

ABSTRACT

Quality indicators and intermediate products: A non-parametric approach

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Measuring and evaluating the right attributes in raw materials, commodities, and intermediate products is a common problem in many sectors of the economy. In food industries, for instance, it is well known that the necessary condition for the making of a good wine is the availability of grapes with the right attributes, but the same can be said of the characteristics of milk for cheese production, of fruits for juices, of beets or canes for sugar, of beans for coffee, and many others. In this paper we propose a methodology to measure the characteristics and composition of intermediate products and we pursue three objectives.

First, with the methodological contribution, we address the issue of how to measure quality attributes for intermediate goods using a general representation of the technology. Although there are other instances of this problem in the literature, especially in that dealing with hedonic prices, there are few contributions that address explicitly this topic on the production side. In this paper we model the quality attributes with a multi-output technology, using a general representation of technology based on directional distance functions. Directional distance functions is an alternative and more general representation of technology to compare and measure input, output and productivity aggregates across firms, for instance.

The second objective of the paper, more policy-oriented, is to evaluate how quality attributes interact with the quantity level in the production of these intermediate products. The reason for this interest is that in many agricultural markets and food industries, especially in Europe, producer groups are granted the authority to self-regulate production and trade of many commodities, and a common policy device is the imposition of ceiling on yields. This regulation is common, for instance, for producer groups in the appellation contrôlée wine, typical products, and fruit and vegetable industries.

Advocates of this regulation claim that by reducing quantity one can increase quality, and thus it would benefit consumers and producers alike. Economic theory is relatively scarce, with some results showing how in some instances output control by a producer group

can indeed increase total economic welfare. However, the results of the paper impinge on the assumption of the substitutability between quality and quantity or, put in another way, quality and quantity substitutability would be a necessary condition for the regulation to be welfare-increasing. In the paper we find evidence of a trade-off between quantity and aggregate quality, although this substitutability is stronger for Chardonnay, in some years, compared to Merlot.

The third objective, more geared towards industry applications, is to investigate how one can create incentives for the production of the right quality attributes given the information about the technology. This is an important topic, which may be of interest to suppliers, buyers, cooperatives, retailers, etc. In the paper we discuss how to compensate producers for their efforts and whether giving the right signal on which attribute is more valuable is prone to increase the efficiency of supply chain relationships and food industries.