

Technical, Allocative, and Economic Efficiencies of Broiler Farms in the Central Region of Saudi Arabia: Data Envelopment Analysis Approach

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Abstract

Broiler farms in Central Saudi Arabia require substantial high investment costs and competent management. Some of the farms have experienced a wide range of technical and managerial problems. Some farms are operated at less than full capacity while others have ceased operations. The aim here is to determine the performance of the farms that remain, to measure their technical, allocative, and economic efficiencies, and to determine if the mean technical efficiency differs between small and large farms. The Data Envelopment Analysis approach (DEA) is used to estimate the technical, allocative, and economic efficiencies of broiler farms in the central region of Saudi Arabia by determining which farms are located on the production frontier and which are not. The mean technical efficiency of small farms is compared with that of large farms to determine if policy instruments should be targeted toward small or large farms.

Overall technical, allocative and economic efficiency measures estimated from the DEA approach and their frequency distributions with CRS and VRS are presented. Under the CRS assumption, the estimated mean TE measure for the broiler farms is 72.9%. With the VRS model the mean technical efficiency was estimated to be 81%. The mean allocative (*AE*) and cost or economic (*EE*) efficiency measures estimated from the DEA frontier are 77.9% and 56.4%, respectively, for CRS, and 81.9% and 66.4% for VRS indicating that costs could be reduced by approximately 20%, if all of the farms were allocatively efficient.

The mean TE estimated for small farms for the CRS and VRS DEA approaches are 82.1% and 87.2%. This result means that the small farms could produced the same level of output at approximately 17.9% less cost if the operation was technically efficient if CRS is assumed, or by 12.8% if VRS is assumed. The mean allocative (*AE*) and economic (*EE*) efficiency measures estimated with the DEA model are 71% and 58.5%, respectively, for CRS, and 74.5% and 65.3% for VRS.

The mean technical efficiencies estimated for the large farms for CRS and VRS DEA approaches are 81.6% and 89.9%. The mean allocative (*AE*) and economic (*EE*) efficiency measures estimated from DEA frontier are 84.5% and 68.3%, respectively, for CRS, and 88.5% and 79.5% for VRS.