Padua 2017 Abstract Submission

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Conference Presentation

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Keywords
Bordeaux en primeur wine ratings, Parker, Martin, copula functions,

Research Question
Given the recent (2016) establishment of Neal Martin as the successor to Robert Parker for Bordeaux wine ratings, we examine the historical relationship between their en primeur wine ratings.

Methods
Parametric copula function modelling is employed to examine the nature of the bivariate distribution between the ratings of Robert Parker and Neal Martin over 2010-2012 for en primeur wines

Results
The results indicate significant upper tail dependence in Parker and Martin ratings for left bank wines but much less so for right bank wines.

Abstract
ABSTRACT
Introduction

Numerous studies such as Noparumpa et al. (2015), Ali et al. (2010), Ashenfelter, (2010), Jones and Storchmann, (2001) have shown that Bordeaux en primeur prices are heavily dependent on critics' barrel ratings despite the many uncertainties from the continued aging, blending and bottling process. In particular, it has long been known that barrel scores from the prestigious wine critic Robert Parker Jr. have a significant influence on the initial en primeur price offering by the chateaux. Indeed, Parker's ratings have been largely viewed as the authority on Bordeaux en primeur wines with his scores and palate having a significant influence over the past 38 years. For example, a low rating by Parker has a significant adverse impact on the release price of the wine (Mendick et al., 2016).

His reign as the world's leading wine critic on Bordeaux wines has not been without some controversy as he has been criticised with advocating style over substance and creating a homogenous world of highly oaked and over-extracted wines. However, he has been credited with having pushed the Bordeaux wine industry into investments in newer technology and equipment, resulting in greater consistency over the years (Millar, 2015).

In February 2015, Parker announced that he would no longer review Bordeaux wine futures; turning the responsibility over to his successor Neal Martin, a British wine critic. Martin's rise to prominence as a wine rater

had been relatively quick having his beginnings as a wine buyer and taster, and as a wine blogger commencing in 2003 with the website Wine Journal (Mendick et al., 2016). He gained a substantial following in a short period of time, and consequently was asked by Parker to join the Wine Advocate as a wine writer and critic in 2006 (Lyons, 2015).

As of April 2016, Martin assumed responsibility for the review of all Bordeaux wines, both in barrel and bottle, for Parker's prestigious publication, the Wine Advocate.

Given the long-standing influence of Parker on the Bordeaux wine industry, the appointment of Martin creates some uncertainty for many chateaux, both with respect to the future influence of Martin's ratings and their consistency, or lack thereof, with that of Parker's. Therefore, this study seeks to examine the relationship between Parker and Martin's en primeur wine ratings. An understanding of the relationship between the two wine critics may provide some indication of the potential importance and impact of Martin's ratings.

Data

For the period of 2010 through 2012 Robert Parker and Neal Martin rated many of the same Bordeaux en primeur wines, providing the opportunity to examine the relationship between their evaluations. The data was obtained from the wine ratings database www.borderview.com, maintained by the Dutch wine sellers Bolomey Wijnimport. Ratings are available for many left and right bank wines allowing for an analysis of the relationship between the critics' ratings in these two broad appellations over each of the three years. For example, it has been noted that both critics have expressed a preference for Merlot dominated blends stemming from Bordeaux right bank wines (Millar, 2015).

Both wine critics employ the same methodology for their rating, using Parker's established scale of 50 to 100. Frequently, in both cases, the ratings are expressed in terms of ranges, typically spanning two data points and rarely exceeding three data points. In some instances a (+) is added. In such cases the average of the range was employed or an addition value of .5 added to the score if it was followed by a (+).

Methodology

To explore the relationship between the Parker and Martin ratings we employ copula function modelling which provides a practical way of characterizing a multivariate distribution independent of the specification of the univariate marginal distributions. Its strength lies in that it can capture basic non-linear relationships, or tail dependence, over the range of the multivariate distribution, frequently overlooked by methods that implicitly assume linearity.

Although the number of copula functions is theoretically infinite, there are parametric copulas which can capture typical dependence structures between two covariates, with known parameters that can be estimated. These parametric forms then allow us to classify the copula functions into families; two of particular importance are the elliptical and the Archimedean families. A detailed description of other copula families may be found in Nelsen (2006). Typical copulas of the elliptical family frequently employed are the Gaussian or normal copula and the Student T copula. However, they are limited to radial symmetry restricting their ability to fully capture nonlinear, and particularly asymmetric, tail dependence.

Many applications, however, call for different upper and lower tail behaviour. Fortunately, the Archimedean family of copulas includes some relatively simple closed forms with dependence parameters that capture asymmetric tail dependence between covariates in a tractable way. Common forms of the Archimedean family employed are the Gumbel, Clayton, and Frank copulas. The Clayton copula, for example, enables the modelling of greater correlation or tail dependence in the lower values of the covariates, while the Gumbel copula captures tail dependence in the higher values. The Frank copula captures greater correlation in the middle of the marginal distributions as opposed to the tails.

The standard approach to copula function modelling is to fit several copula functions to the data and apply maximum likelihood goodness-of-fit tests to identify which functional form models the dependency structure relatively better.

Results

Our results show significant tail dependence in the multivariate distribution of Parker's and Martin's ratings, particularly for left bank wines. This relationship is consistent for each of the three years and is primarily captured by an inverted Clayton copula function indicating much higher correlation between high wine rankings. In other words, Martin's ratings appear to be highly correlated with that of Parker's when the ranking is high, but less so at lower ranges of ratings.

Despite the stated interest and potential bias of both Parker and Martin in right bank wines, our results indicate much less tail dependence in the multivariate distribution across the three years of right bank data. Indeed, the best fitting copula function characterizing the relationship between Parker's and Martin's ratings was that of a Gumbel for the 2010 data. Like the inverted Clayton, this indicated higher level of correlation in terms of the highly rated wines. However, for the years 2011 and 2012 the multivariate distribution was best characterized by the Gaussian, copula with a lower level of correlation across the ratings of the two critics. This results in the question of whether Martin's ratings were evolving over time with less correlation with that of Parker's in terms of the right bank wines as he developed his own idiosyncratic preferences. The results indicate greater uncertainty for right bank producers in terms of consistency with the prior ratings and preferences of Parker.

Finally, after identifying univariate (marginal) distributions for the ratings of both critics, we employ the respective best fitting copula functions and Monte Carlo simulation to generate a bivariate distribution of ratings, for each of the left and right banks. This allows for the generation of probabilities of occurrences in terms of consistency of ratings between Parker and Martin.

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An Exploration of the Relationship Between Robert Parker and Neal Martin en Primeur Wine Ratings

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Introduction

Numerous studies such as Noparumpa et al. (2015), Ali et al. (2010), Ashenfelter, (2010), Jones and Storchmann, (2001) have shown that Bordeaux *en primeur* prices are heavily dependent on critics' barrel ratings despite the many uncertainties from the continued aging, blending and bottling process. In particular, it has long been known that barrel scores from the prestigious wine critic Robert Parker Jr. have a significant influence on the initial *en primeur* price offering by the chateaux. Indeed, Parker's ratings have been largely viewed as the authority on Bordeaux *en primeur* wines with his scores and palate having a significant influence over the past 38 years. For example, a low rating by Parker has a significant adverse impact on the release price of the wine (Mendick et al., 2016).

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