2017

Robert Parker's Wine Advocate and the Consequential Pricing of Provençal Wines

Gweneth Marter
Scripps College

Robert Parker's *Wine Advocate* and the Consequential Pricing of Provençal Wines

Gweneth Marter
Scripps College

Submitted to Scripps College in Partial Fulfillment of the Degree of Bachelor of Arts

Professor Dalton Krauss
Professor Roberto Pedace

December 9, 2016

Abstract: Robert Parker is an esteemed, somewhat controversial wine-critic. Since 1978, Parker has assigned every wine he tastes a score between 50 and 100. He uses this method to communicate to both consumers and producers his opinion of the quality, taste, and aging potential of the wine. Between the years 2005 and 2015, Robert Parker graded 115 wines from the French region of Provence. The goal of this thesis is to determine whether and to what extent Robert Parker's grades affect the price of wine. Through descriptive statistics and regression analysis of Robert Parker's grade and year of production on the average price, I assess the effects of one expert's opinion on the price of Provençal wine. My results show that, while there is a statistically significant relationship between Robert Parker's grade and the price of wine, the relationship between the two variables has not varied considerably over the past ten years. In addition, my results show an indifference on the part of Provençal wine-producers in regards to pricing based on the grades their wines receive from the wine-critic. This led me to the conclusion that the relationship between price of wine and grade is not as strong as hypothesized. This is an interesting finding given the prevalence of consumer reports and expert-opinion based journals for consumable goods.

Acknowledgements:
The biggest, most sincere thank you to my readers Professor Krauss and Professor Pedace. Enduring my non-stop emails and numerous drafts was a herculean effort and I am indebted to you both. An enormous thank you to my parents as well who were unfailingly supportive throughout the semester (and my life) with the big things and the minutia alike. You each deserve a 100-point Chateauneuf-du-Pape bottle of Grenache.

Table of Contents

Introduction

Wines that have any aspirations of success are sent to world-renowned wine critic Robert Parker to be tasted. On a scale of 50 to 100, he assigns grades to each wine based on the aroma, color, taste, etc. With 51 different, possible ratings, his grade can be a wine's death knell or the jetpack that sends it shooting towards success. I will be looking at the effect of these grades on the wines' price over the course of ten years with resources including grades that Robert Parker has assigned wines produced in the Provence region of France. The grades published by Robert Parker are for his international audience and not specifically the French wine-consumers. Were his grades tailored towards the wine drinkers native to the selected region of study, variables like grape would be deemphasized in favor of characteristics like region or award-winning producers. Other resources used for this thesis include The Journal of Wine Economics and the *Wine Spectator*.

The Parker grades are generally published in the spring of each year, about six to seven months after the grape harvest and before the wine prices are established. Since 1994, each spring Robert Parker visits Bordeaux to taste and evaluate the latest wines of that region. Parker publishes his findings in the April issue of *The Wine Advocate*, his bimonthly journal. Wine producers fix their market prices in the weeks and months after. The market usually opens at the end of April, and lasts until June, giving producers the possibility to incorporate the information contained in the Parker grades. On the scoring method, Robert Parker (2001) has said, "Scoring permits rapid communication of information to expert and novice alike." That is, if he wants to communicate to consumers that this wine tastes exceptional and offers a high utility, he will score it higher to indicate that.

My hypothesis is that, over the past ten years, Provençal wine producers have recognized

consumers' growing dependence on Robert Parker when they purchase a bottle. When consumers are aware that a wine has merited a high score, they feel comfortable paying a higher price. Wine producers, similarly, feel comfortable assigning a higher price to their well-rated bottles and are doing so more now than ten years ago. My thesis looks into whether and to what extent Parker's tastes, which are publicized for consumers and wine producers to see, shift the demand curve. The price of wine, like most consumption goods, is determined by both demand and supply factors. The quantity of wine produced, the cost of inputs, the average income of consumers, and people's preferences all play a role in determining how to price a wine. However, in my thesis, I am isolating the demand side of the economic model. The belief is, in assigning high grades to wine, Robert Parker shifts the demand curve out and consequently the price of the wine increases. In the same vein, Robert Parker shifts the demand curve back by assigning a low grade and the price decreases. I want to determine just how much of a role Robert Parker's ratings play in that relationship and how the relation has changed over time. The specific question being asked is: how has the quantitative relationship between Robert Parker wine grades and prices of wines produced in the region of Provence changed in ten years?

This thesis speaks to how malleable consumers and producers are in the face of an expert's opinions. Plenty of consumable goods (wine included) are appraised and reviewed in, *e.g.,* Consumer Reports, which are disseminated to the public. The general belief is that, with so much variety in the aisles of stores (including the wine aisle), the consumer is victim to choice-overload. To combat the overload, consumers may look to experts to help determine their willingness to purchase and how much they are willing to pay.

If my analysis demonstrates a growing and strong relationship between price and the expert-rating, one can assume both sides of the counter (in regards to consumers of Provençal

wines) are actively paying attention to the opinion of one expert (Robert Parker) in the field of wine. If my analysis demonstrates otherwise, one can begin to make assumptions that Provençal wine consumers and producers are disregarding the expert's opinion when it comes to buying and pricing – in other words, Provençal wine consumers trust their own preferences (or the preferences of third parties other than Robert Parker), and wine producers trust their own pricing strategies.

Selected Region of Study: Provence

The region of Provence is 150 miles wide, covering a surface area of 65,000 acres. It spans the Cote d'Azur to the Rhone River Valley. There are a total of approximately twelve Wine Regions in France. Each region cultivates a particular set of grapes that lend to its climate. A nice dry Rosé, using Grenache and Syrah grapes, is easily produced in the South of France where it is hot. A deep oaky Merlot comes from Bordeaux where rain is more abundant year round. Provence specifically produces Grenache, Cinsault, Syrah, Mourvedre, Tibouren, Carignan, and Cabernet Sauvignon. The main Appellations in Provence are Cotes de Provence, Coteaux d'Aix-en-Provence, and Coteaux Varois en Provence. A grower is restricted as to what kinds of grapes can be grown, how the grapes are grown, and how many tons can be harvested.

The Cotes de Provence spans 49,000 acres and produces normally 123 million bottles or 924,000 hectoliters. Production consists of approximately 89% rosé, 7.5% red, and 3.5% white. There are 372 private cellars and 38 cooperative cellars. Producers are authorized a yield of 55hl/hectare but the average yield comes in at 46hl/hectare.

The Coteaux d'Aix-en-Provence is smaller, with 10,000 acres, producing 27 million bottles or 202,000 hectoliters. Production is approximately 83% rosé, 12.5% red, and 4.5%

white. There are 65 private cellars in the region, twelve cooperative cellars. Authorized yield is 60 hl/hectare but average yield is 49 hl/hectare.

Finally the last major area in the region of Provence is the Coteaux Varois en Provence. There are 6,000 acres of vineyards in this area, with 16 million bottles (121 hectoliters) produced yearly. Rosé makes up 89% of production, red 8%, and white 3%. There are 75 private cellars and ten cooperative cellars. Authorized yield is 59 hl/hectare but average yield is 47 hl/hectare.

Data from this research was obtained through the *Wine Advocate*, a global bimonthly publication featuring the assigned grades of wine given by esteemed wine critic Robert Parker. The available information includes the price, grape, rating, color, appellation, and year. There is a subscription fee to access the Wine Advocate wine-ratings but the information is disseminated quickly. While I paid a fee to obtain the data, the average consumer need only Google a wine in order to get at least a good sense of its Robert Parker rating.

This analysis seeks to determine whether and to what extent the rating of Robert Parker has an effect on the price of wine. Namely, it will shed insight into the strength of the relationship between grades and success and, moreover, the current state of that strength. Are wine connoisseurs looking to Robert Parker more or less now than they were in 2005? The models utilized are basic consumer demand and elasticity of demand. While consumers may trust Robert Parker to point them in the direction of an en-primeur wine, there is still a limit to which they are willing to pay**.** I will be searching to quantify the amount of influence directly on prices. This analysis will also provide information on how wine-producers of Southern France depend on the wine critic Robert Parker and on how the relationship between grade and price of wines produced in the Provence region of France has changed and potentially strengthened over the last ten years.

Currently there exist studies of the macroeconomic determinants of wine prices, empirical analysis of wine firms in France, studies of wine scores in Bordeaux, and world market studies on French wine. However, I have yet to come across any specific analyses that look specifically at the region of Provence, or narrow the relationship to score and price.

The rest of the paper proceeds as follows: First, I will provide a literature review of previous studies, which are predominantly analyses of the effects of expert wine ratings on price. Second, I will provide background information and context on the relationship between Robert Parker's grades and the prices of French wines of a different region. Third, I will present my data set with accompanying summary statistics and analysis. This will include regression analysis of my data. Finally, I conclude with the significant economic implications of my thesis. By way of clarification, I will refer to grade, score, and rating interchangeably throughout this thesis.

Literature Review

The relationship between ratings given by wine critics and the success of wine is a thoroughly analyzed topic for which there is an ample amount of economic research. The American Association of Wine Economics has devoted many articles entirely to how expert ratings affect prices. The following articles provided a starting point for my research as they each investigate the apparent correlation and causation of expert ratings and success of wine. On the other hand, the amount of research done on Provençal wines and, more specifically, their relation to expert ratings, is scarce. The literature reviewed spans from 1994 to 2013 and will not be organized chronologically. Sources span from the Journal of Wine Economics to the American Economic Journal: Applied Economics.

In their paper *"The impact of gurus: Parker grades and en-primeur wine prices,"* Ali, Lecocq, and Visser (2005) investigated the impact of Robert Parker's oenological grades on

Bordeaux wine prices. This investigation will be useful to my thesis as it analyzes what the relationship was like ten years ago, though not in the chosen region of my study. Ali, Lecocq, and Visser (2005) studied the impact of Parker's grades on the en primeur wine prices, *i.e.,* the prices determined by the chateau owners when the wines are still very young. The Parker grades are generally published in the spring of each year, before the wine prices are established. This is about six to seven months after the grape harvest. As previously stated in the Introduction, each spring Robert Parker comes to Bordeaux to taste and score the latest wines. He publishes the scores in his bimonthly journal, in the April issue. The en primeur prices are fixed by the chateau owners in the weeks and months thereafter Parker's publication (the en primeur market usually opens at the end of April, and lasts until June). This timeline gives the producers the possibility to incorporate the information contained in the Parker grades. In 2003, Parker did not visit Bordeaux in the spring to taste the wines produced in 2002. This gap gave Ali, Lecocq, and Visser the opportunity to investigate the effects of the relationship. The wine grades were published much later, in the autumn, after the determination of the prices. This unusual timeline was investigated by the authors to estimate a Parker effect. The authors found that, on average, the effect of a good review is equal to a 2.80 euros increase per bottle of wine. They also estimated grade-specific effects, and used these estimates to predict what the prices would have been had Parker attended the spring tasting in 2003.

Lecocq and Visser (2006) conducted another study on the relation between expert ratings and wine prices entitled *What Determines Wine Prices: Objective vs. Sensory Characteristics.* Their objective was to determine which variables significantly affect the price of Bordeaux and Burgundy wines. In their study, wines were evaluated via blind-tasting sessions. This evaluation differed from grades published in wine guides or magazines, in the sense that the blind-tasters

assigned their grades without being influenced by the name of the wine, its price, or its prior rankings. Within this study, Lecocq and Visser (2006) attempted to solve what they describe as the "price puzzle." Regarding the conclusion of their price-quality relationship investigation, the authors' results indicated that characteristics that are directly revealed to the consumer upon inspection of the bottle and its label (grape, year and appellation) explain the major part of price differences. Sensory variables, the qualities an expert like Robert Parker is most definitely looking for, do not appear to play an important role. These sensory variables would include aromatic intensity, evaluation of taste, persistence of taste, and presence of firm tannins (which indicates a wine's ability to age in a positive manner). Out of fifteen sensory characteristics tested in the 2006 study by Lecocq and Visser, only two or three had a significant impact in the hedonic price equation. The basic premise of the hedonic pricing method is that the price of a marketed good is related to its characteristics. Hedonic pricing is a model identifying price factors according to the concept that price is determined by both internal characteristics of the good being sold and external factors affecting it. Therefore, with only two or three sensory variables significantly affecting the price of wine in Lecocq and Visser's 2006 study, one can assume that consumers are looking more towards the grape, year, and region when determining their willingness to pay.

My thesis is not unique in its investigation of a price-quality relationship of wine. There have been many previous papers that looked at the determinants of prices and attempted to report estimation results of hedonic price functions. In the analyses underlying these papers, wine prices are regressed on a set of characteristics in order to determine which characteristics have a significant effect. Oczkowski (1994) applied the method to Australian table wine and included in his set of characteristics attributes that are objective and easily observable for the average

consumer (year, region, grape). Oczkowski also included the grades that are published in a popular Australian wine guide. Grades were measured on a five-point scale, and Oczkowski showed that, by introducing dummy variables for the five levels, wine prices increase with the rating level.

Ashenfelter has contributed two studies that relate to my thesis: one in 1995 with Ashmore and Lalonde, studying Bordeaux wines, and another with Byron in 1995 for Australian wines. The studies consider year and weather conditions that prevailed during the growing season as characteristics, and show that these variables alone explain more than 80% of the price variation in their samples. Ginsburgh, Monzak, and Monzak (1994) applied their hedonic price method to a sample of Médoc wines. Médoc is another wine-producing region of France. The data set of Ginsburg, Monzak, and Monzak allowed the authors to analyze the price effects of weather, reputation, natural endowments (soil, exposure of the vineyards or grapes) among other sorts of production factors. Perhaps the most important finding from this research is that technology and weather conditions explained two-thirds of the price variation. Moreover, the proportion of explained variance increased to almost 85% once the reputation variable is added.

The previously mentioned articles and studies took place in a time when Robert Parker had gained some notoriety, but had not yet reached peak levels of supposed influence. In 2009, Robin Goldstein published a book review of Robert Parker's "*World's Greatest Wine Values under $25*" in which he declared, "Robert Parker was not the first wine critic to employ a 100-point scale, but it was he that etched the paradigm of attaching numbers to wine into the collective consciousness of the gustatory media. Parker's leading competitors in America—Stephen Tanzer, *Wine Spectator*, Wine & Spirits, Wine Enthusiast—all currently use 100-point rating scales." Stephen Tanzer and *Wine Spectator* were used as independent variables in the

2011 study by Grocekus and Nottebaum, which I will review below. If anything, the mention of the two in this book review by Goldstein only further underlines the small yet powerful echelon of expert wine critics. With so few in the game, expert wine critics' influence on wine consumers may have a strong correlation.

Both the *Wine Spectator* and Robin Goldstein made appearances again in 2009. Goldstein, Ashenfelter, and Riddell (2009) from the American Association of Wine Economics asked the question, "Do Expert Ratings Measure Quality?" Though Robert Parker's grades in particular did not make an appearance in this study, the scrutiny on the overall effect of experts' opinions may provide insight for my thesis. The study was done in response to the large scandal that arose when the magazine *Wine Spectator* gave its Award of Excellence to a fictional restaurant with a fictional wine list in Italy. Understandably, the validity of *Wine Spectator* awards was brought into question. Goldstein, Ashenfelter, and Riddell (2009) set out to examine alternative theories of what the *Wine Spectator* ratings reflect in consumer preferences and restaurant pricing.

With data from more than 1,700 restaurants, Goldstein, Ashenfelter, and Riddell's study went farther into examining décor quality, service quality, and food quality through regression analysis. Relevant to my thesis topic, the three concluded from their study that restaurants with a *Wine Spectator* award cost more than other restaurants with comparable food, service, and décor. Furthermore, the authors concluded that the *Wine Spectator* award could be interpreted as a signal to consumers of an overpriced restaurant. They also concluded that, in receiving the *Wine Spectator* award, restaurants are "allowed" to charge more. The study emphasized that, by making a payment to the *Wine Spectator,* any restaurant can generally assure itself that it will receive the award (as was done by the fictional restaurant previously mentioned). The magazine

collects a $250 fee from each of the 4,000 applicants and a vast majority of those applicants receive awards. The magazine receives gross revenues of over one million US Dollars from those application fees. What can be gleaned from this 2009 study is that, in the food and drink industry, expert opinions and awards act as a signal to consumers *and* producers/sellers, regardless of the integrity of the experts. The acquisition of an award (even one that has been publicly proven to rely more on a payment than actual quality) communicates to consumers that they should feel comfortable paying larger sums of money and communicates to owners of restaurants that they should feel comfortable charging more.

More recently, Gokcekus and Nottebaum (2011) contributed to the Journal of Wine Economics with the pressing question, "To whose rating should a wine drinker pay attention?" Gokcekus and Nottebaum compare the effect of tastes of regular consumers captured by community tasting notes to the effect of expert ratings. These experts include Robert Parker, the *Wine Spectator*, and Stephen Tanzer. The dilemma the authors sought to investigate is perhaps familiar: a wine-drinking consumer decides to buy a bottle from a particular region. While she may know which grape she prefers, or even what year, she is uncertain about the further decision-making. Thus, she turns to the wine-experts. Gokcekus and Nottebaum (2011) investigated whom she relies upon and how strongly. This question in particular is a difficult one seeing as taste is a fundamentally subjective issue. The authors found that, for a randomly selected sample of 120 2005 Bordeaux wines, Stephen Tanzer's scores are most closely associated with the community ratings (defined below); and, when compared to expert ratings, average price paid for a bottle of wine is more highly correlated with median community scores.

In order to accomplish their study, Gokcekus and Nottebaum collected data from CellarTracker. It is the world's largest wine social networking site in both number of catalogued

bottles and number of listed tasting notes. Its database contains more than 1.8 million "community tasting notes" in addition to 300,000 professional reviews. Community tasting notes and ratings are available for all wines in Gokcekus and Nottebaum's sample. In addition to community tasting notes, (a) the average score, (b) the median score, (c) the average number of ratings, and (d) the average price paid are available as statistical information. The evaluating community members had purchased 2,928 bottles of the wines in the sample for an average price paid of $109/bottle and generated 35 evaluations on average per wine, with average and median scores of 91.4 and 91.8, respectively. Out of 120 wines in the authors' sample, Robert Parker evaluated 107. For these 107 wines, the average community score was 91.66 and the average Robert Parker score (the "RP score") was 93.24. The authors ran a two-sample t-test (with unequal variances) to check if the 1.58 points difference between community score and the RP score was statistically significant. The t-statistic was 4.58 with a critical t-value of 1.97. The null hypothesis that there is no difference between community and RP average scores was rejected.

Friberg and Grönqvist (2012) studied the effects of expert reviews on the demand for wine in their study entitled "Do Expert Reviews Effect the Demand for Wine?" They examined the demand for wines in Sweden using five years of weekly data on sales, advertising, and expert reviews. The authors found that the effect of a favorable review peaked in the week after publication with an increase in demand of 6 percent. The effect remained significant for more than 20 weeks. What's more, Friberg and Grönqvist also found small demand-enhancing effects of neutral reviews and no evidence of important negative effects from unfavorable reviews.

This selection of literature above focuses on the relationship between expert ratings (most specifically, Robert Parker) and economic success of different wines. My specific thesis omits many of the variables mentioned above such as weather conditions, technology, and other

production factors. Keeping this omission in mind, another study I will include in this literature review is "Macroeconomic Determinants of Wine Prices" (Jiao 2016). Jiao's study took on an empirical approach to identify the macroeconomic determinants of fine wine prices and estimated their impacts on a monthly database from 1996 to 2015. This period captured information on different stages of the development of the fine wine market along with the macroeconomic fluctuations during the last twenty years. Jiao chose 2004 as a breakpoint where fine wines started to be more financialized and behave more sensitively to the economic cycles. Her study accounted for the weakening US Dollar, the slowdown of economic growth in emerging markets since 2011, as well as the recent depreciation of national currencies. She concluded that the financialization of the wine market had provoked volatility in wine prices. Jiao concluded other factors such as included money supply, real interest rate, and the growth of investment funds have recently affected wine prices. This macroeconomic perspective should be able to explain some of the variation in my particular sample data set on a more global, larger scale.

In this literature selection, there is an obvious emphasis on the region of Bordeaux, Burgundy, and certain wine-producing regions of Australia. There is a gap in research done on Provençal wines. With this thesis, I can begin to scrutinize the specific Provence winemaking region and its relation to wine expert ratings. This would fill a void in the previous literature that has not yet been touched upon by economists. My thesis will also fill the void in these studies surrounding the development of the relationship between Robert Parker ratings and prices for wine.

The French region of Provence is the world's largest wine region specializing in dry rosé. As demonstrated by the information given above regarding the three main appellations, rosé is

produced on a much larger scale than red or white wine in Provence. This may not seem particularly significant until one considers the growing thirst amongst consumers for the Provençal pink drink. In 2014, exports of rosé from Provence to the United States increased by 29%. In 2015, prompted by the extreme spike in consumer demand for the wine specialty of Provence, the popular magazine *Vanity Fair* published an article entitled "When Did Rosé Become a Thing?". Journalist Alex Beggs wrote, "The rosé from the popular Provence winery Triennes, first arrived to the U.S. in 2010 in a shipment of 55,000 bottles; so far this year they've already sold 200,000." (Beggs 2015) This quote speaks directly to the region and time period of my study and emphasizes a more global spotlight on Provence. While my thesis topic will look into Robert Parker's relationship with all the wines of Provence, rosé could play a significant role as it has grown in such popularity over the last few years, and a higher demand by itself may have encouraged producers to raise prices.

The second gap in knowledge addressed by my thesis relates not just to the relationship between expert ratings and wine pricing, but the *strength* and current state of that relationship. Development of the relationship between grade and price is not an aspect that I have seen analyzed in previous studies. I have yet to come across a study or journal article that analyzes how the influence of ratings on consumers has changed over time.

Data and Variables

To examine the development of the relationship between Provençal wine grades and price, I collected data from Robert Parker's Wine Advocate online journal. On this site, every wine he has sampled and graded is available for the consumer, as well as the wine's price in US Dollars. In fact, for uniformity, the only prices I am using in this study are those from his website. On the Wine Advocate website, it is specified that the wine prices are derived from

current retail prices received from WineAlert and WineSearcher. The prices are updated periodically. For this thesis, price is acting as my dependent, resulting variable. Grade is the independent, explanatory variable.

To collect the initial sample set, specific criteria were set to obtain the most conclusive and accurate sample set of wine prices and ratings. The first parameter on the sample set was that wines analyzed had to have been produced and bottled between the years 2005 and 2015. This characteristic of the sample set is important because this thesis only studies the relationship between rating and price over the last ten years. While Parker and his system have been around for a while, and the wines of Provence for much longer, the study is meant to give insight into his more recent effect on the market.

The next criteria utilized for the sample set was that the wines selected were only produced in the Provence region of France. With the growing demand for Provençal rosé, the region is gaining popularity amongst consumers. Observed in the literature review, a large body of work has been done on regions like Bordeaux. I believe the reputation and notoriety of wines coming from Bordeaux could give biased results or skew the data. Consumers' previous familiarity with wines of Bordeaux, Burgundy, Champagne, or other branded regions suggests they may be willing to pay more than the average price for a bottle of wine if it is produced in those geographic spots.

The rest of the data section will be organized in the following manner: I will provide background information to offer a perspective into the variation in pricings among wines. I will then complete descriptive statistics on my collected data set. (See Tables 1-5) Finally, regressions of the data set will be run and analyzed.

Before I introduce the samples, I will provide some figures for context. In recent years, specifically in the selected region of Provence, there has been a large variation in the prices of wine. A 2014 Provence rosé with a 91 rating costs $94 on average. A 2012 Provence blend of Mourvedre and Syrah with an 88 rating costs $40 on average. A 2015 Provence Cinsault with an 89 rating costs an average $22 per bottle. A 2015 Provence Rosé with an 87 rating costs $16 on average. The range in scores is 4 points while the range in price is $78.

More context is given in the following analysis of Chateauneuf-du-Pape wines in Table 1.

Table 1: Price of 100-Point Wines

Year	RP Grade	Price
2005	100	$383.00
2005	100	$376.00
2007	100	$310.00
2007	100	$181.00
2007	100	$379.00
2007	100	$301.00
2007	100	$498.00
2009	100	$236.00
2009	100	$642.00
2010	100	$236.00
2010	100	$175.00
2010	100	$200.00
2010	100	$241.00
2010	100	$446.00
2010	100	$422.00
Avg. Price		$335.07

Robert Parker has not, in the past ten years, given a wine that was produced in Provence a grade of 100 points. The nearest region receiving, on multiple occasions, the perfect score is from a sub-region of the Rhône area: Chateauneuf-du-Pape. From 2005 to 2010, fifteen wines received 100 points. Table 1 (above) shows all fifteen and their respective prices, as well as the average price overall. The range in score is 0 but the range in price is $467. The average price of a wine from Chateauneuf-du-Pape that received a perfect score is $335.07. The minimum price

of such a bottle is $175. The most expensive, maximum price is $642. This data demonstrates the enormous variation in prices, despite the complete lack of variation in grade. Evidently, there are many factors that determine how much a bottle costs. Receiving a high score perhaps legitimizes a minimum price of $175, but it does not establish a maximum. Now that some context and background information has been given, analysis of the selected region can begin.

I will continue this collection of data, including year, price, and score, providing all the descriptive statistics in the Provençal region. As one can see in the range in prices from the small data set of Chateauneuf-du-Pape wines (Table 1), there can be a large variation in prices, regardless of score. Therefore, it is very possible that I will not be able to pin down a linear relationship between the Robert Parker score and the price of a wine from the Provençal region.

Table 2: Average Price and Grade 2005-2015

Year	Number of wines	Average price	Average grade
2005	15	$39.87	88.53
2006	8	$32.13	88.88
2007	13	$27.85	89.08
2008	8	$29.13	88.13
2009	10	$24.90	88.10
2010	9	$22.89	89.33
2011	13	$28.46	89.54
2012	8	$27.50	89.38
2013	5	$28.00	89.40
2014	18	$38.44	88.89
2015	8	$26.63	87.88
Total	115	$30.78	88.83

Table 2 is a collection of the average price and grade of wines from Provence scored by Robert Parker spanning the years 2005-2015. Parker graded 115 such wines total. Parker graded the most wines (18) in 2014, and in the prior year, 2013, he only graded five. Demonstrated by Table 2, there does not appear to be a pattern with the number of wines scored each year. The only

exception is the mode of eight wines scored for four separate years (2006, 2008, 2012, and 2015).

The analysis between these two variables is limited, given the small sample size of data available. A larger sample size, as well as uniform sub-samples, would have been ideal for this analysis. The average prices and scores may not be considered significant due to the variation of number of wines scored.

The median rating for Provençal wines between 2005-2015 is 89 with a mode of 90. The median price between 2005-2015 is $21 with a mode of $16. From these summary statistics, it can be gleaned that the average wines (produced in 2005-2015) deserving of Robert Parker's tasting will cost between $16 (the mode) and $30.78 (the average). Moreover, any Provençal wine receiving a score at or above 88 should cost within that range. Looking at the average prices spanning the last ten years, if a unique wine has a score of 88, one can establish a minimum price of $22.89 (the minimum average price, circa 2010). As well, one should not expect that same bottle to cost more than $39.87 (the maximum average price, circa 2005).

Isolating the first and last year of analysis, the price has varied from an average of $39.87 per bottle (2005) to $26.63 (2015). The change in average price ($39.87-26.63) from 2005 to 2015 is $13.24. My hypothesis is that wines with lower grades would be priced lower. Armed with the negative $13.24 decrease in price, I would assume that the average grade has also fallen in the last ten years. But as the table indicates, that is not the case.

While the total range in average price ($39.87-22.89) is $16.98, the total range in average grade (89.54-87.88) is 1.66. With just these comparisons alone, it is difficult to pin down a precise relationship between price and grade. The lack of variation in scores means either that the smallest decimal points need to be examined more closely, or that different summary statistics

will tell more of the picture. Another suggestion is that Robert Parker has been making a conscious decision to assign grades between 80-90 over the course of the last ten years. It is very possible that Parker has avoided tasting wines he anticipates will receive a low score. As mentioned previously, a particularly high score from Parker can be the reason a certain bottle of wine shoots towards success. On the opposite end of the spectrum, a low score has negative connotations and Robert Parker may be consciously avoiding the negative reactions associated with assigning a low score. This reasoning may explain the miniscule range in grades. Later in this section, the standard deviations within isolated years will be analyzed, and a simple linear regression will be run.

Shown in Table 3 below, the maximum single price for a bottle of wine from Provence over the last ten years was $149 in 2005, a wine meriting a score of 95. For comparison, the minimum price was $7 for a 2010 wine that received a score of 85. The highest score given out was a 98, to a 2010 bottle that cost $70.

The year with the highest average price was 2005. The year with the lowest average price was 2010. That is to say, wine producers in the Provence region priced their wines in a manner reflecting a belief that consumers would pay an average of approximately $40 a bottle in the year 2005, but priced 2010 wines reflecting a belief that consumers would pay only approximately $23. More specifically, wine producers believed this about consumers who drank wine that was deserving of Robert Parker's opinion.

Although the sample size is small (Parker scored 15 wines in 2005 and 9 in 2010), one assumption is that consumers' willingness to pay decreased in the first half of this ten-year analysis. This is somewhat surprising, considering the variety in average score from this first half only ranged 1.23 points. As discussed in the literature review of this thesis, Provence is the

world's largest wine region specializing in dry rosé. In 2014, Provence rosé wine exports to the United States increased by 29%. Another possible assumption is that the decrease in prices by Provençal producers over the last ten years was intentional in order to incentivize wine-consumers to purchase more. Although this thesis neglects to take the supply-side price determinants into account, another variable, which influences price, is the amount of wine produced. A deeper inspection of prices follows in Tables 3 and 4.

Table 3: Maximum and Minimum Prices 2005-2015

Year	Max price	Min price	Range
2005	149	13	136
2006	68	15	53
2007	101	15	86
2008	62	15	47
2009	71	12	59
2010	70	7	63
2011	55	16	39
2012	41	13	28
2013	34	16	18
2014	90	12	78
2015	44	15	29

Though the sample size of each year is not consistent in terms of number of wines graded, one important indication from Table 3 is the lowering variance in prices as one moves through the ten-year period. Demonstrated in Table 3, the average range in prices from 2005 to 2010 is $74. The average range in prices from 2010 to 2015 is only $42.50. Prices are becoming more uniform as the decade progresses. Table 4 (below) only strengthens this observation. While one cannot say there is a consistent decrease in the standard deviation of the average price, it is difficult to ignore the exceptionally high figure in 2005 (47.06) and relatively low figures of 2012, 2013, and 2015 (9.47, 7.65, and 10.38 respectively) (Table 4). An outlier occurs in 2014 (during which the standard deviation in price was 24.68). The lower deviations in the second half

of the time period suggest consumers' becoming more price sensitive. As time move forwards, wine-consumers have developed a reference point, an expectation of how much they normally spend on a bottle from Provence. A particularly expensive bottle (even one that has received a grade between 95 and 100) does not particularly attract the consumer, and wine-producers may have recognized that. It could also suggest that consumers are treating Provençal wines as a generic product more so now than they were in 2005. Provence is a less well-known region of France and without the notoriety of Bordeaux or Bourgogne; wine consumers may feel less inclined to spend money on a Provençal bottle. Name recognition has influence on consumers' willingness-to-pay, and it is possible that wine-producers have recognized that when they price their bottles.

Table 4: Standard Deviations in Grade and Price

Year	Stan. Dev in Grade	Stan. Dev in Price
2005-2015	2.84	24.11
2005	3.74	47.06
2006	1.81	17.71
2007	1.49	24.19
2008	2.53	20.65
2009	2.88	17.3
2010	3.94	18.36
2011	1.94	12.86
2012	3.2	9.47
2013	1.67	7.65
2014	3.64	24.68
2015	2.48	10.38

Model, Results, Regression Analysis

Table 5: Summary Statistics of First Regression

Variable	Mean	Std. Dev.	Min	Max
Price	30.78261	24.10677	7	149
Year	5.86087	3.295097	1	11
Rating	88.83478	2.837501	77	98

Table 5 lists the summary statistics for each variable in the regression. As previously mentioned, I interchangeably use "rating" in place of grade and score. Ratings are always on a 100-point scale. The variable "Price" is described in US Dollars. Before running a regression to analyze the relationships between variables, I converted the years to periods. Year 2005 becomes time period 1, year 2006 becomes time period 2, and so on until 2015. This modification was made to the data so that the coefficients could be more easily interpreted. When the single digit time periods are used in lieu of years, it is less difficult to determine how a one-unit change in a year may affect the price.

Before running the regression with all three variables, I isolated price and rating. "Price" remains the dependent Y Variable. The modification to my thesis is that "rating" is the sole independent X variable. In running this regression first and neglecting the year, I am seeking to determine how much grade has influenced price over the last ten years.

$Y= \beta 0 + \beta 1X + \beta 2X+... \beta kX$

The regression that Stata produced is featured in Table 9.

$Price= -229.5553\ \beta 0+ 2.931\beta 1(rating)$

Table 6: 1st Regression Results

n	115
F(1,113)	15.26
Prob > F	0.0002
R-Squared	0.119
Adj R-Squared	0.1112
Root MSE	22.727

Table 7: 1st Regression Results Continued

Price	Coefficent	Std. Err.	t	P>ltl	95% Conf. Interval	
Rating	2.930585	0.7501616	3.91	0	1.44438	4.416791
Constant	-229.5553	66.67413	-3.44	0.001	-361.6488	-97.46182

In the regression reflected in Table 7, compared to the second (see Tables 8-9), R-squared is 0.119 and adjusted R-squared is 0.1112 (Table 6). 11.9% of the data is explained by the x variable present: "Price." In comparison to the second regression below, the F score present here has increased significantly (7.66 to 15.26), as well as the Probability > F. The p-value from the first regression is 0.0002, and it increases to 0.0008 in the second regression (Table 8 and Table 6). Within the first regression, this means that there is a 0.0002% chance the x and y variables are not related. Another figure to consider is the grade coefficient, which changes marginally between Regressions 1 and 2. The model seems to suggest that a one unit increase in grade will increase the price by $2.93. Similarly, Ali, Lecocq, and Visser (2005) had concluded a good review by Robert Parker (dubbed the "Parker Effect) resulted in a 2.80-euro increase in the price per bottle of the wine. The 0 p-value, as well as the 3.91 t-score, imply statistical significance in this variable.

I then ran the regression using the Stata Command: regress Price Year Rating. This command indicates that Price is acting as my dependent, y-variable. "Year" and "Rating" are the X Variables I will use to determine whether or not there is an overall correlation between variables. Price= $\beta 0 + \beta 1X(year) + \beta 2X(rating)$

Table 8: 2nd Regression Results

# of Observations	115
F(2,112)	7.66
Prob > F	0.0008
R-Squared	0.1203
Adj R-Squared	0.1046
Root MSE	22.811

Table 9: 2nd Regression Results Continued

Price	Coefficent	Std. Err.	T	P>ltl	95% Conf. Interval	
Year	-0.2659135	.6485189	-0.41	0.683	-1.550871	1.019044
Rating	2.937062	0.7531038	3.9	0	1.444883	4.429241
Constant	-228.5722	66.96385	-3.41	0.001	-361.2525	-95.8919

The regression is Price= β0 + β1X(year) + β2X(rating) As seen in Table 7, the results came out to be Price=-228.5722 β0 +-.2659135 β1 (year)+ 2.937062 β2 (rating)

As my thesis focuses on the state and development of the relationship between the Robert Parker grade and the price of the wine, the null hypothesis I am seeking to reject is: the X variables "Rating" and "Year" have no influence on the "Price" of a given wine.

Before analyzing the statistical significance, the regression shown in Table 9 implies that with a positive one-unit increase in the year, the wine becomes .26 cents less expensive. With a one-unit increase in grade, the bottle becomes $2.94 more expensive. The negative constant seems to suggest that wines with a score of 0 out of 100 that are not produced in the given time period start off at a price of negative $228.57. This would suggest that producers pay consumers over $200 in order to drink this wine, and that simply is not the case.

However, upon further analysis of the data, one can assume that the relationship between price, year, and grade is weak. The F score is 7.66. The p-value for "rating" (0.000) appears to indicate that only one variable is statistically significant. P-value refers to statistical significance

in the sense that if it is 0, there is a 0% chance that the variables are not related. With a p-value for the variable of year at 0.683, we assume there is a 68.3% chance the two variables are not related. The test was run with a 95% confidence interval. Since the p-value for year is greater than alpha 0.05, we fail to reject the null hypothesis of this regression, which is that there is no relationship between the two variables year and price.

However, for the variable "Rating" one observes 0.000 for p-value. There is statistical significance here. Zero is less than alpha 0.05, and we reject the null hypothesis of no relation between "price" and "rating". As well, the t-score for "rating" is 3.9, which is large enough to support the statistical significance.

The R-squared value of this regression is 0.1203. R squared values indicate what percentage of the data is explained by the variables present. In taking only year and rating into account to determine price, 12.03% of the data is explained. That is to say, 12.03% of the price of wine can be explained by the year and rating of the wine. The adjusted R-squared value, of which the "adjusted" refers to accounting for the number of independent variables in a regression, is 0.1046. In this case, 10.46% of the change in price is explained by the variables present. This is a rather low score and suggests that perhaps additional control variables, such as production levels or weather conditions, are needed in order to fully explain the y variable.

The next number to take into account is the Root MSE. It is the standard deviation of the residual in the model. The MSE alone is the variance of the residual in the model. In the case of this specific regression, Root MSE is 22.811 (demonstrated in Table 8). It is a measure of the differences between values predicted by a model and the observed true values. With a Root MSE as large as 22.811, there is an indication that the difference in predicated prices and actual prices is almost a total of $23. When the overall standard deviation in price is $24.11(Table 4), this

does not imply a robust model.

Another number that serves as an indicator of the strength of this regression is the probability > F. This number, shown in Table 9 above is 0.0008. This means, that there is a 0.0008% chance the three variables are not related. Ideally, probability>F would equal 0.

In the final regression run on Stata, the x variable "Year" was converted to 11 dummy variables. The years 2005 through 2015 become qualitative characteristics, in order to isolate each year's unique effect on the variable "price". D_1 =1 if the wine was priced and graded in 2006, D_2=1 if the wine was priced and graded in 2007, etc. The Dummy variables equal 0 in relation to the years in which they were not priced or graded. The results of the regression involving years as separate dummy variables are seen in Tables 10 and 11.

The R-squared value in Table 10 (0.1822) suggests an 18% of variance in price is explained by "Rating" and the year of production. The F value (2.09 seen in Table 10) has lowered in comparison to the last regression, suggesting a weak relationship between the variables present. On the other hand, the p-value of .0277 implies there is a 2.77% chance the variables present are not related. This final regression did not support my initial hypothesis enough to assume a strengthening relationship between the variables "Price" and "Rating" over the last ten years.

However, what can be gleaned from this final regression is the significance of the variables "Rating" and "Year2010". Seen in Table 11, Year2010 has the highest t-score apart from Rating (-2.01) and the largest coefficient (-19.54). This suggests that Provençal wine was $20 cheaper on average in that year. This is most likely due to the global recession. This particular qualitative variable acts as a proxy for all that is going on macro-economically during the selected time frame. It is not a coincidence that "Year2011" is the only variable with a

positive coefficient. This variable has the second lowest p-value, suggesting somewhat statistically significant implications. The combination of these two variables, regarding the nature of the coefficients and p-values, indicate some of the macroeconomic determinants of Provençal wine prices. "Rating" has a t-score of 3.99 and a p-value of 0.000 (Table11). Both these figures suggest a statistically significant relationship between y variable Price and Rating. The coefficient value attached to "Rating" of 3.076 implies that a one unit change in the grade a wine is given by Robert Parker results in a $3.076 change in the price. While I was seeking an observable development in the relationship between the variables "Price" and "Rating" over the last ten years, my regressions suggest a different story. The abundance of high p-values for each year variable in Table 11 connotes statistical insignificance. These figures make it difficult to make any assumptions about the development of the relationship over the past ten years. The only safe assumption one can take aware from all three linear regressions is that Robert Parker's Rating has a small but statistically significant influence on the price of Provençal wines.

Table 10: 3rd Regression Results

Number of observations	**115**
F(11,103)	2.09
Prob > F	0.0277
R-squared	0.1822
Adj R-squared	0.0949
Root MSE	22.935

Table 11: 3rd Regression Results Continued

Price	Coefficient	Std. Err.	t	P>ltl	95% Conf	Interval
Rating	3.076323	0.7703987	3.99	0.000	1.548418	4.604227
Year2006	-8.792744	10.0443	-0.88	0.383	-28.71325	11.12776
Year2007	-13.69277	8.70087	-1.57	0.119	-30.94889	3.563353
Year2008	-9.485502	10.04578	-0.94	0.347	-29.40894	10.43793
Year2009	-13.63359	9.369094	-1.46	0.149	-32.21498	4.947794
Year2010	-19.43884	9.689834	-2.01	0.047	-38.65634	-0.2213354
Year2011	0.1449723	8.725215	-1.66	0.1	-31.80163	2.807179
Year2012	-14.9559	10.06177	-1.49	0.14	-34.91105	4.99924
Year2013	-14.532	11.86235	-1.23	0.223	-38.05899	8.993361
Year2014	-2.516	8.022795	-0.31	0.754	-18.42735	13.3953
Year2015	-11.2164	10.05365	-1.12	0.267	-31.15547	8.722632
Constant	-232.49	68.46255	-3.4	0.001	-368.2698	-96.7111

Conclusion

The hypothesis that prompted this thesis was that Provençal wines receiving higher scores from Robert Parker would be priced more highly now than at the beginning of the last decade. What I expected to find was a stronger relationship overtime between the price of wine and the rating it received from Parker. I assumed that a high rating from Robert Parker would result in an increased willingness-to-pay on the part of consumers, which would be recognized by wine-producers in the region of Provence. I also assumed that consumers are becoming more dependent on the expert's reviews when choosing a wine, which would be reflected in a higher price of wine based for a high rating. Following my hypothesis, Provençal producers receiving a high rating would feel comfortable assigning a high price to their recently produced wines, because they had seen the relationship between grade and price strengthen over time. There would be significant evidence to believe consumers have become more willing to purchase expensive wine if it merited a high score from a world-renowned expert. However I am unable to speak confidently on the development of the relationship between the selected variables. While

undoubtedly Robert Parker's ratings play a role in price determination, my data analysis does not allow for many assumptions regarding the span of time.

The findings are significant because they are an indication of the relationship between an expert's and consumers' preferences, as well as an expert's ranking of a wine in relation to its price. What can be gleaned from the findings is that prices of highly rated wines have not changed very much over the last ten years. While both supply and demand of Provençal wines have increased, the ratings and subsequent prices are not rising very quickly at all. A decreasing variation in the average prices of wine was observed, as well as a somewhat statistically significant relationship between y variable "Price" and x variable "Rating".

Overall this study helps expand our knowledge of how demand for particular consumer goods is influenced by expert critiques and consequently priced in the current market. This study could give further insight into the producers' pricing strategy and how both sides of the market are influenced by expert ratings.

The findings can be applied to more than just wine. There are experts in almost every category of consumer goods. While this research was narrowed down to wines of Provence over the last ten years, it speaks to market influence in both pricing and demand by expert ratings. Websites and journals that focus on Consumer Reports are popular because consumers do not always trust their own preferences when faced with choice overload, as is often the case in the wine aisle of the supermarket. Consumers look to educate themselves on the quality of goods through the opinions of experts in the field. The results of this thesis suggest that Provençal wine producers are not paying as close attention to Robert Parker grades as initially anticipated. Although wine-producers base a small portion of their pricing strategy on the grade received, this does not tell the whole story.

This study is important because it speaks to how much or how little one person's opinion of a consumer good can affect the price. Further research related to critics' scores and pricing could explore more of the supply side of this Provençal wine study. The results of this thesis suggest that producers do not base prices solely on critics' scores.

This research has some limitations and there are several elements I neglected to study (*e.g.*, production quantity, weather, larger macroeconomic variables) that contribute to the pricing strategy of Provençal wine producers. The amount of each wine produced for the specific years was not readily available. Supply has a significant impact on the price, and because it was not used as a variable, the data may be less indicative of the strength and development of the relationship between Robert Parker's scores and the price of Provençal wines. The research design also lacks a dummy variable for red wine versus white wine versus rosé. It lacks as well a variable that controls for the supply of wine in each year.

We see evidence of a small, but not altogether statistically insignificant, growth over the ten-year period in the strength of the relationship between Robert Parker's grades, and the prices of the wines.

References

Ashenfelter, O., D. Ashmore, R. Lalonde, (1995). "Bordeaux Wine Vintage Quality and the Weather." *Chance* 8: 7-13.

Ashenfelter, O., Goldstein, R. and Riddell, C. (2010). "Do expert ratings measure quality? The case of restaurant wine awards", Mimeo. Presented at Summer Micro Conference, Federal Reserve Bank of San Francisco.

Beggs, A. (2015). When did Rosé Become a Thing? *Vanity Fair*

Combris, P., S. Lecocq and M. Visser (1997). "Estimation of a hedonic price equation for Bordeaux wine: does quality matter?" *The Economic Journal*, 107 (441), 390-402.

Friberg, R. and Grönqvist, E. (2012) "Do Expert Reviews Affect the Demand for Wine?" *American Economic Journal: Applied Economics,* Vol. 4. No. 1, pp193-211

Ginsburgh, Victor, Muriel Monzak and Andras Monzak (1994), "Red Wines of Medoc: What is Wine Tasting Worth?" *Verona: Vineyard Data Quantification Society*.

Gokcekus Omar., and Nottebaum, Dennis (2011). "The Buyer's Dilemma—Whose Rating Should A Wine Drinker Pay Attention To?", *Journal of Wine Economics*,

Goldstein, R., Almenberg, J., Dreber, A., Herschkowitsch, A. and Katz, J. (2008). "Do more expensive wines taste better? Evidence from a large sample of blind tastings.", *Journal of Wine Economics*, 3(1), 1–9.

Goldstein, R. (2012, October 16). Book review: Robert M. Parker | Parker's wine bargains: The world's greatest wine values under $25. [online] Available at: http://www.wine-economics.org/journal/details-content/volume-5-2010-no-1/book-review-robert-m-parker-parkers-wine-bargains-the-worlds-greatest-wine-values-under-25/ [Accessed September 11, 2016]

Hadj Ali, H., Lecocq, S. and Visser, M. (2010). "The impact of gurus: Parker grades and en primeur wine prices", *Journal of Wine Economics*, Vol. 5 No. 1, pp. 22–39.

Jiao, Linda (2016). "Macroecnomic determinants of wine prices", *Journal of Wine Economics*, Working Paper 202

Lecocq S, Visser M. (2006). "What determines wine prices: Objective vs. sensory characteristics", *Journal of Wine Economics*, pp.42-56

Oczkowski, Eddie (1994). A Hedonice Price Function for Australian Premium Table Wine, *Australian Journal of Agricultural and Resource Economics*, 38, (1), 93-110

Investopedia (2003). "Hedonic Pricing." *Investopedia*. [online] Available at: http://www.investopedia.com/terms/h/hedonicpricing.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186&lgl=no-infinite [Accessed September 11, 2016]