Padua 2017 Abstract Submission

I want to submit an abstract for:
Conference Presentation

Corresponding Author
Emmanuel Paroissien

E-Mail
emmanuel.paroissien@u-bordeaux.fr

Affiliation
University of Bordeaux

Keywords
Multivariate Forecasting Wine

Research Question
How to forecast average price series using all information available for the agents of the market ?

Methods
time series econometrics (ARIMA, VAR, ECM), limited dependent variable regression (truncated regression) and state space methods (Unobserved Component Models)

Results
A fruitful comparative analysis of the respective performance of univariate methods and multivariate methods where the exogenous predictors must be forecasted as well using separate models.

Abstract
Contrary to the main agricultural markets, wine markets are not equipped with a future market. Wine producers do not dispose of freely available information about future prices and need to formulate their own expectations. To do so, they need to aggregate all information about the fluctuations of the plausible drivers of the market into one single forecast. Following Cardebat and Bazen (2016), I investigate the feasibility of forecasting Bordeaux wine prices using statistical methods that are often out of reach for the wine professionals. My focus is the same as in Cardebat and Bazen (2016), except that I extend the forecast to the 15 main AOC of Bordeaux and run multivariate forecasts including several predictors. The aim of this paper is to find the optimal forecasting method for the prices of those 15 AOC for horizons from 1 to 12 months.

The market data are obtained from the wine trade organization in charge of the information system for the Bordeaux wine market. The average price series only include transactions from the producers and for which the wine has been sold in bulk. Those transactions represent between 40% and 70% of all the volume sold by Bordeaux wine producers, depending on the AOC. As the local professionals, I assume that those prices are representative of the market as a whole. In the first part of the paper, I assess the performance of univariate forecasting with ARIMA models and unobserved component models (UCM) for each of these 15 series separately, and altogether in VAR and VECM models.

I then compare those forecasting models using only price data with models trying to use all the information available. Indeed, the agents dispose of a large body of information to make their expectations, including volumes, total stock held by the producers, weather conditions as indicators of both the quantity and the quality of the next harvest, level of the harvests of the competitors, and other macroeconomic indicators such as exchange rates, interest rates and GDP growth. In this paper, I attempt to combine all this information into a single point forecast as would do any agent of the market, but using statistical methods rather than expertise. The data are the same as in Paroissien (2016) which focused on the influence of quality. Adding explaining variables to the model allows a better understanding of the market by providing a measure of the respective influences of those variables on the prices. However, the forecasting performances are not necessarily better, because those explaining variables need to be predicted as well. In the second part of the paper, I test several specifications to find the best forecasting

model for the price. A side benefit of this approach is that I actually provide forecasts for all the variables of interest, namely prices, volumes, stocks and harvests.

The macroeconomic indicators are exogenous to the Bordeaux wine market. The forecast of these indicators are therefore performed using only univariate models. Forecasting the stocks has demanded more attention. In order to forecast the stock held by the producers in horizons from 1 to 12 months, I need to forecast both the volume sold and the next harvest. As for the price, the volume sold is driven by the exogenous macroeconomic indicators of the market. However, these volumes obviously cannot exceed the level of the stocks. To take this into account when making point forecasts of the volume sold, I use a truncated regression model where the upper bound is the stock held at the beginning of each month.

The agents of the Bordeaux wine market pay close attention to the climatic conditions over the growing season to forecast the quantity and the quality of the next harvest. To control for the information on the next harvest volume, I use weather data provided by MétéoFrance to forecast the yields of each AOC. To control for the expected quality of next harvest, I rely on the criteria of quality designed by Geny and Dubourdieu (2015). Forecasting the quantity harvested can be divided into the forecast of the area cultivated and the forecast of the yield. The fluctuation of the area cultivated is driven by the prices and the yields in a linear regression model. The yields are mainly driven by the weather conditions. The specification of the influence of the weather on the yields has been designed after a series of interviews with researchers in oenology at the University of Bordeaux. I also take into account the market regulation on the yields. In fact, there exist a maximum yield for each AOC above which a producer is not allowed to use the AOC label of quality. This maximum yield is decided around July by the representatives of each AOC and gives another information about the future harvest. For each 15 AOC, I have estimated a truncated regression model that take explicitly into account this maximum yield.

I compare the respective performances of VAR and VECM specifications where all variables except prices and volumes are assumed exogenous. All models give sensible forecasts, but often fail to beat the naive forecast for the price, that is, assuming the price won't change. On the contrary, the harvest model performs well. In the last part of the paper, I will try to improve the management of the seasonality, which is particularly troublesome for the stocks, using multivariate state-space methods.

References

Jean-Marie Cardebat and Stephen Bazen. Forecasting Bordeaux AOC wine prices using state space methods. In 10th Annual Conference of the American Association of Wine Economists, June 2016.

Laurence Geny and Denis Dubourdieu. Le millésime 2015 à bordeaux. Technical report, Institut des Sciences de la Vigne et du Vin de l'Université de Bordeaux, Unité de Recherche Oenologie, 2015.

Emmanuel Paroissien. Insight from the entry-level Bordeaux wines market: vintages as a commodity. In 10th Annual Conference of the American Association of Wine Economists, June 2016.

File Upload (PDF only)

- Abstract_AAWE_2017.pdf

Multivariate Forecasting of Wine Price

emmanuel.paroissien

December 2016

Contrary to the main agricultural markets, wine markets are not equipped with a future market. Wine producers do not dispose of freely available information about future prices and need to formulate their own expectations. To do so, they need to aggregate all information about the fluctuations of the plausible drivers of the market into one single forecast. Following Cardebat and Bazen (2016), I investigate the feasibility of forecasting Bordeaux wine prices using statistical methods that are often out of reach for the wine professionals. My focus is the same as in Cardebat and Bazen (2016), except that I extend the forecast to the 15 main AOC[1] of Bordeaux and test multivariate forecasting including several predictors. The aim of this paper is to find the optimal forecasting method for the prices of those 15 AOC for horizons from 1 to 12 months.

The market data are obtained from the CIVB[2], the wine trade organization in charge of the information system for the Bordeaux wine market. The average price series only include transactions from the producers and for which the wine has been sold in bulk. Those transactions represent between 40% and 70% of all the volume sold by Bordeaux wine producers, depending on the AOC. As the local professionals, I assume that those prices are representative of the market as a whole. In the first part of the paper, I assess the performance of univariate forecasting with ARIMA models and unobserved component models (UCM) for each of these 15 series separately, and altogether in VAR and VECM models.

I then compare those forecasting models using only price data with models trying to use all the information available. Indeed, the agents dispose of a large body of information to make their expectations, including volumes, total stock held by the producers, weather conditions as indicators of both the quantity and the quality of the next harvest, level of the harvests of the competitors, and other macroeconomic indicators such as exchange rates, interest rates and GDP growth. In this paper, I attempt to combine all this information into a single point forecast as would do any agent of the market, but using statistical methods rather than expertise. The data are the same as in Paroissien (2016) which focused on the influence of quality. Adding explaining variables to the model allow a better understanding of the market by providing a measure of the respective influences of those variables on prices. However, the forecasting performances are not necessarily better, because those explaining variables need to be predicted as well in order to forecast the price. In the second part of the paper, I test several specifications to find the best forecasting model for the price. A side benefit of this approach is that I actually provide forecasts for all the variables of interest, namely prices, volumes, stocks and harvests.

The macroeconomic indicators are exogenous to the Bordeaux wine market. The forecast of these indicators are therefore performed using only univariate models. The forecasting of the stocks has demanded more attention. In order to forecast the stock held by the producers in horizons from 1 to 12 months, I need to forecast both the volume sold and the next harvest. As for the price, the volume sold is driven by the exogenous macroeconomic indicators of the market. However, these volumes obviously cannot exceed the level of the stocks. To make point forecasts of the volume sold, I then rely on a truncated regression model where the upper bound is the stock held at the beginning of each month.

The agents of the Bordeaux wine market pay close attention to the climatic conditions over the growing season to forecast the quantity and the quality of the next harvest. To control for the information on the next harvest volume, I use weather data provided by MétéoFrance to forecast the yields of each AOC. To control for the expected quality of next harvest, I rely on the criteria of quality designed by Geny and Dubourdieu (2015) to forecast quality. Forecasting the harvest can be divided into the forecast of the area cultivated and

[1] Protected designation of origin, *Appellation d'Origine Contrôlée* in French.
[2] *Conseil Interprofessionel des Vins de Bordeaux* in French

the forecast of the yield. The fluctuation of the area cultivated are driven by the prices and the yields in a linear regression model. On the other hand, the yields are mainly driven by the weather conditions. The specification of the influence of the weather on the yields has been designed after a series of interviews with researchers in oenology at the University of Bordeaux. I also take into account regulatory measures. In fact, there exist a maximum yield for each AOC above which a producer is not allowed to use the AOC label of quality. This maximum yield is decided around July by the representatives of each AOC and gives another information about the future harvest. For each 15 AOC, I have estimated a truncated regression model that take explicitly into account this maximum yield.

I compare the respective performances of VAR and VECM specifications where all variables except prices and volumes are assumed exogenous. All models give sensible forecasts, but often fail to beat the naive forecast for the price, that is, assuming the price won't change. On the contrary, the harvest model performs well. In the last part of the paper, I will try to improve the management of the seasonality, which is particularly troublesome for the stocks, using multivariate state-space methods.

References

Jean-Marie Cardebat and Stephen Bazen. Forecasting bordeaux aoc wine prices using state space methods. In *10th Annual Conference of the American Association of Wine Economists*, June 2016.

Laurence Geny and Denis Dubourdieu. Le millésime 2015 à bordeaux. Technical report, Institut des Sciences de la Vigne et du Vin de l'Université de Bordeaux, Unité de Recherche Œnologie, 2015.

Emmanuel Paroissien. Insight from the entry-level bordeaux wines market: vintages as a commodity. In *10th Annual Conference of the American Association of Wine Economists*, June 2016.