

Efficiency Evaluation of Ankara Public Transport Bus Lines Using DEA

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ABSTRACT

Public transport is an important service supplied by municipalities. Majority of public transport system in metropolitan areas is based on bus systems in Turkey. Maintaining public transport supply based on bus system in large metropolitan areas has important economic consequences as cost of providing the system increases in sprawling urban areas. For this reason, it is very important for the local administrators to effectively manage urban bus transportation. In this study, bus transit performance of the Ankara EGO bus lines was examined by Data Envelopment Analysis (DEA). The most common method used to measure the effective utilization performance of the available resources in Decision-Making Units (DMU) with certain input-output is DEA. It is a nonparametric method based on mathematical modeling. Performance of the Ankara EGO bus lines were analyzed by two main models of DEA: Charnes, Cooper, Rhodes (CCR) Model and Banker, Charnes, Cooper (BCC) Model. Both models use data collected during Ankara Transportation Master Plan Project.

The analysis phase consists of two stages. In the first stage, bus lines divided by EGO into five regions examined individually; relative efficiency scores were obtained for each bus line. In the second stage, Ankara was taken as a whole and relative efficiency scores were obtained for all bus lines in five regions. The output variables are the average number of passengers and the average occupancy rate of passengers. Service frequency, line length, and time of services are input variables. The efficiency scores obtained by the DEA are compared and the results are interpreted accordingly.

Finally, the obtained activity scores are put into the geographic information system (GIS) and the efficiency performances are shown on the routes of the lines.

Key Words: *Data Envelopment Analysis, Urban Transportation, Efficiency*