Abstract

Data Envelopment Analysis (DEA) is one of the most widely used efficiency measurement techniques in the literature. In the method developed by Charnes, Cooper, and Rhodes, the relation between input(s) and output(s) is examined and relative efficiency values are obtained for many decision-making units. In order to be able to accurately measure the efficiency with Data Envelopment Analysis, the selection of input and output variables needs to be done carefully otherwise, the results may be misleading. For this purpose, it is aimed to make an objective selection process by using Grey Relational Analysis (GRA) in the identification of variables in the study. Via this method 17 financial ratios of 20 firms in the BIST Food Index for the period of 2013-2015 categorized into 4 groups, then each category clustered and the ratios which have the highest correlation within each cluster selected as representative indicator. Thus, 3 inputs and 2 output variables were selected so that the number of variables was reduced from 17 to 5. An input-oriented BCC model was established with selected variables to determine the efficiencies of firms in each period. The Malmquist Total Factor Productivity Index was used to analyze the productivity changes between periods. It was concluded that 7firms were efficient in each year and the productivity of the sector increased between the periods as a result of the analysis.