The Effect of Climate on Vintage Quality Rankings



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Talk Outline

- What is Wine Quality?
- Vintage Ratings and Consensus Rankings
- Research in Burgundy and Other Regions
- Summary/Conclusions

What is Wine Quality?

Can you Measure Wine Quality?



Thoughts on Wine Quality

- Determining wine quality involves both sensory and contextual components
- For most wine connoisseurs, quality refers to what they personally consider 'good' versus 'bad' wine, and correspondingly desirable versus aversive
- This is usually framed within the context of conformity relative to established, learned norms for the wines concerned
- Possessing distinctive varietal and stylistic features are generally viewed as the baseline, on which other aspects of quality rest
- The general consumer often evaluates wine on extrinsic factors such as provenance, producer, cultivar, vintage, and/or price

Measures of Wine Quality

Subjective versus Objective

- Yield and/or Production
- Fruit/Must Composition (sugar, acidity, pH, etc.)
- Price at Market
- Vintage Ratings
- Vintage ratings are a measure that reflects the interrelationships of the other measures
- While inherently subjective, vintage ratings from numerous sources exhibit moderate to high correlations
- Differences seen are typically in the rater's wine style preferences (e.g., Robert Parker)

Napa Valley Cabernet Sauvignon 1998 Vintage Release Price vs Vintage Ratings



- Rating effect on price is exponential
- 10-point increase from 80 to 90 resulting in a 200% price increase
- 10-point increase from 85 to 95 resulting in a 350% price increase
- Exponential form and effect are similar across other regions and other varieties

The demand for expert opinion: Bordeaux Wine

Orley Ashenfelter and Gregory V. Jones The Oenometrics Prize of the Vintage Data Quantification Society "Prix d'Ajaccio." October 1998

Using weather data to predict the phenologic development of the vine and wine quality

Orley Ashenfelter and Gregory V. Jones Vineyard Data Quantification Society Published in Cahiers Scientifique 1999

Climate Influences on Grapevine Phenology, Grape Composition, and Wine Production and Quality for Bordeaux, France GREGORY V. JONES1* AND ROBERT E. DAVIS2 Am. J. Enol. Vitic., Vol. 51, No. 3, 2000

Wine market prices and investment under uncertainty: an econometric model for Bordeaux Crus Classés

Gregory V. Jones^{a,*}, Karl-Heinz Storchmann^{b,c}

Agricultural Economics 26 (2001) 115-133

Asymmetric warming over coastal California and its impact on the premium wine industry

Ramakrishna R. Nemani^{1,*}, Michael A. White¹, Daniel R. Cayan², Gregory V. Jones³, Steven W. Running¹, Joseph C. Coughlan⁴, David L. Peterson⁴

Vol. 19: 25–34, 2001	CLIMATE RESEARCH Clim Res	Published November 22

CLIMATE CHANGE AND GLOBAL WINE QUALITY

GREGORY V. JONES1, MICHAEL A. WHITE2, OWEN R. COOPER3 and KARL STORCHMANN⁴

> Climatic Change (2005) 73: 319-343 DOI: 10.1007/s10584-005-4704-2

Climate and Bordeaux wine quality: identifying the key factors that differentiate vintages based on consensus rankings

Kerrie A. Baciocco^a, Robert E. Davis^{a*} and Gregory V. Jones^b

Journal of Wine Research, 2014 http://dx.doi.org/10.1080/09571264.2014.888649

Climate and Wine: Quality Issues in a Warmer World

Gregory V. Jones The Oenometrics Prize of the Vintage Data Quantification Society "Prix de Bourgogne." May 2004

Influence of climate variability on wine regions in the western USA and on wine quality in the Napa Valley

Gregory V. Jones^{1,*}, Gregory B. Goodrich²

Vol. 35: 241–254, 2008 doi: 10.3354/cr00708	CLIMATE RESEARCH Clim Res	Published February 14
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Seasonal differences in climate in the Chianti region of Tuscany and the relationship to vintage wine quality

DOI 10.1007/s00484-015-0988-8

Michael James Salinger¹ · Marina Baldi¹ · Daniele Grifoni² · Greg Jones³ · Giorgio Bartolini² · Stefano Cecchi⁴ · Gianni Messeri² · Anna Dalla Marta⁴ · Simone Orlandini4 · Giovanni A. Dalu1 · Gianpiero Maracchi5

Int J Biometeorol (2015) 59:1799-1811

A New Method to Obtain a Consensus Ranking of a Region's Vintages' Quality*

José Borges^a, António C. Real^b, J. Sarsfield Cabral^c and Gregory V. Jones^d

Journal of Wine Economics, Volume 7, Number 1, 2012, Pages 88-107 doi:10.1017/jwe.2012.7

A climatology of Vintage Port quality

António C. Real,^{a,b*} José Borges,^a José S. Cabral^a and Gregory V. Jones^c

The Demand for Expert Opinion: Bordeaux Wine*

Orlev Ashenfelter^a and Gregory V. Jones^b

Journal of Wine Economics, Page 1 of 9 doi:10.1017/jwe.2013.22

Int. J. Climatol. (2016) Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/joc.4953

Vintage Ratings and Consensus Rankings

- An impartial assessment of wine quality is a tool for producers, consumers, investors, and wine researchers to understand factors influencing quality and make purchasing or investing decisions
- Several critics, magazines, and organizations publish vintage charts that assign a score to each vintage, representing the corresponding perception of the wine quality
- Each institution has its own tasting panel, with its own criteria and perception of quality, which tastes a different set of wines, at different times and under different conditions
- So consensus between institutions is moderate at best

- There are a number of ratings systems for describing wine quality, which use 100 points, 20 points, 5 stars, 3 glasses, etc.
- Unfortunately, there is no standard for these systems, and so no two wine critics use these systems in quite the same way
- Simply averaging wine scores across different critic's ratings scales has no meaning; that is, the critics are speaking different languages
- A classic example of this is the Judgment of Paris, from 1976, in which the "official" summed scores are meaningless, because the tasters were all using different versions of the 20-point scale

Example rating scales from eight different institutions:

Source	Rating scale
Berry Bros & Rudd (BBR)	1 - 10
Decanter (DC)	1-5
Michael Broadbent (MB)	0-5
Sotheby's Wine Encyclopedia (SWE)	0 - 100
Vintages.com (VT)	0 - 10
Wine Advocate (WA)	50 - 100
Wine Enthusiast (WE)	50 - 100
Wine Spectator (WS)	50 - 100

- To address these issues, Borges et al. (2012):
- Proposed a rank aggregation method
- Commonly used in voting theory and web search algorithms
- Converts scores, on any scale, into individual critics ranking
- Combines multiple critic rankings into a consensus ranking

Journal of Wine Economics, Volume 7, Number 1, 2012, Pages 88–107 doi:10.1017/jwe.2012.7

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Correlation Coefficients for the Scores Given by Several Publishers to Three Wine Regions

	Piedn	nont	1985-	2006			White	e Burg	gundy	1982	-2003	5	Cho	ampaş	gne 1	982–2	2003
	DC	WS	WA	VC	AB		DC	WS	WA	VC	AB	MB		DC	WS	VC	MB
DC	1.00	0.77	0.76	0.77	0.84	DC	2 1.00	0.80	0.61	0.78	0.73	0.53	DC	1.00	0.17	0.59	0.54
WS		1.00	0.95	0.84	0.93	WS	5	1.00	0.68	0.75	0.77	0.59	WS		1.00	0.48	0.52
WA			1.00	0.90	0.89	WA			1.00	0.47	0.50	0.52	VC			1.00	0.79
VC				1.00	0.88	VC	2			1.00	0.80	0.53	MB				1.00
AB					1.00	AB	;				1.00	0.62	<u> </u>				
			I			MI	i					1.00					

(DC: Decanter; WS: Wine Spectator; WA: Wine Advocate; VC: Vintages; AB: Addy Bassin; MB: Michael Broadbent).

An Illustration of the Conversion of the Vintage Chart Scores (a) into Ranks with the Scores for White Wines from the Burgundy Wine Region (b)



- The rank aggregation problem is defined as the task of combining many different rank orderings into the ranking that is closest to the set of input rankings
- Average or Sum ranking issues
- Majority grade issues
- Condorcet property, minimizing the number of pairwise disagreements between the input rankings and the resulting ranking

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	Year	85	86	87	88	89	90	91	92	93	94	95	96	97	<u>98</u>	99	00	01	02	03	04	05	06
Scores	DC	5	3	2	4	5	5	2	1	2	2	2	5	5	5	3	4	4	2	4	4	2	5
	VC	9	8	7	8	10	10	5	5	8	7	9	10	9	9	9	9	9	7	8	10	8	9
	WS	94	86	83	92	97	97	77	76	87	77	88	98	99	93	90	100	95	72	88	93	94	89
	WA	95	89.5	86	90	97	96	76	74	90	77	87	97	93	92	93.5	95	96	75	89.5	94.5	93	91.5
	AB	92	80	86	92	97	98	78	76	87	80	88	96	97	93	90	94	92	80	88	91	88	90
Ranks	DC	1	13	15	8	1	1	15	22	15	15	15	1	1	1	13	8	8	15	8	8	15	1
	VC	5	13	18	13	1	1	21	21	13	18	5	1	5	5	5	5	5	18	13	1	13	5
	WS	7	17	18	11	4	4	19	21	16	19	14	3	2	9	12	1	6	22	14	9	7	13
	WA	5	15	18	13	1	3	20	22	13	19	17	1	9	11	8	5	3	21	15	7	9	12
	AB	7	18	17	7	2	1	21	22	16	18	13	4	2	6	11	5	7	18	13	10	13	11

The Scores for the Piedmont Wine Region and the Corresponding Ranks

The Combined Consensus Ranking for the Piedmont Wine Region

Year	90	89	96	97	00	01	85	04	<u>98</u>	88	99	06	05	03	95	<i>93</i>	86	87	94	02	91	92
R_c	1	1	1	4	4	6	7	8	8	10	11	12	13	14	15	16	17	18	19	20	20	22

Research in Burgundy and Other Regions

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The effect of climate on Burgundy vintage quality rankings

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- Goal was to use the ratings to consensus ranking procedure by Borges et al. (2012) to isolate the top 10 and bottom 10 vintages
- Used 12 rating agencies
- Ratings for both red and white wines
- Common time period 1961-2015

Rating Agency	Rating Scale
Andy Bassin	0–100
BB&R	0–10
Broadbent	0—5
Clive Coates	0–20
Decanter	0–5
DeLong	0–5
Alexis Lichine	0–20
Sotheby's	0–100
Vintages.com	0–10
Wine Advocate	0–100
Wine Enthusiast	0–100
Wine Spectator	0–100

Red and white wine consensus rankings between 1961-2015

Red Rank	Year	White Rank	Year	
1	2005	1	2014	
2	1990	2	1962	
3	2015	3	2002	
4	2009	3	2010	
5	2002	5	1996	
6	1969	6	2005	10
7	1962	7	1969	d
7	1964	7	1995	10
7	1966	9	1966	合
10	1999	10	1989	
46	1992	46	1965	
47	1986	47	1993	
48	1982	48	1981	0
49	1973	49	1974	n 1
49	1994	50	1991	UO UO
51	1981	51	1987	ott
52	1974	52	1975	Ä
53	1984	52	1984	
54	1977	54	1980	
55	1975	55	1977	







- Examine a suite of climatic variables to distinguish those factors most important for vintage quality differences
- Climate data from Dijon for 1961-2015
- Variables Tavg, Tmax, Tmin, GDD, HI, DTR, T>35°CF, T<0°C, Precipitation (total and days), and P-ET
- Organized by long term average Pinot
 Noir phenological stages observed at
 Domaine Louis Latour
- Total of 56 individual weather/climate factors considered in the analysis

Stage	Period
Dormancy	Nov 1-Mar 31
Bud Break	April 5-31
Flowering	June 1-15
Véraison	August 1-20
Ripening	Sept 1-30

- Weather/climate variables differ significantly between top and bottom ranked vintages; Red 19 of 56, White 15 of 56
- Effects occur mostly over the entire growing season, but conditions during bud break and the ripening period are also important
- Used multivariate stepwise discriminant function analysis to isolate most significant effects
- The most important climatic factor in distinguishing between topand bottom-ranked vintages is warmer vintages (Tavg, GDD, HI) but high DTR most important for reds, moderate Tmax for whites
- Best Burgundy vintages are also more likely when there is ample rainfall during the late winter/early spring and dry conditions during the véraison and ripening phases

Similar Research in Other Regions

 Bordeaux – top ranked vintages exhibited higher Tavg, GDD/HI vintages and a general lack of rainfall, particularly during véraison



Similar Research in Other Regions

Tuscany – top ranked vintages exhibited higher Tavg, GDD/HI vintages, more days over 95°F from fruit set to véraison, lower humidity levels during the growing season, and a general lack of rainfall, particularly during véraison to harvest

Yearly	y ranks	Sorted	Sorted consensus						
Year	PRO	WS	DEC	VT	CN	AB	Consensus	Year	Rank
1980	12	29	31	32	31	29	32	1997	1
1981	12	25	21	27	22	24	26	2006	2
1982	12	20	8	20	14	19	21	1990	2
1983	1	17	8	20	27	25	21	1985	4
1984	30	32	31	27	32	27	30	1988	5
1985	1	3	1	4	4	3	4	2001	6
1986	12	22	21	13	28	22	23	2004	6
1987	27	27	21	20	28	30	27	1999	6
1988	1	3	1	1	5	13	5	2007	6
1989	27	28	28	27	25	32	29	1995	10

Similar Research in Other Regions

 Port – growing season mean temperatures above the region's average, but lower heat stress pre and post véraison lead to vintage declarations and best ranked vintages

Rank	Vintage
1	1994
2	2007
3	2000
4	2003
5	2009
6	1997
7	1983
8	1985
9	1991
10	1992

Vintage	P (Higher quality)	P (Lower quality)	Class Prediction	Reported
2010	0.01	0.63	2	Fair
2011	0.99	0.01	1	Spectacular
2012	0.49	0.14	2	Fair
2013	0.03	0.74	3	Poor
2014	0.78	0.13	1	Fair

Similar to 1988, not well regarded, warm season but rain at harvest

- The consensus ranking method has proven useful for the research community, providing a relative measure of wine quality
- Common positive effects for top vintages across regions include wet late winters/early springs, warmer growing seasons (1-2°C or 30% higher GDD/HI), higher DTR, and drier late seasons
- Common negative effects for bottom vintages across regions include shorter and cooler seasons, lower DTR, rain during ripening/harvest
- Some differences between red/white wines, more data needed

- Marginal effects point to:
 - +1°C above average, probability of a top vintage +60%
 - -1°C below average, probability of a bottom vintage +45%
- Brings to light climate change issues, many regions have seen;
 - Earlier phenology, including harvest dates
 - Warmer growing seasons
 - Higher humidity
 - Increased precipitation variability
 - Increased frequency of some extreme events
- Rule of 9's in Burgundy, holds for 3 of last 5 ... but 2019?

- Wine quality will always be hard to define
- Wine quality will always be personal
- What comes first for critics, quality recognition due to producers touting good vintage weather/climate conditions, or their own objective assessment?
- Ratings scores may become less relevant over time
- Amateurs vs Experts (Vox article on CellarTracker)
- Currently working on the same type of analysis for Napa



Thank You!

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