Lausanne 2024 Abstract Submission

Title
Assessing technical efficiency in Argentine wineries. How different are exporters?

I want to submit an abstract for:
Conference Presentation

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Keywords
Efficiency, Stochastic Frontier Analysis, Wineries, Argentina

Research Question
We ask whether the production function of exporter wineries is different from those of firms devoted to the local market and whether their levels of technical efficiency differ.

Methods
The set of best practices in a sample defines a “frontier”, susceptible to be estimated. We use Stochastic Frontier Analysis (or SFA), which applies econometrics to estimate technical efficiency.

Results
We conclude that differences exist, exporters on average have differences in their efficiency levels and their technical parameters showing that export and local businesses are somewhat different.
Abstract
The Argentine wineries involved in exports differ from those devoted only to the domestic market. The exporters comprise both, sellers of bulk and bottled wine. Exporter wineries count with comparatively greater human and physical capital, entrepreneurial attributes, and marketing practices than non-exporter wineries. We ask whether the production function of exporter wineries is different than those of firms devoted to the local market. To insert into the international market product differentiation and quality improvements are required. Differences in the production function imply differences in input mixes, or intensities, as well as in process technologies. Moreover, within exporters and non-exporters firms, efficiency levels (units of outputs per unit of inputs) would likely differ. The determination of the relative levels of efficiency of exporters against non-exporter Argentine wineries is our second motivation.

We hypothesize that 1) exporters would have different techniques than non-exporters since their products or product mix is disparate; 2) exporters would have different intensities of factor use than non-exporters since we expect higher qualities on average in export products; 3) exporters would have different levels of technical efficiency than non-exporters since international markets demand more to producers than domestic ones. We characterize the differences in production technology of different types of wineries represented in our sample and estimate their technical efficiency through Stochastic Frontier Analysis using a recent survey.

The original sample consists of 230 observations from a survey representing one-fourth of Argentine wineries, enquiring on several topics (production, inputs, processes, quality, destination, commercial practices, et cetera), of which 166 are exporters. We use efficiency frontier techniques to explore differences in efficiency in each group of firms. The main goal of this paper is to compute the productive efficiency in the context of stochastic frontier analysis (SFA) cross-sectional models for different subsets of firms. The original sample needed some adjustments since some missing data impeded the use of the complete set of observations.

Some studies employ DEA, SFA, and both methods, to estimate technical efficiency, using cross-sectional or panel data. In a few cases, they use two-stage methods (DEA and econometrics to assess efficiency determinants) or spatial models (to assess differences due to the territorial position of the wineries). They use as a dependent variable wine production or wine value, and in some cases sales concepts instead of production. Also, grape production appears to be an independent variable. As inputs, proxies of land, capital, labor, and raw materials are used, and some studies use environmental (contextual or non-discretionary inputs) and qualitative variables to explain efficiency.

The rationale behind efficiency frontiers is that some “decision-making units” (or DMUs), which can be firms, state dependencies, or any other organization in or out of the markets, use resources to attain certain outcomes and use inputs with different efficiency levels. We use in this paper the standard model for estimating efficiency using a Stochastic Frontier Analysis (SFA), for a production frontier in cross-sectional databases, as described in Kumbhakar et al. (2015). Our model to be estimated is a Cobb-Douglas in logarithms. According to Faria et al. (2021), the usage of cross-sectional SFA models does not allow for consistent estimates of technical efficiency, bringing only an estimate of the conditional mean of the efficiency level. Additionally, the cross-sectional model assumes the error components are not correlated with the regressors, which is problematic considering that inefficiency derives from unobservable managerial capacities, which are not independent of the input levels chosen by DMUs. The use of panel data can provide information on how efficiency varies between firms and over time.

In the first pair of estimates, we estimate the equation (4) for the two samples, considering output, five inputs, and a set of quality variables, while in the second set, we add certain technological practices (chemical, mechanical, agronomical, and enological practices), proxy by dummies.

References

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Assessing technical efficiency in Argentine wineries. How different are exporters?

Paper Presented to the 2024 AAWE Conference, Lausanne

Gustavo Ferro1, Nicolás Gatti2, Nicolás Depetris-Chauvin3, and Emiliano Villanueva4

Abstract

The Argentine wineries involved in exports differ from those devoted only to the domestic market. The exporters comprise both, sellers of bulk and bottled wine. Exporter wineries count with comparatively greater human and physical capital, entrepreneurial attributes, and marketing practices than non-exporter wineries. We ask whether the production function of exporter wineries is different than those of firms devoted to the local market. To insert into the international market product differentiation and quality improvements are required. Differences in the production function imply differences in input mixes, or intensities, as well as in process technologies. Moreover, within exporters and non-exporters firms, efficiency levels (units of outputs per unit of inputs) would likely differ. The determination of the relative levels of efficiency of exporters against non-exporter Argentine wineries is our second motivation.

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