of wine producers and

regions and draw some conclusions for the new consumer oriented agri-food policy in Germany.

Key words: food and beverages, consumer economics, regional and producer reputation

JEL codes: L66, D83, Q18

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Introduction

Agricultural markets are changing in Europe. The new policy creed, especially in Germany, is that

higher-quality food products, in particular those with ecological features, should command higher prices and, *ceteris paribus*, earn higher returns for farmers. However, when product quality cannot

be determined in advance of purchase, i.e. when products are what Nelson (1970) calls "experience

goods," potential consumers must rely on a host of signals in forming quality expectations.

One set of signals that operates in a number of food and beverage markets around the world are quality assessments from industry organizations and agricultural societies. For example, the

German

Agricultural Society (DLG) assesses more than 20,000 food and beverage products annually (www.dlg.org). Voluntary product experts from trade, industry, science and food surveillance organizations assign food awards based on a gold, silver, and bronze medal scheme for products such

as frozen foods, ready-to-eat dishes, delicatessen products, bread and pastry products, dairy and meat

products, wine, spirits, and non-alcoholic beverages. Every producer can participate voluntarily in

the quality competitions. The experts apply their senses and accumulated knowledge to ascertain whether the food or beverage is produced with perfect craftsmanship and provides the enjoyment promised by the packaging or at the sales counter. In the other countries, similar testing procedures

and award schemes are applied. In the United States, for example, competitions during annual agricultural state fairs decorate prize winning food and beverage products. In Australia, a similar tradition of annual food competitions at Royal Agricultural Shows exists (www.rast.com.au).

While these competitions provide quality assessments across a wide range of product categories including dairy and meat products a clear historically founded focus is the wine industry. For wine,

quality really matters to potential consumers and expert opinions are often regarded as absolutely essential. While we want to keep the discussion of price-quality reputation effects in this paper as general as possible, we will use the wine industry as an illustrative example. This is done mostly because of data availability constraints for other products. However, we hope to test some of the hypotheses made in this paper on other products as soon as reliable data is available to us.

For the most part, food products are not search goods but experience goods. The distinction between

search and experience goods is due to Nelson (1970). For search goods, potential consumers may, with some effort on their part, obtain enough information about product quality before a purchase. In

contrast, the search for information is ineffective for experience goods and consumers must make their own assessment relying on signals such as expert evaluations or producer reputations.

The price received for a given product is positively related to quality ratings. Caves and Greene (1996) find that the median rank correlation between quality and price is between 0.27 and 0.38 in a

broad study of numerous product categories. Most studies analyzing price-quality relationships are

hedonic models based on the hypothesis that any product represents a bundle of characteristics that

define quality. Their theoretical foundation is provided in the seminal paper by Rosen (1974), which

posits that goods are valued for their utility-generating attributes. Rosen suggests that competitive implicit markets define prices for embodied product attributes, and that consumers evaluate product

attributes (e.g. features of a car, indicators of air or water quality) when making a purchasing decision. The observed market price is the sum of implicit prices paid for each quality attribute.

Shapiro (1983) presents a theoretical framework to examine the effects of producer reputation on prices. He develops an equilibrium price-quality schedule, assuming competitive product markets

and imperfect consumer information, to demonstrate that reputation allows high-quality producers to sell their items at a premium that may be interpreted as revenue for producer investments in building

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reputation. On the demand side of the market, it is costly for consumers to improve their information

about product quality too. In such an environment of imperfect information, learning about the reputation of a product or of some of its attributes can be an effective way for consumers to reduce

their decision-making costs. A favorable product or producer reputation signal facilitated through accumulated awards may serve as an effective way to reduce the decision-making costs.

Tirole (1996) presents a model of collective reputation as an aggregate of individual reputations where current producer incentives are affected by their own actions as well as collective actions of

the past. He derives the existence of stereotype producers from history dependence, shows that new

producers may suffer from past mistakes of older producers for a long time after the latter disappear,

and derives conditions under which the collective reputation can be regained. A favorable regional

reputation may be another effective way to reduce consumer decision-making costs.

For wine, the quality of a particular bottle of wine cannot be known until it is de-corked and consumed, consumers' willingness to pay will depend on reputations associated with that wine.

In

addition to quality assessments, individual producer reputation and collective regional reputation indicators also affect wine quality and thus prices. Landon and Smith (1997, 1998) analyze wine from the Bordeaux region, focusing on reputation indicators in addition to sensory quality attributes.

In both papers, they study the impact of current quality as well as reputation indicators on consumer

behavior using hedonic price functions. Lagged sensory quality ratings define individual product reputation. Regional reputation indicators are government and industry classifications. In addition,

their 1997 paper analyzes five individual vintages over the period 1987 to 1991. Their main conclusions are: reputation indicators have a large impact on consumer willingness to pay; an established reputation is considerably more important than short-term quality improvements; and ignoring reputation indicators will overstate the impact of current quality on consumer behavior. However, their estimated coefficients vary substantially across the five vintages examined.

Schamel (2000) estimates a hedonic model based on U.S. data for sensory quality ratings, individual

wine quality and regional reputation indicators for two premium wine varieties (Chardonnay and Cabernet Sauvignon). The paper examines wines from seven regions over eight vintages between 1988 and 1995. However, it does not estimate coefficients for individual vintages. The estimated price elasticity of sensory quality is larger for white wine, indicating that consumers were willing to

pay a higher quality premium for white compared to red wine. However, the results also show

that

regional reputation indicators seem to be more important for red wine, which suggests that promoting

regional reputation may have a higher payoff for regions that primarily grow red wine. In other words, it seems that the public-good value of a regional appellation is higher for red wine regions and that individual producers in those regions may benefit more from collective marketing efforts.

In Schamel and Anderson (2001), consumer willingness to pay depends on a critic's quality rating of

the wine and/or the producer and on the reputation of growing regions and grape varieties expressed

through simple premiums or discounts relative to a base region and variety. For Australia and New

Zealand, they separately examine two large data sets of expert ratings for several recent vintages.

Oczkowski (2000) estimates a hedonic price function for Australian wine arguing that single indicators of wine quality and reputation are imperfect measures because tasters' evaluations differ

and thus contain measurement errors. Employing factor analysis and 2SLS, he finds significant reputation effects but insignificant quality effects.

All these studies suggest that expert quality ratings provide important information about product quality to potential consumers. However, there is also enough reason to believe that these ratings are

neither definitive, nor fully dispersed across potential consumers. Objective food quality measures

are very difficult to define, as many sensory indicators that determine expert opinions are highly

subjective. Indicators such as labeling, package design, or the reputation of producers and regions may also advance or hinder the sale of a particular food product. Moreover, it is unlikely that the expert who rates the product and the consumer who buys the product always communicate properly.

Therefore, appropriate research into price-quality relationships will not only look at present quality

assessments but also consider the quality performance of producers or regions in the past. Using Shapiro's (1983) model of reputation formation, previous quality assessments would translate into a

reputation for product quality that is reflected in current prices. For wine, Landon and Smith (1997,

1978) find that previous quality ratings have a positive impact on current prices.

As alert consumers, we take it as given that a product's quality performance, its producer's reputation for quality, and the regional origin are important signals that affect the price it sells for in

the marketplace. Examples for this observation are ample. For instance, a German car will typically

sell for a higher price than Korean car with similar features. In the case of wine, a bottle from California's Napa Valley typically sells at a higher price than a wine of comparable sensory quality

from elsewhere. For food this observation holds as well. A growing number of German

consumers

rather buy higher priced "ecological" produce as opposed to regular retail food. Consumers may be

prepared to pay a much higher price for a reputable product from a well-known origin. We attempt

to explain such observations by positing that the decision to buy a particular food product is affected

by additional quality indicators including regional and producer reputation effects.

In this paper, we are interested in how price-quality signals at different levels of aggregation evolve

over time. In particular, we attempt to estimate price elasticities of product, producer, and regional

reputation indicators based on quality performance. Thus, the aim of this paper is to examine the extent to which these signals affect consumers in their buying decisions. The impact that a quality signal has on price will depend on how much consumers take notice of it. We follow Tversky and Kahneman (1974) in recognizing that when people try to estimate the likelihood of an

event (here a positive experience from buying a food product), they often rely on how easily they can

summon examples of similar events from the past. In combination with the large number of signals

generated in the marketplace, it follows that boundedly rational individuals only have a limited attention space for quality signals (Simon, 1997).

In what follows, we argue that consumer awareness of a product's quality signals is a positive function of the quality performance of its producer. Moreover, the attention also increases with the

quality performance of associated producers due to spillovers across geographically associated producers given the regional characteristics of food markets. This leads us to hypothesize that the impact of quality signals on price will be higher for more experienced quality performers, as opposed

to inexperienced performers, or their regionally associated producers. With little or no prior experience, consumers would not notice small differences across competing products. As time passes, and consumer experience accumulates, they begin to pay closer attention to particular features of the different products and make more detailed decisions.

There is also evidence that these relationships do vary over the life cycle of an industry.

Mannering

and Whinston (1991) note that the energy crises in the 70's led to US consumer awareness of the fuel

efficiency of Japanese cars. In this case, an exogenous event led to an increased awareness of certain

quality attributes. After sales began to accumulate, consumers became aware of other competitive features such as handling and design built into the Japanese cars. While it may be much too early to

tell, a similar effect could come about from the current BSE-crisis in Europe. As more and more consumers experience "ecological" food products due to the also exogenous BSE-event, they may become aware of other desirable traits in those products. This would suggest that accumulated market experience moderates the relationship between quality signals and price.

Producer Quality Performance

We begin with the proposition that consumers do not attend equally to all quality signals. Simon (1997) emphasizes that rational agents must choose among all possible alternative behaviors but in

their actual behavior, only a few of all these possible alternatives are considered. Arrow (1974) notes

that limited information-handling ability is an essential part human behavior. Individuals who attend

to some things do not attend to others. The central problem becomes that of isolating the factors that

increase the amount of attention paid to a given set of signals. In a market context, a number of candidate factors warrant consideration. Random events may direct attention toward a given producer, or group of associated producers (e.g. US consumers and fuel-efficient Japanese cars). Moreover, consumers may be attracted by certain endorsements or affiliations (Podolny, 1993).

And

of course, promotion and advertising activities may also attract consumer attention.

All these random events, affiliations and strategic actions may increase consumer attention.

However, in this paper we concentrate on how quality performance accumulates over time and thus

raises consumer attention. In an evolutionary context, this suggests that consumer attention would differ between signals sent from new versus experienced producers. Our main point is that producers

(as well as regional associations of producers) differ in terms of their quality performance in the market, which will affect the likelihood that consumers have had a positive prior product experience.

Given the scarcity of information-handling ability, the higher the likelihood of a positive product experience, the higher is consumer attention toward a given product. Of course, various other aspects may also lead to this effect, including time in the market, cumulative prior output, or as we

will analyze in more detail its cumulative prior quality assessments. However, while greater prior output or sales also increase the likelihood that consumers have observed or consumed a producer's

products, it may not correspondingly increase the probability that consumers have had positive prior

product experience as in Roberts and Reagans (2001).

The longer a producer has been a quality performer in the market, the more likely consumers have

experienced the quality of its products. Especially for experience goods, prior quality assessments are important as they direct consumers to specific products or product groups. Awards and expert quality assessments are regarded as significant and more likely to reach consumers. As they accumulate, they attract more attention. Altogether, this suggests that consistent quality performance

will enhance the extent to which consumers will notice quality signals. Moreover, due to their limited information-handling ability, individuals develop habits and routines which ensure that behavioral patterns once initiated tend to persist (Simon, 1997). Producers entering from the outside

must work harder, in our case through the accumulation of prior quality assessments. In summary, we posit that consumer attention to producer quality signals increases with the level of quality performance in the market. The sensitivity of a product's price to its own quality signals is positively related to the quality performance of its producer. Note that our argument is that quality performance and not just market experience yields increased attention, which then leads to prices being more sensitive to quality signals. In other words, high quality producers can expect higher price sensitivity for quality signals, which would help them and hurt those producing lower-quality products. Moreover, we combine producer and collective reputation effects.

Producer Association

The arguments above imply that consumer attention is a scarce commodity. As a consequence, a producer's own quality performance attracts the attention of potential consumers, which then makes the prices of its products more sensitive to quality signals. In a market environment, any action that impacts consumer attention received by one producer will also affect the other producers. However, consumer attention based on quality performance has public good properties. To generate a quality performance record requires product comparisons, which also create attention spillovers across associated producers. Attention spillovers are created through associations in the minds of consumers because of similar product features. In many cases, the specific dimensions that leads to an association are structural and may not be used strategically. For example, cars are grouped into small, mid-sized or luxury vehicles; wine is distinguished by regional origin and variety; and food may be grouped into fast food, gourmet food, semi-prepared food, or ecological food products. Attention spillovers occur along dimensions that are considered important to consumers. This paper considers regional association as an example. For food, regional or country origin is an important product dimension to consumers. You will find regional denominations in any food store: Bavarian Beer, Florida Oranges, Bordeaux Wine, Tasmanian Cheese, Parma Ham, etc. We are not suggesting that regional or country origin is the only basis on which associations are formed. Other dimensions include product types or production methods (e.g. ecological food, frozen foods). In summary, we argue that products may benefit from attention spillovers, which originate with quality performance of associated producers. Regional or country of origin associations are important for food and beverage products. We hypothesize that over time the sensitivity of a product's price is positively related to the quality performance of associated producers.

Data and Analysis

Building on the seminal work by Rosen (1974), we assume that the price of a particular food product

P_{wi} as a function of its characteristics z_i :

(1) $P_{wi} = \alpha_0 + \alpha_1 z_{i1} + \alpha_2 z_{i2} + \dots + \alpha_k z_{ik} + \epsilon_i$

The estimated regional influence in this study will be the price premium commanded by products from a specific region after controlling for product characteristics such as style, type, or current quality assessments. In addition, we include producer and associated producer reputation indicators

derived from the cumulative quality assessments from product experts (e.g. food awards).

To illustrate our arguments, we discuss a hedonic model using a data set with which we are able to

discern expert quality assessments for individual products as well as measurements for producer and

regional reputation indicators. We found such a detailed data set for the California wine industry. The book "*California Wine Winners*" publishes expert quality evaluations decorating premium wines

at nine different annual wine competitions (see Tables 1 and 2). The published expert evaluations are in the form of award certificates and their numerical equivalents. The sum of the numerical equivalents for every award certificate (Bronze = 1, Silver = 3, Gold = 5, Double Gold or Special Awards = 7) is a measure of the reputation for an individual wine (*IndivRep*) in our model.

Furthermore, we derive cumulative numerical award equivalents, which include all award certificates

received by each producer or region up to the judging year.¹ The cumulative numerical equivalent for

a producer measures quality performance or producer reputation (*ProdRep*) while the cumulative

numerical equivalent for a region measures regional quality performance or reputation (*RegRep*).

Other variables of interest are as follows. The dependent variable is product price in 1990 dollars, which is obtained by dividing the price reported in *California Wine Winners* by a consumer price

index for alcoholic beverages.² The full data set, which we analyzed, includes the judging years 1990 through 2001 and consisted of more than 25,000 observations. The sample size was reduced due to missing price, grape type, or vintage data. Descriptive statistics are listed in Table 1.

¹ The competitions during a judging year start in February and end in late June. The book "*California Wine Winners*" is

published annually during November.

² For the wines in our sample, the reported price is a producer suggested retail price at the time of judging. This list price

may differ from actual transaction prices, as retail mark-ups and government taxes differ.

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This paper focuses quality performance or cumulative quality evaluations, which reflects the number

of prior quality signals that a producer, or region has generated. In markets for experience goods, these expert evaluations direct consumers to a particular product or product association. Although we

employ the numerical equivalent measure of quality performance in the model, we also explored other avenues. We ran each model using cumulative medal counts, which would also reflect

producer

and regional quality performance. The two variables are highly correlated with a correlation coefficient of 0.86 and thus yield similar results. The control variables include a set of indicator variables for grape type and regional origin as well as the age of the wine at the time of judging as

we expect that longer aged wines should achieve higher prices.

Although we use a mixed log-linear functional form, the results are robust to model specification.

The core model estimated in this paper is:

$$(2) \log(P_i) = \hat{\alpha} + \hat{\alpha}_1 \log(\text{IndivRep}) + \hat{\alpha}_2 \log(\text{ProdRep}) + \hat{\alpha}_3 \log(\text{RegRep}) + \hat{\alpha} \text{Age} + \hat{\alpha} D_{\text{Reg}} + \hat{\epsilon} D_{\text{Var}}$$

where $\log(P_i)$ is the logarithm of price, $\log(\text{IndivRep})$ measures the reputation elasticity for an individual wine, $\log(\text{ProdRep})$ the reputation elasticity for producers, and $\log(\text{RegRep})$ the reputation

elasticity for a region, **Age** is the age of the wine in years at the time of judging, and D_{Reg} and D_{Var} are

matrices of dummy variables that control for regional origin and variety, respectively. We estimate

the vectors $\hat{\alpha}_i$, $\hat{\alpha}$, $\hat{\alpha}$, and $\hat{\epsilon}$ ($i = 1, 2, 3$) relative to the contribution of the base control variables.

Results

Tables 3 and 4 list the regression results from the three hedonic models that we have analyzed over

five different time horizons.³ Model 1 estimates equation (2) without $\log(\text{ProdRep})$ and $\log(\text{RegRep})$.

Model 2 adds producer reputation [$\log(\text{ProdRep})$] as an explanatory variable and Model 3 regional

reputation [$\log(\text{RegRep})$] to estimate the full equation (2). In both cases, the estimates are highly significant and F-tests show that adding these variables will significantly improve the model fit. Thus, we are able to show that producer as well as regional price-quality signals are affecting consumers in their buying decisions.

As expected, wine prices increase with age and are positively related to positive product evaluations

(IndivRep), producer reputation (ProdRep) and regional reputation (RegRep). Wines of higher quality, and those whose producers and/or regions have better quality performance command significantly higher prices. However, the price premiums are relatively small. For example, a 1% increase in the regional reputation indicator will only result in a 0.044% increase in prices for the most recent overall sample. The relative contribution of the control variables for grape type and regional origin to prices is comparatively stable for all three models as well as over time.

However,

the price premiums for variety and regional origin (dummy indicators) are quite large, varying between -55% and + 40% for variety (relative to Cabernet Sauvignon) and between 18% and 55%

for regional origin (relative to California denominations).

If access to more proximate quality signals is difficult, consumers may rely on more imperfect signals, such as regional reputations, in making their decisions (Tirole, 1996). A collective reputation

for quality may serve as such a signal (Landon and Stuart, 1997). In the current context, it would be

reasonable to suggest that low levels of consumer attention imply reduced access to accurate quality signals. Therefore, collective reputations should have an effect on price when attention (or quality performance) is low, but should lose their impact as attention increases.

³ For example, the column for the judging year 2001 includes the complete set from all wine competitions between 1990

and 2001. The column for the judging year 1998 only includes the judging years 1990 through 1998.

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Model 3 shows that the main effect of regional reputation is positive and significant. Over time, as

producer and regional reputation accumulate, it seems that the sensitivity of price to product quality

signals, as well as to producer reputation signals are relatively stable. However, the sensitivity of price to regional reputation *increases* over time (Figure 1).

A possible explanation for this increase may be as follows. While the California wine industry has a

long history, recent growth in terms of new vineyard development has been tremendous. Many new

producers have emerged and started to participate in wine competitions. The number of different producers in our sample increased from 289 in 1990 to 434 in 2001. Thus, consumers had to absorb

a lot of new information on new producers and have, in the course of this, increasingly relied on regional reputation signals in addition to product and producer signals. Thus, this market may still be

at a stage where the level of producer quality performance is low and consumers do tend to rely on

the more diffuse quality signal. The very low elasticity for producer reputation (0.012% - 0.015%)

and the large regional origin coefficients support this claim (see also Figure 2).

However, as producer quality performance accumulates, thus raising consumer attention, producer

signals should become more and regional reputation signals less important. As consumers pay closer

attention to differences among products and producers, the quality performance relationship within a

region becomes more competitive and less complementary. Regional producers benefit from each other's quality performance because of attention spillovers. In turn, increased attention facilitates quality-based competition among producers. The overall relationship among associated producers is

a combination of complementary and competitive forces.

Discussion and Conclusion

For experience goods, consumers rely on a host of market signals to make an evaluation because their quality cannot be determined in advance of purchase. However, these signals are not generated

in a vacuum and their transmission and reception must be analyzed in context (Spence, 1974).

Aim

in this paper was to discuss and analyze the proposition that price-quality relationships are based

consumer attention which depend on the quality performance of producers as well as associated producers and are related to the stage of industry development. Our analysis for California wine price-quality relationships supports this position.

We also recognize a trade-off due to attention spillovers from the quality performance of associated

producers. In the early stages of development, when producer and regional quality performance is accumulates rapidly a positive impact of regional reputation on price suggests that associated producers may be harmed by the quality performance of low-end quality producers (free-rider problem). Over time, as the relationship among associated producers becomes more competitive this

effect may reverse and associated producers may be harmed by high-end quality performers.

Our consumer attention based argument also suggests that there may be a side benefit accruing to high quality producers when an exogenous event causes heightened consumer alert. Then, every producer would receive greater scrutiny from which high-quality producers should receive greater

returns on their investments in quality.

These arguments affect how we think about policies aimed at market development. Let us take a brief look at recent developments in German food markets. The BSE-crises is to be the turning point

for German food market. Consumers are on heightened alert. Every food item, especially beef, is scrutinized to ensure that it is safe for consumption. The aim is to reestablish consumer confidence

and to prevent sales of food that may have faults. Authorities recognize the public good problems stemming from reputation effects and are working to constrain any negative quality demonstrations.

The chosen strategy is to encourage "ecological" production and consumption.

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Now, we would like to infer some conclusions on the future of this strategy from the arguments on

consumer attention and quality performance made above. Clearly, the market for ecological food products is in an early development stage. Newly certified "ecological" products (through the so-called

"Öko-Siegel") are to send quality signals to consumers. In their minds, a specific dimension that leads to producer and regional association is established.

From the California wine case, we may learn that the critical issue may be a matter of numbers. If many new producers emerge, consumers may have to absorb a lot of new information and will first

rely more on collective reputation signals and less on product and producer signals. However, if only

a few producers emerge, consumers may have to absorb less information and rely more on product

and producer signals and less on collective reputation signals.

The chosen strategy of a collective quality signal through a single certification process seems to imply that many new producers may emerge, and thus consumers must first rely on a more imperfect

collective signal, when making their decisions. If successful and the collective reputation for these

products accumulates, consumers will then pay closer attention to individual quality signals that are generated and the high-end producers will finally receive higher price premiums for their quality demonstrations. At the that time, the accumulated reputation of these producers will place them at an advantage relative to "conventional" producers, who, even if they do produce at high quality, will not get the boost in price associated with producer-specific attention.

However, what if the alternative is true and only a few producers or brands emerge because food retailing is increasingly concentrated. Consumers will have to absorb less information and would be ready to rely more on product and producer signals. Since consumers are on high alert, every producer receives great scrutiny from which high-quality producers would receive a greater return on their investments in quality. There would be no need for an imperfect collective reputation signal. Then, an alternative strategy would be to promote "ecological" brands and let the market play it out.

Moreover, if the chosen strategy is not successful and collective reputation indicators for these products do not accumulate in the minds of consumers, it would fail altogether. Since the collective strategy at first hampers the development of brands and individual quality signals generated by highend producers, they would not receive premiums for their quality demonstrations until consumers would pay closer attention to those signals.

Notice that the issue of competition for attention has not received sufficient attention in our analysis.

We have argued that associated producers attract mutual attention to their products. However, we are not suggesting that there is no competition for attention. Otherwise, we could not credibly argue that bounded rationality implies constraints on attention. In the current context, one potential source of

competition for attention comes from conventional producers. At another level, competition for consumer attention within the food industry would be mitigated if there were an overall shift of attention toward this domain. In other words, are consumers devoting more of their limited cognitive resources to making food purchase decisions? If true, we would have to ask where this higher level

of attention comes from? An answer to this question requires further work into the processes of attention decay to complement the discussion of attention accumulation.

Finally, we need to mention some peculiar features of the wine industry studied. Consumer attention

may be quite high, with several major publications providing regular wine quality ratings. There are

also regional as well as variety 'fashion' trends in wine consumption. Moreover, the quality of each

vintage is affected by many factors beyond producer control. However, it would be intriguing to

see

whether the estimation results hold for a food of beverage product other than wine. We are looking

for an additional data set to study attention based arguments.

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Table 1: Characteristics of the Data Set

Varieties Count Freq. Av. Price

Cabernet Sauvignon ¹ 3,623 18.50% 18.63

Zinfandel 2,054 10.49% 14.96

Merlot 1,816 9.27% 16.29

Pinot Noir 1,428 7.29% 18.54

Red Meritage 575 2.94% 28.48

White Zinfandel 430 2.20% 5.90

Syrah 534 2.73% 17.66

Petite Sirah 334 1.71% 14.27

Italian Reds ² 452 2.31% 17.68

Other Reds ³ 500 2.55% 16.09

Chardonnay 3,845 19.63% 15.09

Sauvignon Blanc 1,512 7.72% 9.71

Riesling 613 3.13% 9.81

Gewürztraminer 450 2.30% 9.60

Chenin Blanc 304 1.55% 7.03

Other White ⁴ 1113 5.68% 14.86

All Red Varieties 11,746 59.98% 17.32

All White Varieties 7,837 40.02% 12.98

All Observations 19,583 100.00% 15.582

Regions ⁵

Napa 3,735 19.07% 20.36

Sonoma 5,176 26.43% 16.84

Bay Area 620 3.17% 17.91

North Central 1,303 6.65% 13.72

North Coast 1,832 9.36% 14.07

Sierra Foothills 1,181 6.03% 13.47

South Central 2,076 10.60% 15.59

South Coast 426 2.18% 13.10

California ¹ 3,234 16.51% 10.29

Averages

Total Medal Number ⁶ 2.648

Numerical Equivalent ⁷ 6.296

Age ⁸ 2.521

Notes:

¹ Cabernet Sauvignon is base variety, California is base region

² Italian Reds include Sangiovese and other Red Italian Varietals.

³ Other Reds include Cabernet Franc as well as other Bordeaux and Red Rhone Varietals.

⁴ Other Whites include Semillon, Voignier, Pinot Blanc, White Dessert, White Varietals, and White Meritage.

⁵ Regions are defined as follows:

Napa Napa County

Sonoma Sonoma County

Bay Area Alameda, Contra Costa, San Mateo, Santa Clara and Santa Cruz Co.

North Central Monterey and San Benito Co.

North Coast Lake, Mendocino, Marin and Solano Co.

Sierra Foothills Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Tuolumne, Yuba Co.

South Central San Luis Obispo and Santa Barbara Co.

South Coast Los Angeles, Orange, Riverside, San Diego and Ventura Co.

California All other California Counties and non-specified blends from above.

⁶ Medals awarded from competitions are Special Awards, Gold Medals, Silver Medals, and Bronze Medals or None.

⁷ Numerical equivalents are 7 for Special Awards, 5 for Gold Medals, 3 for Silver Medals, 1 for Bronze Medals.

⁸ Judging age defined as the difference between judging year and vintage.

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Table 2: Wine Competitions

Judging Years '90-'93 '94-'96 '97-'98 '99-'01

Los Angeles County Fair X X X X

Orange County Fair X X X X

Riverside Farmers Fair ¹ X X X X

San Francisco Fair ² X X X X

California State Fair X X X X

San Diego Competition X X X X

National Orange Show X X X

West Coast Competition X X X

Dallas Morning News X X X

New World International X X X

¹ Riverside International beginning in 1999

² San Francisco International beginning in 1999

Table 3: Model 1 & 2 Results [dep. variable = log(deflPrice)]

Model 1 Model 2

Judging Year 2001 2000 1999 1998 1997 2001 2000 1999 1998 1997

CONSTANT 1.870 1.872 1.867 1.873 1.856 1.784 1.785 1.776 1.797 1.798

log(IndivRep) 0.0473 0.0494 0.0510 0.0468 0.0473 0.0358 0.0375 0.0386 0.0365 0.0396

log(ProdRep) 0.0219 0.0222 0.0236 0.0202 0.0155

Age 0.071 0.072 0.077 0.077 0.079 0.070 0.072 0.077 0.077 0.079

Zinfandel -0.054 -0.070 -0.070 -0.082 -0.094 -0.054 -0.070 -0.070 -0.082 -0.093

Merlot 0.008* 0.020* 0.034 0.032 0.029 0.005 0.017 0.031 0.030 0.027

Pinot Noir 0.120 0.121 0.131 0.124 0.123 0.117 0.118 0.128 0.121 0.120

Red Meritage 0.412 0.415 0.420 0.427 0.427 0.409 0.411 0.415 0.422 0.423

White Zinfandel -0.571 -0.565 -0.552 -0.549 -0.530 -0.572 -0.565 -0.551 -0.548 -0.529

Syrah 0.111 0.117 0.136 0.145 0.156 0.105 0.111 0.130 0.140 0.152

Petite Sirah -0.104 -0.116 -0.126 -0.137 -0.148 -0.107 -0.118 -0.128 -0.138 -0.149

Italian Reds 0.098 0.113 0.145 0.149 0.188 0.096 0.111 0.141 0.144 0.183

Other Reds 0.002* -0.003* 0.011* 0.022* 0.022* -0.003 -0.007 0.007 0.019 0.022

Chardonnay -0.010* 0.006* 0.026 0.030 0.043 -0.011 0.006 0.027 0.031 0.043

Sauvignon Blanc -0.361 -0.355 -0.338 -0.336 -0.330 -0.365 -0.358 -0.340 -0.338 -0.331

Riesling -0.322 -0.310 -0.284 -0.273 -0.250 -0.329 -0.316 -0.290 -0.279 -0.254

Gewurztraminer -0.328 -0.321 -0.300 -0.294 -0.289 -0.336 -0.329 -0.308 -0.302 -0.294

Chenin Blanc -0.561 -0.560 -0.544 -0.551 -0.542 -0.562 -0.560 -0.543 -0.549 -0.541

Other White 0.002* 0.014* 0.027* 0.023* 0.013* -0.009 0.003 0.016 0.013 0.006

Napa 0.550 0.520 0.480 0.470 0.456 0.561 0.530 0.491 0.479 0.463

Sonoma 0.425 0.394 0.356 0.346 0.336 0.420 0.389 0.351 0.342 0.334

Bay Area 0.471 0.455 0.430 0.419 0.407 0.478 0.463 0.440 0.427 0.415

North Central 0.255 0.233 0.197 0.185 0.172 0.257 0.235 0.200 0.188 0.175

North Coast 0.308 0.291 0.260 0.253 0.252 0.299 0.282 0.250 0.245 0.246

Sierra Foothills 0.244 0.214 0.178 0.172 0.156 0.253 0.224 0.190 0.183 0.165

South Central 0.366 0.344 0.308 0.304 0.296 0.375 0.353 0.317 0.311 0.302

South Coast 0.218 0.206 0.192 0.169 0.128 0.224 0.210 0.197 0.175 0.132

adjusted-R₂ (%) 46.70 46.67 46.79 47.15 48.42 47.16 47.16 47.34 47.54 48.64

F-Statistic** 172.46 158.02 158.01 101.24 51.19

* NOT significant at the 5% level; all other variables are significant.

** F-Test versus Model 1.

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Table 4: Regression Results [dep. variable = log(deflPrice)]

Model 3

Judging Year 2001 2000 1999 1998 1997

CONSTANT 1.425 1.444 1.437 1.505 1.663
 log(IndivRep) 0.0389 0.0407 0.0428 0.0410 0.0419
 log(ProdRep) 0.0122 0.0132 0.0148 0.0129 0.0120
 log(RegRep) 0.0441 0.0420 0.0416 0.0359 0.0170
 Age 0.074 0.075 0.081 0.080 0.080
 Zinfandel -0.057 -0.072 -0.071 -0.082 -0.093
 Merlot **0.001*** **0.015*** 0.031 0.030 0.028
 Pinot Noir 0.116 0.118 0.128 0.122 0.121
 Red Meritage 0.406 0.409 0.413 0.421 0.423
 White Zinfandel -0.555 -0.548 -0.532 -0.532 -0.523
 Syrah 0.088 0.094 0.115 0.127 0.146
 Petite Sirah -0.101 -0.112 -0.123 -0.134 -0.147
 Italian Reds 0.071 0.086 0.115 0.122 0.172
 Other Reds **-0.018*** **-0.022*** **-0.009*** **0.005*** **0.014***
 Chardonnay **-0.006*** **0.012*** 0.033 0.037 0.046
 Sauvignon Blanc -0.352 -0.345 -0.328 -0.327 -0.327
 Riesling -0.306 -0.294 -0.268 -0.261 -0.247
 Gewurztraminer -0.317 -0.310 -0.291 -0.287 -0.288
 Chenin Blanc -0.535 -0.534 -0.517 -0.527 -0.531
 Other White **-0.017*** **-0.004*** **0.008*** **0.006*** **0.004***
 Napa 0.547 0.517 0.477 0.466 0.456
 Sonoma 0.389 0.359 0.322 0.316 0.320
 Bay Area 0.553 0.536 0.514 0.491 0.444
 North Central 0.295 0.274 0.241 0.223 0.191
 North Coast 0.316 0.298 0.266 0.258 0.251
 Sierra Foothills 0.303 0.275 0.243 0.228 0.187
 South Central 0.387 0.365 0.330 0.322 0.306
 South Coast 0.320 0.306 0.299 0.267 0.179
 adjusted-R₂ (%) 47.66 47.58 47.72 47.82 48.99
 F-Statistic** 186.72 140.60 109.85 72.19 13.95
 N 19,583 17,291 15,044 13,489 11,474
 * NOT significant at the 5% level; all other variables are significant.
 ** F-Test versus Model 2.

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Figure 2: Regional Premiums

0%

10%

20%

30%

40%

50%

1997 1998 1999 2000 2001

Judging Year

Napa Sonoma Bay Area North Central

North Coast Sierra Foothills South Central South Coast

Figure 1: Reputation Elasticities

0.000

0.010

0.020

0.030

0.040

1997 1998 1999 2000 2001

Judging Year

Elasticity

$\log(\text{IndivRep}) \log(\text{ProdRep}) \log(\text{RegRep})$

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