Variable Selection in a Data Envelopment Analysis Model by Multiple Proportions Comparison

Authors : Jirawan Jitthavech, Vichit Lorchirachoonkul

Abstract : A statistical procedure using multiple comparisons test for proportions is proposed for variable selection in a data envelopment analysis (DEA) model. The test statistic in the multiple comparisons is the proportion of efficient decision making units (DMUs) in a DEA model. Three methods of multiple comparisons test for proportions: multiple Z tests with Bonferroni correction, multiple tests in 2Xc crosstabulation and the Marascuilo procedure, are used in the proposed statistical procedure of iteratively eliminating the variables in a backward manner. Two simulation populations of moderately and lowly correlated variables are used to compare the results of the statistical procedure using three methods of multiple comparisons test for proportions with the hypothesis testing of the efficiency contribution measure. From the simulation results, it can be concluded that the proposed statistical procedure using multiple Z tests for proportions with Bonferroni correction clearly outperforms the proposed statistical procedure using the remaining two methods of multiple comparisons and the hypothesis testing of the efficiency contribution measure.

Keywords : Bonferroni correction, efficient DMUs, Marascuilo procedure, Pastor et al. method, 2xc crosstabulation

Conference Title : ICMCSSE 2017 : International Conference on Mathematical, Computational and Statistical Sciences and Engineering

Conference Location : Stockholm, Sweden

Conference Dates : July 13-14, 2017