# Title

Does the Market Structure of Grape Varieties Impact Exports Performance?

## I want to submit an abstract for:

Conference Presentation

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## Keywords

Exports performance, Market structure, Grape varieties

## Research Question

The purpose of this research is to examine whether or not the specialization into few internationally known variety grapes has an impact on the export performance of countries?

## Methods

Traditionally, the most usual way of testing the market-structure hypotheses has been to introduce concentration and market share as explanatory variables of performance. The alternative approach proposed in this paper is to use standard Data Envelopment Analysis (DEA) to compute the efficiencies of wine exports when market concentration of grape varieties is considered as a decision making unit. Data Envelopment Analysis (DEA) is a non-parametric method to estimate the production frontier of Decision Making Units (DMUs) with multiple inputs and outputs.

## Results

The purpose of this study is to test whether the level of market concentration can explain variations in export performance of countries. The aim is to identify the best performers in a sample of countries.

## Abstract

Does the Market Structure of Grape Varieties Impact Exports Performance?

a DEA approach

Summary for submission to the American Association of Wine Economists (AAWE)
Introduction

An important way in which countries and producers seek to boost their competitiveness is to exploit their geographical and varietal distinctiveness. The reputation of a country or country-brand is particularly important in the wine industry. The traditional practice of displaying regional names on wine bottle labels is increasingly being supplemented by grape varietal names. Products are characterized by easier recognition and understanding for the consumer than those of European countries, traditional producers, because they are less complex in look and taste. Berrios and Saens (2015) analyze whether or not the reputation of a region/country in the international wine market depends on a region/country’s efforts to specialize in a specific grape variety. The purpose of this research is to examine whether or not the specialization into few internationally known variety grapes has an impact on the export performance of countries? Are the European countries penalized by the complexity and multiplicity of their local varieties?

The objective is to examine the relationship between the market structure of grape varieties and performance in the wine sector. Performance could be related to competitiveness in the world market, export growth, quality ratings or reputation. In this study, we follow this approach and use published data on worldwide grape varieties in all countries producing wine (Anderson and Aryal, 2013). We calculate market shares and Herfindahl indices to test the market-structure hypothesis. We also use the data envelopment analysis (DEA) to determine the impact of the market structure of varieties on the efficiency and test whether the level of market concentration can explain variations in country performance.

Theoretical model of structure and performance

The literature based on structural approaches has investigated how the market structure affects the productivity, performance and competition among firms. The existence of economies of scale and scope has always been at the heart of agricultural studies but the existence in the viticulture sector is not proved because the “wine” category does not satisfy the condition of uniqueness of the product (Delord et al., 2014).

Traditionally, the most usual way of testing the market-structure hypotheses has been to introduce concentration and market share as explanatory variables of performance, on the assumption that market share will reflect the effect of efficiency. In this case, if the market share positively affects performance, and concentration is not significant, the hypothesis of efficiency is not rejected.

To test the SCP hypothesis, the first static measure is the well-known Herfindahl-Hirschman concentration index calculated with the market shares (qi) of all companies in a market:

\[ H = \sum q_i^2 \]

The advantage of this measurement is that it makes it possible to calculate a “number equivalent” of companies \((N^* = 1/H)\) where \(N^*\) is the potential number of companies of the same size which could exist on the market for a given degree of concentration.

The relationship with performance is defined as follows:

\[ \text{Performance} = f(CR, MS, X) \]

Where CR is the concentration measure of the market, MS is the market share variable (qi) which captures firms’
superior efficiency in obtaining a larger portion of the market and \( X_i \) are country specific variables that could affect the efficiency of the firm. As an alternative to the Herfindahl index, the dominance index is used as a CR variable.

The alternative approach proposed in this paper is to use standard Data Envelopment Analysis (DEA) to compute the efficiencies of wine exports when market concentration of grape varieties is considered as a decision making unit. Data Envelopment Analysis (DEA) is a non-parametric method to estimate the production frontier of Decision Making Units (DMUs) with multiple inputs and outputs. It was developed by Charnes et al. (1978) and Banker et al. (1984). Once the input and output variables are identified, for a set of DMUs, a Production Possibility Set (PPS) is produced and it is possible to estimate the production frontier.

The purpose of this study is to test whether the level of market concentration can explain variations in export performance of countries. The aim is to identify the best performers in a sample of countries.

Data

The raw data used in this paper are presented by Anderson and Aryal (2013) and provide a brief guide to the types of information compiled in this new database and in an accompanying e-book. The biggest three countries, Spain, France and Italy, account for 54% of the world’s winegrape vineyard area in both 2000 and 2010. The same three countries dominate global wine production and exports. In many countries the dominant grape variety represents less than 20% market share but some major producing countries like New Zealand have a high concentration of the vineyard into a single grape (52.3% for Sauvignon Blanc in New Zealand) (Anderson, 2000).

The extent of varietal concentration in the world’s vineyard has increased over the decade to 2010. Half the world’s plantings in 2000 were accounted for by 21 varieties but, by 2010, that total had dropped to 15 varieties (Anderson and Aryal, 2013). In red varieties, Cabernet Sauvignon and Merlot dominate the world’s vineyard while in white varieties, with the exception of Airen, only planted in Spain, Chardonnay and Sauvignon Blanc are the dominant grapes.

For each country we know the area of production and the number of prime varieties and we calculate the level of concentration of grape varieties using market shares and Herfindahl indices. We also collect information of the level of production in 2000 and 2010 and the level of exports for 2000 and 2010. Because of data availability the sample is limited to the 29 major exporting countries in 2010.

Empirical analysis and results

In the first part of the empirical analysis we calculate the impact of market concentration of varieties on the export performance of countries. The following equation is estimated with OLS and 29 countries:

\[
\text{(Exports 2010-Exports 2000)} = f \{\text{CR, MS, Area, Number of grapes, production}\}
\]

In the second part we use standard Data Envelopment Analysis (DEA) to compute the efficiencies of wine exports when market concentration of grape varieties is considered as a decision making unit. To estimate the production frontier of Decision Making Units (DMUs) export performance is the output variable and we use the same set of variables as inputs.