



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



# AMERICAN ASSOCIATION OF WINE ECONOMISTS

AAWE WORKING PAPER  
No. 212  
*Economics*

## ANALYZING BARREL PURCHASING DECISIONS ON WINERY COSTS

Eric Sims and Sarah Quintanar

Feb 2017

[www.wine-economics.org](http://www.wine-economics.org)

AAWE Working Papers are circulated for discussion and comment purposes. They have not been subject to a peer review process. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the American Association of Wine Economists AAWE.

© 2017 by the author(s). All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

# Analyzing Barrel Purchasing Decisions on Winery Costs

Eric N. Sims, Continuum Estate  
[eric@continuumestate.com](mailto:eric@continuumestate.com)

Sarah Quintanar, University of Arkansas at Little Rock  
[smquintanar@ualr.edu](mailto:smquintanar@ualr.edu)

## Structured Abstract

### Purpose:

French Oak barrels are considered a vital input for the finest wines, and comprise a very large portion of wine production costs. Wineries in the United States purchase French oak barrels priced in Euros, and have the opportunity to pay for their barrels early, in April, with a discount or in September with no discount. Given the inherent complexities in fluctuating exchange rates and limited resources of the average winery, little consideration has been placed on this purchasing decision despite potentially large cost implications.

### Design/methodology/approach:

The present work analyzes historical and barrel-specific data over the last fifteen years to find a huge monetary advantage to early purchasing and obtaining the price discount, even accounting for exchange rate volatility and opportunity costs. Barrel-specific prices were obtained from Continuum Estate in Napa, California, though the authors provide detailed analysis and a broader interpretation to aid in practical decisions of typically structured wineries in the United States.

### Findings:

Early purchasing of French oak barrels over the past fifteen years, accounting for lost interest, would have decreased average winery costs by over \$60,000 as compared to paying upon delivery. For larger producing-wineries, this savings is even more pronounced.

### Originality/value:

This is the first paper to investigate the existence of an optimal decision rule regarding the purchasing of wine barrels, a vital input to wine production. This is of interest to not only those involved in the growing industry of wine-making, media and wine connoisseurs, but also to any similarly structured firm facing early commitments at a reduced price.

Keywords: early pay discounts, wine, input prices, cost minimization

JEL Codes: L66, D24, G13

“In wine, there’s truth.” Pliny the Elder, Natural History

Neither do men pour new wine into old wineskins. If they do, the skins will burst, the wine will spill, and the wineskins will be ruined. Instead, they pour new wine into new wineskins, and both are preserved." Matthew 9:17

## **I. Introduction**

As a producer of any good or service, one’s all-encompassing goal is generally to maximize profit, which oftentimes comes in the form of minimizing cost. In some industries it is fairly straightforward to do so just by having a strong understanding of the product that you are producing and its accompanying inputs and technologies. However, in the wine industry, these decisions are increasingly complex given exchange rate volatility and limited resources of small wineries, as well as the rising costs of oak barrels for reasons related to barrel production and use elsewhere (Stamp, 2015).

Despite acknowledging the importance of barrel purchasing decisions in operating a successful winery, little to no attention has been paid to timing of purchasing within academic or practitioner publications. Instead, authors have focused on storage costs, barrel type, and quality rating implications (Noparumpa, et al., 2015; Stamp, 2015). This paper is the first to utilize data and systematically analyze the timing of this purchasing. Wineries have the option to pay for their barrels in advance with a discount, or upon delivery for full price. This choice depends not only on the discount, but since French oak barrels are purchased in euros, exchange rates also impact the real cost. Utilizing fifteen years of price data for a specific custom made barrel, the current paper analyzes costs of purchasing the same type of barrel over time. This barrel is

specifically made for winemaker Tim Mondavi, and provides a reliable starting point for the long-term analysis of understanding the expense of barrel purchasing. From these initial values, the analysis extrapolates to other similar firms' decisions using exchange rate data over the same time period.

Research within the context of the wine industry is not novel: questions range from understanding the impact of quality ratings on price, validity and robustness of quality ratings, as well as traditional economic concepts as applied to wine. For example, researchers have found expert ratings to be highly correlated with quality ratings of self-reported wine connoisseurs (Schiefer & Fischer, 2008) and that engaging in wine futures to mitigate risk results in premiums (Noparumpa, et al., 2015). Broader scale analyses find higher quality wines have a lower exchange rate pass-through in the Argentinian wine market (Chen & Juvenal, 2016). Relatedly, evidence exists that there is a premium to higher quality in firms' export decisions for Champagne producers (Crozet, et al., 2011).

## **II. The Wine Industry**

In order to consider the impact of exchange rates and the early-pay discounts on costs, the present work focuses on wineries within the United States, which produce approximately 8% of the world's wine. There are 7,061 bonded wineries in the United States of America and 2,885 of those are found in California (Wine Business Monthly 2016). Production in the U.S. has broadened however, with over 600 wineries in Washington and 439 in Oregon (Wine Business Monthly 2016).

The majority of these wineries produce fine wines and use French oak barrels in the production process. In fact, French oak barrels are the overwhelming favorite with 63 percent of all new barrel purchases (Wine Business Monthly 2016), and 170,000 barrels imported annually

to the U.S. (communication with Union of Barrel Makers, 2016). Though there are unlimited opinions given what makes a great wine superior, one almost universally agreed upon component of fine wine is French oak barrels, which are expensive. For example, a single Taransaud T5 barrel was €1,500 in 2016 (if you were lucky enough to be allocated any).

Much of the complexity of purchasing barrels comes from staffing at a typical small winery. The professional staff of a 10,000 case winery typically includes a Winemaker, Viticulturist, Salesperson, and Accountant. Wineries who purchase these barrels could employ winery accountants or controllers to develop a working knowledge of Euro exchange rates and hedging strategies to be used in this once a year transaction. However, given the resource constraints regarding finance decisions for the average winery, this is impractical, and barrel decisions become a small part of an annual procedure where one employee is responsible for a wide variety of financial decisions. This paper seeks a simple and consistent tactic which could be utilized by wineries without the resources to make an independent annual decision regarding when to pay for their barrels. This solution could be used annually to minimize costs over time.

Consider a typical small single vineyard wine and its barrel requirements. A typical 228 litre (60 gallon) wine barrel will hold 25 cases of wine. A high-end luxury cuvee of 1,000 cases of wine would require 40 barrels per year – assuming one hundred percent new oak. At €929 per Taransaud Ref 102 barrel it would cost the winery € 37,160 for barrels (assuming 100 percent new oak) in 2016. Roughly, \$40,000 a year is not worth adding a hedging expert. But, it is worth seeking a simple repeatable tactic. A 1,000 case blend or winery is not uncommon. Each Year the Wine Spectator publishes the influential Top 100 wines of the year. For 2016 the top five wines from around the world were: first 2013 Lewis Napa Valley Cabernet (1,600 cases), second 2014 Domaine Serene Oregon Chardonnay (2,000 cases), third 2014 Beaux Freres

Oregon Pinot Noir (2,405 cases), forth 2013 Chateau Climens Barsac France (1,417 cases), and fifth Producttori de Barbaresco Asili Italy (1,110 cases). All examples of wineries similar in size to our 1,000 case example analyzed in this paper

Wineries have a few options of how to purchase their barrels. Tonnelleries (coopers) send out order forms in January and February for barrels to be delivered in August. All prices are denominated in Euros, generally with a discount for paying early. For example, Artisan Barrels & Tanks, Inc. Pricing Catalog 2016 states “3% discount for all Rousseau barrels orders placed by April 1<sup>st</sup>, 2016 and delivered by June 15, 2016. Net 30 days.” Bouchard Cooperages, representing the coopers Billon and DAMY grants a 50 Euro per barrel discount (6%) for orders placed by April 15 and delivered by July 1. Barrels are typically delivered at the end of summer, just before the grape harvest begins. The first option for purchasing barrels is to purchase barrels and pay early with the discount. Another standard option is to pay thirty days after delivery; usually the end of September.<sup>1</sup> The present estimates assume a 5% discount rate; a mid-range estimate for savings by paying early.

The purpose of the current work is to address this extremely important, and yet, minimally discussed question: is there a simple tactic or rule to purchase barrels and minimize costs? More specifically, using historical price patterns, what would have been the most cost effective if a winery had a single tactic and pursued it every year? These questions are made more complicated in application given the infrequency of foreign transaction, lack of institutional knowledge, plus the exchange rate volatility and high cost of French oak barrels.<sup>2</sup>

---

<sup>1</sup> Some barrel producers also offer the option of a mixed strategy which includes some proportion of purchasing now and some later. In the interest of brevity the current paper does not consider the implications of this mixed strategy since it is not substantially different than those results discussed herein.

<sup>2</sup> The authors are thankful for feedback from colleagues suggesting another, more technical approach, which utilizes the forward market to inform exchange rate expectations in September. The present paper does not include this type of analysis given the goal to present a straightforward tactic for purchasing barrels. An interesting future question is



### III. Analysis

The present analysis approaches this question in a specific real-world applied framework; utilizing barrel prices paid by Robert Mondavi Winery and Continuum Estates in Napa Valley. Both of these high-end wineries feature Tim Mondavi, the son of ledged Robert Mondavi, as the primary Winemaker. A bottle of Continuum sells for over \$200. Since 2001 Tim Mondavi has purchased a custom barrel; in terms of cooper, forest, toast and shape. It is the Taransaud Ref 102 barrel, considered vital to producing the high-quality red wine flavor of these wineries (Penn, 2003).

Figure 1 depicts the movement of actual per-barrel prices for Continuum Estate.<sup>3</sup> Note that this barrel price should be a good proxy for any related French oak barrel widely used in the United States wine industry, even if others choose different barrel types or styles. Prices likely move in the same direction over the time period. Secondly, the euro-dollar exchange rate must be considered over time to see how the foreign currency market impacts this decision strategy.<sup>4</sup>

#### [FIGURE 1 HERE]

As mentioned in the previous section, the winery has two options for what method to pursue in terms of purchasing their barrels: buy at a discount in April, pay in September, pay in October after delivery. It is important to note that in opposition to other goods and services, the price of these barrels does not change over one year: the “catalog” price and quoted discount are constant throughout a given season (year). In discussions of purchasing, especially for wine, storage costs

---

likely the impact of such a rule in comparison with what is adopted here, while considering any additional time costs of either strategy.

<sup>3</sup> Provided through personal communication with staff at the winery.

<sup>4</sup> Note that Chen and Juvenal (2016) find that higher priced (and quality) wines have lower pass-through. This is relevant insofar as future sales price impacts a winery’s decision about whether and how many barrels to purchase and if those results correspond to barrels themselves.

are substantive. However, in the present setting, wineries receive their barrels at the same time regardless of if they pay early or upon delivery. Thus, there are no additional storage costs when buying early.

Figure 2 depicts the annual costs of each strategy for the hypothetical winery which purchases 100 French oak barrels at historic Robert Mondavi Winery and Continuum Estate prices.<sup>5</sup> Note that no single strategy is always optimal from year to year, however, the discounted real price in April is, on average, significantly lower than the other two options. Even when it is more expensive, the difference is not extremely large, especially compared to the differences in other years when it is the cheaper option.

**[FIGURE 2 HERE]**

To provide a more comprehensive estimate, Table 1 provides calculations for the total cost of each tactic over these fifteen years, utilizing the same data as found in

---

<sup>5</sup> This number will vary from winery to winery, but 100 provides estimates that mirror cooperage needs of a relatively small winery which is likely too small to hire a CFO or comptroller with the specific responsibility to hedge.

Figure 2. The table below illustrates the huge advantage over time of paying in April and receiving a discount. For simplicity, the first column estimates assume the firm has no other options for the money used in the early purchasing. However, Column 2 includes an estimate of opportunity cost for the winery: the interest they could have earned if the barrel funds were spent on a 3 month CD to earn interest. Even including this foregone interest earnings, and then purchasing later, the overall savings is roughly \$60,000 for purchasing in April with a discount. For the average winery, this amount of money is nontrivial.

**[TABLE 1 HERE]**

For 2016, the barrels utilized by Continuum cost 929 Euros. If the winery had followed our purchasing rule based on the previous 15 years of data (again, assuming purchase 100 barrels), the winery would have saved about \$4,000 in that year alone. This comes to a savings of approximately 4% in barrel costs.

#### **IV. Conclusion**

This paper is the first systematic analysis of the timing of barrel payments for U.S. wineries. Wineries in the United States purchase French Oak barrels priced in Euros, and have the opportunity to pay for their barrels early, in April, with a discount or in September with no discount. Given the inherent complexities in fluctuating exchange rates and limited resources of the average winery, little consideration has been placed on this purchasing decision despite potentially large monetary implications. Based on the last fifteen years, an average U.S. winery buying French Oak barrels would have saved roughly \$60,000 by taking advantage of the early-purchase discount. Applying this procedure to 2016 remains consistent in a savings of about 4% of barrel purchase costs.

In addition to the financial advantage to purchasing early there are a number of non-pecuniary advantages to buying barrels early. In February 2015 the nine-month labor conflict at U.S. West Coast ports between the Pacific Maritime Association (PMA) and the International Longshore and Warehouse Union (ILWU) ended. Many barrels shipped to Long Beach, Oakland, Portland and Tacoma were not available for the 2014 harvest. This impacted California, Oregon, and Washington wineries. Those wineries that took early delivery in 2014 avoided the port strike.

Demand for high-quality wine barrels far exceeds supply. French Oak forests and tree falling permits are limited and the three to five year drying process disconnects current supply and demand. On top of growing fine wine demand there are now many more uses for oak ageing like whiskey, small-batch bourbon, vodka, gin, and beer (Adamian, 2014). Even non-traditional uses such as pickles, ice cream, chocolate, and maple-syrup makers are demanding fine oak barrels. Early ordering assures the winery of getting the barrels they want, and there are no additional storage costs since barrels are delivered at the same time.

Continuum Estate in Napa is a high-end example of a California winery, though its barrel choice and production decisions can easily be extended to other similar wineries in the United States and beyond. Future work will explore the external validity of these choices more broadly to lower quality commercial wineries as well.

## References

Adamian, J. (2014). Barrel Aging Is So Hot Right Now (Too Bad There Aren't Enough Barrels). *Modern Farmer*. (June 30, 2014).

Anon., n.d. *About the United States Wine and Grape Industry: General Industry Stats 2014*. [Online] Available at: <http://wineamerica.org/policy/by-the-numbers> [Accessed 26 September 2016].

Chen, N. & Juvenal, L., 2016. Quality, trade, and exchange rate pass-through. *Journal of International Economics*, 100, 61-80

Crozet, M., Head, K. & Mayer, T., 2011. Quality sorting and trade: Firm-level evidence for French wine. *The Review of Economic Studies*, 79(2), 609-644

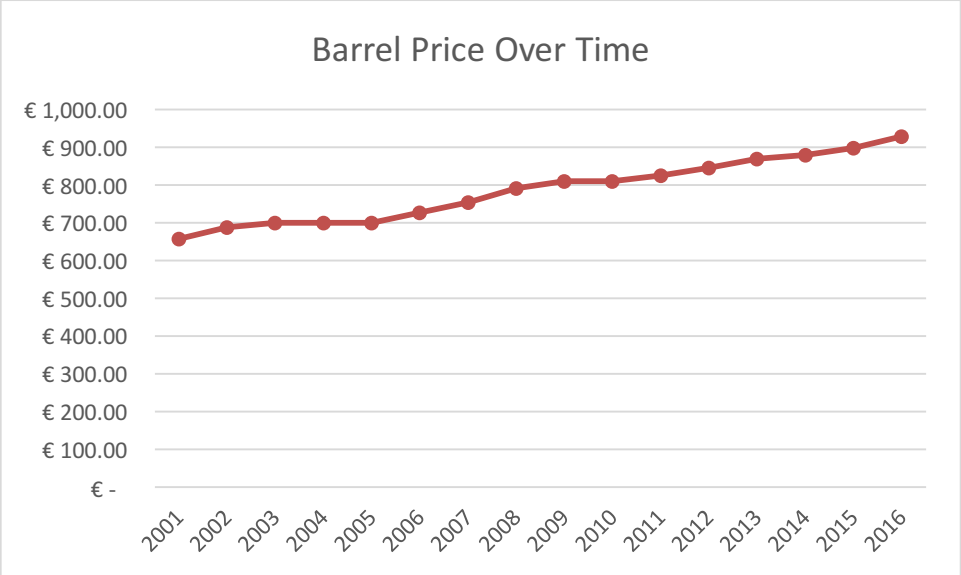
Noparumpa, T., Kazaz, B. & Webster, S., 2015. Wine Futures and Selling Under Quality Uncertainty. *Manufacturing & Service Operations Management*, 17(3), 411-426.

Schiefer, J. & Fischer, C., 2008. The gap between wine expert ratings and consumer preferences: Measures, determinants and marketing implications. *International Journal of Wine Business*, 20(4), 335-351

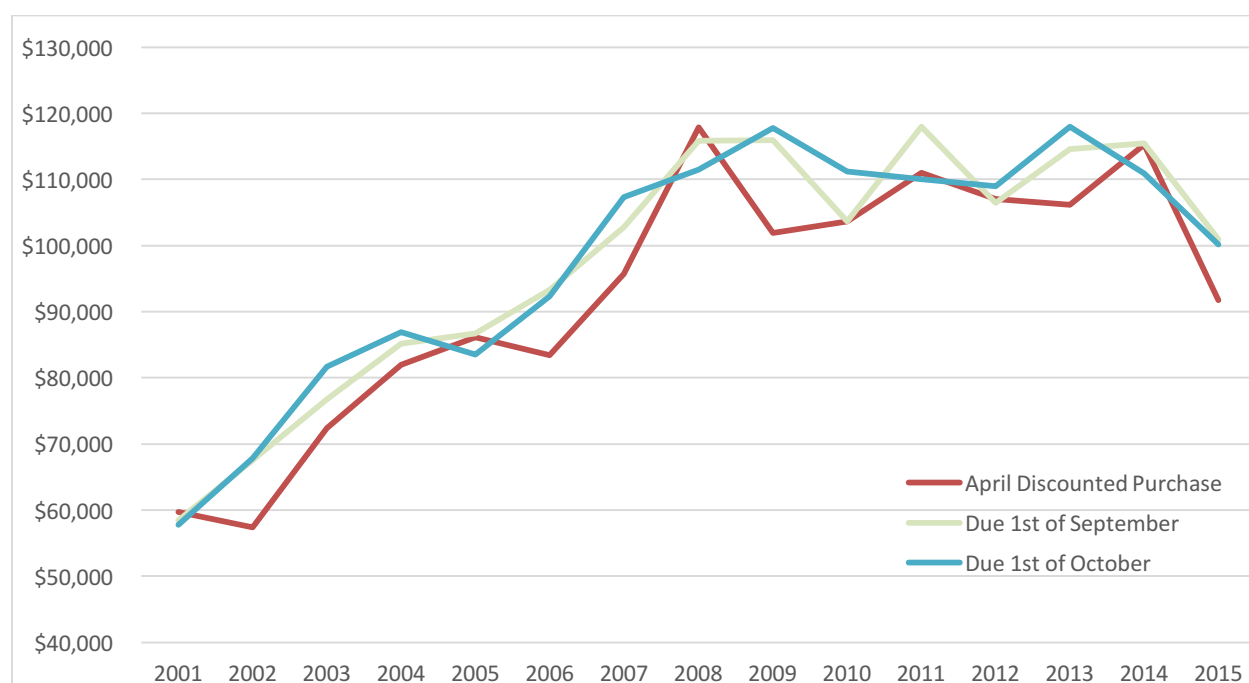
Stamp, C., 2015. The Economics of Wine Barrels: How to Determine the Effect of Barrel Choices on Profits. *Wines and Vines*, August, 54-57.

Wine Spectator (2016). Top 100. Wine of the Year.

**Figure 1. Advertised barrel prices (as quoted in euros) for the Taransaud Ref 102 barrel**



**Figure 2. Time Series of Barrel Costs**



**Table 1. Difference in Cost by Barrel Payment Decision**

	Pay in April vs. Pay in September		Pay in April vs. Pay in October	
	Payment Difference (Sept.– April)	Payment Difference Including Foregone Interest (3 month CD)	Payment Difference (Oct. – April)	Payment Difference Including Foregone Interest (6 month CD)
2001	\$(1,207.57)	\$(1,506.03)	\$(1,864.57)	\$(2,461.50)
2002	\$10,143.18	\$9,856.06	\$10,418.38	\$9,844.13
2003	\$4,329.85	\$3,967.72	\$9,271.85	\$8,547.60
2004	\$3,248.00	\$2,838.36	\$4,963.00	\$4,143.72
2005	\$538.65	\$107.76	\$(2,646.35)	\$(3,508.12)
2006	\$9,880.05	\$9,462.91	\$8,919.09	\$8,084.81
2007	\$7,044.62	\$6,565.92	\$11,568.62	\$10,611.22
2008	\$(2,027.52)	\$(2,616.65)	\$(6,304.32)	\$(7,482.58)
2009	\$14,015.43	\$13,505.79	\$15,837.93	\$14,818.65
2010	\$43.74	\$(474.44)	\$7,544.34	\$6,507.98
2011	\$7,029.67	\$6,474.85	\$(883.41)	\$(1,993.05)
2012	\$(626.46)	\$(1,161.69)	\$1,894.62	\$824.17
2013	\$8,473.80	\$7,943.19	\$11,797.20	\$10,735.97
2014	\$127.60	\$(448.82)	\$(4,378.00)	\$(5,530.84)
2015	\$9,148.38	\$8,689.62	\$8,403.04	\$7,485.53
Total	\$70,161.43	\$63,204.55	\$74,541.43	\$60,627.68



