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RESEARCH ARTICLE

Sounds Better? Potential Implications of Obscure American Viticultural Areas to Consumers

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Abstract

The American Viticultural Area (AVA) allows designated wine regions to be created, marketed, and protected. But many of the now 248 AVAs may be meaningless to consumers. Are AVAs thus meritless? Can AVAs affect consumers despite low recognition? A choice experiment examines three appellations that are applicable to the same wine: *New Jersey*, *USA*; *Pilesgrove*, *New Jersey*; and *Outer Coastal Plain* (*OCP*)—a New Jersey AVA. The results show that consumers prefer *OCP* wines over the former alternatives, affirming the marketing potential of AVAs that omit state names. Nevertheless, AVA may have exploited consumers' lack of information.

Keywords: American Viticultural Area; appellation label policy; consumer preference; marketing of production origin; wine marketing;; willingness to pay

JEL codes: Q13; Q18; L66

1. Introduction

The number of wineries and vineyards in the United States has rapidly expanded. There were 9,654 wineries in 2018, up from about 1,000 in 2001; about 25,000 farms are engaging in viticulture (Bureau of Labor Statistics, 2018; Statista, 2019). While California accounts for 86% of U.S. wine production, more than half of the wineries are in other states, which are in general less famed than the Golden State in winemaking (Statista, 2019). Vintners and winemakers in these less-prestigious regions have used the American Viticultural Area (AVA) to establish designated wine regions (Chace and Smith, 2013). There are now 248 AVAs nationwide, noteworthy given that the first prestigious U.S. wine region, Napa, was relatively unremarkable until the 1960s (Alcohol and Tobacco Tax and Trade Bureau, 2020a; Taber, 2006). Nevertheless, the proliferation has prompted suggestions that AVAs are both confusing and meaningless, thus having no positive effect on consumer preference (Atkin and Johnson, 2010; Johnson and Bruwer, 2007b).

On the other hand, some winemakers argue that AVA's merit exists in a more nuanced way. In replacing a less-prestigious origin with an AVA, it causes consumers to overlook potentially negative quality that the less-prestigious origin implied, even though the AVA is itself unknown to consumers (Davidson, 2013; Smith, 2013). This claim, however, has received little attention in the literature.

If AVAs do little to stimulate consumer preference, it substantiates the opponents' claim, resources are wasted in creating meaningless identities of appellations. Conversely, if AVAs stimulate consumer preference, AVA is transformative in marketing terms, which enhances less-prestigious wine regions; AVA can thus provide economic development opportunities for the

less-prestigious wine regions and potentially enhances land value in these rural regions (Cross, Plantinga, and Stavins, 2011b).

To shed more light on AVAs' merit, the impact of a New Jersey AVA on consumer willingness to pay (WTP) is examined with a choice experiment. From the results, consumers are willing to pay more for wines with the AVA label than other alternatives where "New Jersey" is noted. The respondents also rated the quality of the wine with the AVA label higher than wines from New Jersey. Given that these labels can apply to the same wine, the results suggest a spillover effect—AVAs might be confounding consumers. In sum, this study supplies empirical insights, which can stimulate discussions to advance and safeguard AVA's policy.

1.1. Background and Literature

AVAs transform the experience attribute of American terroirs into a search attribute (Caswell and Mojduszka, 1996). The policy allows vintners, wineries, and sellers to capture the premium that the origin might generate. The importance of AVA is rooted in the concept of *terroir*, a belief that wine's quality is shaped by a place's soil, climate, and culture (Demossier, 2011; Gergaud and Ginsburgh, 2008; Gilbert, van der Lelie, and Zarraonaindia, 2014). Among the established AVAs are Fennville, Lancaster Valley, Bell Mountain, and High Valley—a dizzying array of names that hold little hints about their true geographical origins (Alcohol and Tobacco Tax and Trade Bureau, 2020a). Others like Napa Valley and Willamette Valley have become seals of quality to oenophiles around the world.

Terroirs have well-established links to the price of wines. Nine of the most expensive wines, averaging from $4,975 to $19,327, are from Côte de Nuits—a wine region in France; all American wines above $500 per bottle originate from the Napa Valley (wine-searcher.com, 2018). Many studies have observed that wines' regions of origin generate price premium. For instance, small-scale cool-climate regional wines of Australia exhibit a higher price premium (Oczkowski, 1994). Wines from Pauillac, Pomerol, and St. Estephe are priced higher than the average Bordeaux wines (Cardebat and Figuet, 2004; Combris et al., 1997; Landon and Smith, 1997). Rioja and Duero produce higher-priced bottles among Spanish wines (Angulo et al., 2000). And Napa has a premium over other California, Washington, and most New World wines (Costanigro, McCluskey, and Mittelhammer, 2007; Delmas and Lessem, 2017; Schamel, 2009). Overall, the evidence that the place of origin is an important consideration in wine purchases is convincing.

Studies have examined various aspects of terroir. The geographical factor has been found to impact the prices of vineyards (Cross, Plantinga, and Stavins, 2011a, 2011b, 2017). Gokcekus and Finnegan (2017) found that sub-AVA elevates the prices of wines produced in Willamette County. Gergaud and Ginsburgh (2008) found that the impact of the natural endowment—which embodies terroir—has a negligible impact on wine quality; terroir affects the level of technological investment, which may cause quality to be misattributed to terroir; nevertheless, AVA may be needed to protect the technological investment. Overall, an argument exists for a place of origin trademark—to prevent infringement and to allow promotion of regional identity (U.S. Department of the Treasury, 2018a).

While often seen as such, AVAs are not seals of quality but strictly designations of places (Mendelson, 2016). The law stipulates that an AVA petition must meet the requirement of Distinguishing Features—which describes how a geographical area's climate, geological features, soils, and other features that may affect viticulture and make it distinctive (Office of the Federal Register, 1979). However, wine quality is not an essential requirement; the panel overseeing AVA petitions does not include experts in the evolving science of viticulture, enology, and other aspects of terroir (Mendelson, 2016). The AVA is unlike the French's System, where each Appellation d'origine Controlee (AOC) region specifies its production methods, minimum levels of alcohol, vine age, and other measurements (Munsie, 2002; Puckette, 2016). Therefore, if an AVA increases

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consumer preference and they are not rewarded with an elevated wine quality, it then raises the question if AVAs are merely marketing ploys, which may suggest an inherent flaw in the AVA policy.

Since the first AVA—Augusta in Missouri—was established in 1980, AVAs are now scattered across 33 states (U.S. Department of the Treasury, 2018a). Many of the AVAs are said to be unknown, uninformative, have no real premium to protect, and meaningless (Atkin and Newton, 2012; Gray, 2014; Johnson and Bruwer, 2007b; Mendelson, 2016). Johnson and Bruwer (2007a) suggest that the industry is "marketing unknown" by the rapid creation of AVA. The notion is supported by the observation that 55% of respondents have "no opinion of quality" for the Knight Valley AVA, but only 1% professed to have no opinion of Sonoma County, when in fact Knight Valley is a premier partition of Sonoma County (Johnson and Bruwer, 2007b).

Consumer preference for appellations is influenced by subjective knowledge. For instance, German participants willing to pay more for the cheaper *Passé Tout Grains AOC* wine than the pricier *Burgundy AOC* wines, showing that knowledge and awareness moderate preference (Bazoche et al., 2013). Further, consumers expect better quality when the wine is presented with both a sub-AVA label and county, e.g., "Bennett Valley, Sonoma County," as opposed to just the sub-AVA label "Bennett Valley" alone (Bruwer and Johnson, 2010). Atkin and Newton (2012) show that consumers claimed to be more knowledgeable about "Sonoma County" than its sub-AVAs, despite that the sub-AVAs are more selective and prestigious. Atkin and Johnson (2010) observe that consumers use brands, regions, counties, vintage, and states more than AVAs as indicators of wine quality. These evidence cast doubts on the overall marketing value of AVAs; while some, such as Napa Valley, have established a reputation to be protected; most AVAs are likely unknown entities to consumers, which thus—in theory—hold little value as a marketing device, asssuming that consumers' knowledge is essential to create value.

1.2. Objectives

While regional identity is an important element in wine marketing, little is known if an obscure AVA can be beneficial as a marketing tool, and if so, at what cost in terms of Pareto efficiency. Without clarity on these questions, it is uncertain if AVAs are fulfilling its mandates to promote producers' and consumers' interests simultaneously. There are 19 pending petitions, indicating a strong and sustained interest in the industry for AVA, which highlights the value of this study (Alcohol and Tobacco Tax and Trade Bureau, 2020b).

With the goal to highlight the value created by a not-well-known AVA, this study investigates the effect of a New Jersey AVA on consumer preference. The results generate useful insights to illuminate the impact of an unknown AVA on consumers. Based on the results, relevant discussions about policy implications are carried out.

2. Methods

This study focuses on an AVA that fits the criteria of being relatively unknown and nested within a state with a traditionally weaker winemaking reputation, namely the Outer Coastal Plain (OCP) AVA, an AVA established in 2007, of Southern New Jersey (Office of the Federal Register, 2007).

In an ideal setting, we would regress the consumer preference of wines against AVAs—with perceived quality and other relevant factors controlled to ascertain the value of AVAs. Nevertheless, consumer preference is not directly observable; with 248 established AVAs and a general void of data about consumer preference of the AVAs, a comprehensive evaluation of all AVAs is relatively unreachable. A compromise in scope is necessitated by the challenge posed by the numerous AVAs in a controlled setting; many factors affect consumer preference for wines (Angulo et al., 2000; Lockshin and Corsi, 2012; Orth, McGarry Wolf, and Dodd, 2005).

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Our main hypotheses surround the impact of the OCP appellation label on consumer preference. We ask if consumers' WTP for the AVA label is systematically different from labels where "New Jersey" is denoted.

A choice experiment is used as it is easy to deploy on a wide sample, and it accommodates examination of multiple attributes in a controlled manner, fitting the purpose of this study (Hensher, Rose, and Greene, 2005). Furthermore, it has been applied in studies of consumer preference, including wine, which further justifies its use (Delmas and Lessem, 2017; Lusk, 2003; Meas et al., 2015; Perrouty, d'Hauteville, and Lockshin, 2006). The choice experiment is conducted online with a U.S.-wide sample of wine consumers.[1]

In the choice experiment, wines that differ according to a selected set of appellation labels, prices, and other attributes are generated (Figure 1). These alternatives of wines are distributed in choice sets; each choice set simulates a purchase situation, where respondents were asked to choose the most desirable alternatives within a choice set or to forego the purchase should the presented wines are not appealing. Note that these purchases are hypothetical; no actual money and products are exchanged. Consumer preference is inferred from the observed choices econometrically, where utility and WTP estimates are generated to gauge the economic impact of an AVA.

3. Choice Experiment Design and Hypotheses

The experiment features 750 ml cabernet sauvignon—the most widely produced and consumed varietal in the United States; it is also the most widely planted varietal in the OCP region (Karlsson and Karlsson, 2018; Outer Coastal Plain Vineyard Association, 2020; Thach, 2015).

Six appellations labels are included: OCP; New Jersey, USA; Pilesgrove, New Jersey (Figure 1); California, USA; Napa Valley; and Product of USA (Table 1). These appellations will henceforth be referred to as *OCP*, *NJ*, *Pilesgrove*, *California*, *Napa*, and *USA*, where the italic denotes appellations.

A Southern New Jersey winery in Pilesgrove could use the first three labels. *OCP* allows the wine to be marketed by its AVA, where the state name is omitted. Whereas *NJ* and *Pilesgrove* advertise the state name. As the same wine can be marketed under these labels, any differences in WTP (ceteris paribus) thus result from the appellation labels, which teases out the effect of the AVA.

The design leverages OCP's fine wine production aspiration, which has been hindered by its state's weaker reputation (Smith, 2013; Thompson, 2018). In 2012, OCP wines competed against Bordeaux wines in a blind tasting, in a format similar to the Judgement of Paris that had propelled Napa into the first premier American wine region; the OCP wines were competitive, rank-sum tests found only 1 out of 12 OCP wines were deemed statistically inferior to the significantly higher-priced Bordeaux wines (Quandt et al., 2012).

Despite it, New Jersey has not been traditionally seen as a fine wine producing region. The state produces 2.7 million gallons of still wine in 2017, which is 0.17% of the U.S. production by volume (U.S. Department of the Treasury, 2018b). Its winemaking reputation may have been somewhat negative. Media depictions demonstrate such sentiment; for example, George Taber, a renowned wine journalist, points to the state's history of "mass production of rotgut," referring to the sweet Welch-like wines that the state is known for (Davidson, 2013). The negative reputation was said to be an obstacle to the region's aspiring winemakers, prompting the creation of the OCP AVA as a means to shed the negative reputation of New Jersey wine (Chace and Smith, 2013; Davidson, 2013; Smith, 2013). The Wine Enthusiast magazine noted the rise of New Jersey wine quality, claiming that "New Jersey is ready for its time in the spotlight," but its subtext imply that the state's winemaking reputation is relatively lower (Thompson, 2018).

[1]The survey instrument was reviewed and approved by the institutional review board of the author's institution; no deception is used in the survey instrument.

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Figure 1. The map of Outer Coastal Plain and approximate location of Pilesgrove, New Jersey.
Source: https://www.atwineries.com/wineries/united-states/new-jersey/outer-coastal-plain/

In this study, the degree to which *OCP* elevates the competitiveness of the New Jersey wine is a point of interest, specifically:

$$H_0^1\colon WTP_{NJ} - WTP_{OCP} = 0$$

Hypothesis 1 tests for the difference in WTP between the state appellation of *New Jersey* and *OCP*. Failure to reject the null indicates that the AVA is ineffective for price premium generation.

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Table 1. Attributes of the choice experiment

Attributes	Levels	Appearance in the Choice Experiment
Appellations	OCP[a]	Outer Coastal Plain
	NJ	New Jersey, USA
	Pilesgrove	Pilesgrove, New Jersey
	California	California, USA
	Napa	Napa Valley
	USA	Product of USA
Organic	No organic claim[a]	[Blank]
	Organic	Made with Organic Grapes
Sustainability	No sustainability claim[a]	[Blank]
	Sustainable	SUSTAINABLE WINEMAKING
Price per bottle ($)	$7.99	
	$10.99	
	$13.99	
	$16.99	

[a]Base Categories of Dummy Variables, Prices are continuous.

If hypothesis 1 is rejected with $WTP_{NJ} < WTP_{OCP}$, hypothesis 2 would suggest whether the premium could be due to the omission of "New Jersey" from the label,

$$H_0^{2a}: WTP_{Pilesgrove} - WTP_{OCP} = 0$$

$$H_0^{2b}: WTP_{Pilesgrove} - WTP_{NJ} = 0$$

Pilesgrove is a town within the OCP; the *Pilesgrove* label thus represents a hypothetical sub-AVA of OCP in the vein of Calistoga AVA.[2] Rejection of hypothesis 2a with $WTP_{Pilesgrove} < WTP_{OCP}$, and the failure to reject hypothesis 2b would suggest that respondents fail to recognize the geographical relations of these New Jersey-based appellations. Also, the inclusion of *Pilesgrove* could inform producers of the potential of such townships sub-AVA.

As a rational and fully informed consumer would not have significantly different WTP for the same wine, the pattern above would indicate that the assumption of perfect information is violated. Therefore, the WTP for *OCP* is likely stemming from consumer's lack of knowledge. This strategic use of AVA is reflected in real-world examples[3] and as noted in Smith (2013).

As with all choice experiments, the number of required choice sets increases exponentially with the number of attributes, which renders a larger number of appellation labels impractical (Hensher et al., 2005). Nevertheless, the setting is sufficient to draw implications about marketing with relatively unknown AVAs.

In addition to appellations, the design also includes the Organic wine label and the Sustainable Winemaking label. These ecolabels are included to enhance realism, as it reflects wine sold in the

[2]https://www.wine-searcher.com/regions-calistoga.

[3]E.g., http://www.tastings.com/Product-Images/Wine/2018/9_23_2018/225337_fr.jpg; http://www.heritagewinenj.com/wp-content/uploads/2016/06/chenin-blanc-heritage-vineyard-white-wine-650x650.jpg; https://ballymote.files.wordpress.com/2010/03/img_4820.jpg.

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market.[4] The role of these increasingly popular labels to consumer preference has been discussed, where there remains a general lack of consensus regarding whether the labels appeal to consumers (Abraben, Grogan, and Gao, 2017; Delmas and Grant, 2014; Di Vita et al., 2019; Sogari et al., 2015; Waldrop, McCluskey, and Mittelhammer, 2017). This is despite that the market for organic wine has been expanding steadily, and various claims of sustainability have been increasingly used in marketing (Berghoef and Dodds, 2011; de La Hamaide and Denis, 2018; Ecolabel Index, 2019; Sogari, Mora, and Menozzi, 2016). Nevertheless, these ecolabels have been included here for realism, as the property is essential for data quality (Hensher et al., 2005; Louviere, Hensher, and Swait, 2000; Train, 2003). Additionally, the inclusion may minimize experimenter demand bias, which arises from respondents being overly focused on the research objectives (Sawyer, 1975).

Lastly, four levels of prices are used, which range from $7.99 to $16.99 in increments of $3.00. These prices correspond to the $10 per 750 ml bottle after-tax mean retail price nationally (Bekkerman and Brester, 2019; Quackenbush, 2017; Wine and Vines, 2017). Bekkerman and Brester (2019) show that wine purchases above the price of $20 represent only a smaller segment of the market. Thus, the price range is sensible given the goal of charting the consumer's preference at the mean level, rather than the narrower preferences of connoisseurs. The chosen range implies that the results might not reflect the market for higher-priced wines, where different evaluation criteria are likely used. Nevertheless, the proposed implementation satisfies our main objective, which is to understand how AVA affects most consumers.

The choice experiment features graphical representations of wine labels as depicted in Figure 2. In particular, the attributes appear as text on the wine labels, where the exact form is denoted in Table 1. In cases where a product is without Sustainable Winemaking or the organic grape claim, the space where the labels occupy are left blank, reflecting the common practice in the marketplace.

The study, as a positive analysis, intends to simulate the actual preference in the marketplace. Thus, respondents were not told the exact locations of the geographical labels and the definitions of Sustainable Winemaking and organic wine. This is so that consumers' preference for the attributes is not altered with the provision of information, as previous experiments have shown that such information can alter preference (Uchida et al., 2013).

To reduce hypothetical bias, i.e., respondents' tendency to inflate their stated WTP, a cheap talk script from Lusk (2003) is used in the study. The script has been shown to reduce hypothetical bias (Lusk, 2003; Tonsor and Shupp, 2011).

The choice sets are generated with D-efficiency criteria with the Partial Factorial Algorithm in JMP 13 (Crabbe and Vandebroek, 2012). The final design scores highly at 93.84%, where all main effects can be estimated (Kuhfeld, 2010). The algorithm yields 24 unique choice profiles; the choice profiles are distributed into 48 choice sets (Hensher et al., 2005). Then, the choice sets are distributed into six blocks. Each respondent completes eight choice sets, which is below the threshold of fatigue (Czajkowski, Giergiczny, and Greene, 2014).

4. Model

A mixed logit (ML) model estimates the consumer preference. The model uses random coefficients to represent taste variation, allowing consumer WTP at different percentiles to be estimated (Train, 2003). Following the Random Utility Model,

$$U_{ijt} = \alpha p_{ijt} + \boldsymbol{\mu}\mathbf{x}_{ijt} + \varepsilon_{ijt} \quad (1)$$

where U_{ijt} represents the utility level of respondent i from the wine in the choice set t's alternative j. The variable p represents the price level; its fixed coefficient avoids unrealistic WTP estimates implied by a random price coefficient (Hensher et al., 2005). The model sets

[4]Example of Organic Wine: http://www.princeofpinot.com/media/images/11_24/11_24-19.jpg;
Sustainable Winemaking: https://www.nzwine.com/media/2739/swnz-oct07.DbD1dg.jpg?width=300.

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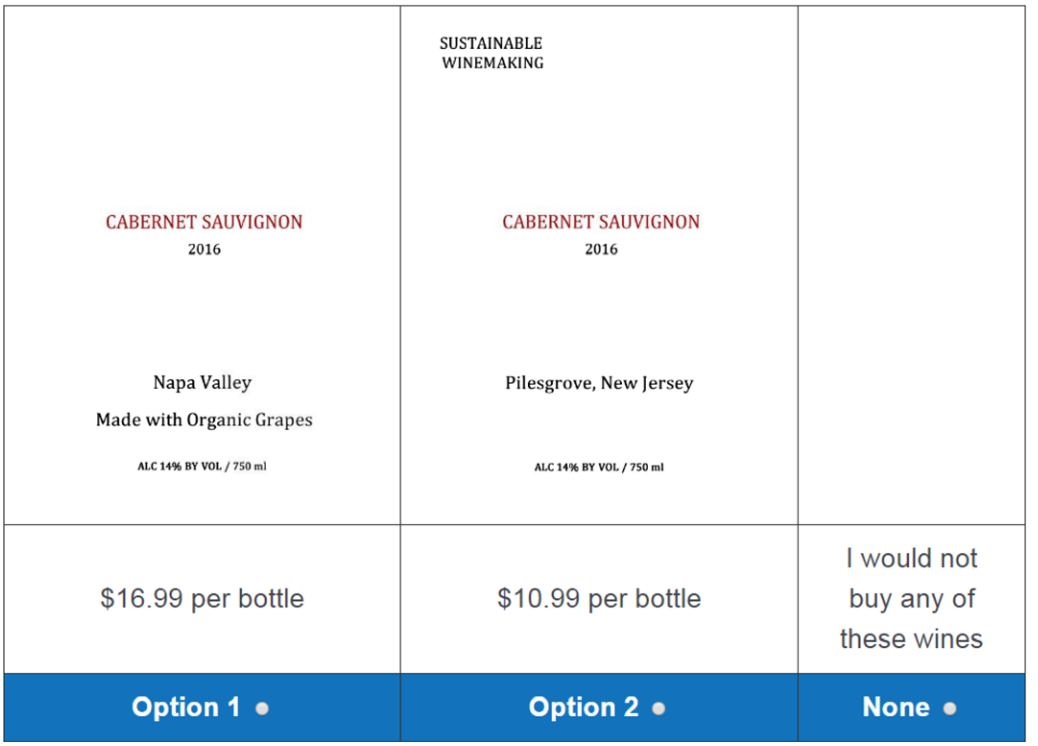

Figure 2. A sample choice set.

OCP, non-ecolabeled wines as the reference category. The dummy-coded vector **x** depicts the non-price attributes, **x** = [Opt Out, Organic, Sustainable, NJ, Pilesgrove, California, Napa, USA].[5] The coefficients associated with **x** are assumed to be normally distributed. Formally, $\boldsymbol{\mu} \sim \mathrm{N}(\boldsymbol{\beta}, \boldsymbol{\sigma}^2)$: **β** corresponds to the mean; $\boldsymbol{\sigma}^2$ corresponds to the variance term that captures unobserved taste variation. The random coefficients are specified correlated to account for correlated taste among the attributes (Hensher et al., 2005).

The model's likelihood function involves an integral without a closed-formed solution. It is thus estimated with the Maximum Simulated Likelihood Method of STATA 15's Mixlogit module (Hole, 2007; Train, 2003). The results are simulated with 2000 Halton draws, where the stability of the estimates is established (Walker, 2002).

WTP estimates are derived from the ML model. Means of the WTP are calculated as $-\beta_{attribute}/\alpha$, and their standard errors are derived with the delta method (Hensher et al., 2005). To illustrate taste heterogeneity, the median and the 25th percentile of the WTP are simulated with the Krinsky and Robb method; specifically, 1,000 vectors of $\beta_{attribute}$ are generated, wherein the random coefficients' correlation is accounted (Hensher et al., 2005).

5. Sampling

Per the Tailored Design Method (Dillman, 2007), the survey was pilot-tested with a small panel of 18 respondents which include several experts of the method; the panel's comment was used to enhance the clarity of the survey. After this, the sampling was carried out online in November

[5]The opt-out (dummy) variable is set to one to represent the option of not buying in each choice set. The coefficient thus reflects a measurement of compensation variation for the consumers to forego consumption of the wines.

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Table 2. Summary statistics of the sample

Glasses of wine consumed		
1–3 glasses	57.4%	
4–7 glasses	28.7%	
7–10 glasses	9.7%	
More than 10 glasses	4.3%	
	Sample	Population
Female	52.15%	51.01%
At least some college	61.80%	59%
Household income ($)	51.780.56	59,039
	(29,041.46)	

Notes: N = 1,047, 8 missing values in income data. Income of less than $10,000 is coded as $10,000; income of more than $100,000 is coded as $105,000; mid-points are used otherwise.
Source: Gender distribution (Kaiser Family Foundation, 2017).

2017 over a period of 21 days by Qualtrics, a professional survey company that also provided the survey software (Qualtrics, 2019). The average time taken to complete the survey is around 13 min. The respondents, per common practice, were compensated with token gifts for their participation by the online panel company.

The study targets a national distributed sample, where it elicited responses from 1,047 American wine consumers. Those who claimed no consumption of wine per week on average are screened out of the sample; the mode and median glasses of wine per week are 1–3 glasses (Table 2). Slightly more than half of the sample is female (52.15%). Most (62.2%) have some college experience, which corresponds to the U.S. population statistics of 59% (Ryan and Bauman, 2016). The reported mean household income is about $52,000—slightly lower than the median household income of $59,000 (United States Census Bureau, 2017). The lower income is potentially due to the way the top income group is coded in this study (above $100,000 is coded as $105,000). Overall, the sample corresponds reasonably to the characteristics of the U.S. population. Additionally, the sample also corresponds reasonably to the range of demographic characteristic noted in other reports (Thach and Camillo, 2018; Wine Intelligence, 2018); in particular, the education profile matches those reported in Thach and Camillo (2018) and the gender distribution to Wine Intelligence (2018); higher income than this study is noted in both reports, which again may be due to the way our data is categorized.

We evaluate if the results is skeewed by the preference of New Jersey residents, particularly if they exhibit a strong preference for *OCP*. Residents of New Jersey make up 3.4% of the sample, which tracks the population statistics (United States Census Bureau, 2017). To verify the potential bias, a ML model is tested. This model includes additional terms, where a dummy variable indicating that the respondent is New Jersey resident interacts with the appellation variables (Appendix Table A1). The results show that none of the interaction terms is statistically significant, indicating that the collective preference for the appellations of New Jersey residents is not different from the whole sample. Thus, the concern of the bias is minimal.

6. Results

For a fuller context, the respondents' perceived quality of wines is included as a preview. The ratings are tabulated in Table 3.[6] As expected, Napa implies the highest quality for the respondents; more than

[6]*California* was omitted due to a coding error in the survey instrument.

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Table 3. Quality rating by appellations

	1	2	3	4	5	Mean	Standard deviation
Product of USA	4.2%	9.2%	54.2%	22.7%	9.7%	3.25	0.90
Napa Valley, USA	1.2%	4.4%	19.5%	46.6%	28.4%	3.97	0.87
New Jersey, USA	4.5%	20.7%	49.2%	19.0%	6.6%	3.02	0.92
Pilesgrove, New Jersey	4.7%	21.6%	49.4%	18.4%	5.9%	2.99	0.91
Outer Coastal Plain, USA	2.5%	13.2%	50.8%	25.7%	7.8%	3.23	0.86

Notes: $N = 1{,}047$. 1 = far below average; 2 = somewhat below average; 3 = average; 4 = somewhat above average; 5 = far above average. The question is worded as: "Based on your intuition, what do these tell about the wine quality?"

70% of the sample perceives that the appellation implies higher than average quality. The ratings given to USA and OCP are statistically equivalent ($P = 0.64$; mean [USA] = mean [OCP]), but lower than the ratings for Napa ($P < 0.001$ in both cases). However, in this setting, "USA" was attached to "Outer Coastal Plain," which might have elevated the ratings given to OCP. The ratings given to *NJ* and *Pilesgrove* are the lowest, where the mean scores are around the "average" rating; *t*-tests suggest that both are rated lower than *OCP* ($P < 0.001$ in both cases). These results thus suggest that *OCP* is perceived as better than *NJ* and *Pilesgrove*. While the data are not directly available, the respondents are unlikely to mistake *OCP* as a California appellation, since the percentage of respondents who rated *OCP* as being above average is vastly less than the percentage who rated Napa highly; also, Californian wine, in general, is perceived positively (Orth et al., 2005).

We analyze ratings by the subsample of New Jersey residents. The main distinction is that *NJ* and *Pilesgrove* receive higher ratings than the full sample, where both are statistically equivalent to *USA*. The ratings given to the pair are also higher than *OCP* ($P = 0.013$ for mean [*NJ*] > mean [*OCP*]; $P = 0.06$ for mean [*Pilesgrove*] > mean [*OCP*]). The state's residents value products with the "New Jersey" relatively higher than the full sample. Further, the lower relative rating of *OCP* suggests that New Jersians are uninformed since the three New Jersey appellations are closely related.

7. Econometric Estimates

The ML model converges with McFadden R^2 of 26% (Table 4) (Hensher et al., 2005). The price coefficient (α) is negative ($P < 0.01$) as expected. The opt-out coefficient ($\beta_{opt-out}$) is negative ($P < 0.01$)—a sign of successful sample screening, as the respondents are interested in the products. The positive coefficient ($\beta_{organic}$) indicates that organic is a preferred attribute, although at the mean level, consumers are indifferent toward sustainable winemaking.[7] Six of eight diagonal elements of the random coefficient's Cholesky matrix are statistically significant, suggesting substantial taste heterogeneity toward the attributes (Hensher et al., 2005). A joint test that all the tested appellations are equivalent to *OCP* is rejected ($P < 0.01$), indicating that the origin labels affect consumer choice.

The utility estimates infer a hierarchy of appellations. *Napa* is the most preferred, followed by *California*; their difference is statistically significant ($P < 0.01$), suggesting *Napa* is more preferred among the two. The *Product of USA* comes third. *OCP*, the omitted category, ranks fourth. The last pair is the *New Jersey* and *Pilesgrove* wines, where they are not statistically different ($P = 0.86$).

[7]Respondents may not be informed or convinced about "Sustainable Winemaking." The insignificant ecolabel coefficient reflects previous findings. Readers can refer to Delmas and Lessem (2017), as well as Lim and Reed (2020)—the companion publication of this paper, for more discussions.

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Table 4. Mixed Logit (ML) estimates

	Main coefficients		Standard deviation	
Price	−0.23	***	FIXED	
	(0.01)			
Opt out	−4.51	***	8.70	***
	(0.17)		(0.96)	
Organic	0.25	***	0.91	***
	(0.06)		(0.15)	
Sustainable	0.05		0.23	**
	(0.05)		(0.09)	
NJ	−0.24	***	1.35	***
	(0.09)		(0.36)	
Pilesgrove	−0.26	***	0.70	***
	(0.08)		(0.22)	
Napa	1.05	***	1.19	***
	(0.08)		(0.31)	
California	0.79	***	0.42	***
	(0.07)		(0.15)	
USA	0.28	***	0.39	**
	(0.07)		(0.17)	
Log-likelihood			−6,802.19	
McFadden R^2			0.2607	
F-tests:				
$\beta_{NJ} = 0$ $\beta_{California} = 0$ $\beta_{Napa} = 0$ $\beta_{Pilesgrove} = 0$ $\beta_{USA} = 0$	$\chi^2(5) = 299.91$	***		
$\beta_{Napa} = \beta_{California}$	$\chi^2(1) = 13.88$	***		
$\beta_{NJ} = \beta_{Pilesgrove}$	$\chi^2(1) = 0.03$			

Notes: Single, double, and triple asterisks (*, **, ***) indicate statistical significance at the 10%, 5%, and 1% level. Standard errors in brackets.

These estimates largely fit the expected hierarchy of appellations, and our key interest is that the utility associated with *OCP* is significantly different from all other examined appellations.

With the negative WTP_{NJ} ($P < 0.01$), consumers prefer *OCP* over the *NJ* state appellation (Table 5). The average consumer is willing to pay about $1.00 more for the OCP wines. And 25% of the consumers are willing to pay $4.00 per bottle more for the OCP wines (Table 5). Thus, the result supports the benefit of switching from state appellation to the AVA.

$WTP_{Pilesgrove}$ is statistically equivalent to WTP_{NJ} ($P = 0.86$), but it is lower against WTP_{OCP} ($P < 0.01$). Consumers are indifferent between both wines explicitly noted as from New Jersey, despite one indicates the township and another only the state. However, *OCP* elicited a higher WTP than *Pilesgrove* when both could have been identical wines. Given that the state of origin

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Table 5. WTP derived from the ML model

		Mean ($)		Percentile ($)	
	Hypotheses	WTP		25th	75th
Opt out		−19.97	***	−29.11	−11.29
		(0.68)			
Organic		1.13	***	−1.85	4.05
		(0.25)			
Sustainable		0.20		−1.21	1.69
		(0.21)			
NJ	H^1	−1.05	***	−4.32	2.35
		(0.40)			
Pilesgrove	H^{2a}	−1.13	***	−3.75	1.24
		(0.35)			
New Jersey—Pilesgrove	H^{2b}	0.08			
		(0.42)			
California		3.48	***	1.57	5.53
		(0.32)			
Napa		4.65	***	1.43	7.92
		(0.37)			
USA		1.25	***	−0.42	3.19
		(0.31)			
California—NJ		4.53	***		
		(0.42)			
Napa—NJ		5.71	***		
		(0.47)			

Notes: Single, double, and triple asterisks (*, **, ***) indicate statistical significance at the 10%, 5%, and 1% level. Standard errors are calculated with the delta method. Percentile is calculated by Krinsky and Robb simulation that account for the correlated random coefficients. Standard errors in brackets.

is omitted from the *OCP* label, the omission may have contributed to the preference of OCP wines, as previously observed.

The OCP label affects competitiveness. There are substantial differences in WTP between Napa and California wines to New Jersey wines ($5.71 and $4.53, respectively). The OCP label lowers the gaps considerably. Switching from *New Jersey* to *OCP* reduces the gaps by $1.05 on average. The effect is pronounced at the niche level; 25% of the consumers are willing to pay only around $1.50 less for the OCP wine than the wines from Napa and California. These results again support that the AVA label is competitiveness enhancing.

Finally, the average consumer prefers *Product of USA* to *OCP*, for which they are willing to pay $1.25 higher. The preference is in line with observations that the average consumer would rely more on broader and more recognizable appellation than AVA (Atkin and Johnson, 2010; Atkin and Newton, 2012; Bruwer and Johnson, 2010; Johnson and Bruwer, 2007b). However, the preference is not generalized to the whole sample; the WTP at the 25th percentile suggests

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that consumers are willing to pay more ($0.42) for *OCP* than for the USA-labeled wine. The contrast may be due to the differences in consumers' characteristics, where the niche consumers may make use of AVAs more as a quality indicator. A question is nevertheless raised if denoting the American origin of an AVA label could be advantageous—e.g., *OCP, USA*—which future studies tailored for this purpose can verify.

8. Discussion and Policy Recommendations

To the question "do AVA labels affect consumer preference," the answer from the results is a resounding yes. The level of preference is systematically different by appellation labels. Appellations serve as a quality cue; Napa is sought after, New Jersey wines labeled as such are less desirable. The preference for *OCP* is stronger on average than the preference for *NJ* and *Pilesgrove*. These observations bolster the position that the AVA may be elevating consumer preference for the New Jersey wines. The answer to *should* AVAs be adopted, however, is more nuanced.

The Cumulative Prospect Theory explains the observed behavior intuitively. In nutshell, the theory suggests that risk attitude is outcome dependent (Tversky and Kahneman, 1992). In context, the perception ratings imply buying New Jersey wines is viewed as a probable bad outcome. The theory observes that people are more risk-seeking when a bad outcome is more likely, i.e., in the choice between New Jersey wines and *OCP*, *OCP*'s unknown quality is more appealing. The strategy of "don't say it's from New Jersey" thus has its merit (Smith, 2013).

Nevertheless, there may be exceptions especially for wineries targeting local consumers. Residents of New Jersey have given higher ratings for the wines where the state name is mentioned than from OCP.[8] The discrepancy shows that consumers can be uninformed even if the AVA is within one's home state. When the primary market is local, the wineries should instead use appellation labels with the state name, as responding to consumers' desire to support local farmers and businesses may be more rewarding (Darby et al., 2008; Di Vita et al., 2019; Lim and Hu, 2016; Martinez et al., 2010).

Also, the strategy to adopt AVA can be less appealing in the short term. As the results show, the generic American appellation may appeal to certain segments of consumers. Nevertheless, adopting the American appellation would forego the potential to forge a regional identity, where the success—as Napa and Willamette Valley show—can bring about long-term rewards (Cross et al., 2011b; Hira and Swartz, 2014).

While the analysis shows a potential benefit, it is insufficient to claim that all AVAs are preferred over state appellations. The effect likely depends on the quality projected by the specific AVA, which is dependent on the semantics. Also, the context of our analysis is specific to New Jersey; while many states' winemaking reputation may be comparable, others such as Washington and Oregon have advanced considerably in recent years. Additionally, the validity of our findings could be verified against reveal preference data in future studies. Interested winemakers should carefully gauge the cost-benefit of their proposed AVA, as well as the winemaking reputation of their state, of which our analysis may serve as a template.

The fact that AVA influences consumer preference shows that the appellation label could be valuable for wineries to shape their regional identity. This suggests that AVA should be viewed as a common asset, of which the Collective Action Theory can be a useful guide (Ostrom, 1998). Wineries within an AVA can work collaboratively to increase the reputation of an AVA by sharing production knowledge and resource (Hira and Swartz, 2014; Johnson and Bruwer, 2007b). The reward for an improved quality image of an AVA could be immense; reputation increases of even a subset of wineries within an AVA may feed into the appellation's wine prices, especially for wines that are in the lower price ranges (Costanigro, McCluskey, and Goemans, 2010).

[8]The higher rating does not result in statistically higher preference, see Appendix Table A1.

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Conversely, the AVA should not be abused as a tool to deceive; in repeated purchases, consumer experience unveils the mystique of an unknown AVA. After this, the AVA may serve either as a signal of good or bad quality contingent on consumers' experience (Steenkamp, 1990). AVAs should be viewed as a tool for aspiring wine regions to gain competitiveness and to form a regional brand reputation, but it should not be viewed as a substitute for long-term improvements in quality.

The Mississippi Delta AVA serves as a testament that AVA is not a panacea, the AVA—established in 1984—has failed to jump-start production volume of the AVA, which covers northwestern Mississippi, parts of Tennessee, and Louisiana (Appellation America, n.d.). While AVA appears a promising but supplemental tool, quality improvement should remain the top priority for aspiring wine regions.

Noteworthily, the results unveil an inherent conflict in the dual purposes of AVA in simultaneously promoting producer interest and consumer interest. AVA can be valuable as a marketing tool, but it can arguably harm consumers when pursued as a disguise of poor wine quality. If the decision to use AVA rests upon disguising a negative with an unknown, whether the practice constitutes exploitation of consumers' lack of information is concerning. Parallels can be drawn from the "Natural" label, which is misunderstood by consumers and yet effective as a marketing tool (Abrams, Meyers, and Irani, 2010). The issue should be critically examined in future research and policy debates, especially on what AVA implies to consumers.

If it is deemed that consumers are misguided by AVAs, this deleterious effect could be addressed with a mandate of full disclosure. This suggestion follows the calls from previous studies that a more meaningful, broader regional name should be attached to an AVA label (Atkin and Johnson, 2010; Johnson and Bruwer, 2007a, 2007b; McCutcheon, Bruwer, and Li, 2009). Such disclosure can reduce the information gap and enable consumers to make better-informed decisions.

Also, the ethical issue may be resolved if AVA is elevated to an official seal of quality. Such a quality stipulation might be necessary to legitimatize and preserve the health of the AVA system; consumers who are repeatedly disappointed by AVA could conceivably discount the designation as merely a marketing ploy. To prevent the devaluation of AVA, quality standards can be established such that all products under an AVA must meet the distinctive characteristics of terroir—such as sugar content of grapes, the alcohol content of wines, to the molecular characteristics of an appellation (Mendelson, 2016). The change involves production guidelines, putting the AVA more in line with the French AOC system, which many see as more substantive than the present set-up of the AVA system (Johnson and Bruwer, 2007a; Mendelson, 2016).

9. Conclusions

Many AVAs have been created, and more will likely be created, despite the substantial costs of such endeavor (Alcohol and Tobacco Tax and Trade Bureau, 2020b; Johnson and Bruwer, 2007b). Yet relatively little is known about the effect of an AVA to a less renowned wine region. This study examines consumer WTP of such AVAs, using the OCP of New Jersey as an example.

The OCP AVA generates a higher WTP, in general, vis-à-vis its state appellation. Further, the AVA label reduces the WTP gap between the New Jersey wines to Californian and Napa wines, suggesting that the AVA label adds a competitive advantage. Cumulative Prospect Theory may explain the preference of an unknown AVA over a less-prestigious appellation, as consumers are risk-seeking when facing a probable bad outcome (Tversky and Kahneman, 1992).

AVA may be a double-edged sword. Its dual mandate may be increasingly fractious with ever more AVAs. If consumers deem as deception the intention to disguise an unglamorous wine origin with an AVA, the marketing benefits come at a cost to consumers. Whether the AVA system can truly benefit producers and consumers in all situations must be further scrutinized.

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Appendix

Table A1. ML model with New Jersey residents interaction terms

	Coefficients	Standard error	*P* value
Price	−0.226	0.008	0.000
Opt out	−4.509	0.172	0.000
Organic	0.254	0.057	0.000
Sustainable	0.045	0.047	0.339
NJ	−0.274	0.091	0.003
Pilesgrove	−0.264	0.080	0.001
California	0.794	0.072	0.000
Napa	1.056	0.083	0.000
USA	0.293	0.072	0.000
Interaction terms with New Jersey Residents			
NJ*NJR	1.168	0.752	0.121
OCP*NJR	0.156	0.646	0.809
Pilesgrove*NJR	0.430	0.690	0.533
California*NJR	−0.066	0.642	0.918
Napa*NJR	0.044	0.630	0.944
USA*NJR	−0.179	0.669	0.789
[Cholesky matrix output omitted]			
Log-likelihood		−6,796.27	
McFadden R^2		0.2614	

Note: NJR denotes New Jersey Residents.

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