

ABSTRACT

The milk price received by New York dairy farmers is now primarily based on the amounts of the three main milk components: butterfat, protein, and other solids. Thus, by altering individual component production levels in respond to each component price, dairy farmers may increase their profits. It is, therefore, important for dairy farmers, first, to identify the production factors involved in milk production, and to examine their effects on each of the component production as well as aggregate milk.

For many years, economists and animal scientists examined the relationship between production factors and milk production, but one important aspect of milk production that has been overlooked is the effects of business factors on milk components. Although most business factors in milk production are not considered to be as crucial as factors like feed and breed type, the production performance of a dairy farm is in fact strongly connected to various business factors such as human capital, housing type, and milking frequency. Therefore, it is imperative that individual component production be examined as functions of production factors, including traditional inputs like feed, as well as business characteristics reflecting management. Only through this type of study will dairy farmers be able to comprehensively understand their production performance and fully realize their potential.

To accomplish this end, four single-output production functions using SUR and a stochastic output distance function were estimated using the New York Dairy Farm Business Summary data from 105 farms in 2003 and 107 farms in 2004. Since only two years of data were available for this study, estimating production functions with panel characteristics were precluded.

Thus, a year dummy variable was included to allow for the unobserved technical changes and environmental between the two years.

Based on the estimation results, this study examined (a) the effects of business factors and other inputs on aggregate milk and individual component production, (b) the technical efficiency of New York dairy farms that participated in the DFBS project, and (c) the relationships between the outputs. Consequently, twelve common factors were found to have significant effects on milk production among 22 total independent variables related to feed, breed, labor, capital, and other managerial and environmental factors. Of these 12 significant variables, the amount of commercial feed provided to a cow, quality of hired labor, capital intensity of a farm, productivity of land for home-grown forage, herd genetics, cow comfort level, BST use, and milking frequency, were shown to increase overall milk output as well as individual milk components. On the other hand, year dummy variable (2003=0 and 2004=1), average operator age, amount of home-grown forage provided to a cow, and percentages of Non-Holstein breeds on the farm were found to have negative effects on milk production.

From the stochastic output distance function, very little technical inefficiency was found in these participating New York dairy farms. The minimum value of estimated technical efficiency was 90% and the average was 96%. This implies that almost all of the participants in the DFBS project produce outputs at near the maximum possible output levels, given their production technology.

This study also examined the relationships between the outputs by computing the elasticity between outputs. The elasticity between milk and butterfat, and milk and protein were both found to be negative, while milk and

other solids were found to be positive. However, these elasticities may not be particularly useful because dairy cows cannot be asked to alter their milk composition without changing inputs, and these output substitution elasticities are computed from a constant input vector.