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THE NEW BORDEAUX: SEARCHING FOR A NEW CLASS OF INVESTMENT GRADE
WINE

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ABSTRACT

This paper seeks to examine whether there are geographic regions that rival Bordeaux, France when it comes to investment-grade wine. Bordeaux is widely regarded as the top region in the world for investment grade wine, as an extremely high percentage of all wine purchased for investment originates in vineyards of the region. This study focuses on four factors of the wines: historic price appreciation, liquidity, terroir, and taste ratings. Wines from six different regions of the world, including Bordeaux, were examined according to these qualities via either quantitative or qualitative means. Historic auction data was pulled from an online database in order to calculate the average annual return for each vintage being sold in an auction, and a similar database was used to compile average tasting scores from the world's top critics in order to analyze the average score of each region. Terroir and liquidity were examined from a qualitative standpoint, with the study highlighting the unique characteristics that each region possesses with regards to these two attributes. It was concluded that in the current day and age, none of the five wine regions have investment characteristics that rival those of Bordeaux. Bordeaux has the highest average historic price appreciation of any region, while boasting a strong average tasting score from top critics. Combined with a terroir that encompasses the heavy tradition and an environment conducive for growing grapes, Bordeaux wines have unparalleled investment attributes that make it the best region in the world for wine investment. However, with some of these investment factors being dynamic, rather than static, other regions in the study do have the potential to emerge as more ideal investment regions for wine.

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I. Introduction

1. Motivation

In this paper, I assess whether there is another geographic region of the world that shows similar investment promise to Bordeaux when it comes to wine. Bordeaux has set the standard when it comes to investment grade wine due to a variety of factors. This study's aim is to identify such factors and measure them against Bordeaux via qualitative and quantitative means. If a comparable region does emerge from the field of five distinct wine regions, it could present an investment opportunity with massive upside in a non-traditional asset class.

2. Background on wine as an Investment

Amidst a market where investors are constantly searching for low-risk yield, many may find it surprising that something as commonplace as wine could provide such investment returns. Investing in fine wine, although not common for the majority of retail investors, is been a practice that has been around for decades and has proven to be valuable to investors for a multitude of reasons. Not only does fine wine have a history of providing strong nominal returns to investors, but wine also provides a unique element of diversification to any portfolio. It is a physical good that has a finite supply, and has the embedded perception of 'getting better with age'. The value of a bottle of wine can almost never go to zero either, as it nearly always will have a use as being a consumable beverage above all else.

Investing in wine does not come without its fair share of considerations, however. There are many additional expenses associated with investing in large quantities of fine wine. Whether it professional storage for the bottles, insurance on the vintages, or even auction house commission that can reach up to 20% of the total value of the wine. Yet, investors continue to believe that such expenses are only a small price to pay for a strong physical asset that can heavily contribute to a portfolio.

With so much upside behind wine investment, it might seem curious why more people do not turn to such a commonplace good as an investment vehicle. After all, almost 25 million liters of wine were consumed worldwide in 2014,¹ so it is by no means foreign to most regions of the world. Despite this, the global wine investment market is only about \$4 billion worldwide.² Such a large discrepancy between the total consumption market and the total investment market is likely partially due to the fact that many investors don't require such an exotic alternative investment in their portfolios. However, it could also be because of the specific wines that people deem to be investment grade.

¹ "Worldwide Wine Consumption by Country" (*Wine Institute*: 2014), <http://www.wineinstitute.org>

² Matthew Stevenson, "The Geography of Investment Grade Wines" (*New Geography*: 2012), <http://www.newgeography.com>

3. Wine Investment Returns vs. Traditional Asset Classes

Table 1 - Wine Investment Returns vs. Traditional Asset Classes

	Liv-ex Fine Wine Investables Index (LIVXFWIN)	S&P 500	NASDAQ	Gold	Bloomberg Commodity Index	Vanguard FTSE Emerging Markets ETF (VWO)
10-Year Return	98.28%	57.85%	122.88%	80.52%	-45.70%	-7.53%
Correlation	-	0.015	0.050	0.202	0.209	0.407

The chart above³ displays the aggregate 10-year return for the Liv-ex Fine Wine Investables Index along with the return for other popular, traditional assets. The wine index provides an impressive return relative to the other asset classes, as it appreciated almost 100% over the ten year period. Also listed in the chart are the correlation coefficients for the traditional assets against the wine index, with a coefficient of 1 meaning that the two assets are perfectly correlated. No traditional asset shows even a remote correlation to the wine index, with the emerging markets ETF showing the highest correlation at 0.407. This confirms the notion that wine adds an unparalleled level of diversification to investment portfolios, without sacrificing return.

³ Bloomberg Data, 2007-2017

4. Bordeaux Wine as an Investment

Depending on the source, experts estimate that approximately 80 – 90% of investment grade wine comes from the Bordeaux region of Southwestern France.⁴ Bordeaux carries with it a great deal of cache from a wine perspective, as it boasts centuries of winemaking tradition that can only be found in a select number of other places around the world. Consequently, bottles of various Bordeaux vintages are sought out not only for their refined tastes, but also because of their value as an investment. If one is to read a beginners' guide to wine investing, Bordeaux is almost always the starting point, as returns are safer here than essentially any other wine region on earth. *Liv-ex*, which is a global online marketplace for wine and a provider of various wine investment indices, includes predominately Bordeaux wines in its broader market indices. All 50 wines of *Liv-ex 50* index are Bordeaux First Growth wines, while 73 of the 100 wines in the *Liv-ex 100* are from Bordeaux.⁵ In other words, Bordeaux can essentially be seen as a proxy for the overall wine investment market.

Bordeaux's current supply and demand situation is extremely unique compared to the rest of the world. In 1855, the Bordeaux Brokers Union created a mandate that today is known as the Bordeaux Classification. These classifications were based solely on price, and acted as a tool of comparison for consumers of the time. The Bordeaux Classifications were later coupled with the Appellation d'Origine Contrôlée in 1936, in an effort to further protect consumers against fraudulent wine and to ensure that quality standards for top wines were being kept.⁶ As a result, the supply of fine wine from the Bordeaux region has stayed relatively low, while demand for

⁴ *The Case for Investment Grade Wine as a Strategic Alternative Asset Class* (Alexandria, VA: Trellis Fine Wine Investments LLC., 2012)

⁵ "Liv-ex Fine Wine Indices" (Liv-ex, 2017), <https://www.liv-ex.com>

⁶ "History and Fundamentals" (Bacvin), <http://www.bacvin.com>

both consumption and investment has stayed high. This, in turn, has created a scarce environment for a good majority of Bordeaux 'First-Growths', many of which are included in this paper.

As no one would dispute the merits of holding Bordeaux wine in an investment portfolio, many would dispute what the actual criteria is for being an investment grade wine. Yes, Bordeaux's prestige and tradition definitely contribute to its investment grade status, but are those really the only qualifications? Intuitively, the answer is no, given that there are many other wines that produce similar, if not better returns, that include grapes from 20th century vineyards and wineries. This is where the discrepancy between wine consumption and wine investing comes to the forefront. Because investors perceive only a small portion of the wine market as investible, they are therefore limited in their perceived options. What is also important to remember is that there are other regions of the globe that are producing extremely sought-after and critically acclaimed wines. Whether it be Northern Italy, the Australian Coast, Chile, or even portions of the United States, vineyards and wineries are producing vintages that are able to stand up to even some of the most prestigious chateaux's in Bordeaux. They consistently score highly in critic rankings and demand prices into the thousands of dollars on some occasions. Therefore, it makes sense that many of these wines could also be fantastic additions to an investment portfolio as well.

The question then becomes; is there a new Bordeaux? Is it possible for a region of the world to overcome the cache of brilliance and years of tradition that traditional investment grade wines inherently possess? Can investors find a new 'go-to' when they decide that wine would be a lucrative addition to their investment portfolios? This paper discusses various geographic regions from around the world that have developed a reputation for outstanding

winemaking. From a select group of wines, each region is then tested against a number of criteria that are important in the perception of wine from an investing standpoint. The aim is ultimately to see if any region consistently matches or outperforms the control set of Bordeaux wines with regard to these criteria. If so, investors may find it easier to stray from their French safe-haven, and make the world of wine investing much larger and more commonplace.

II. Summary of Previous Literature

The *CultWines Investment Guide*⁷ is a resource for those wishing to invest in fine wine and is published by one of the worldwide leaders in wine investing. The guide starts off by explaining the benefits of wine as an investment. Notable benefits cited by *CultWines* include portfolio diversification, tangibility, tax efficiency, a demand / supply imbalance, and prestige. The guide then goes on to cite specific examples, using indexes such as the *Liv-ex 100* and various Bordeaux First Growths, with the emphasis being the outperformance of equities over the medium-to-long term. *CultWines* then has a section detailing factors affecting wine price. They include:

1. Brand
2. Producer History
3. Vintage Quality
4. Critic Score
5. Supply
6. Historical Price Performance
7. Vintage Production
8. Comparative Price Analysis
9. Market Trends
10. Drinking Window
11. Scheduled Re-scores

⁷ *Fine Wine Investment Prospectus* (Richmond, UK: Cult Wine, 2015)

Since this is simply a brochure for investing, *CultWines* does not go into detail with regards to these factors, or how they were determined.

In the *Priceonomics* article titled “The Price of Wine”⁸, the author explores the fact the difference between extremely cheap wine and wine that sells at hundreds and even thousands of dollars per bottle. He cites the fact that numerous studies have concluded that in many instances, neither amateur consumers, nor professional critics, are able to consistently differentiate wines of various price points, or specifically identify the qualities that make one wine more expensive than another. He interviews a wine merchant, who notes that there are two categories of the wine market. One is a category that is centered around bulk production, where price is primarily determined by pure profit margins. The article then talks about how anything outside of this category is hard to pinpoint, given it is not just profit margins driving pricing. It cites location as a big determinant in pricing, as labels such as "Napa Valley" can drive prices higher alone, as well as high scores from critics such as Robert Parker. Fine wine is even harder to pinpoint, given that each one carries cachet that is totally independent of quality. Another

Wei Zhao’s “Social Categories, Classification Systems, and Determinants of Wine price in the California and French Wine Industries”⁹, starts off by noting that price in nothing more than what a consumer is willing to pay a producer for a good. When it comes to premium wines, consumption can be so conspicuous that rationale behind pricing henceforth goes out the window. The author notes that over time, quality has become easier and easier to measure with wines, and it definitely plays a big role when it comes to less-established regions, such as California, but is not as useful in France where centuries of tradition have already solidified quality. Zhao also notes

⁸ Alex Mayyasi, “The Price of Wine” (*Priceonomics*, 2013), <https://priceonomics.com>

⁹ Wei Zhao, “Social Categories, Classification Systems, and Determinants of Wine Price in the California and French Wine Industries” (*Sociological Perspectives*, 2008), 163-90

that, in the instance of comparing Californian wines with French wines, it is difficult to do a direct comparison of two bottles. Californian wines are classified and labeled primarily by the type of grape used to make the wine, whereas French wines are more typically classified according to their geography.

Bombrun and Sumner's article in the *UC Davis AIC Journal* titled, "What Determines the Price of Wine?"¹⁰, notes that when a consumer is buying a bottle of wine, there is only so much information available to them at the point of purchase. Primarily, consumers must rely on the information printed on the label, and preconceived notions of the wine / vineyard / brand. The study looked at wines featured in the "New Releases for California". It found that Cabernet wines had the highest weighted price overall, with Chardonnay displaying the lowest price. Interestingly, the study also showed that labels like "Napa Valley" had higher overall prices than wines just labeled "California", suggesting that certain buzzwords can affect perceived value. Also, the study noted that the higher the tasting score, the higher the weighted average price for the wine. When broken down, age at release had the highest impact amongst other label characteristics for a wine. Also, Pinot Noir in particular provided an interesting premium on a bottle of wine, as it had a \$3.70 increase per bottle over the standard Merlot bottle.

Ling and Lockshin's study¹¹ in the *Australasian Marketing Journal* used a hedonic pricing model to look at pricing of Australian wines in particular. It examined the effects of winery reputation, winery size, age of the wine, and the source of the grape itself. This was based on four main varieties of Australian wine (2 red and 2 white). In the end, the study found that

¹⁰ Helene Bombrun & Daniel A. Sumner, "What Determines the Price of Wine" (*AIC Issues Brief*, 2003), 1-6

¹¹ Bith-Hong Ling & Larry Lockshin, "Components of Wine Prices for Australian Wine: How Winery Reputation, Wine Quality, Region, Vintage, and Winery Size Contribute to the Price of Varietal Wines" (*Australasian Marketing Journal*, 2003), 19-32

wine quality rating and winery reputation have major effects on the price of wine, whereas the region and the size of the winery have more of an inconsistent effect. Vintage has a minor effect overall.

The overall objective of the study, “What Determines Wine Prices: Objective vs. Sensory Characteristics”¹², in *The Journal of Wine Economics*, is to determine which variables significantly affect the price of Bordeaux and Burgundy wines. This source takes three samples of wine from various French sources, and looks at the pricing of each set. From there, the name, color, ranking, and appellation are taken into account. Each wine was also blind tasted by critics, with the critics rating the wine on an objective scale from 0 - 20. Yes, wine critics already factor in taste when assigning rankings, however by doing a blind taste test, the bias of label and price are taken away. Overall, there were 519 wines in Sample 1, 613 in Sample 2, and 255 in Sample 3. The hedonic technique was then applied to the wine sets. Objective variables that are on the label were included, as well as sensory characteristics that were measured during the blind tastings. Overall, the results indicated that the characteristics that are revealed on the label explain the majority of price differentiation.

Despite other studies being critical of sensory characteristics in determining the pricing of wine, Figuet and Cardebat’s article¹³ in the *Journal of Applied Economic Letters* signifies that such factors do actually have a larger impact than originally anticipated. 254 different Bordeaux wines from 26 appellations were blind taste tested, with tasters asked to rate each wine based on a range of various characteristics. The hedonic pricing model was then applied to each wine,

¹² Sébastien Lecocq, “What Determines Wine Prices: Objective vs. Sensory Characteristics” (*Journal of Wine Economics*, 2006), 42-56

¹³ Jean-Marie Cardebat & Jean-Marc Figuet, “What Explains Bordeaux Wine Prices” (*Applied Economics Letters*, 2004), 293-96

with the characteristics being the main inputs. The study also briefly analyzed the various appellations from a qualitative perspective, examining the prestige and reputation of each. The study concluded by finding that reputation, as many other studies have confirmed, is the major determinant in wine pricing. However, it also noted that sensory factors had a much larger correlation to price than previous literature had highlighted. The author primarily attributes this to the fact that more and more consumer have access to wine critic reviews, and are frequently more educated on the matter when they decide to purchase wine for themselves.

In the study titled, “Raise Your Glass: Wine Investment and The Financial Crisis”¹⁴ by Masset and Weisskopf, wine is confirmed to be not only a good investment in times of economic prosperity and stability, but also during time down turmoil and crisis. The study utilized various indices and used the capital asset pricing model to find that overall volatility was much lower than traditional stock indices, while still producing strong risk-adjusted returns. The study included the years of the 2000s financial crisis, and noted that wine added even more value to portfolios at this point due to its diversification benefits. The authors found that the most prestigious vintages and estates greatly outperformed the general wine index, however did not specify the exact origins or geographical regions of these prestigious vintages.

¹⁴ Philippe Masset & Jean-Philippe Weisskopf, *Raise Your Glass: Wine Investment and the Financial Crisis* (SSRN, 2010)

III. Hypothesis

Although it still seems uncertain which region specifically will show characteristics similar to Bordeaux, it is likely however that at least one region will do so. There are multiple instances where previous literature suggests that marketing factors, and other factors that are not directly associated with the quality of the wine, are the driving force behind pricing. Since Bordeaux wines come from some of the oldest vineyards in the world, it is likely that the cache of prestige that they have accumulated over the years is the main driver for price appreciation and investment gain. However, it is apparent that other regions of the world have names synonymous with winemaking quality and prestige as well. Although none of the other regions have the same history, I still believe that they have enough of a sterling reputation around the world to qualify as an investment grade region. The blind taste tests referenced in the previous literature also further cement this fact. It is a given that extremely cheap bottles of wine (those only earmarked for consumption) will be left out due to obvious tasting differences and discrepancies. However, distinguishing one bottle of fine wine from another has proved to be almost impossible, and likely will make tasting scores nearly negligible in determining another top wine region. Because reputation is likely to play a huge factor, and because the majority of their wines will likely meet (if not outperform) the tasting scores of Bordeaux, Napa Valley and Tuscany will likely be the two regions to outperform, if any. This is simply because the two regions have a reputation for wine, and wine alone. They were also the two regions that were the most often referenced in the previous literature, besides Bordeaux, which shows that they are already at the forefront of many discussions on wine as an investment.

IV. Methodology

To explore the possibility of a region that rivals Bordeaux in wine investing, this study will look at six distinct and unique geographic regions of the world. These regions are Bordeaux (which will act as the control region), Tuscany, Australia, South Africa, Chile, and Napa Valley. Each region was chosen for its reputation as a worldwide exporter of a variety of wines and its sheer quantity of vineyards and wineries producing high quality grapes and wine. The study purposefully decided to omit Burgundy given its geographic similarities to Bordeaux and the narrowness of its wine offerings. For each region, four separate factors will be examined, two of which being quantitative in nature and two of which being more qualitative. These factors are historical price appreciation, liquidity, terroir, and critic taste ratings. Historical price appreciation will be determined by looking at historical auction sales prices for the various wines within the study, broken down by up to ten different vintages per label. Historical averages will then be calculated on both an aggregate and annualized basis. Liquidity will examine the distinct consumer markets for each of the regions, with a specific emphasis on the capital markets rather than the consumption markets. Terroir, being a complex and multi-faceted factor, will involve the analysis of many parts of the wine making process, including geography and tradition. Finally, critic taste ratings will be computed as an average across vintages, labels, and regions, based on scores from multiple top critics from leading publications. By analyzing data and background information for each factor, one will be able to compare each of the regions to the control region of Bordeaux. There is no specific quantitative or qualitative requirement for any of the regions to meet as a qualifier, rather the intention of the study is to allow for a means of comparison of these elements that investors would deem important for wines.

Bordeaux	South Africa
Chateau Lafite Rothschild	Vergelegen V Red
Chateau Margaux	Mullineux 'Schist' Syrah
Chateau Latour	The Sadie Family Columella Red
Chateau Haut-Brion	Bouchard Finlayson Tete de Cuvee Galpin Peak
Chateau Mouton-Rothschild	Klein Constantia Vin de Constance
Chateau Ausone	De Toren Expression Unique Book XVII Red
Chateau Cheval Blanc	Kanonkop Pinotage
Chateau Angélus	Rust en Vrede 1694 Red
Chateau Pavie	Anthonij Rupert Red Blend
Chateau d'Yquem	Hamilton Russell Vineyards Chardonnay
Tuscany	Napa Valley
Sassicaia	Screaming Eagle Cabernet Sauvignon
Ornellaia	Harlan Estate
Masseto	Schrader Cellars Old Sparky Cabernet Sauvignon
Tignanello	Screaming Eagle Second Flight
Solaia	Bryant Family Bettina Proprietary Red
Biondi Santi Tenuta Greppo Riserva	Abreu Vineyard Thorevilos Cabernet Sauvignon
Bibi Graetz Testamatta Colore	Colgin Cariad
Tenuta dell'Ornellaia	Marcassin Pinot Noir
Case Basse di Gianfranco Soldera	Araujo Estate Eisele Vineyard Cabernet Sauvignon
Avignonesi Occhio di Pernice Vin Santo di Montepulciano	Opus One
Australia	Chile
Penfolds Bin 389	Vina Altair
Penfolds Bin 95 Grange Shiraz	Errazuriz Vinedo Chadwick
Penfolds Bin 707	Casa Lapostolle Borobo
Henschke Shiraz Hill of Grace	Vina Almaviva
Lake's Folly Cabernet	Neyen Espiritu de Apalta
Moss Wood Cabernet Sauvignon	Antiyal Red
Cullen Diana Madeline Cabernet Merlot	Matetic EQ Syrah
Rockford Basket Press Shiraz	Leyendas de Familia Magia Negra Ensamblaje
Wynns Coonawarra Estate Cabernet Sauvignon	Errazuriz Kai Carmenere
Clarendon Hills Shiraz	Sena

V. Data Collection

With liquidity and terroir both being qualitative factors, no numerical data was collected for either factor. For price appreciation and critic taste ratings, however, numerical data was used in order to reach conclusions when it came to each factor. The following details the methodology

and reasoning behind the data collection, while the data itself can be found in Appendix A of this paper.

1. Price Appreciation Data

Very rarely do investors have a short-term time horizon when it comes to wine investment, as one would have with a small-cap equity holding or a forward contract. Given that wine is a consumption good, first and foremost, investors typically look to hold wine for a relatively long time. Hence, when looking at price appreciation, a holding period of ten years was used. For the majority of wines, those ten years encompassed the period between 2003 and 2013. Although this time period encompasses a recessionary period that the majority of the globe experienced from 2007-2009, the entry and exit points represent two years of relative economic stability worldwide. This is the same case for the time period of 2006-2016, which had to be used for some wines due to a lack of data from the aforementioned time period.

The chosen database used to conduct this analysis was *Vinfolio's Wine Prices*¹⁵ website. This comprehensive online database includes up-to-date pricing information for hundreds of thousands of wines worldwide. A particularly useful display that the database showcases is the historical average auction price for a particular vintage of wine on a year-by-year basis. *Vinfolio* compiles the data from twelve of the most prominent auction houses in the world and creates an average based on the auctions for that specific wine in a given year. Therefore, it is incredibly easy to perform a percent change calculation given the data from two separate years.

¹⁵ *Vinfolio Wine Prices*, <https://www.vinfolio.com/do/wineprices>

2. Taste Rating Data

Wine Searcher¹⁶ was the database used to collect all taste rating data. Wine Searcher is particularly useful given that it compiles the tasting data from esteemed critics such as Robert Parker and Wine Spectator and provides an average for each specific vintage of a given label. The score is given on a scale of 0 - 100, with 100 being the highest score possible. What is important to note about the tasting scores is that they are completely subjective. Each critic is well-versed in the history and tradition of fine wine, and has been formally trained to identify attributes of fine wine, but there is simply no way to consistently quantify a quality so subjective as taste. As with auction price history, not all wines in the study had available tasting data from *Wine Searcher*; the database that was chosen to conduct the study. Due to the availability of data, the only regions examined were Bordeaux, Tuscany, Australia, and Napa Valley, with a varying number of data points for each region.

¹⁶ *Wine-Searcher*, <http://www.wine-searcher.com>

VI. Empirical Results

1. Price Appreciation

At its core, an investment is nothing more than a store of value. Regardless of what this investment may be, what matters is the overall profit or loss that the investor faces once they exit their position. Hence, it makes sense to first examine the overall price appreciation for the wines in question.

Without even looking at price points, or percentages, it is easy to draw some basic, yet important, conclusions. For one, as comprehensive as the *Vinfolio* database might be, there is simply not much auction data for wines outside of traditionally coveted investment wines. Even with some extremely prestigious wines, such as wines from Napa Valley's *Screaming Eagle* vineyard, no auction data was found by *Vinfolio*. *Screaming Eagle*'s phenomenally high prices certainly do confirm that there is a market for the wine, however it is possible that it is sold via means different than a traditional large auction house, or that the vineyard is simply too young to have its wines being sold amongst labels with more historical appeal. *Screaming Eagle* is certainly one of the few outliers, however, as many other wines of lower prestige did not have any auction data likely because of the lack of a market for the wine. Especially so in Chile and South Africa, such wines are simply not brought to worlds' largest auction houses to be sold, with transactions more likely taking place in smaller auctions or private sales. Another conclusion one can draw is that many of these transactions do not necessarily involve wines that costs thousands of dollars, or even hundreds of dollars. Many wines, although coveted, have sold

at auction for a little as \$70 or \$80 per bottle. This is relevant mostly for consumer availability, as this price point would be attractive to the majority of middle-class retail investors.

Table 3 - Historic Price Performance (Annualized Average)

Region	Data Points	High	Low	Average
Bordeaux	93	51.53%	4.25%	24.15%
Tuscany	48	25.17%	2.80%	9.78%
Napa Valley	42	8.41%	-1.16%	2.42%
Australia	27	19.30%	-0.61%	8.05%

a. Bordeaux

Bordeaux, acting as our control group, was by far the most outstanding geographic region when it came to price appreciation. Not only did it have the largest sample size available for data collection, with 93 total wines having sufficient auction history, but those sampled averaged a ten-year total return of 241%, or 24.15% on an annualized basis. This is thanks to 9 of the 10 labels from the sample returning over 150% for the ten-year period, highlighted by *Chateau Lafite Rothschild* returning an average of 515.29% across its vintages over the period. Given that Bordeaux wine makes up the vast majority of traditional investment grade wine, as already previously stated numerous times, it comes as little surprise that the investment return is so strong.

b. Tuscany

Even though Tuscan wines are almost equal to Bordeaux in terms of prestige simply as a beverage, the historical return pales in comparison to its French counterparts. Across 48 unique

data points, Tuscan wines returned 97.77% over the ten-year period, or 9.78% on an annualized basis. Compared to equities, or fixed income investments, Tuscan wines do outperform on an annualized basis, however fall far short of the Bordeaux sample. The same goes for the Australian wines, where 27 wines produced an average ten-year return of 64.37%, or 6.44% on an annualized basis.

c. Napa Valley

Napa Valley is perhaps the most surprising geographic group in the segment, with 42 wines producing an average ten-year return of 24.21%, or 2.42% on an annualized basis. One would expect much better returns from a region of the world containing numerous critically-acclaimed vineyards, however the Northern California region barely manages to outperform a basic U.S. Bond portfolio. The absence of *Screaming Eagle* certainly brings the total return down for the region, however it appears that the youth of the Napa Valley is truly its downfall. Many of the highest rated vineyards in the region are only 10-15 years old, with no tradition or historical appeal for investors to 'latch onto'. It will likely take at least a decade of maturation for many of these wines to find their labels on the auction block therefore, and for investors to get a true glimpse into their potential investment return.

d. Chile and South Africa

Chile and South Africa are the two regions that did not have a single wine with any significant auction history recorded on *Vinfo*'s database. As previously stated, this could imply many things about the Chilean and South African wine markets. Regardless of the true reasoning

for a lack of auction data, one can nevertheless conclude that investors looking to enter into such regions for investment will have a tough time tracking how such wines have historically performed in the marketplace.

2. Liquidity

Regardless of price appreciation, an investor's ability to buy and sell an asset in order to capitalize on an investment gain is imperative. This requires a liquid market for the wine, with ample numbers of buyers and sellers on either side looking to purchase wines either for investment or for consumption. The availability of pricing data for this study can help draw initial conclusions about the liquidity, however it is hard to find similarly quantifiable metrics to create any ranking for the regions in terms of liquidity.

a. Bordeaux

Liquidity is the one qualification of investment grade wine that simply is a byproduct of maintaining the status quo. With Bordeaux wines making up 75-85% of the investment grade market, investors are aware that investing with the masses will free them from any concern regarding liquidity. According to Adam Lewis' article title "*Bordeaux is the most 'liquid' wine market*", Lewis makes the case that Bordeaux has also struck the perfect balance from a production standpoint as well. Despite the prestige surrounding Bordeaux wine, he notes that the region typically still has higher average production than other areas of the world. Whereas a Burgundy vineyard might only produce 500 - 1,000 cases per year, a comparable Bordeaux Chateau produces anywhere from 10 - 20,000. This allows Bordeaux to be accessible enough to

maintain liquidity, but not dilute the market and drive down value. When one considers the fact that about there are about 50 of such Chateaus are considered to be ‘world class’,¹⁷ one can immediately see further attractiveness in the diversity of the region as well.

b. *Project Genome*

Constellation Brands, which is one of the world’s leading producers in wine and spirits, released a study in 2014 titled, *Project Genome*¹⁸. The study looked at thousands of consumers of wines in the U.S. and categorized them based on their purchasing habits and their thought process when purchasing wine. All of *Constellation’s* brands are mass-produced wines, meaning that the study is primarily intended to look at consumers purchasing wine strictly for consumption, rather than for investment. However, the study still reveals a key takeaway regarding how consumers view the world of wine. *Project Genome* found that the largest share of consumers (23%) are classified as ‘Overwhelmed’ (See Figure 1). As the title suggests, this means that such consumers are so taken back by the variety and choice available to them in the wine market, that they struggle when it comes to making a purchase. This is confirmed when *Project Genome* looks at the share of purchasers, where Overwhelmed consumers only made up 13% of overall purchases. The 10% gap suggests that often times, the inundation of choice compels such consumers to avoid buying wine altogether. Mike Veseth, the editor of *The Wine Economist*, cites this finding in his argument regarding a lack of liquidity in the wine market. In

¹⁷ Vin-X

¹⁸ Constellation Wines U.S., *Project Genome: Home & Habits* (2014)

his article titled, “The Sub-Prime Wine Crisis”¹⁹, Veseth says that, “[Consumers’] ‘liquidity crisis’ is a real one – they are afraid to invest in complicated wine products due to a lack of confidence in their knowledge and lack of transparency regarding what’s really in the bottle.” In short, Veseth suggests that in order to increase liquidity, better information must be provided on such wines. This further validates the aforementioned point that, as it stands, Bordeaux represents the most liquid wine market in the world due to the abundance of information available to investors. Investors feel comfortable and confident in the product that they are investing in, when it comes to Bordeaux wines, and consequently will be more likely to find a seller, or be a buyer, than if they were dealing with any other wine region.

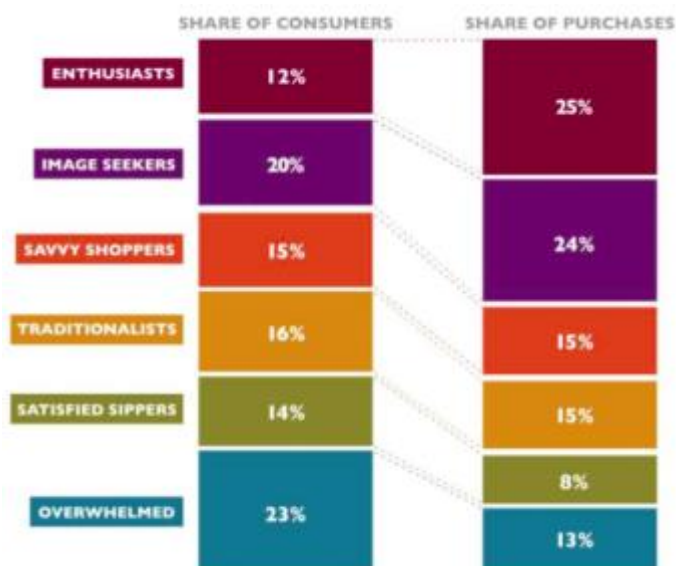


Figure 1 - Project Genome Consumer Breakdown (Constellation Brands, 2014, Slide 6)

¹⁹ Mike Veseth, “The Sub-Prime Wine Crisis” (*The Wine Economist*, 2008), <https://www.wineeconomist.com>

3. Terroir

According to *Wine Folly*²⁰, terroir is “one of the most used and least understood wine words”. It is an all-encompassing word used to describe facets of wine are that particular to not only a certain region, but also a certain vineyard / wine producer. The four traits that are reflected within terroir are climate, soil, terrain, and tradition (See Figure 2). The first three traits are relatively self-explanatory, as they reflect the geographic elements which affect the grapes that eventually go into the wine. Tradition, on the other hand, reflects human processes rather than natural processes. It is based upon the standard practices for winemaking at a particular vineyard given that different practices and traditions can often lead to lending specific and unique attributes to wines. Given that wine is a consumption good, above all else, it makes sense to examine the terroir of Bordeaux wines and compare it to the other regions of wine in the study.

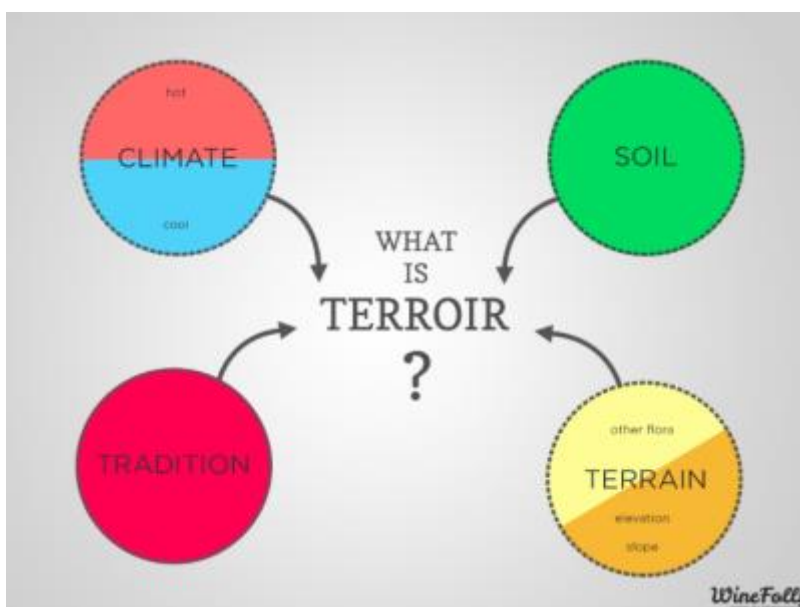


Figure 2 - What Is Terroir? (Wine Folly, 2013)

²⁰ Madeline Puckette, “Terroir Definition” (*Wine Folly*, 2013), <http://www.winefolly.com>

a. Bordeaux

Counter-intuitively, the soil in Bordeaux is actually very poor from an agricultural standpoint.²¹ Although this may not bode well for growing traditional crops, it is great for wine grapes. Vines growing in this soil are forced to seek out nutrients, which puts stress on the vine itself. As a result of this, and a lack of water, the grapes develop much more than the leaves on the vines. This in-turn produces a limited quantity of very juicy and concentrated grapes - perfect for wine making. Bordeaux's overall climate can be described as temperate and mild given its proximity to the Mediterranean Sea. It has an average temperature of about 55 degrees Fahrenheit year-round, which naturally spikes during the summer months. Experts say that the Bordeaux nighttime temperatures are key to driving a fantastic wine product as well. The temperature, even in the summer, often dips to about 48 degrees Fahrenheit which provides an acidity to the grapes and makes for a better overall wine product. The region is also far from flat, as many vineyards are actually placed on hillsides throughout Bordeaux. This allows for proper drainage during wet periods, which is aided by the fact that much of the soil in Bordeaux is gravel-based (See Figure 3). As far as tradition is concerned, Bordeaux arguably has more wine tradition than anywhere else in the world. Many Chateaus and wineries are family businesses, that have been around for as long as 10-11 generations. Winemaking practices from winery to winery will obviously be slightly different throughout the region, but as a whole, Bordeaux has figured out the key to making great wine and has been doing so for hundreds of years.

²¹ Jeff Leve, "Dirty Little Secret about the Soil, Terroir and Climate of Bordeaux" (*The Wine Cellar Insider*), <http://www.thewinecellarinsider.com>

b. Tuscany

Tuscany, which is the closest region geographically to Bordeaux, reaps the same benefits of being a Mediterranean climate. It is relatively temperate, and access to water is abundant. Tuscany also has a high level of prestige around its wine-making traditions. Such traditions date back to the Etruscan period and have been refined over centuries to produce some of the world's best wines. What differentiates Tuscan soil from other regions of the world is the diversity that



Figure 3 - Gravel-based Bordeaux Soil (The Wine Cellar Insider)

can be found within the single region.²² Many different soils of different compositions can be found throughout the region, which bodes well for the diversity of grapes that can be utilized to their fullest extent, and solidifies Tuscany as possibly the most well-balanced wine region in the world.

²² Sunny Brown, "The World's Top 10 Wine Soils" (*Winegeeks*), <http://www.winegeeks.com>

c. Australia

Australia, especially in its summer months, boasts a very hot and less temperate climate than Bordeaux. Combined with harder access to water, and soil that drains relatively poorly, Australian vineyards are typically at a natural disadvantage when it comes to picking grapes for winemaking.²³ However, in coastal vineyards, there are select Australian vineyards that are much more conducive to growing grapes due to cooler winds coming off of the ocean. Such grapes have the potential to make fantastic wines, but are harder to come by than in Bordeaux or Tuscany. From a tradition standpoint, Australia certainly does not have the same sort of history and tradition that the previous two regions have. However, tradition is by no means static, and Australian winemakers are learning over time to make the best wine possible from the less than ideal climate that their grapes grow in.

d. South Africa

South Africa, like Tuscany, is surprisingly conducive to growing a very diverse selection of grapes for various wines²⁴. Its coastal position within the African continent makes for an ideal climate, and the diversity of geography gives growers a large selection of soils that benefit a range of different grapes. Like Bordeaux, many vineyards reside on hills or low mountains for irrigation purposes. However, South African wines face a similar immaturity to Australian

²³ James Halliday, "Wine-Essentials: Terroir" (*Wine Companion*), <http://www.winecompanion.com.au>

²⁴ Dawid Saayman, "South African Vineyard Soils and Climates" (*Wines of South Africa*, 2013), <http://www.wosa.co.za>

wines, given that there is not a very rich history of winemaking in the country. Therefore, tradition has yet to become a staple within the South African terroir.

e. Chile

Chile, although it might possess the smallest amount of tradition amongst the regions, surprisingly boasts some of the best qualities of anywhere in the world.²⁵ Via Pacific Ocean to the west, and the Andes Mountains to the East, Chile is insulated from any severe weather, while still receiving the benefits of cool breezes and plentiful water from mountain run-down. The soil drains very well, preventing pooling within the valleys, and the Bordeaux-like temperature dips at night which helps when it comes to grape acidity. Chile also prides itself on having large organic vineyards, which are free from traditional pesticides and unnatural growing aids due to the fact that grapes need little aid to grow in such a supportive climate.

f. Napa Valley

Perhaps the hardest terroir to classify and generalize is that of Napa Valley. Even though Napa is a relatively small part of California, it still features extremely varied climates depending on where one grows grapes.²⁶ The region is extremely active from a seismic perspective, and due to various volcanic residues and water features, there are diverse soil layers with various moisture properties and mineral content. Napa Valley, even to the casual wine consumer, is well-

²⁵ “Chile’s Viticultural Paradise and Unique Geography” (*Wines of Chile*), <http://www.winesofchile.org>

²⁶ “The Terroirs of Napa Valley” (*Bell Wine Cellars*), <http://www.bellwine.com>

known as the United States' premier destination for wine due to the consistently high quality of wine being produced in the region; signaling that vineyards and winemakers have become very comfortable with their specific terroir, and know precisely how to make the best wine possible based on their surroundings. This absolutely signals strong tradition amongst Napa Valley vineyards as well, but like the other regions, tradition that simply cannot stand up to Bordeaux and Tuscany.

In summary, every region within this study has qualities that make it a strong geographic center for growing wine. Even harsher climates like Australia and South Africa have elements that allow farmers to grow top-notch grapes, and vineyards have increasingly found the method that works best for their part of the world to deliver the best wine that they can. It is the final element of terroir, tradition, that excels Bordeaux and Tuscany far past the competitors. Vineyards can change processes for making wine, and often can even change the grapes that are grown to make the wine. However, generations of tradition and perfecting the art of winemaking are attributes that cannot be gained in an instant, and are simply age-old byproducts of the French and Italian regions.

4. Taste Ratings

Table 4 - Critic Taste Ratings by Region

Region	Data Points	High (Single Vintage)	Low (Single Vintage)	Average
Bordeaux	92	97	86	92.27
Tuscany	48	96	87	91.42
Napa Valley	39	97	90	93.18
Australia	25	95	90	92.86

Wine, as a consumption good, is intuitively tied to its physical qualities when it comes to how much people are willing to pay for it. An interesting challenge is presented when taste is the main indicator of such physical qualities, and taste being a completely subjective measure that can vary drastically from critic to critic. Yet, because there is no other way to gage the taste of a wine before purchasing it, many people rely on well-known critics or publications to provide unique insights on a third party's opinion of the wine. What makes ratings even more difficult to examine in this study is the fact that all of the wines in the study are 'top-tier' for their region. They have received attention primarily since critics have recognized them as tasting extremely good. However, as in any top-tier luxury good, there are still winners and losers, and it is beneficial to examine how ratings of Bordeaux wines compare to wines from the other regions in the study.

Whereas Bordeaux was by far the best region when it came to price appreciation, the region did not even emerge with the top average critic score. In fact, it came in third out of the four regions where data was collected. Across its 92 data points, Bordeaux had an average score of 92.27. The majority of the Bordeaux wines had an average in the 92 - 93 range, with *Chateâu Ausone* and *Chateâu Mouton-Rothschild* scoring slightly lower. The top-ranking region was Napa Valley, which had an average score of 93.18 across its 39 data points. *Harlan* emerged as the top label in the Valley, with an astonishingly impressive 94.60 average across its ten vintages. Australia was the second-place region, with an average score of 92.86 across its 25 data points, and Tuscany was fourth with an average score of 91.42 across its 48 data points.

There are many areas for possible discrepancy in this study of average critic score. For one, the number of data points for each region varies quite drastically in some instances, and had more or fewer wines been included, the result could have very well changed. Another possible

difference to point out is the fact that the critics included in *Wine Searcher's* average score for each vintage could vary from wine to wine. *Wine Searcher* does not provide a specific breakdown of which reviews are included in the aggregate number, and it is more than likely that not all of the same critics reviewed all of the same wines.

Despite these possible discrepancies, there are still valid conclusions that can be drawn. Foremost, it is that critic score has little-to-no impact on the price performance of a wine. Even though Bordeaux wines were by far the highest returning wines when it came to historical price appreciation, they were ranked third in overall critic ranking. The same goes for wine-specific metrics. For example, *Chateau Lafite Rothschild* had the highest average total return for any of the Bordeaux wines, yet was only the seventh highest when it came to average critic rating. Secondly, the range of critic scores is extremely low, regardless of which region of the world is being examined. The highest rated wine in the study received an average score of 94.6 across its vintages, where the lowest received an average score of 90.3. This represents a difference of only 4.3 points. The range becomes even smaller when it comes to the overall regional average, as the difference between Napa Valley, the highest rated region, and Australia, the lowest rated region, was only 0.33 points.

VII. Summary, Findings, and Future Research

Table 5 - Summary of Wine Analysis Factors

Factor	Qualitative or Quantitative (Within Study)	Correlation to Wine Price	Dynamic or Static
Historic Price Appreciation	Quantitative	High	Dynamic
Liquidity	Qualitative	Low	Dynamic
Terroir	Qualitative	Medium – High	Static
Critic Taste Ratings	Quantitative	Medium – High	Static

1. Summary & Findings

In short, contrary to the hypothesis, no other wine region comes close to rivaling Bordeaux. Bordeaux's incredible investment return relative to the rest of the world makes it the obvious choice for investors that are looking to invest in an asset with a strong track record. Even more telling is the fact that Bordeaux wines have so much more historical data available than the other wines, making research much easier than in other cases. This, in addition to the fact that Bordeaux is already the most actively traded wine in the world, also makes it the most liquid asset in the study; a crucial fact for investors looking to easily enter and exit positions in the wine market. Looking at the terroir of the various regions showed that even though Bordeaux has great geologic and atmospheric conditions for making wine, that there are many other regions that feature equally as good, if not better, conditions. Other than Tuscany, however, no region in the study was able to match Bordeaux in the fourth element of terroir: tradition. Quite simply, there are no

A surprising, yet insightful, finding in the study found that critic rating was of little significance to a wine's overall popularity or price appreciation, and that world class wines from around the world typically fit into a very narrow band of critic ratings that provides little room for differentiation. The confirms much of the previous literature which stated that critics often times had a difficult time quantifying the difference between one fine wine and another. It can be concluded that taste ratings can act as a 'qualifier' for fine wine, but not a differentiator.

If one were to seek out the soundest wine investment advice based on the data from this study, it would be to solely invest in Bordeaux wines. This conclusion can certainly summarize the present investment landscape for wine, however, the study leaves space for future opportunity. The study did not necessarily state that the wine market for other regions displayed negative indicators for investment, rather that the regions often times did not display any indicators at all, as there was so little data outside of the West/Central Europe markets. As a rule of thumb, investors look to acquire as much publically available information on an asset before investing in it. However, in the case of Chile, Napa Valley, South Africa, Australia, and even Tuscany in some instances, there simply is not that much information to synthesize or analyze. Therefore, until more information regarding critic ratings and historical price appreciation becomes available to investors, the ideal terroirs of the regions will do little to entice people into investing.

2. Future Research

As previously mentioned, it is impossible for any region to accrue the amount of prestige and tradition that Bordeaux Chateaus have managed to acquire over the years. If there is

one other region that has managed to build a phenomenally strong reputation in a very short period of time, however, it is Napa Valley. This is not just for a specific subset of wines within the Valley either, as the diverse terroir of the region allows for various grapes that produce numerous types of award-winning wine. Although Napa Valley's data points did not produce strong investment returns, many of the vineyards are extremely young, giving investors little historical acclaim to base their purchase around. *Harlan's* first vintage was produced in 1990, *Marcassin's* was in 1991, and *Colgin's* first vintage only dates to 1992. For a good that is supposedly better with age, few investors will likely pay a heavy premium for a good that is slightly older than the average college student, regardless of how limited its quantity is. With time comes perspective, however, and it seems as though Napa Valley in the decades to come will benefit from this and see an increase in demand for its wines as an investment.

An ideal topic for future research would be to evaluate this hypothesis that Napa Valley will improve as an investment grade wine region going forward, by taking a deeper look at the fundamentals of the region and what differentiates it from other geographies. Another interesting topic for future research would be the difference that lies in purchasing investment grade wine from an auction and purchasing it via a private deal. Although data may be difficult to accumulate, it would be insightful for prospective investors to see which method of purchase is most beneficial to them.

Appendix A

Vintage Data

Bordeaux

	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
Chateau Lafite Rothschild					
2000	\$1,685.27	\$409.87	311.17%	31.12%	97
1999	\$706.15	\$133.84	427.61%	42.76%	92
1998	\$748.96	\$135.29	453.60%	45.36%	94
1997	\$642.82	\$92.14	597.66%	59.77%	92
1996	\$1,111.78	\$238.70	365.76%	36.58%	96
1995	\$811.35	\$152.64	431.54%	43.15%	95
1994	\$641.63	\$84.64	658.07%	65.81%	88
1993	\$720.22	\$97.70	637.18%	63.72%	87
1992	\$602.61	\$81.18	642.31%	64.23%	91
1991	\$613.81	\$84.31	628.04%	62.80%	88
AVG	\$828.46	\$151.03	515.29%	51.53%	92
Chateau Margaux					
2000	\$978.38	\$514.23	90.26%	9.03%	97
1999	\$397.35	\$107.40	269.97%	27.00%	93
1998	\$381.01	\$113.89	234.54%	23.45%	94
1997	\$343.51	\$97.89	250.91%	25.09%	91
1996	\$596.06	\$228.80	160.52%	16.05%	96
1995	\$477.20	\$222.70	114.28%	11.43%	94
1994	\$352.76	\$104.54	237.44%	23.74%	91
1993	\$339.02	\$105.83	220.34%	22.03%	90
1992	\$322.24	\$139.75	130.58%	13.06%	86
AVG	\$465.28	\$181.67	189.87%	18.99%	92.4
Chateau Latour					
2000	\$1,051.19	\$413.28	154.35%	15.44%	97
1999	\$458.90	\$96.49	375.59%	37.56%	92
1998	\$485.04	\$97.76	396.15%	39.62%	92
1997	\$1,152.07	\$87.25	1220.42%	122.04%	89
1996	\$802.45	\$206.13	289.29%	28.93%	95
1995	\$530.83	\$187.49	183.12%	18.31%	94

1994	\$422.22	\$117.42	259.58%	25.96%	92
1993	\$410.74	\$97.44	321.53%	32.15%	90
1992	\$398.32	\$98.47	304.51%	30.45%	90
1991	\$321.66	\$101.01	389.40%	38.94%	91
AVG	\$603.34	\$150.27	389%	38.94%	92.2

	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
Chateau Haut-Brion					
2000	\$685.27	\$344.85	98.72%	9.87%	96
1999	\$351.53	\$95.56	267.86%	26.79%	92
1998	\$388.63	\$153.72	152.82%	15.28%	95
1997	\$336.50	\$84.04	300.40%	30.04%	90
1996	\$375.25	\$125.15	199.84%	19.98%	93
1995	\$426.13	\$150.12	183.86%	18.39%	94
1994	\$318.31	\$104.86	203.56%	20.36%	92
1993	\$313.21	\$77.49	304.19%	30.42%	90
1992	\$514.33	\$88.37	482.02%	48.20%	89
1991	\$327.79	\$81.06	243.70%	24.37%	96
AVG	\$403.70	\$130.52	244%	24.37%	92.7

	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
Chateau Mouton-Rothschild					
2000	\$1,478.89	\$396.18	273.29%	27.33%	94
1999	\$413.83	\$96.15	330.40%	33.04%	92
1998	\$412.01	\$132.09	211.92%	21.19%	92
1997	\$365.00	\$93.78	289.21%	28.92%	90
1996	\$444.70	\$145.21	206.25%	20.62%	94
1995	\$461.30	\$156.28	195.18%	19.52%	94
1994	\$327.20	\$90.24	262.59%	26.26%	90
1993	\$333.51	\$94.83	251.69%	25.17%	89
1992	\$319.71	\$79.21	303.62%	30.36%	86
1991	\$320.56	\$77.84	258.24%	25.82%	86
AVG	\$487.67	\$136.18	258%	25.82%	90.7

	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
Chateau Ausone					
1999	\$424.85	\$110.64	283.99%	28.40%	93

1998	\$545.55	\$141.90	284.46%	28.45%	95
1997	\$372.31	\$76.03	389.69%	38.97%	92
1996	\$397.52	\$157.32	152.68%	15.27%	93
1995	\$543.95	\$151.51	259.02%	25.90%	93
1990	\$359.63	\$156.61	129.63%	12.96%	92
1989	\$315.82	\$134.36	135.06%	13.51%	92
1988	\$299.74	\$109.45	173.86%	17.39%	90
1986	\$290.61	\$95.07	205.68%	20.57%	90
1985	\$288.22	\$107.58	223.79%	22.38%	89
AVG	\$383.82	\$124.05	224%	22.38%	91.9

	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
Chateâu Cheval Blanc					
2000	\$851.68	\$517.86	64.46%	6.45%	95
1999	\$392.96	\$137.71	185.35%	18.54%	93
1998	\$532.98	\$269.94	97.44%	9.74%	96
1997	\$293.11	\$98.52	197.51%	19.75%	89
1996	\$347.68	\$124.31	179.69%	17.97%	93
1995	\$365.91	\$143.39	155.19%	15.52%	93
1994	\$391.98	\$81.52	380.84%	38.08%	91
1993	\$400.06	\$88.19	353.63%	35.36%	91
1992	\$245.00	\$99.50	146.23%	14.62%	
1990	\$970.19	\$504.21	195.59%	19.56%	96
AVG	\$479.16	\$206.52	196%	19.56%	93

	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
Chateâu Angelus					
2000	\$389.34	\$145.39	167.79%	16.78%	95
1999	\$205.90	\$64.84	217.55%	21.76%	92
1998	\$289.17	\$76.48	278.10%	27.81%	93
1997	\$197.17	\$42.64	362.41%	36.24%	90
1996	\$236.47	\$63.90	270.06%	27.01%	92
1995	\$277.73	\$84.24	229.69%	22.97%	93
1994	\$197.92	\$61.29	222.92%	22.29%	92
1993	\$189.16	\$51.14	269.89%	26.99%	90
1990	\$438.25	\$177.12	147.43%	14.74%	95
1989	\$487.14	\$149.57	240.65%	24.06%	93
AVG	\$290.83	\$91.66	241%	24.06%	92.5

Chateaû Pavie	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
2000	508.21	241.74	110.23%	11.02%	95
1999	230.35	67.87	239.40%	23.94%	92
1998	212.17	94.09	125.50%	12.55%	93
1995	120.82	46.8	158.16%	15.82%	87
1994					
1993					
1992					
1991					
1990					
1989					
AVG	267.8875	112.625	158%	15.83%	91.75

Chateaû d'Yquem	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
1997	\$226.71	\$204.08	11.09%	1.11%	96
1996	\$183.91	\$167.34	9.90%	0.99%	94
1995	\$173.28	\$146.06	18.64%	1.86%	94
1994	\$175.82	\$121.66	44.52%	4.45%	88
1993	\$199.16	\$125.43	58.78%	5.88%	91
1991	\$219.08	\$124.83	75.50%	7.55%	93
1990	\$375.30	\$242.67	54.65%	5.47%	96
1989	\$383.53	\$260.28	47.35%	4.74%	96
1988	\$375.01	\$231.17	62.22%	6.22%	96
1987	\$220.51	\$159.37	42.52%	4.25%	91
AVG	\$253.23	\$178.29	43%	4.25%	93.5

Tuscany

	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
Sassicaia					
2000	\$167.70	\$72.41	131.60%	13.16%	92
1999	\$165.20	\$103.92	58.97%	5.90%	92
1998	\$194.98	\$113.42	71.91%	7.19%	95
1997	\$287.02	\$167.46	71.40%	7.14%	91
1996	\$165.63	\$107.05	54.72%	5.47%	90
1995	\$161.54	\$115.33	40.07%	4.01%	92
1994	\$121.17	\$79.52	52.38%	5.24%	88
1993	\$107.87	\$104.44	3.28%	0.33%	89
1992	\$138.03	\$93.67	47.36%	4.74%	87
1991	\$225.61	\$87.83	156.87%	15.69%	87
AVG	\$173.48	\$104.51	68.86%	6.89%	90.3
Ornellaia					
1998	\$194.88	\$121.00	61.06%	6.11%	93
1997	\$265.90	\$128.59	106.78%	10.68%	92
1996	\$147.18	\$71.86	104.81%	10.48%	91
1995	\$205.62	\$83.13	147.35%	14.73%	93
1994	\$98.28	\$66.75	47.24%	4.72%	89
1993	\$118.40	\$61.05	93.94%	9.39%	89
1990	\$363.81	\$174.91	108.00%	10.80%	93
1988	\$135.81	\$131.57	3.22%	0.32%	92
1987					
1986					
AVG	\$191.24	\$104.86	84.05%	8.40%	91.5
Masseto					
1999	\$549.45	\$114.67	379.16%	37.92%	94
1998	\$553.73	\$230.00	140.75%	14.08%	95
1997	\$751.85	\$220.55	240.90%	24.09%	94
1996	\$471.68	\$124.59	278.59%	27.86%	92
1995	\$384.64	\$151.47	153.94%	15.39%	92
1994	\$425.40	\$84.46	403.67%	40.37%	92
1993	\$355.47	\$113.62	212.86%	21.29%	91
1989	\$578.97	\$152.19	280.43%	28.04%	91
1988	\$765.66	\$191.00	300.87%	30.09%	96

1987	\$461.91	\$204.83	125.51%	12.55%	90
AVG	\$529.88	\$158.74	251.67%	25.17%	92.7

Tignanello	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
2000	\$97.16	\$40.13	142.11%	14.21%	91
1999	\$120.62	\$61.50	96.13%	9.61%	92
1998	\$73.84	\$57.20	29.09%	2.91%	90
1997	\$175.81	\$96.54	82.11%	8.21%	92
1996	\$81.33	\$58.37	39.34%	3.93%	88
1995	\$116.12	\$69.58	66.89%	6.69%	90
1994	\$67.62	\$67.96	-0.50%	-0.05%	91
1990	\$162.19	\$147.84	9.71%	0.97%	91
1988	\$115.76	\$103.30	12.06%	1.21%	91
1985	\$293.70	\$158.23	85.62%	8.56%	92
AVG	\$130.42	\$86.07	56.26%	5.63%	90.8

Solaia	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
2000	\$150.24	\$91.45	64.29%	6.43%	91
1999	\$152.41	\$110.06	38.48%	3.85%	90
1998	\$128.79	\$105.45	22.13%	2.21%	92
1997	\$408.39	\$246.77	65.49%	6.55%	94
1996	\$110.70	\$95.58	15.82%	1.58%	90
1995	\$123.07	\$106.33	15.74%	1.57%	91
1994	\$149.36	\$125.67	18.85%	1.89%	94
1990	\$246.91	\$249.83	-1.17%	-0.12%	93
1988	\$205.29	\$175.67	16.86%	1.69%	91
1987	\$125.01	\$100.96	23.82%	2.38%	92
AVG	\$180.02	\$140.78	28.03%	2.80%	91.8

Australia

Penfolds Grange	2016	2006	Gain/Loss	Ann Ret.	Taste Rating
2000	\$296.68	\$185.53	59.91%	5.99%	90
1999	\$315.58	\$153.38	105.75%	10.58%	93
1998	\$389.56	\$314.42	23.90%	2.39%	95
1997	\$298.68	\$207.37	44.03%	4.40%	92
1996	\$315.93	\$193.53	63.25%	6.32%	95
1995	\$328.78	\$185.60	77.14%	7.71%	91
1994	\$329.78	\$174.03	89.50%	8.95%	94
1993	\$300.67	\$164.21	83.10%	8.31%	91
1992	\$286.21	\$190.94	49.90%	4.99%	92
1991	\$315.23	\$194.59	62.00%	6.20%	95
AVG	\$317.71	\$196.36	65.85%	6.58%	92.8

Penfolds Bin 707	2016	2006	Gain/Loss	Ann Ret.	Taste Rating
1999	\$204.16	\$89.20	128.88%	12.89%	
1998	\$223.30	\$57.76	286.60%	28.66%	92
1996	\$166.71	\$61.35	171.74%	17.17%	92
1993	\$221.00	\$63.33	248.97%	24.90%	90
1991	\$183.64	\$70.80	159.38%	15.94%	
1990	\$199.00	\$75.89	162.22%	16.22%	93
1989					
1988					
1987					
1986					
AVG	\$199.64	\$69.72	192.96%	19.30%	91.75

Henschke Shiraz Hill of Grace	2016	2006	Gain/Loss	Ann Ret.	Taste Rating
1999	\$426.30	\$175.66	142.68%	14.27%	93
1998	\$367.50	\$281.43	30.58%	3.06%	94
1992	\$398.00	\$199.00	100.00%	10.00%	94
1991	\$306.25	\$189.50	61.61%	6.16%	94
1989	\$306.25	\$276.66	10.70%	1.07%	90
1988					
1987					
1986					
1985					
1984					
AVG	\$360.86	\$224.45	69.11%	6.91%	93

Clarendon Hills Shiraz	2016	2006	Gain/Loss	Ann Ret.	Taste Rating
1999	\$165.40	\$100.16	65.14%	6.51%	93
1998	\$167.40	\$171.77	-2.54%	-0.25%	94
1997	\$133.63	\$190.00	-29.67%	-2.97%	93
1996	\$122.74	\$171.53	-28.44%	-2.84%	94
1995	\$179.80	\$220.85	-18.59%	-1.86%	95
1994	\$183.80	\$237.00	-22.45%	-2.24%	94
1993					
1992					
1991					
1990					
AVG	\$158.80	\$181.89	-6.09%	-0.61%	93.83

Napa Valley

Harlan	2013	2003	Gain/Loss	Ann Ret	Taste Rating
1999	\$378.92	\$273.43	38.58%	3.86%	93
1998	\$371.58	\$237.82	56.24%	5.62%	94
1997	\$979.62	\$524.22	86.87%	8.69%	97
1996	\$497.82	\$403.24	23.46%	2.35%	95
1995	\$588.43	\$491.87	19.63%	1.96%	95
1994	\$932.61	\$586.72	58.95%	5.90%	96
1993	\$394.67	\$296.83	32.96%	3.30%	93
1992	\$449.16	\$273.36	64.31%	6.43%	93
1991	\$537.56	\$344.41	56.08%	5.61%	97
1990	\$637.36	\$325.33	95.91%	9.59%	93
AVG	\$576.77	\$375.72	53.30%	5.33%	94.6

Colgin	2016	2006	Gain/Loss	Ann Ret.	Taste Rating
2003	\$201.53	\$239.00	-15.68%	-1.57%	94
2002	\$257.25	\$389.70	-33.99%	-3.40%	95
2001	\$290.50	\$369.74	-21.43%	-2.14%	95
2000	\$239.00	\$174.25	37.16%	3.72%	93
1999	\$178.64	\$191.21	-6.57%	-0.66%	92
1998					
1997					
1996					
1995					
1994					
AVG	\$233.38	\$272.78	-8.10%	-0.81%	93.8

Araujo	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
2000	\$129.37	\$50.41	156.64%	15.66%	92
1999	\$176.73	\$184.12	-4.01%	-0.40%	94
1998	\$212.33	\$122.90	72.77%	7.28%	91
1997	\$201.17	\$220.50	-8.77%	-0.88%	93
1996	\$120.00	\$168.64	-28.84%	-2.88%	92
1995	\$261.25	\$255.40	2.29%	0.23%	94
1994	\$262.09	\$236.37	10.88%	1.09%	94
1993	\$224.66	\$159.86	40.54%	4.05%	94
1992	\$267.58	\$190.02	40.82%	4.08%	93
1991	\$162.52	\$173.93	-6.56%	-0.66%	93

AVG	\$201.77	\$176.22	27.57%	2.76%	93
Opus One	2013	2003	Gain/Loss	Ann Ret.	Taste Rating
1999	\$236.00	\$117.97	100.05%	10.01%	92
1998	\$239.26	\$119.64	99.98%	10.00%	90
1997	\$276.70	\$166.18	66.51%	6.65%	92
1996	\$284.37	\$153.09	85.75%	8.58%	91
1995	\$320.29	\$154.43	107.40%	10.74%	92
1994	\$240.11	\$176.51	36.03%	3.60%	90
1993	\$272.16	\$125.58	116.72%	11.67%	91
1992	\$327.72	\$160.03	104.79%	10.48%	90
1991	\$255.26	\$167.86	52.07%	5.21%	92
1990	\$262.87	\$153.54	71.21%	7.12%	93
AVG	\$271.47	\$149.48	84.05%	8.41%	91.3
Marcassin Pinot Noir	2016	2006	Gain/Loss	Ann Ret.	Taste Rating
2002	\$410.31	\$398.31	3.01%	0.30%	94
2001	\$229.75	\$236.27	-2.76%	-0.28%	92
2000	\$307.76	\$338.53	-9.09%	-0.91%	93
1999	\$224.58	\$310.80	-27.74%	-2.77%	94
1998	\$338.58	\$404.27	-16.25%	-1.62%	
1997	\$318.60	\$330.59	-3.63%	-0.36%	93
1996	\$256.07	\$339.50	-24.57%	-2.46%	
1995					
1994					
1993					
AVG	\$297.95	\$336.90	-11.58%	-1.16%	93.2

BIBLIOGRAPHY

1. Bombrun, Helene, and Daniel A. Sumner. "What Determines the Price of Wine?" *AIC Issues Brief* 18 (2003): 1-6. Web. 1 Mar. 2017.
2. "Bordeaux." *Vin-X Fine Wine Investment*. Vin-X Ltd., n.d. Web. 1 Mar. 2017.
3. Brown, Sunny. "The World's Top 10 Wine Soils." *Winegeeks*. Geeks, n.d. Web. 1 Mar. 2017.
4. Cardebat, Jean-Marie, and Jean-Marc Figuet. "What Explains Bordeaux Wine Prices?" *Applied Economic Letters* 11.5 (2004): 293-96. Web. 1 Mar. 2017.
5. *The Case for Investment Grade Wine as a Strategic Alternative Asset Class*. Working paper. Trellis Fine Wine Investments LLC., 2012. Web. 1 Mar. 2017.
6. "Chile's Viticultural Paradise and Unique Geography." *Wines of Chile*. N.p., 2015. Web. 28 Mar. 2017.
7. Cult Wine. *Fine Wine Investment Prospectus*. Richmond, UK: Cult Wine, 2015. Print.
8. Halliday, James. "Wine-Essentials: Terroir." *Halliday*. Wine Companion, n.d. Web. 1 Mar. 2017.
- "History of Wine Investment." *Bacchus Vintners*. N.p., n.d. Web. 28 Mar. 2017.
9. Lecocq, Sébastien. "What Determines Wine Prices: Objective vs. Sensory Characteristics." *Journal of Wine Economics* 1.1 (2006): 42-56. Web. 1 Mar. 2017.
10. Leve, Jeff. "Dirty Little Secret about the Soil, Terroir and Climate of Bordeaux." *The Wine Cellar Insider*. N.p., n.d. Web. 1 Mar. 2017.
11. Lewis, Adam. "Why Bordeaux Is the Most 'liquid' Wine Market." *YourMoney.com*. Ae3 Media, 12 Oct. 2015. Web. 1 Mar. 2017.

12. Ling, Bith-Hong, and Larry Lockshin. "Components of Wine Prices for Australian Wine: How Winery Reputation, Wine Quality, Region, Vintage, and Winery Size Contribute to the Price of Varietal Wines." *Australasian Marketing Journal* 11.3 (2003): 19-32. Web.
13. Liv-ex - The Fine Wine Exchange. "Liv-ex Fine Wine Indices." *Home*. Liv-ex, 2017. Web. 01 Mar. 2017.
14. Masset, Philippe, and Jean-Philippe Weisskopf. *Raise Your Glass: Wine Investment and the Financial Crisis*. SSRN. N.p., Feb. 2010. Web. 1 Mar. 2017.
15. Mayyasi, Alex. "The Price of Wine." *Priceonomics*. N.p., 29 Mar. 2013. Web. 1 Mar. 2017.
16. *Project Genome: Home & Habits*. Rep. Constellation Wines U.S., June 2014. Web. 1 Mar. 2017.
17. Puckette, Madeline. "Terroir Definition." *Wine Folly*. N.p., 6 Nov. 2013. Web. 1 Mar. 2017.
18. Saayman, Dawid. "South African Vineyard Soils and Climates." *Wines of South Africa*. N.p., Jan. 2013. Web. 1 Mar. 2017.
19. Sokolin, David, and Alexandra Bruce. *Investing in Liquid Assets: Uncorking Profits In Today's Global Wine Market*. New York, NY: Simon & Schuster, 2008. Print.
20. Stevenson, Matthew. "The Geography of Investment Grade Wines." *New Geography*. N.p., 12 Feb. 2012. Web. 28 Mar. 2017.
21. "The Terroirs of Napa Valley." *Bell Wine Cellars*. N.p., n.d. Web. 1 Mar. 2017.
22. Veseth, Mike. "The Sub-Prime Wine Crisis." *The Wine Economist*. N.p., 20 May 2008. Web. 1 Mar. 2017.
23. *Wine Prices*. Vinfoлио, n.d. Web. 1 Mar. 2017.
24. *Wine-Searcher*. Wine-Searcher, n.d. Web. 1 Mar. 2017.

25. "World Wine Consumption by Country." *Wine Institute*. N.p., Nov. 2015. Web. 28 Mar.

2017.

26. Zhao, Wei. "Social Categories, Classification Systems, and Determinants of Wine Price in the California and French Wine Industries." *Sociological Perspectives* 51.1 (2008): 163-

90. Web. 1 Mar. 2017.

EDWARD T.A. GOODALL

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EDUCATION

The Pennsylvania State University | Schreyer Honors College
Smeal College of Business | Bachelor of Science in Finance, Minor in International Business

University Park, PA
Class of May 2017

Maastricht University | Center for European Studies
Economics of the Emerging Markets of East and Central Europe

Maastricht, NL
Jun 2014 – Aug 2014

RELEVANT EXPERIENCE

Goldman, Sachs & Co.

Investment Banking Summer Analyst – Equity Capital Markets Group

New York, NY

Jun 2016 - Aug 2016

- Worked concurrently with Tech, Media & Telecom and Financial Institutions pods within ECM to create materials assisting companies looking to file an initial public offering or a follow-on equity offering
- Performed due diligence on potential mutual and hedge fund investors in preparation for a mid-cap regional bank IPO and a mid-cap SaaS IPO roadshow to ensure sufficient equity demand and uptake

Convergent Wealth Advisors

Summer Analyst – Investment Strategy and Advisory Groups

Potomac, MD

Jun 2015 - Aug 2015

- Conducted portfolio analysis for individual clients, determining how much risk each individual must take on in order to generate desired future cash flows, using the Monte Carlo Cash Flow model
- Assisted in creation of allocation tables and analyzed fund strategies across various risk preferences
- Pitched real estate mutual fund to the Firm's investment professionals as an addition to the fund platform

Nittany Lion Fund, LLC.

Executive Board – Vice President

University Park, PA

Jan 2016 – Dec 2016

- Served on the Executive Board of the 37 member, \$7.0 million Nittany Lion Fund
- Developed strategies and initiatives to promote a professional and knowledgeable culture in an effort to return capital to shareholders and further the professional development of Fund Managers

Lead Analyst – Financials Sector

Jan 2015 - Dec 2015

- Acted as Lead Fund Manager for the \$1.1 million Financials Sector within the Fund
- Composed presentations using fundamental analysis and short-term catalysts for buy or sell decisions to the Executive Board, Fund Managers, and the Penn State Investment Association general body of 300

LEADERSHIP EXPERIENCE

Alpha Kappa Psi Professional Business Fraternity

Executive Board – Vice President of Finance

University Park, PA

Dec 2015 – Dec 2016

- Budgeted the student bank account of over \$23,000 to pay dues in a timely matter and reimburse chairs
- Forecasted budgets for the year while keeping an up-to-date, assumption-based financial tracking sheet
- Developed professional, networking, and interviewing skills through 90 mock interviews, resume workshops, professional presentations, and information sessions

Executive Board – Vice President of Membership

Dec 2014 - Dec 2015

- Elected to oversee the membership process, including recruitment and new initiate education, of 119 brothers
- Engaged fellow Executive Board members in weekly meetings to discuss the progress of fraternal events and potential actions to further the professional, social, and philanthropic development of the brothers

Penn State IFC/Panhellenic Dance MaraTHON (THON)

Operations (OPP) Committee Member

University Park, PA

Sep 2015 - Feb 2016

- Joined with a committee of 37 members and collaborated with 20 other committees to transform the Bryce Jordan Center into a safe and well-function environment for a 46 hour dance marathon

Donor and Alumni Relations Committee Member

Sep 2014 - Feb 2015

- Contributed to the 2015 donation of over \$13 million to the Four Diamonds Fund by maintaining and building relationships with THON's individual, small business, corporate, and foundation donors

SKILLS, AWARDS & INTERESTS

Skills: Bloomberg, Dealogic, Factset, Morningstar, Microsoft Excel, PowerPoint, Publisher, and Word, S&P Capital IQ

Awards: 2015 CFA Institute Research Challenge, Regional Runner Up, Pittsburgh, PA; Penn State Murray-Igoe Finance Award

Interests: Baseball, cooking, golfing, marathon running, Netflix documentaries, traveling