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Classification and re-classification: Oregon's Willamette Valley AVA and its new sub-AVAs*

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Abstract: The creation of new, sub-AVAs within Oregon's Willamette Valley AVA may indicate a desire on the part of well-established wineries to "split" or separate their social grouping from those with lesser qualifications. Once their social cluster has been differentiated, we theorize that these wineries would be able to capitalize on their newly developed distinctiveness and collect a larger regional reputation premium. Based on 2,221 Wine Spectator rated pinot noir wines between 1984 and 2008, regression analyses demonstrate that indeed regional reputation premiums have significantly increased with the creation of sub-AVAs; and that the price-quality ratio gap between sub-AVAs and the rest of Willamette has widened. (JEL Classification: C20, Q12, Q13, L66)

Key Words: Wine, classification, terroir, AVA, regional reputation premium.

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1. Introduction

Classification matters in winemaking. As an experiential good, a wine's classification is of heightened importance. "Great wines don't come from just anywhere," notes *The Wine Bible* author Karen MacNeil. (MacNeil, 2001, p. 7) Indeed, in wine classification, both producers and consumers value a wine's "terroir", a rather ambiguous concept related to the geographic local of a wine's grapes. Generally, terroir is understood to be a reflection of the interaction between a particular location's climate, soil, cultivar, and human practice. (Van Leeuwen and Sequin, 2007; and Vaudour 2010) However, despite its evident importance, there is no standardized definition of terroir. For instance, in their analysis of the French wine industry, Spielmann and Gelines-Chebat (2012) find that producers, vendors, and high and low involvement consumers all have their own taxonomy of terroir terms.

Despite the lack of commonly accepted definition, there is an extensive literature on terroir and its effect on quality and price of wines and vineyards, e.g., Ashenfelter and Storchmann 2010; Gergaud and Ginsburgh 2010; and Cross *et al.*, 2011. It is well established that terroir can have a demonstrable effect on a wine's worth; however, there is no consensus on whether terroir matters as a fundamental reality or just economically due to the perceived reputation of a particular area. Nevertheless, the price at which winemakers can sell their wine varies depending on the wine's origin. (Lecocq and Visser 2006; Stuart and Smith 1997; 1998; Gokcekus and Finnegan 2013) Along with a wine's price and expert rating, consumers use a wine's regional reputation as a quality indicator; thus, regions known for their quality are able to capitalize on their reputation. (Bicknell and MacDonald, 2012, Stuart and Smith, 1997, and Atkin and Johnson, 2010)

The French Champagne Appellation d'Origine Controlee (AOC) is an excellent example of regional reputation capitalization. For those winemakers within the Champagne AOC, grapes are worth over a million Euros per hectare; winemakers on the outside of Champagne's fence collect a mere €5,000 per hectare. (BBC, 2008) Understandably, vineyards clamber to gain entry into the prestigious Champagne AOC. The process of gaining the AOC label is not easy—applying takes upwards of ten years and applications must meet the approval of the state council, France's highest administrative body—and there is no guarantee of entrance at the end of the lengthy process. In fact, the Champagne AOC has not expanded since 1927.

While winemakers in France struggle to become a part of established AOCs, U.S. winemakers in Oregon are pursuing the development of new, distinct American Viticultural Areas (AVAs) within those already established and recognized. The relatively young Oregon wine industry seems to be at an earlier stage of the Champagne story. Wineries are opting to create small, select regions, perhaps in order to eventually garner a superior reputation similar to that of Champagne. As Zhao (2005, p. 190) points out, a wine's appellation "signifies a wine's standing in the market." Thus, elite wineries will often choose to label their product with the most exclusive appellation available in order to signal their higher status. (Zhao, 2005)

In this study, we focus on the phenomenon taking place in Oregon, i.e., the establishment of sub-AVAs within an existing AVA, in particular within the Willamette Valley AVA. We argue that the establishment of sub-AVAs in the Willamette Valley was part of a dynamic process; it was an act of re-classification by "better" wineries to distinguish themselves from "lesser" wineries and ultimately collect a higher regional reputation premium, *a la* Douglas (1986, p. 108), i.e., the people make new kinds of institutions, the new institutions make new labels, and the new labels make new kinds of people. The importance of these new kinds of people speaks to the influence of classifications and is indicative of how classifications are often representative of social standing, social control, and political power. (Zhao, 2005)

To explain the Oregon phenomenon we put forward the following hypothesis: Well-established wineries with good reputations among wine critics and consumers seek to differentiate themselves from lesser known wineries that share the same AVA label by establishing sub-AVAs. This hypothesis is built upon the idea that if the quality of wines produced by a particular winery is consistently above the AVA's average quality, then this winery is effectively collecting a negative regional reputation premium. Those wineries making wines below the AVA's average quality are essentially free riding on the success of the other wineries; and, from the perspective of the more reputable wineries—wineries with consistently rated high quality wines—bringing down the reputation of the region as a whole. Accordingly, we argue that in order to escape this predicament, more reputable wineries pursue increased distinctiveness through the creation of new, more exclusive regions. Hence, while in France winemakers seek to raise their reputations (and their profits) by associating with well-respected wineries that have already cemented their exclusive zones, in Oregon winemakers seek to improve their reputations by separating themselves from free riders.

To test our hypothesis, the paper is organized as follows: First, after discussing the U.S. AVA system, we briefly describe the key features of the Willamette Valley AVA by highlighting the history of the wine industry in the region, and the current acreage, volume of production, and type of grape varieties planted. Second, we document the recent sub-AVA applications, using the formal applications and the public comments received by the Alcohol and Tobacco Tax and Trade Bureau (TTB). Third, in the models section we formally introduce our theoretical framework to model the re-classification of these sub-AVAs, and derive our workable hypotheses. Fourth, based on the 121 wineries and their 3,297 wines rated by the Wine Spectator between 1996 and 2008, we conduct statistical tests to check the validity of our hypotheses. Fifth, and finally, we provide a summary and offer concluding remarks.

2. The U.S. AVA system and Oregon's Willamette Valley AVA

In the United States, the boundaries of American wine appellations of origin are legally defined by the Alcohol and Tobacco Tax and Trade Bureau (TTB) under U.S. regulation 27 CFR 4.25. Accordingly, appellations of origin are limited to the following geographical boundaries: (1) A country; (2) a U.S. state or the foreign equivalent; (3) for U.S. wine, a listing of up to 3 states (multi-state appellation); (4) a U.S. county or the foreign equivalent; (5) for U.S. wine, a listing of up to 3 counties (multi-county appellation); or (6) a U.S. or foreign government recognized delimited grape-growing area (referred to as a "viticultural area" under U.S. regulations).

The TTB further defines an American Viticultural Area (AVA) as "A delimited grape-growing region having distinguishing features". (Code of Federal Regulations, Title 27) The distinguishing features referenced by the definition include climate, geology, soils, physical features, and elevation. Furthermore, the delineated boundary of an AVA must be established with U.S. Geological Survey maps and use specific map features, such as political entity lines, roads, and human-made features, to establish the discernable boundary of the AVA.

The U.S.' AVA system originated in 1978; earlier wine appellations primarily used state and county borders as their boundary lines. (Appellations, 2009) Recognized in 1980, the Augusta AVA in Missouri was the first officially designated AVA. The U.S. system of designating wine appellations and AVAs is distinct from many of the European appellation classifications in place. Unlike France, for example, the AVA system places no restrictions on crop yield, viticultural

regulations, or varieties used. AVAs are solely a geographic designation. (Coates, 2000) However, in order to use an AVA label, the labeled wine must be at least 85% derived from grapes grown within that particular AVA and the wine must be finished in the state encompassing that AVA. (27 CFR 4.25)

The U.S. allows anyone to petition the TTB for the creation of a new AVA or for a name/boundary change of an existing AVA. As part of the application, petitioners must supply name evidence (evidence regarding how the proposed name is “currently and directly associated” with the proposed AVA area), boundary evidence, distinguishing features, and a map/boundary description of the proposed AVA. The petition process for a sub-appellation within an existing AVA is similar to that of an AVA with the additional requirement that the petitioner must explain “how the proposed AVA is sufficiently distinct from the existing AVA”. (27 CFR 4.25)

Oregon Wine

Swedish immigrant Peter Britt is often credited with being Oregon’s first vintner. (Engeman, 2008) Heralding Oregon’s ascension to statehood, Britt’s vineyard, the Valley View Vineyard, opened in the late 1850s. Despite this relatively (for the U.S.) early foray into the wine industry, Prohibition and the economic crisis of the Great Depression ensured that Oregon’s early grape vineyards never realized their full potential. (Hall, 2001) Only in the latter half of the 20th century was Oregon able to establish itself as a serious producer of wines.

The modern Oregon wine industry owes its existence to the migration of a number of winemakers from the University of California at Davis to Oregon in the 1960s. (Gaffney, 2011) Contrary to the prevailing opinion at the time, these winemakers believed that Oregon would be ideal for cultivating cool-climate grape varieties. One of these UC Davis expatriates, Richard Sommer, was “widely considered the founder of Oregon’s modern wine industry”. (Smith, 2011) In 1961, Sommer founded HillCrest Vineyards in Oregon’s Umpqua Valley, where he planted the first post-Prohibition *vitis vinifera*. Shortly thereafter David Lett and Charles Coury, colleagues of Sommer’s from UC Davis, introduced Pinot Noir in the state. Unlike Sommer, however, Lett and Coury settled in what is now the Willamette Valley AVA; Coury had argued in his graduating thesis that the Willamette Valley would support cool-climate grapes. Lett’s 1975 Eyrie Vineyard South Block Reserve Pinot Noir is credited with “put[ting] Oregon on the

map”, as it placed within the world’s top 10 at the 1979 Gault-Millau French Wine Olympiades. (Hall, 2001)¹

Since the revival of the industry in the 1960s, Oregon has become a world-renowned wine region. As a state, Oregon is the fourth largest wine producer nationally, behind California, New York, and Washington. (Hodgen, 2008) In 2011, Oregon reported having 463 wineries and 849 vineyards. (USDA, 2012 and Southern Oregon University, 2012) According to the 2011 report on production, Oregon set a record high in 2011 with grape production at 41,500 tons. (USDA, 2012) By planted acreage, the five top varieties are Pinot Noir, Pinot Gris, Chardonnay, White Riesling, and Cabernet Sauvignon. While case production information is unavailable for 2011, the industry as a whole sold 1,930,763 cases of the 2010 harvest for a total estimated value of \$252 million.

‘INSERT TABLE 1 HERE’

Unlike many of the California wineries, most of the Oregon producers operate on a small scale; Oregon’s top 20 wineries (in terms of production) account for approximately 55 percent of Oregon’s total production. (Klooster, 2012) The state is also unique in its approach to winemaking in that many of its wineries have adopted sustainable, organic, or biodynamic practices. (Tsui, 2010) According the Oregon Wine Board, 38% of Oregon’s planted acreage now carries some form of sustainability certification.

Currently, there are 17 AVAs/sub-AVAs within Oregon, although some of these—such as the Walla Walla Valley AVA—are primarily located in the surrounding states.² (Oregon Wine

¹ For further information regarding the history of the Oregon wine industry please consult Lisa Hall’s excellent *Wines of the Pacific Northwest*.

² The seventeen Oregon AVAs or sub-AVAs are the following: 1) Willamette Valley, 2) Dundee Hills, 3) Chehalem Mountains, 4) Eola-Amity Hills, 5) McMinnville, 6) Yamhill-Carlton, 7) Ribbon Ridge, 8) Southern Oregon, 9) Umpqua Valley, 10) Red Hill Douglas County, 11) Elkton Oregon, 12) Rogue Valley, 13) Applegate Valley, 14) Columbia Gorge (shared with Washington), 15) Columbia Valley (shared with Washington), 16) Walla Walla Valley (shared with Washington), and 17) Snake River Valley (shared with Idaho). It is important to note that #2-#7 are the sub-AVAs of #1; #9 and #12 are sub-AVAs of #8; #10 and #11 are sub-AVAs of #9; and #13 is a sub-AVA of #12.

Board) While wineries and vineyards have traditionally been concentrated in the cooler climates of Oregon's northwest and southeast, interest in wine production in the southwestern region of Oregon inspired the creation of the Southern Oregon AVA in 2005. (O'Hare, 2012) Pinot Noir continues to account for more than half of Oregon's production, and, according to Wine Spectator, Oregon's pinot noir is unparalleled within the nation. (Tims, 2012)

Willamette Valley AVA

Willamette Valley is the heart of the Oregon wine industry. Officially established as an AVA in 1984, it was within Willamette that several of the early UC Davis expatriates tested their theory concerning the successful growth of cool climate varieties. (Hall, 2001) Their success inspired emulation; the Willamette Valley AVA is Oregon's largest in terms of production, acreage, and number of wineries.³ According to the 2011 reports, the Willamette Valley AVA now has over 300 wineries and over 15,000 planted acres. (USDA, South Oregon University) USDA 2011 production statistics revealed that the Willamette Valley produced over 29,000 tons of grapes; the entire Oregon Wine industry produced 41,500 tons.

With the first applications approved in 2005, the Willamette Valley AVA has been further divided into 6 sub-AVAs: McMinnville, Dundee Hills, Eola-Amity Hills, Chehalem Mountains, Ribbon Ridge, and Yamhill Carlton. (Willamette Valley AVAs, 2010) The Willamette Valley is also unofficially divided into north/south regions. (South Willamette Wineries, 2013) The line for this division is typically cited as having the same latitude as that of Salem, Oregon.

'INSERT TABLE 2 HERE'

Willamette's cooler climate supports early-ripening varieties, such as pinot noir. (O'Hara, 2012) Willamette is actually Oregon's primary producer of pinot noir; 20,000 tons of the approximately 24,000 tons of the 2011 Oregon pinot noir grapes were grown in Willamette. The AVA, however, does produce small quantities of at least 26 other varieties. (Everyvine, 2013) In

³ For in-depth Willamette Valley winery profiles, see Haeger (2008); for an insider's look of a year in the life of a Lange Estate Winery and Vineyards in the Red Hills of Dundee, Oregon, see Doyle (2006).

addition to its distinct climate, Willamette contains three different soil types conducive to grape growing: basaltic, sedimentary, and loess. (Gaffney, 2008) Industry experts are prone to claiming that it is the differences between these soil deposits that are responsible for the diversity in Willamette’s pinot noir offerings. (Cole, 2011)

3. Six new sub-AVAs in the Willamette Valley AVA

In the early 2000s, the existing Willamette Valley AVA underwent an internal transformation; the TTB received several petitions for the creation of sub-AVAs within the greater Willamette Valley. The first of these applications was published by the TTB in June of 2003. (Notice No. 12) Requested by Kevin Byrd, of Youngberg Hill Vineyards, the petition asked that the TTB establish the “McMinnville” AVA within the greater Willamette Valley AVA. As grounds for the sub-AVA’s creation, the petition cited the unique elevation of the 14 wineries and 523 acres of vines that were to be included within the proposed AVA. These wineries were all between 200 and 800 ft of elevation; according to Byrd, this altitude difference caused McMinnville to have a soil and microclimate that was distinct from the surrounding area of Willamette. In keeping with his assertion that it was the elevation that made McMinnville an exclusive region, the geographic boundaries he suggested for the McMinnville AVA included some land that would be excluded from the created AVA, as that land was not within the 200-800 ft elevation range.

Byrd’s petition caused some controversy among those wineries and vineyards that were in the geographic boundaries of McMinnville, but would be excluded from the AVA on the grounds of their altitude. Linda and Arthur Lindsay of Mystic Mountain and Stone Wolf Vineyards both wrote protesting the higher altitude constraint, as their vineyards had elevations of over 1200 ft. (Comments: Notice No. 12) Byrd responded to the concerns of the Lindsay’s by suggesting to the TTB that the “800’ elevation exclusion be eliminated from the proposed boundary criteria (except where it defines the outside most boundary of the AVA)”.

‘INSERT TABLE 3 HERE’

The TTB’s final ruling removed the elevation requirement and included all land within the geographic boundary of McMinnville, regardless of elevation. (RIN 1512–AC78) McMinnville

was found to be distinct on the basis of its geographic and climatic features and publically established as a separate AVA in 2005.

McMinnville was only the first of the petitions for sub-AVAs within Willamette. In August of 2003, the TTB published an application from Alex Sokol-Blosser (then secretary of the North Willamette Valley AVA Group) concerning the creation of the “Dundee Hills” AVA. (Notice No. 14) Sokol-Blosser argued that a variety of distinct geographical factors, such as elevation, terrain, climate, and soil, made the Dundee Hills region deserving of sub-AVA designation. Additionally, Sokol-Blosser provided name evidence supporting the selection of “Dundee Hills” for the AVA, such as excerpts from a 1912 article in the *Oregon Historical Quarterly*. The 13 comments that the TTB received regarding the creation of the Dundee Hills AVA were unanimously in support of the new viticultural area; most shared the opinion of commenter Don Lange that Dundee Hills was “the oldest, most prestigious winegrowing region in the state” and deserved its own appellation (Notice No. 14, Comments). In 2004, the TTB ruled to support the creation of sub-AVA Dundee Hills and the appellation was formally adopted in 2005. (RIN 1513–AA50)

The publication for petitions regarding the creation of the sub-AVAs Eola Hills, Chehalem Mountains, Yamhill Carlton, and Ribbon Ridge followed shortly behind those for McMinnville and Dundee Hills, being published by the TTB in September, October, October, and November respectively. Like the application for Dundee Hills, the Chehalem Mountains petition was sent from Alex Sokol-Blosser; however, the actual authors of the application were pioneer vintners David Adelsheim, Paul Hart, and Richard Ponzi. (Notice No. 18) Unlike the Dundee Hill petition, these applicants did not argue that the Chehalem Mountains were unique on the basis of its soil. Instead, the Chehalem Mountains region deserved a separate AVA on the basis of its terrain, elevation, and climate. Of these, the petition argued that it was “the physical appearance of the Chehalem Mountains” that was its most distinguishing feature. All comments received by the TTB supported the petition and Chehalem Mountains became an official AVA in 2006. (RIN 1513–AA57)

Interestingly, the application for the Ribbon Ridge AVA was actually approved prior to that for the Chehalem Mountains AVA, despite the fact that Ribbon Ridge is actually a sub-AVA of the Chehalem Mountains. (One could consider Ribbon Ridge a “sub-sub” AVA of the Willamette Valley.) Again Alex Sokol-Blosser sent the petition, this time its authors were established winery owners Harry Peterson-Nedry and Doug Tunnell. (Notice No. 21) Like the

argument presented in the Chehalem Mountains petition, the Ribbon Ridge application placed great import on the distinct nature of the region's topographical features. Furthermore, while the greater Chehalem Mountains area did not have uniform soil deposits, the soil found within the more narrowly defined boundaries of Ribbon Ridge was primarily marine sedimentary. On the basis of its topography, soil, and (to a lesser extent) its elevation and climate, and after receiving one supporting comment, the TTB approved the establishment of the Ribbon Ridge AVA in 2005. (RIN 1513-AA58)

Also approved in 2005, the 2003 application for the Yamhill Carlton AVA focused on the region's soil and elevation as the primary evidence supporting the establishment of a new AVA. (Notice No. 19) The boundaries proposed for the Yamhill Carlton AVA were based on where the ancient sedimentary soils of Yamhill Carlton gave way to the volcanic or finer-textured soils of the surrounding area. As was the case in the establishment of the Ribbon Ridge AVA, the TTB received 1 comment regarding and supporting the creation of the Yamhill Carlton AVA. (RIN 1513-AA59)

Of the petitions for sub-AVAs, the application for the proposed Eola Hills AVA generated the most public disagreement. Almost all of the 86 comments received by the TTB expressed serious concern over the proposed name of the sub-AVA (Notice No. 15). Such concern stemmed from the fact that, if the TTB had approved the application for the Eola Hills AVA, the popular Eola Hills Wine Cellar would have been forced to change its name. In order for a winery to put an AVA on its label, 85% of its grapes must come from that particular AVA; the Eola Hills Wine Cellar believed it would be unable to meet this criteria. Moreover, under federal law wineries cannot use AVA names in their brand name, unless they receive a "grandfather" exemption. (76 FR 3489) At the time of the petition, a winery was only eligible for the exemption if it had a Certificate of Label Approval (COLA) issued prior to July 7, 1986. (76 FR 3489) The Eola Hills Wine Cellar, however, had begun operating in 1987 and would therefore have been prevented from receiving such an exemption. In response to the petition—which was authored by Russell Raney and Ted Casteel—the Eola Hills Wine Cellar mobilized both its loyal patrons (this was the only instance in Willamette's 6 sub-AVA petitions in which non-members of the wine industry provided public comments) and its lawyers. In its final ruling on the proposed AVA, the TTB agreed with the petitioners that the area was unique in its soils, geology and temperate climate. (RIN 1513-AA41) However, the TTB also found that there was

sufficient name evidence to call the sub-AVA Eola-*Amity* Hills. With the name change, the operation of the Eola Hills Wine Cellar was unaffected by the creation of the new AVA.

4. Motivation for re-classification: A Model

According to Zeruvabel (1996) we experience the world in which we live as “discrete chunks.” Zeruvabel describes lumping as “the mental process of grouping ‘similar’ things in distinct clusters” and splitting as “separating ‘different’ clusters from one another,” and argues that these diametrically opposite cognitive acts complement each other. Using these complementary, but also contradictory cognitive processes, we manage to categorize—which is the main act of classification. (p.421) Classification is particularly important in the wine industry, as consumers use reputation, which is often regionally based, as a proxy for quality, which can only be determined upon consumption. (Bicknell and MacDonald, 2012) Although the research of Johnson and Bruwer (2007) suggests that the creation of sub-AVAs is diluting the brand power of wine regions, we hypothesize that the creation of sub-AVAs by wineries with already established reputations allows those wineries to separate from others that may be free riding on the reputation of the better wineries. Zhao (2005) argues that classifications “often result in differentiations in social standing among actors (or objects),” a motivation we believe incited the development of sub-AVAs in Willamette. (p. 187) The creation of new, sub-AVAs in Oregon indicates a desire on the part of well-established wineries to “split” or separate their social grouping from those with lesser qualifications; once their social cluster has been differentiated, these wineries are able to capitalize on their newly developed distinctiveness and collect a larger regional reputation premium. Thus, we expect our analysis to demonstrate that 1) regional reputation premiums have increased with the creation of sub-AVAs; and 2) that the price-quality ratio gap between sub-AVAs and the rest of Willamette has widened.

5. Data and Analyses

In this section, we first describe the compilation of our dataset and the various data cleaning methods we applied. Using this data, we then conduct statistical tests to check the validity of our

hypotheses and depict our results. Finally, we discuss the implications of our results and offer concluding remarks.

Data set

Our initial dataset was drawn from Wine-Spectator's list of all of the Oregon wines rated from the year Willamette Valley AVA established (1984) through 2008 and had 4,317 unique wine entries. For data cleaning, we made several deletions to this dataset based on the following six criteria. First, wines were removed if their winery was not physically situated in Oregon. Several California and Washington wineries contract grapes from Oregon vineyards and then sell Oregon wine; we excluded these wines. Second, as our project is only concerned with wineries within the Willamette Valley AVA or one of its sub-AVAs, we deleted wines produced by Oregon wineries from other AVAs, for instance wines from the Rouge Valley AVA were excluded. Third, we also excluded wineries that bottled from several AVAs, since these wineries lacked obvious affiliation with any particular AVA. Fourth, we removed all wines by wineries that were no longer operational. With these parameters, we identified 121 excludable wineries from our sample and, after correcting for the exclusion of these wineries, retained 3,351 unique wine entries.

Fifth, for each winery, we collected information about two measures of size: acreage and cases produced per year. To report both of these measures we endeavored to rely on publically available sources. Acreage information was primarily sourced from the winery's business website, the website oregonpinotnoirwine.com, or the website princeofpinot.com. Acreage is equivalent to total acres planted of all varieties in the year 2012. For information on the number of cases produced per year, we again used the winery's business website when possible. In addition, we sourced case production information from the following websites: winetrailtraveler.com, oregonuncorked.sutromedia.com, princeofpinot.com, wineglobe.com, winebusiness.com, avalonwine.com, and winepressnw.com. We called 61 of the wineries in our dataset and spoke to representatives at 31 of these wineries. When given a case production range by the winery representative, we listed the higher number. We then emailed all wineries for which we were unable to find case production information online and could not reach by phone. We received 9 responses to our email inquiry as of 1/15/2013, after which we opted to remove

all remaining wineries without case production data from our sample. After this final deletion, we had 3,297 unique wine observations from 121 wineries.

Sixth and finally, since 95% of the wines rated by the Wine Spectator are pinot noir and clearly the Willamette Valley is known as pinot noir region, we conducted our analyses on 2,211 pinot noir wines.

Analysis

Using our dataset with 2,211 pinot noir wines rated by the Wine Spectator between 1984 and 2008, we assessed the regional reputation premium of wines in both the six sub-AVAs and the rest of Willamette Valley “before” and “after” the establishment of the sub-AVAs. To do so, first, we calculate the price-quality ratio of each region’s wines before and after the re-classification. The prices are in constant 2000 U.S. dollars. The quality is the points assigned to that wine by the Wine Spectator. The price-quality ratio is the ratio of the price of each bottle divided by its points. The “before” average is the arithmetic average from 1984 until 1999, and the “after” average is the arithmetic average for the years from 2006 until 2008. (In 1984 Willamette Valley AVA was established; in 2000 sub-AVA movement started; and in 2006 all of the studied sub AVAs were officially established.)

‘INSERT TABLE 4 HERE’

As Table 4 indicates, prior to reclassification, for the rest of the Willamette—those wineries that were not included in any of the new sub-AVAs, designed here as the “the others”—the average price was \$22.42; quality was 82.4 points; and the price-quality ratio was 0.27. Three of the now sub-AVA regions, namely Chehalem Mountains, Eola-Amity Hills, and McMinnville, had a lower price-quality ratio than the rest of Willamette, 0.25, 0.24 and 0.20 respectively. Ribbon Ridge had the highest price-quality ratio of 0.32. The price-quality ratio range was relatively narrow, between 0.20 and 0.32.

After reclassification, prices, quality, and, most importantly, the price-quality ratio of Willamette Pinot Noirs have all increased. Specifically, after reclassification 1) for the “others” the average price was \$31.20; quality was 88.1 points; and the price-quality ratio was 0.35; and 2)

each of the sub-AVAs had an equal or higher price/quality ratio than the rest of Willamette; and moreover, 3) the price-quality ratio range widened and became 0.35 to 0.52.

To assess the effect of sub-AVA creation, we set the following model and estimate the coefficients to quantify the sub-AVA-reputation premium before (1996-2000) and after (2003-2008) the creation of the sub-AVAs:

$$\text{Price/Quality}_{it} = a + b_1\text{CHE-MNT}_{it} + b_2\text{DUN-HILL}_{it} + b_3\text{EOL-AMI}_{it} + b_4\text{McMIN}_{it} + b_5\text{RIB-RID}_{it} + b_6\text{YAM-CAR}_{it} + e_{it}.$$

In this regression equation, $\text{Price/Quality}_{it}$ is the price-quality ratio of wine i at time t ; $i=1, 2, \dots, 2,211$; $t = 1984, 1985, \dots, 2008$; CHE-MNT, DUN-HILL, EOL-AMI, McMIN, RIB-RID, YAM-CAR are the dummy variables taking values of “1” for each sub-AVA, namely, Chehalem Mountains, Dundee Hills, Eola-Amity Hills, McMinnville, Ribbon Ridge, and Yamhill Carlton District, respectively, and “0” otherwise; and e_{it} is a well-behaving random error term.

‘INSERT TABLE 5 HERE’

Table 5 summarizes the robust regression results for “before” and “after” periods in column (2) and column (3).⁴ According to the estimation results presented in column (4), 1) after reclassification, the price-quality ratio for all portions of Willamette (sub-AVAs and the greater AVA) increased; most importantly, however, 2) the gap between sub-AVAs and the “others” widened.

The price quality-quality ratio increase was significant for four of the sub-AVAs at a 1% statistical significance level or better. Although the results for two of the six sub-AVAs, Eola-Amity Hills and McMinnville, were not statistically significant, their price-quality ratios also increased.

⁴ The results presented in Table 5 are the robust regression results; we utilized the robust regression command in Stata, `reg`, to take into account the presence of outliers or influential observations. As expected due to the then non-existence of the sub-AVAs, the goodness of fit measure (R^2) for the before period is quite low.

To better demonstrate the sub-AVA creation effect on price-quality ratios, we calculated the “before” and “after” price for a hypothetical bottle of wine with a rating of 90 points by the Wine Spectator from each sub AVAs and the rest of the Willamette—“others”. Table 6 summarizes the results. As is shown in column (3), before the creation of the sub-AVAs, three of the unofficial (at that time) sub-regions of Willamette, namely Chehalem Mountains, Eola-Amity Hills, and McMinnville actually collected a smaller premium for a 90 point wine than the rest of Willamette by \$1.71, \$1.89, and \$6.03, respectively. Dundee Hills and Ribbon Ridge collected a larger premium by \$4.23 and \$5.04. Following the reclassification, as is presented in column (5) each of the sub-AVAs now requires a significantly higher price than that procured by the rest of Willamette between \$1.44 (McMinnville) and \$14.13 (Dundee Hills).

‘INSERT TABLE 6 HERE’

6. Discussion and Concluding Remarks

Following the creation of sub-AVAs, the price-quality ratio for all areas of Willamette increased. Those wineries that had already carried a better quality reputation than the rest of Willamette were able to substantially increase the premium they collected from their reputation; for instance, Dundee Hills is now able to collect \$9.90 more on a hypothetical “90 points” wine than it could before being officially classified as its own sub-AVA. From an economic standpoint, reclassification has seemingly been successful for those “better” wineries included in the new sub-AVAs.

There are studies focusing not just on the effects of sub-AVAs but terroir in general on quality and prices. For example, Ashenfelter and Storchmann (2010) use hedonic models of solar radiation and weather, and they conclude that for the vineyards in Mosel Valley, Germany, natural endowments significantly affect the quality of a wine. Gergaud and Ginsburg (2010) claims otherwise for the vineyards in Haut-Medoc appellation in Bordeaux, France. Their analysis shows that “technological choices affect quality much more than natural endowments, the effect of which is negligible.” Cross et al. (2011) shows that specific site attributes do not affect vineyard prices, but sub-AVA designation does. Interestingly, Cross et al. (2011) uses data from Willamette Valley and its sub-AVAs. Clearly, there is no consensus on the effect of terroir

on quality and prices. More accurately, it is not clear whether terroir matters as a fundamental reality or just economically due to a *perceived* regional superiority.

What does our study say on this? Our study does not explicitly take into account the measurable site attributes such as slope, aspect, elevation, and soil type of each sub-AVAs. However, since it compares the Price/Quality ratios before and after sub-AVA designations, and it is reasonable to assume that both before and after the measurable site attributes are the same in each region (and to assume that the weather and the skills and reputation of the wine makers in each sub-AVAs are also the same), our study only could assess the presence of regional reputation premium. Thus, because of our research design, our analysis is mute regarding the fundamental reality effect of terroir, yet it clearly shows that there is a regional reputation premium.

As mentioned, since the reclassification, the entirety of Willamette has experienced an upsurge in the price premium that all wineries—both in and outside of the sub-AVAs—have been able to collect. While this may partially be a function of the passage of time and an accompanying gain in notoriety, not all gains can be explained by the fact that Willamette is a relatively new wine region and its reputation became more recognizable over the analyzed period of time. In particular, the gains made by areas with a lower price-quality ratio than that of greater Willamette before the reclassification, such as Eola-Amity Hills and McMinnville, were surprising. These areas now claim a price advantage—compared to wineries operating outside of a sub-AVA, but inside of greater Willamette—despite still having a quality rating that is only minimally (if at all) greater than the rest of non-sub-AVA Willamette. Thus, our research indicates that wineries benefit from smaller, more specific classification levels and that previously perceived lower-quality wineries can collect greater price premiums with the creation of more exclusive regions.

This last finding seems to contradict some of the available literature regarding whether wineries should brand their product with the most limiting classification available. Johnson and Bruwer (2007) and Atkin and Johnson (2010) both argue that consumers rely on higher levels of regional classification, such as county, to make their quality assessments and that sub-AVAs (or AVAs in general) often have weak brand strength. Similarly, Atkin and Newton (2012) found that consumers were confused by AVA labeling and relied more on larger regional designations to determine wine quality.

The discrepancy between our findings and those of previous studies may be partially explained by the fact that the Johnson and Bruwer (2007) and Atkin and Newton (2012) focus primarily on the California wine industry. Arguably, the California wine regions Napa Valley and Sonoma County have a longer history than that of Willamette and are more renowned. Farther along in the “Champagne story” than Willamette, the strength of these regions’ reputations overshadowed potential gains from AVA sub-sectioning. Thus, we believe it likely 1) some of the sub-AVA designations of Willamette already had a certain level of brand recognition prior to their formation and 2) Willamette’s relative lack of notoriety, as compared to regions such as Napa Valley, allowed its sub-regions to capitalize on these partially-developed reputations.

Additional research will have to be conducted to confirm this theory; however, the work of Zhao (2005) suggests that greater specificity is often associated with higher status. At the same time, logic dictates that a point must exist at which a wine region reaches a designated level of fame and can no longer benefit from subdivision. Sub-dividing Champagne, for example, would be unconceivable.

Finally, to check the robustness of our findings, it would be helpful to re-run the same analyses 1) by using data from Wine Advocate, Wine Enthusiast, Steve Tanzer, and Allen Meadows (the Burghound) rather than the data from the Wine Spectator, and 2) for different AVAs with a similar sub-AVA creation experience.

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Table 1: Oregon Wine Statistics

No. of AVAs/sub-AVAs	No. of Wineries	Primary Varietal	Total Planted Acreage (All Varietals)	Production of All Varietals (Tons)
16	463	Pinot Noir	20, 400	41, 500
Top 5 Varietals (Production 2010)				
Varietal:			Production (Tons)	
Pinot Noir			16, 765	
Pinot Gris			5, 312	
White Riesling			1, 816	
Chardonnay			1, 503	
Cabernet Sauvignon			1, 138	

Source: USDA, 2012; and Southern Oregon University, 2012.

Table 2: Willamette Valley Wine Statistics

Established	No. of Wineries	Total Area (Acres)	Total Vineyard Acres	No. of sub-AVAs
1984	316	3,411,508	17,852	6
Top 5 Varietals (Acres Planted 2013)				
Varietal:		Acres Planted		
Pinot Noir		9,739		
Pinot Gris		496		
Chardonnay		174		
Riesling		60		
Pinot Blanc		58		

Sources: USDA, 2012; Southern Oregon University, 2012; Everyvine (2013).

Table 3: (Willamette Valley) Sub-AVA Statistics

Sub-AVA	Petitioner(s)	Year Established	Total Area (Acres)	Primary Varietal
McMinnville	Kevin Byrd	2005	36,703	Pinot Noir
Dundee Hills	Alex Sokol-Blosser	2005	6,490	Pinot Noir
Eola-Amity Hills	Russell Raney Ted Casteel	2006	39,045	Pinot Noir
Chehalem Mountains	Alex Sokol-Blosser David Adelsheim Paul Hart Richard Ponzi	2006	68,265	Pinot Noir
Yamhill Carlton District	Alex Sokol-Blosser Ken Wright	2005	57,013	Pinot Noir
Ribbon Ridge	Alex Sokol-Blosser Harry Peterson-Nedry Doug Tunnell	2005	3,350	Pinot Noir

Source: TTB.

Table 4: Production, Price, and Points “Before” and “After”

Sub AVAs, AVA		Cases	Acreage	Cases/Acre	Price (P) (in 2000 \$)	Points (Q)	P/Q
Chehalem Mountains	before	23,921	111	216	\$ 20.85	83.2	0.25
	after	18,047	73	246	\$ 35.95	88.8	0.40
Dundee Hills	before	34,309	107	321	\$ 24.80	84.7	0.29
	after	29,506	149	198	\$ 47.14	89.9	0.52
Eola-Amity Hills	before	13,252	44	300	\$ 20.41	82.9	0.24
	after	14,248	63	225	\$ 32.18	88.3	0.36
McMinnville	before	7,875	130	60	\$ 16.85	81.8	0.20
	after	9,929	100	99	\$ 32.16	87.5	0.37
Ribbon Ridge	before	9,413	88	106	\$ 28.34	86.2	0.32
	after	9,038	117	77	\$ 39.72	89.9	0.44
<i>Rest of the Willamette Valley (the others)</i>	<i>before</i>	41,515	138	301	\$ 22.42	82.4	0.27
	<i>after</i>	32,666	90	364	\$ 31.20	88.1	0.35
Yamhill Carlton	before	17,920	106	169	\$ 23.87	84.1	0.28
	after	13,858	104	134	\$ 37.71	90.0	0.42
Total	before	27,994	104	270	\$ 22.88	83.5	0.27
	after	21,523	108	199	\$ 38.73	89.3	0.43

Source: Authors' calculations.

Table 5: Regression results for price-quality ratio as a function of the regional (sub AVA) reputation: “Before” and “After” sub AVAs creation

	Before sub AVAs: 1984 -1999	After sub AVAs: 2006 - 2008	Difference (<i>sub AVA premium</i>)
Constant	0.264 (30.43)***	0.337 (22.67)***	
Chehalem Mountains	-0.019 (1.24)	0.063 (3.00)***	0.082
Dundee Hills	0.005 (0.36)	0.157 (8.51)***	0.152
Eola-Amity Hills	-0.021 (1.41)	0.032 (1.28)	0.053
McMinnville	-0.067 (1.87)*	0.016 (0.43)	0.083
Ribbon Ridge	0.056 (2.48)**	0.076 (3.03)***	0.020
Yamhill Carlton District	0.007 (0.46)	0.075 (3.79)***	0.068
No. of observations	685	494	
R ²	0.02	0.16	
F-statistic	2.77***	14.93***	

Robust t-values in parentheses; significance levels (two-tailed) 1% (***), 5% (**), and 10% (*).

Table 6: Price of a “90 points” wine “Before” and “After” sub AVAs creation

	Before		After		Changes in	
	Price	Difference (from the Rest of the Willamette)	Price	Difference (from the Rest of the Willamette)	Price (After – Before)	Difference (<i>Sub AVA effects</i>)
<i>Rest of the Willamette Valley</i>	\$23.76	\$0.00	\$30.33	\$0.00	\$6.57	\$0.00
Chehalem Mountains	\$22.05	-\$1.71	\$36.00	\$5.67	\$13.95	\$7.38
Dundee Hills	\$27.99	\$4.23	\$44.46	\$14.13	\$16.47	\$9.90
Eola-Amity Hills	\$21.87	-\$1.89	\$33.21	\$2.88	\$11.34	\$4.77
McMinnvill e	\$17.73	-\$6.03	\$31.77	\$1.44	\$14.04	\$7.47
Ribbon Ridge	\$28.80	\$5.04	\$37.17	\$6.84	\$8.37	\$1.80
Yamhill Carlton District	\$24.39	\$0.63	\$37.08	\$6.75	\$12.69	\$6.12

Source: Authors’ calculations.