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Predicting Middle East Banking Efficiency Sector Future through DEA-DT Machine Learning Techniques

Ali ElMoussaoui

Lebanese University, Lebonan

Abstract

This study uses Data Envelopment Analysis (DEA) to develop a grouping strategy for the bank, measures and evaluates the cost efficiency of the Middle East Banks over twenty years. The measurement of efficiency is estimated using Data Envelopment Analysis (DEA). Sample data contains 169 banks. Constant return to scale (CRS) and variable return to scale (VRS) were used in order to measure the cost efficiency. Our study show that, on the cost efficiency scale only a few banks in the Middle east were efficient in managing their financial resources and generating profit. Furthermore, only few banks were found to be efficient on the scale of pure cost efficiency and only so in a few years. The Political and financial crisis was found to have a significant impact on banks' efficiency. These findings can be used by the regulators, policy makers and banks management to further investigate the reasons behind the inefficient decision-making units (DMUs).

The model examines the relationship through input/output data mining analysis using Machine Learning techniques adopted from the DEA efficiency rank, for the 169 Banks from 1999 till 2018, we indicated the rules for the banks efficiency and for the bank efficiency prediction.

Keywords: DEA, Machine Learning, Decision Tree, Bank efficiency, efficiency prediction