Padua 2017 Abstract Submission

I want to submit an abstract for:
Conference Presentation

Corresponding Author
Bernd Frick

E-Mail
bernd.frick@uni-paderborn.de

Affiliation
Management Department, University of Paderborn, 33098 Paderborn, Germany

Co-Author/s

Name	E-Mail	Affiliation
Patrizia Fanasch		

Keywords
Eco-Wines, Eco-Certification, Wine Prices

Research Question
Using data on more than 30,000 different wines we estimate quantile regressions to identify the price premium that consumers are willing to pay for eco-wines.

Methods
random effects model with standard errors clustered at winery level, quantile regressions

Results
Our results indicate that self-declared eco-wineries charge a statistically significant premium of 5% for their wines. Wineries that are eco-certified can even command higher prices (another 5%).

Abstract
Introduction

Due to misperception of ecologically grown grapes ecological wines are not yet fully accepted by consumers (Delmas, 2010). This is surprising insofar as a number of studies have revealed that consumers are willing to pay a price premium for ecological wines. Using data on more than 30,000 different wines we estimate quantile regressions to identify the mark-up that consumers are willing to pay for wines produced by ecological wineries on the one hand and wineries belonging to the most prestigious professional association in the industry, the “German Association of Quality Wine Estates” (VDP).

Theoretical Background

Previous studies have already investigated the impact of organic agriculture, eco-labeling and eco-certification on wine prices finding positive effects. However, most studies rely on survey data and fail to clearly define the terms that are used in the respective survey (e.g. Mollá-Bauzá et al. (2005) and Ogbeide et al. (2014)). Forbes et al. (2009) also use a survey to identify the willingness to pay for “sustainable wine” while Barber et al. (2009) find an increased willingness to purchase “environmentally friendly wines”. So far, only Delmas and Grant (2013) analyze impact of eco-certified and eco-labeled wines on market prices. Here, eco-certification is defined as the availability of a certificate stating that the wine has been produced based on ecological practices while eco-labeling is the documentation of that certification on the bottle. Delmas and Grant (2013) find that only eco-certification increases customers’ willingness to pay a price premium. One possible explanation is that consumers, being unfamiliar with eco-wines, associate eco-labels negatively (Delmas, 2010). A further study reveals that consumers rate wines higher if they were told that the wine is organic (Wiedmann et al., 2014).

Due to the fact that consumers cannot evaluate the quality of a wine prior to purchase, certification as well as reputation is crucial in the wine market in order to reduce information asymmetries (Akerlof, 1970). A number of previous studies confirm the importance of reputation (e.g. Benfratello et al., 2009) and that past wine quality is more important for a winery's reputation than current quality. Moreover, collective reputation, such as membership in a specific association (e.g. VDP) leads to a price premium (Frick and Simmons, 2013). Such memberships are comparable to certifications because wineries cannot apply for membership but are invited by incumbents to join them, suggesting close peer monitoring.
This study will extend the current research in two different ways:
To the best of our knowledge, no study has so far compared the effects of self-declared eco-wine production and eco-certification on wine prices. We assume that self-declared eco-wineries might already benefit from an eco-premium. Furthermore, eco-certification can lead to a further price premium as it will be considered by consumers as a document of special skills and expertise increasing a winery's credibility.
We conjecture that the impact of eco-certification is likely to differ across the price distribution. Since consumers who purchase more expensive wines are likely to be better informed, we expect the impact of eco-certification to be higher for cheaper wines. To test this hypothesis, we use a quantile regression approach.

Data

Our data set includes 30,846 different wines listed in the German edition of "Gault Millau" in the years 2014 to 2016. The guide includes wines from all 13 German wine growing regions covering the vintage years 1982 to 2014. Before estimating our models, we combined price data with the Gault Millau quality rating of the wineries. Eco-certification is based on a winery's membership in one of the eco-certified and/or biodynamic wine associations. Furthermore, we added to the data set information on self-declared eco-wine production.
Random effects model
Our first model is a hedonic price function (with the log of the bottle price as the dependent variable) using the random effects estimator with standard errors clustered at the winery level. Our independent variables are self-declared eco-wine production, eco-certification, VDP membership and the interaction between VDP membership and eco-certification. Additionally, we control for reputation (based on Gault Millau quality rating), alcohol content, expiration date of the wine (measured in years) as new control variable, year of entry in Gault Millau, vintage year and region. Our model is of the following general form:
$\ln(P)_i = \propto_0 + \alpha_1 Eco + \alpha_2 Ecocertification + \alpha_3 VDP + \alpha_4 VDP \times Ecocertification + \alpha_5 \sum REP + \alpha_6 Expiration + \alpha_7 Alc + \alpha_8 Alc^2 + \alpha_9 ChREP + \alpha_{10} Reentry + \alpha_{11} \sum Year + \alpha_{12} \sum VintageYear + \alpha_{13} \sum RD + \varepsilon$
where
ln(P) Natural logarithm of the price of a particular bottle of wine produced by winery i
Eco Self-declared eco-wine production of a winery (0 = no; 1 = yes)
Eco-certification Individual membership in eco-certified and/or biodynamic wine associations (0 = no; 1 = yes)
VDP Membership in Association of German Quality Wine Estates (0 = no; 1 = yes)
VDP × Eco-certification Interaction of VDP membership and eco-certification
∑REP Vector of reputation dummies for reputation levels 1 to 5 (reference: 0.5), with 0.5 denoting a low and 5 a high level of reputation
Expiration Number of years until wine will expire
Alc Alcohol level
Alc² Quadratic term of alcohol level
Ch_REP Change in reputation to previous year
Re-entry Dummy variable indicating if winery re-entered Gault Millau in specific year
∑Year Publication years of the wine guide (reference year: 2014)
∑VintageYear Vector of vintage year dummies (reference: 1982)
∑RD Vector of 13 region dummies (reference: Palatinate)

Our results indicate that eco-wineries charge a statistically significant premium for their wines. Wineries that are eco-certified can even command higher prices. Nevertheless, if we include the expiration date in the model the results change slightly (especially the dummy for eco-certification decreases). This latter effect is unbiased as there is no correlation between eco-certification and expiration date. Interestingly, the expiration date is highly

significant suggesting that wines that can be stored for a long time sell at significantly higher prices. Moreover, we fail to demonstrate a special eco-certification effect for VDP members.

Table 1: Estimation results of the Random Effects Model

	(1)	(2)	(3)
	ln(P)	ln(P)	ln(P)
Eco	0.053**	0.089***	0.060***
	(0.025)	(0.024)	(0.019)
Eco-certification	0.069***	0.036	0.049**
	(0.026)	(0.023)	(0.019)
VDP	0.167***	0.152***	0.139***
	(0.021)	(0.028)	(0.021)
VDP × Eco-certification	0.020	0.016	0.001
	(0.041)	(0.039)	(0.034)
REP1	0.110***	0.082***	0.081***
	(0.014)	(0.014)	(0.012)
REP2	0.266***	0.159***	0.177***
	(0.018)	(0.020)	(0.016)
REP3	0.388***	0.197***	0.218***
	(0.022)	(0.026)	(0.020)
REP4	0.582***	0.271***	0.298***
	(0.043)	(0.048)	(0.034)
REP5	0.798***	0.380***	0.345***
	(0.076)	(0.096)	(0.079)
Ch_REP	-0.055***	-0.050***	-0.064***
	(0.011)	(0.014)	(0.012)
Re-entry	0.040	0.072**	0.048*
	(0.026)	(0.035)	(0.026)
Alc	-1.354***	-0.612***	-0.281***
	(0.033)	(0.027)	(0.028)
Alc²	0.061***	0.031***	0.016***
	(0.001)	(0.001)	(0.001)
Expiration	0.115***	0.128***	
	(0.002)	(0.003)	
Year	Included		
VintageYear	Included		
RD	Included		
Constant	9.361***	-226.875***	-254.193***
	(0.190)	(4.814)	(6.509)
Observations	30,846	30,846	30,846
Number of groups	1,250	1,250	1,250
R^2 within	0.239	0.491	0.564
R^2 between	0.530	0.589	0.709
R^2 overall	0.388	0.555	0.640

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Quantile regression

In a second step we use the variables listed in Table 1 above to estimate a quantile regression model. Quantiles are divided as displayed in Table 2.

Table 2: Price distribution across quantiles

Quantile	0.10	0.25	0.50	0.75	0.90
Price (average)	6.00 Euro	7.50 Euro	9.95 Euro	15.00 Euro	24.00 Euro

Our results show that the impact of eco-certification is indeed smaller for more expensive wines. However, these results cannot be confirmed for self-declared eco-wine production since in this case the size of the coefficient increases over the quantiles. In contrast to eco-certification, VDP membership as well as the expiration date are increasingly important for more expensive wines.

Table 3: Estimation results of the Quantile Regression

Quantile	0.10	0.25	0.50	0.75	0.90
Eco	0.053***	0.039***	0.051***	0.041***	0.066***
	(0.008)	(0.007)	(0.009)	(0.009)	(0.012)
Eco-certification	0.092***	0.087***	0.071***	0.062***	0.051***
	(0.009)	(0.007)	(0.006)	(0.009)	(0.015)
VDP	0.120***	0.127***	0.130***	0.143***	0.150***
	(0.009)	(0.007)	(0.007)	(0.008)	(0.012)
VDP × Eco-certification	-0.066**	-0.046***	-0.018	-0.008	-0.021
	(0.028)	(0.017)	(0.020)	(0.026)	(0.024)
Expiration	0.098***	0.114***	0.141***	0.164***	0.184***
	(0.030)	(0.002)	(0.015)	(0.002)	(0.042)
Constant	-193.458	-224.993***	-280.261	-326.948***	-366.332
	(0.000)	(3.505)	(0.000)	(4.043)	(0.000)
Observations	30,846	30,846	30,846	30,846	30,846
Pseudo R^2	0.331	0.365	0.413	0.441	0.453

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Conclusion

We show that both, self-declared eco-wine production as well as eco-certification, have a significantly positive impact on wine prices. Our quantile regressions indicate that the importance of eco-certification declines as wines get more expensive. This is most likely due to the fact that consumers who are interested in expensive wines are usually better informed and, therefore, do not need the eco-certification as a signal to reduce information asymmetries. However, VDP membership as another quality signal gets more important as wine prices increase. This latter result is contrary to our hypothesis. It may well be that consumers expect VDP membership from wineries producing particularly expensive wines.

File Upload (PDF only)

- The-Returns-to-Eco-Wine-Production.pdf

The Returns to Eco-Wine Production: A Quantile Regression Approach

Patrizia FANASCH, Bernd FRICK

University of Paderborn, Germany

Patrizia.Fanasch@uni-paderborn.de, Bernd.Frick@uni-paderborn.de

Introduction

Due to misperception of ecologically grown grapes ecological wines are not yet fully accepted by consumers (Delmas, 2010). This is surprising insofar as a number of studies have revealed that consumers are willing to pay a price premium for ecological wines. Using data on more than 30,000 different wines we estimate quantile regressions to identify the mark-up that consumers are willing to pay for wines produced by ecological wineries on the one hand and wineries belonging to the most prestigious professional association in the industry, the "German Association of Quality Wine Estates" (VDP).

Theoretical Background

Previous studies have already investigated the impact of organic agriculture, eco-labeling and eco-certification on wine prices finding positive effects. However, most studies rely on survey data and fail to clearly define the terms that are used in the respective survey (e.g. Mollá-Bauzá et al. (2005) and Ogbeide et al. (2014)). Forbes et al. (2009) also use a survey to identify the willingness to pay for "sustainable wine" while Barber et al. (2009) find an increased willingness to purchase "environmentally friendly wines". So far, only Delmas and Grant (2013) analyze impact of eco-certified and eco-labeled wines on market prices. Here, eco-certification is defined as the availability of a certificate stating that the wine has been produced based on ecological practices while eco-labeling is the documentation of that certification on the bottle. Delmas and Grant (2013) find that only eco-certification increases customers' willingness to pay a price premium. One possible explanation is that consumers, being unfamiliar with eco-wines, associate eco-labels negatively (Delmas, 2010). A further study reveals that consumers rate wines higher if they were told that the wine is organic (Wiedmann et al., 2014).

Due to the fact that consumers cannot evaluate the quality of a wine prior to purchase, certification as well as reputation is crucial in the wine market in order to reduce information asymmetries (Akerlof, 1970). A number of previous studies confirm the importance of reputation (e.g. Benfratello et al., 2009) and that past wine quality is more important for a winery's reputation than current quality. Moreover, collective reputation, such as membership in a specific association (e.g. VDP) leads to a price premium (Frick and Simmons, 2013). Such memberships are comparable to certifications because wineries cannot apply for membership but are invited by incumbents to join them, suggesting close peer monitoring.

This study will extend the current research in two different ways:

1) To the best of our knowledge, no study has so far compared the effects of self-declared eco-wine production and eco-certification on wine prices. We assume that self-declared eco-wineries might already benefit from an eco-premium. Furthermore, eco-certification can lead to a further price premium as it will be considered by consumers as a document of special skills and expertise increasing a winery's credibility.
2) We conjecture that the impact of eco-certification is likely to differ across the price distribution. Since consumers who purchase more expensive wines are likely to be better informed,

we expect the impact of eco-certification to be higher for cheaper wines. To test this hypothesis, we use a quantile regression approach.

Data

Our data set includes 30,846 different wines listed in the German edition of "Gault Millau" in the years 2014 to 2016. The guide includes wines from all 13 German wine growing regions covering the vintage years 1982 to 2014. Before estimating our models, we combined price data with the Gault Millau quality rating of the wineries. Eco-certification is based on a winery's membership in one of the eco-certified and/or biodynamic wine associations. Furthermore, we added to the data set information on self-declared eco-wine production.

Random effects model

Our first model is a hedonic price function (with the log of the bottle price as the dependent variable) using the random effects estimator with standard errors clustered at the winery level. Our independent variables are self-declared eco-wine production, eco-certification, VDP membership and the interaction between VDP membership and eco-certification. Additionally, we control for reputation (based on Gault Millau quality rating), alcohol content, expiration date of the wine (measured in years) as new control variable, year of entry in Gault Millau, vintage year and region. Our model is of the following general form:

$$\begin{aligned}\ln(P)_i = {} & \propto_0 + \alpha_1 Eco + \alpha_2 Ecocertification + \alpha_3 VDP + \alpha_4 VDP \times Ecocertification + \alpha_5 \sum REP \\ & + \alpha_6 Expiration + \alpha_7 Alc + \alpha_8 Alc^2 + \alpha_9 ChREP + \alpha_{10} Reentry + \alpha_{11} \sum Year \\ & + \alpha_{12} \sum VintageYear + \alpha_{13} \sum RD + \varepsilon\end{aligned}$$

where

ln(P)	Natural logarithm of the price of a particular bottle of wine produced by winery *i*
Eco	Self-declared eco-wine production of a winery (0 = no; 1 = yes)
Eco-certification	Individual membership in eco-certified and/or biodynamic wine associations (0 = no; 1 = yes)
VDP	Membership in Association of German Quality Wine Estates (0 = no; 1 = yes)
VDP × Eco-certification	Interaction of VDP membership and eco-certification
∑REP	Vector of reputation dummies for reputation levels 1 to 5 (reference: 0.5), with 0.5 denoting a low and 5 a high level of reputation
Expiration	Number of years until wine will expire
Alc	Alcohol level
Alc²	Quadratic term of alcohol level
Ch_REP	Change in reputation to previous year
Re-entry	Dummy variable indicating if winery re-entered Gault Millau in specific year
∑Year	Publication years of the wine guide (reference year: 2014)
∑VintageYear	Vector of vintage year dummies (reference: 1982)
∑RD	Vector of 13 region dummies (reference: Palatinate)

Our results indicate that eco-wineries charge a statistically significant premium for their wines. Wineries that are eco-certified can even command higher prices. Nevertheless, if we include the expiration date in the model the results change slightly (especially the dummy for eco-certification decreases). This latter effect is unbiased as there is no correlation between eco-certification and expiration date. Interestingly, the expiration date is highly significant suggesting that wines that can be

stored for a long time sell at significantly higher prices. Moreover, we fail to demonstrate a special eco-certification effect for VDP members.

Table 1: Estimation results of the Random Effects Model

	(1) ln(P)	(2) ln(P)	(3) ln(P)
Eco	0.053**	0.089***	0.060***
	(0.025)	(0.024)	(0.019)
Eco-certification	0.069***	0.036	0.049**
	(0.026)	(0.023)	(0.019)
VDP	0.167***	0.152***	0.139***
	(0.021)	(0.028)	(0.021)
VDP × Eco-certification	0.020	0.016	0.001
	(0.041)	(0.039)	(0.034)
REP1	0.110***	0.082***	0.081***
	(0.014)	(0.014)	(0.012)
REP2	0.266***	0.159***	0.177***
	(0.018)	(0.020)	(0.016)
REP3	0.388***	0.197***	0.218***
	(0.022)	(0.026)	(0.020)
REP4	0.582***	0.271***	0.298***
	(0.043)	(0.048)	(0.034)
REP5	0.798***	0.380***	0.345***
	(0.076)	(0.096)	(0.079)
Ch_REP	-0.055***	-0.050***	-0.064***
	(0.011)	(0.014)	(0.012)
Re-entry	0.040	0.072**	0.048*
	(0.026)	(0.035)	(0.026)
Alc	-1.354***	-0.612***	-0.281***
	(0.033)	(0.027)	(0.028)
Alc^2	0.061***	0.031***	0.016***
	(0.001)	(0.001)	(0.001)
Expiration		0.115***	0.128***
		(0.002)	(0.003)
Year			Included
VintageYear			Included
RD			Included
Constant	9.361***	-226.875***	-254.193***
	(0.190)	(4.814)	(6.509)
Observations	30,846	30,846	30,846
Number of groups	1,250	1,250	1,250
R^2 within	0.239	0.491	0.564
R^2 between	0.530	0.589	0.709
R^2 overall	0.388	0.555	0.640

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Quantile regression

In a second step we use the variables listed in Table 1 above to estimate a quantile regression model. Quantiles are divided as displayed in Table 2.

Table 2: Price distribution across quantiles

Quantile	0.10	0.25	0.50	0.75	0.90
Price (average)	6.00 Euro	7.50 Euro	9.95 Euro	15.00 Euro	24.00 Euro

Our results show that the impact of eco-certification is indeed smaller for more expensive wines. However, these results cannot be confirmed for self-declared eco-wine production since in this case the size of the coefficient increases over the quantiles. In contrast to eco-certification, VDP membership as well as the expiration date are increasingly important for more expensive wines.

Table 3: Estimation results of the Quantile Regression

	Quantile				
	0.10	**0.25**	**0.50**	**0.75**	**0.90**
Eco	0.053***	0.039***	0.051***	0.041***	0.066***
	(0.008)	(0.007)	(0.009)	(0.009)	(0.012)
Eco-certification	0.092***	0.087***	0.071***	0.062***	0.051***
	(0.009)	(0.007)	(0.006)	(0.009)	(0.015)
VDP	0.120***	0.127***	0.130***	0.143***	0.150***
	(0.009)	(0.007)	(0.007)	(0.008)	(0.012)
VDP × Eco-certification	-0.066**	-0.046***	-0.018	-0.008	-0.021
	(0.028)	(0.017)	(0.020)	(0.026)	(0.024)
Expiration	0.098***	0.114***	0.141***	0.164***	0.184***
	(0.030)	(0.002)	(0.015)	(0.002)	(0.042)
Constant	-193.458	-224.993***	-280.261	-326.948***	-366.332
	(0.000)	(3.505)	(0.000)	(4.043)	(0.000)
Observations	30,846	30,846	30,846	30,846	30,846
Pseudo R^2	0.331	0.365	0.413	0.441	0.453

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Conclusion

We show that both, self-declared eco-wine production as well as eco-certification, have a significantly positive impact on wine prices. Our quantile regressions indicate that the importance of eco-certification declines as wines get more expensive. This is most likely due to the fact that consumers who are interested in expensive wines are usually better informed and, therefore, do not need the eco-certification as a signal to reduce information asymmetries. However, VDP membership as another quality signal gets more important as wine prices increase. This latter result is contrary to our hypothesis. It may well be that consumers expect VDP membership from wineries producing particularly expensive wines.

References

Akerlof, G.A. (1970): The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics* 84(3): 488–500.

Barber, N. and Taylor, C. and Strick, S. (2009): Wine consumers' environmental knowledge and attitudes: Influence on willingness to purchase. *International Journal of Wine Research* 1(1): 59–72.

Benfratello, L. and Piacenza, M. and Sacchetto, S. (2009): Taste or Reputation: What Drives Market Prices in the Wine Industry? Estimation of a Hedonic Model for Italian Premium wines. *Applied Economics* 41(17): 2197–2209.

Delmas, M.A. (2010): Perception of Eco-Labels: Organic and Biodynamic Wines. *UCLA Institute of the Environment*.

Delmas, M.A. and Grant, L.E. (2013): Eco-Labeling Strategies and Price-Premium: The Wine Industry Puzzle. *Business & Society* 53(1): 6–44.

Forbes, S.L. and Cohen, D.A. and Cullen, R. and Wratten, S.D. and Fountain, J. (2009): Consumer Attitudes Regarding Environmentally Sustainable Wine: An Exploratory Study of the New Zealand Marketplace. *Journal of Cleaner Production* 17(13): 1195–1199.

Frick, B. and Simmons, R. (2013): The Impact of Individual and Collective Reputation on Wine Prices: Empirical Evidence from the Mosel Valley. *Journal of Business Economics* 83(2): 101–119.

Mollá-Bauzá, M.M.B. and Martínez-Carrasco, L. and Martínez-Poveda, A. and Rico Pérez, M. (2005): Determination of the Surplus that Consumers Are Willing to Pay for an Organic Wine. *Spanish Journal of Agricultural Research* 3(1): 43–51.

Ogbeide, O.A. and Ford, C. and Stringer, R. (2014): The Environmental Benefits of Organic Wine: Exploring Consumer Willingness-to-Pay Premiums? *Journal of Food Products Marketing* 21(5): 482–502.

Wiedmann, K-P. and Hennigs, N. and Behrens, S.H. and Klarmann, C. (2014): Tasting Green: An Experimental Design for Investigating Consumer Perception of Organic Wine. *British Food Journal* 116(2): 197–211.