been dealt with in previous studies. A common approach is to split the sample into several groups using *a priori* information, and subsequently estimate different functions for each group. Following this approach, we estimate separate stochastic frontier production functions for the parlor and stanchion farms. Alternatively, different technologies within a sample can be determined by econometric procedures that differentiate the alternative technologies. In particular, the most common econometric approaches are random coefficient models and latent class models. Random coefficient models assume that each observation is derived from a unique technology, and thus different coefficients are estimated among the observations given the explanatory variables. In contrast, a latent class model can be viewed as an approximation to random coefficient models, in which the variation is treated as generated by a discrete distribution. Hence, the assumption is that there are a finite number of groups underlying the data. In particular, latent class models classify the sample into a number of groups specified by the researcher, and each decision making unit can be assigned to a particular group using the estimated posterior probabilities of class membership. In this paper, we use a latent class stochastic frontier model in order to estimate different production functions. Comparison between the two approaches allows determining whether the milking system is a determinant factor in determining technology class.

In particular, we analyze whether there are different technologies in a sample of New York dairy farms over a 12 year period from 1993 to 2004. And, if so study whether the milking system is a determinant factor in determining technology. The results suggest that milking system is only a partial determining factor of technology differences.

Meta-Frontier in Comparison of the Performance of the Dairy Cooperatives with the Performance Of Investor Oriented Firms

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• Research Problem: Agricultural cooperatives differ in their financial structure, ownership and objective (s) from investor-owned firms (IOF). These differences may result in differences in technology and in the efficiency of these types of firms. Failure to account for technological differences may bias results of a comparison of technical and cost efficiency between firm types.

• Objective: The objective of this paper is two folded. The first is to evaluate the technical and cost efficiency of European dairy processing firms. The second is to compare performance of cooperatives with the performance of the IOFs .

• Methodology: A meta-frontier analysis is applied to the two different types of firms. First we estimate type- specific and common cost frontier. Secondly we apply a type of envelope that provides a good fit for a meta-frontier. The application of meta-frontier enables us to assess the performance of the firm in relation to the industry as a whole and only among the same type.

• Data: The empirical application focuses on firm level data of European Dairy processing firms. The data was obtained from AMADEUS. This is a European database provides financial figures on the firm level. The data used in this study represents 160 dairy firms (cooperatives and IOFs) within the EU, among which 65% of the firms are IOFs.

• Results: Empirical evidence shows that the application of traditional efficiency techniques based on pooled frontier efficiency scores tend to underestimate the actual efficiency level resulting in biased cross-type comparison.

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