ANALYSIS OF RETAIL PRICE PREMIUMS ON CERTIFIED SUSTAINABLE OREGON WINES

by

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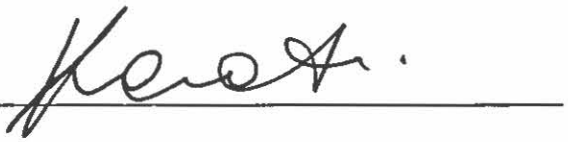
Approved: 

Dr. Ken Njoroge

This work is an attempt to analyze the impact of a growing business culture centered on environmental consciousness in the State of Oregon on retail prices for the price of wine produced and sold in Oregon. Prices of organically certified and non-certified wine at retail prices were gathered and statistically analyzed for price correlations. Results suggest the organically certified eco-labeled wine sells at a retail price premium in Oregon's Willamette Valley. This could contradict earlier findings that eco-labels reduce the price of a bottle of sustainably certified wine.

There is a growing interest in researching organic business practices and associated consequences, as many organic practices have been adopted in the last two decades. This research presents more evidence for a growing debate on organic business practices as well as insight for Oregon's retail wine industry.

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I. Introduction

This thesis examines whether organic certification in wine is associated with a retail price premium. Over the last two decades, the U.S. agricultural industry has increasingly adopted environmentally conscious growing practices that are monitored strictly by both Federal Agencies and private third-party certification organizations. In this study, I focus on viticulture in the State of Oregon's Willamette Valley region, where wine production has flourished over the last four decades. My objective is to assess if wine consumers perceive organic certification of wine from this region as credible as well as their willingness to pay a retail price premium for wine with this certification.

While we observe vineyards increasingly adopting organic growing and production practices and undertaking costly certification, the consumer's willingness to pay for organic wine from the Willamette Valley is an empirical question. The answer to this question is important to wine producers, certification agencies and regulators. For example, if the retail price premium for organic certification is small or absent, growers may have to rethink whether the costs associated with certification are justifiable. Meanwhile, third party certification agencies might have to rethink whether their certification process is credible, or whether it even matters, to retail wine consumers. Effectively, the size of a retail organic certification price premium sheds light on the long-term sustainability of organic growing practices and the viability of their certification process.

Debate regarding the price effects of organic food has focused largely on the trade-off between health effects, or other quality benefits, and affordability. Because it is difficult to quantify health effects – or quality benefits - this thesis will instead focus on the empirical relation between organic certification and retail price premiums. Specifically, the study will control for other known determinants of the retail price of wine - such as age, region where the grapes are grown, and variety – and assess the incremental effect of labeling wine as 'certified organic' on price. The size of this incremental effect should be informative to both producers and retail sellers in the wine industry when planning new production and retail strategies.

The data for this study were hand collected over a one month period in the cities of Portland and Eugene, Oregon, at six different dedicated wine shops – five in Portland and one in Eugene. Data were gathered on all of the Oregon pinot noir and chardonnay varieties sold at these locations. The data gathered included price, year, region, variety, whether or not the wine was certified organic and which agency certified the wine. There are three third party certification organizations that certify wine in the Willamette Valley: Oregon Certified Sustainable Wine (OCSW), Low Input Viticulture & Enology (LIVE) and Demeter. Given that the data are hand collected, I limit the study to wine produced and sold within the Willamette Valley. Accordingly, the results of my study may not be generalizable to other wine growing regions.

The rest of the study is organized as follows. Section II presents the relation of my study to prior research, Section III details the research design, Section IV discusses the model, Section V describes the sample, Section VI presents the results and Section VII concludes.

II. Relation to Prior Research

This study analyzes the relation between retail prices and eco-labeling. Eco-labeling is achieved using a sticker on the wine bottle, for wineries that meet sustainability standards as verified by a recognized third party certification agency (see Figure 1). Thus, to the extent that the certification process is reliable, eco-labeling allows the retail consumer to distinguish between wine produced using sustainable organic practices from conventional wine. Debate surrounding the effectiveness of Eco-labeling on price has varied – largely relying on evidence of price premiums in the market or consumer surveys on the willingness to pay for certified wine.

Figure 1. Wine bottle featuring eco-labels for LIVE, Salmon Safe and Horse Powered.

My study is most closely related to Delmas and Grant (2010). They argue that while obtaining certification is good for improving the quality of the wine and adding to a price premium, eco-labeling the wine as certified can detract from consumer

willingness to spend more. Their results indicate that a certified wine with no label would have an average 13% price premium above non-certified wine, while wine with a certified eco-label had a 20% average reduction in price. To understand this seemingly logical dilemma, Delmas and Grant postulate that consumers become confused about differences in certification labels and lack understanding of the sustainable processes required for certification. They posit that consumers feel organic wine is an inferior product and that wines must first meet high quality expectations based on traditional factors before an eco-label can possibly help differentiate the wine as a superior product to competitors. Becoming certified undoubtedly increases the quality of growing and production practices, thus leading to the identifiers of traditional product superiority without the consumer's direct knowledge. Yet there is logical argument – and conflicting research – to suggest that having an eco-label on the wine bottle should not keep consumers from purchasing a certified wine. This is a conundrum that even Delmas and Grant acknowledge.

Additional research has used surveys to evaluate consumer willingness to pay for organic wines. Using a consumer survey study, Loureiro (2003) found that eco-labeling a wine attracted a price premium that was too small to be of economic significance to the wine maker's profits. Loureiro found a 17 cent premium for a $10 bottle of wine on Colorado wine labeled environmentally friendly. The author's sample is small (just over 400 individuals) and the Colorado region is very new to the wine industry, thus the wines themselves have not had time to mature, which the author notes is a very limiting factor on the study. However, the report did find that consumers differentiate between organic and non-organic wine, even in a young market. As with

the Delmas and Grant study, the author concludes that wines must first prove quality and maturity by traditional standards before diversifying their product using eco-labeling and sustainable certification.

In contrast to the above studies, a second stream of extant research finds significant relation between price premiums and eco-labeling. Mollá-Bauzá et al (2005) examines the habits of Spanish wine consumers and identifies specific consumer interests that predict the premium those consumers are willing to pay for sustainable wine. Spanish consumers were willing to spend on average a 16% premium for eco-certified wine, while 14% of the population was willing to spend up to 25% more for a bottle of wine identifiable as certified organic. The difference in willingness to pay centered on consumer interests in personal health, the environment, and consuming quality products versus consumers that did not have such interests. For example, consumers that are highly interested about diet and health (50% of the studied population) should be willing to pay 10% to 18% more for certified organic wine. Mollá-Bauzá et al concluded that in a highly competitive market, wineries should target consumers by using eco-labeling and any related health benefits as a means of direct marketing.

In a similar vein of study, Zucca et al (2009) finds that while consumers are confused about terms such as ‘organic’ and ‘green’, sustainable viticulture is a growing field and buyer awareness is also growing, leading to higher future demand for sustainably grown grapes and wine production. The authors suggest that the wine industry should create marketing programs that help consumers identify sustainable wines and distinguish them from conventional wines. The author’s research suggests

that 90% of wine consumers find sustainable production in wine important and have a willingness to buy such wines. However, only 10% of respondents in the study could identify a wine that was produced using sustainable practices. Wineries could easily change this by using eco-labeling to better identify their growing practices on the bottle. A result of this higher demand for eco-friendly wine should be a price premium. In order to capitalize on that higher demand, Zucca et al suggest that the wine industry should "develop programs that help the consumer identify and distinguish these products." Of course, eco-labeling is just such a program.

This study is similar to the Delmas and Grant research, but differs in areas of price testing and regression modeling. While their sample (13,000 wines and 314 wineries) is significantly larger than my own, only 16 wineries in their study used eco-labels, which is 5% of the wineries in their study. My study encompasses 82 different wineries with 11 of them using eco-labeling; at 13.4% this is more than twice the ratio of eco-labeling in the Delmas and Grant study. The price variables in the Delmas and Grant study were producer prices gathered directly from the wineries, rather than retail prices from the consumer market. Retailers are able to further mark up the price or reduce the price of a wine depending on how well it sells. Because my study uses the retail price, it is better able to capture consumer willingness to pay.

It is important to understand if eco-labeling still has a negative effect on price premiums four years after the Delmas and Grant study, as eco-labeling is a popular practice for many certified wineries. It may also be the case that a smaller, concentrated market with industry maturity, such as the one in Oregon, might respond differently from California and Colorado. Delmas and Grant also noted in their study that, "It is

possible that the difference between eco-certification and eco-labeling benefits will fade over time as consumers become better informed about the link between green practices and wine quality." Over the course of the four years since the Delmas and Grant study was published, consumers may have also become more familiar with eco-labeling. To better understand the value of different labels and certifications, I evaluate the certifications independently in different models which should indicate the effectiveness of each certification. Delmas and Grant did not observe this possibility in their work.

III. Research Design

My research design seeks to estimate the consumers' willingness to pay for sustainable wine production practices, as captured by eco-labeling, controlling for other traditional wine quality attributes. I hand collect data from six separate wine retailers in the State of Oregon, five in Portland and the only dedicated wine shop in Eugene. Two of the businesses are grocery related stores with a dedicated wine section and salesperson. The other four are entirely dedicated to selling wine. My sample period is restricted between December of 2013 and January of 2014 in order to limit the effect of market price fluctuations on the results of the study.

Sales volume data are unavailable. Accordingly, my study analyzes retail wine prices, which inherently adjusts for the equilibrium sales volume – to the extent that retail prices clear. At equilibrium, it is unlikely that costly shelf space in a retail wine shop is occupied by wine which does not clear at its retail price. Essentially, if a wine is not selling, the retailers are unlikely to keep it on the shelf. In contrast to consumer surveys that are based on consumer responses to a researcher's questionnaires, my study analyzes consumers' actual choices as captured by the retail price. To the extent that actions speak louder than words, my research design has a distinct advantage.

I categorize wine at each of the six retailers first as 'pinot noir' or 'chardonnay'. I then classify the wine as certified if it has a certification stamp located on the back label of the bottle (see Figure 1) as well as record the specific certification (OCSW, LIVE, Demeter). For each wine bottle, I identify the brand (the winery at which the wine was produced), whether the wine was a pinot noir or chardonnay, the year, the price, and if it has a certification stamp. The following section discusses the Model.

IV. Model

I examine the relation between retail wine prices and certification, controlling for the age and type of wine based on estimating the following regression:

$$Price_{i,t} = \alpha_0 + \alpha_1 * Age_{i,t} + \alpha_2 * Type_{i,t} + \alpha_3 * Non\_Certified_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where $Price_{i,t}$ is the retail price of a bottle of wine by retailer i, at time t. *Age* is the wine's age in years and *Type* is a dummy variable equal to 0 for chardonnay (white wine) and 1 for pinot noir (red wine). Meanwhile, *Non_Certified* is a dummy variable equal to 1 if the bottle is not eco-labeled and 0 if it is eco-labeled.

Three different certification agencies, OCSW, LIVE and Demeter, issue eco-labels in the Willamette Valley during my sample period. Accordingly, regression (1) is estimable for each of the three eco-labels independently as well as use all three in the same model. The three certification organizations use differing rules and qualifications, however, they all require heavy investment on behalf of the winery and are not likely decipherable from each other by the consumer (Delmas and Grant, Loureiro). Low Input Viticulture and Enology (LIVE) focuses on grape growing while Demeter certifies biodynamic production processes for the production of wine. Oregon Certified Sustainable Wine (OCSW) is a combined approach that recognizes work in both viticulture of the grapes and production facilities, however, this certification was discontinued during the summer of 2014. It is included in this study because many wines on the market still use the OCSW eco-label. The following discusses the sample variables.

V. Sample Description

Portland and Eugene represent the largest wine markets in Oregon and are located in the Willamette Valley which happens to be the central wine growing location in Oregon. Pinot Noir and Chardonnay are the two most popular types of wine produced in Oregon by production number in 2012.[1] My sample consists of hand collected data from six separate wine retailers in the State of Oregon, five in Portland and the only dedicated wine shop in Eugene. The sample period is between December of 2013 and January of 2014 with a total of 145 retailer-price observations.

Table 1 provides summary statistics describing the primary variables for all 145 observations collected. Price is in dollars per bottle at the retail level, while year represents the release year on the bottle. Panel A compares certified and non-certified wine prices. The mean (median) retail price for a bottle of certified wine is $33.78 ($31.99). Meanwhile, the mean (median) retail price for a bottle of non-certified wine is $31.56 ($29.95). These figures suggest that on average certified wine is likely to be more expensive than non-certified wine. However, the standard deviation for non-certified wine is greater than that of certified wine ($13.23 versus $11.80). Section VI presents a more formal statistical comparison.

[1]http://oregonwine.org/media/105756/oregon_2012_vintage_vineyard_and_winery_census_report.pdf

Table 1. Panel A - Sample Description: Certified and Non-Certified

	Certified – Eco-Labeled		Non-Certified	
Statistic	Price	Year	Price	Year
Num. Obs.	29	29	116	116
Mean	33.78	2011	31.56	2011
Stnd Dev	11.80	1.02	13.23	1.33
Min	17.99	2007	9.99	2004
5%	18.99	2009	14.95	2008
25%	23.99	2010	20.99	2010
Median	31.99	2011	29.95	2011
75%	39.99	2011	40.0	2011
95%	56	2012	56	2012
Max	67.99	2012	74.99	2012

Panel B of Table 1 compares the retail price of pinot noir to that of chardonnay wine samples. The mean (median) retail price of pinot noir wine bottles is $33.04 ($31.50) and for Chardonnay the retail price is $25.89 ($22.99). These retail prices suggest that pinot noir wine will be on average more expensive than chardonnay. The standard deviation for the retail price of pinot noir is also greater than chardonnay ($13.23 versus $9.22).

Table 1. Panel B - Variables Description: Variety

	Pinot Noir		Chardonnay	
Statistic	Price	Year	Price	Year
Num. Obs.	124	124	21	21
Mean	33.04	2011	25.89	2011
Stnd Dev	13.23	1.33	9.22	0.58
Min	9.99	2004	13.99	2010
5%	15.99	2008	14.99	2011
25%	21.97	2010	18.99	2011
Median	31.50	2011	22.99	2011
75%	42.00	2011	34.99	2012
95%	56	2012	38.99	2012
Max	74.99	2012	46.99	2012

Chardonnay often sells for a lower price in the market, so the results above are expected and typical of market sales. The following discusses the results of the study.

VI. Results

My first test analyzes the relation between eco-labeling and retail wine prices, where certification includes all three certifications, OCSW, LIVE and Demeter, controlling for the wine's age and type. As column (1) of table 2 reports, I find that on average, a one year increase in age is associated with a $2.49 dollar increase in the retail price of a bottle of wine, significant at the 1% level. In addition, column (2) shows that a bottle of pinot noir wine is, on average, $7.141 more expensive than a bottle of chardonnay wine, significant at the 5% level. In contrast, however, as columns (3) and (4) report, I find no statistically significant relation between certification and retail wine prices, even after controlling for age and type.

Table 2. Price as a function of Age, Type and Certification

Price as a function of Eco-Labeling (OCSW, LIVE, Demeter)				
	(1)	(2)	(3)	(4)
	col1	col2	col3	col4
age	2.490***			2.123**
	(2.926)			(2.471)
type		-7.141**		-6.640**
		(-2.374)		(-2.147)
noncertified			-2.228	-3.657
			(-0.828)	(-1.371)
_cons	23.879***	40.177***	33.784***	35.605***
	(8.047)	(11.151)	(14.032)	(6.095)
N	145	145	145	145
R-sq	0.06	0.04	0.00	0.09

Notes to Table 2

Table2 reports the results of estimating regression (1) as follows –

$Price_{i,t} = \alpha_0 + \alpha_1 * Age_{i,t} + \alpha_2 * Type_{i,t} + \alpha_3 * Non\_Certified_{i,t} + \varepsilon_{i,t}$. where $Price_{i,t}$ is the retail price of a bottle of wine by retailer i, at time t. *Age* is the wine's age in years and *Type* is a dummy variable equal to 0 for chardonnay (white wine) and 1 for pinot noir (red wine). Meanwhile, *Non_Certified* is a dummy variable equal to 1 if the bottle is not eco-labeled and 0 if it is eco-labeled. T-statistics are in parentheses, while *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

It is important to also analyze the certifications independently, that is, separate LIVE and Demeter from OCSW. The State of Oregon discontinued funding for the OCSW program while this study was in its early stages. Wine Spectator reported a lack

of government funding for the program and high staff turnover. OCSW funds were rolled into the LIVE certification program in the fall of 2013.[2] Support from the wine producing community was also lacking for this program. For these reasons, I conduct a second test in which I restrict certification to LIVE and Demeter and treat OCSW as non-certified.[3] Table 4 presents the results of this test. Once I nullify OCSW certification, I find that LIVE and Demeter labeled wines are statistically more expensive than non-certified wines by almost $8.

More specifically, as columns (1) and (2) of Table 3 report, I find that the relation between retail price and both age and type remains unchanged. However, as columns (3) and (4) show, I now find that a bottle of non-certified wine is on average $7.972 cheaper than a bottle of certified eco-labeled wine, significant at the 5% level, even after controlling for age and type. This result suggests that there is a statistically significant and economically meaningful price premium for using certifications and eco-labels from well-organized certification organizations with a history of certification (LIVE started in 1999,[4] Demeter in 1928[5]), while relatively newer and ineffective programs like OCSW provide negligible results. Since an average bottle of wine retails at about $32, a certification premium of $7.97 amounts to almost 25% of the average retail price.

[2] http://www.winespectator.com/webfeature/show/id/49194
[3] In an unreported test, I entirely exclude OCSW certified observations from the regression and find similar results.
[4] http://liveinc.org/about
[5] http://www.demeter-usa.org/about-demeter/demeter-history.asp

Table 3. Price as a function of LIVE and Demeter eco-labeling certification

Price as a function of Eco-Labeling (LIVE, Demeter)				
	(1) col1	(2) col2	(3) col3	(4) col4
age	2.490*** (2.926)			2.197** (2.596)
type		-7.141** (-2.374)		-5.914** (-1.995)
noncertified			-7.504** (-2.215)	-7.972** (-2.442)
_cons	23.879*** (8.047)	40.177*** (11.151)	38.677*** (12.106)	38.697*** (6.747)
N	145	145	145	145
R-sq	0.06	0.04	0.03	0.12

Notes to Table 3

Table 3 reports the results of estimating regression (1) as follows –

$Price_{i,t} = \alpha_0 + \alpha_1 * Age_{i,t} + \alpha_2 * Type_{i,t} + \alpha_3 * Non\_Certified_{i,t} + \varepsilon_{i,t}$. where $Price_{i,t}$ is the retail price of a bottle of wine by retailer i, at time t. *Age* is the wine's age in years and *Type* is a dummy variable equal to 0 for chardonnay (white wine) and 1 for pinot noir (red wine). Meanwhile, *Non_Certified* is a dummy variable equal to 1 if the bottle is not eco-labeled and 0 if it is eco-labeled. T-statistics are in parentheses, while *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

The following section discusses my conclusion.

VII. Discussion and Conclusion

This study analyzes the effect of eco-certification and eco-labels on the price of wine produced and sold in Oregon's Willamette Valley. This study analyzes the relation between retail wine prices and eco-label certification using a hand collected sample of 145 observations. Of the three certification programs used in the Willamette Valley, I find that only LIVE and Demeter certification correlates significantly with retail price. On average wine certification attracts a retail price premium of $7.97 per bottle. In other words, the average wine consumer is willing to pay almost $8.00 more for a bottle of certified sustainable wine practices. This study also produced expected results for age and variety, with aged and pinot noir wines averaging higher retail prices. This study suggests that wine producers in Oregon should continue to work toward attaining these certifications, and that the certification along with an eco-label on the bottle will create a price premium. This is important for wine makers as Oregon is a small, competitive wine market and distinguishing one Willamette Valley wine from another can be difficult. As Zucca et al (2009) recommends, finding ways to differentiate wine quality to the consumer is an important aspect for wine producers and using eco-labels can help achieve that goal.

This study largely disagrees with previous research done by Delmas and Grant (2010) and Loureiro (2003) because my results show a significant price premium for eco-labeled wine. However, my research does not separate certified wine and eco-labeled wine into two categories as in the case of Delmas and Grant. The results in this study are therefore a composite of a winery being certified and using an eco-label. It is also possible that not all certifications interact with price equally. My findings suggest

that this is an important distinction to make and that different certifications can produce varying results concerning retail price premiums. Delmas and Grant found that eco-labeled wine in California correlated with a 20% reduction in the price of wine, while my study suggests that specific certifications and eco-labeling can increase the price by an average of almost $8.00. I think this also largely contradicts their conclusion that "eco-labels are relatively new, and consumers do not necessarily understand the meaning of different labels."[6] As noted previously, the two certifications with statistical relevance are 15 and 86 years old; they are not new to the consumer market. Whether or not consumers understand the processes to achieve certification with these organizations, the price premium suggests that these eco-labels help create higher perceived value in the market that leads to price premiums. It is also noteworthy that research by Mollá-Bauzá et al and Zucca et al suggest that while consumers may be confused about the details of a certification and organic production practices, they typically react positively to signs that a winery is taking measures to produce certified grapes and employing bio-dynamic processes.

While this work added to the debate over whether eco-labeling is an effective tool for wineries to use, it does show that more research is needed to evaluate the benefits and costs of these expensive certification programs. Future work should continue to distinguish certified wine from eco-labeled wine like the Delmas and Grant study, but there also needs to be specific independent evaluations as to the effectiveness of different eco-labels. It is possible that eco-labels with a longer history or greater consumer recognition provide larger price premiums versus eco-certifications that are

[6] Delmas and Grant, 35

newer. Understanding this effect can help wineries better pick certifications that fit the wine market best and are more likely to provide greater benefit. This study does not look at winery reputation which could also relate to price. Future studies can analyze this effect by looking at how long the winery has been in production and find the price effect of how long the winery has produced wine. Future studies also need to take the time to gather larger amounts of data, which was certainly a limiting factor on the ability to delve deeper into the results of this study.

It is exciting to know that wineries can be proud of their hard work to protect the environment and create a sustainable business practice through the use of certification processes and know that these practices will bring some financial benefit in the long run. Certification organizations should greatly promote their work if the results of sustainable investments include benefits to the environment, wineries, and the greater community. With so many dollars at stake, as well as our future, researchers should continue to study the effectiveness of these programs.

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