Technical Efficiency of State Road Transport Undertakings in India - Data Envelopment Analysis

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ABSTRACT

Data envelopment analysis (DEA) is a method of analyzing the relative efficiency of similar types of organizations known as decision making units (DMU's). In this paper, DEA model is applied to evaluate the relative technical efficiency of state road transport undertakings (SRTU's) in India during the period 2011-2012. The authors have considered thirty-four SRTU's functioning in India. The variables chosen to characteristic production units are the number of fleet held, staff strength and fuel efficiency as inputs and Passengers carried as output. The BCC model is input-oriented allowing for variable returns to scale (VRS), units are ranked and the projection analyses are given.

Keywords: Banker Charnes Cooper (BBC), Data Envelopment Analysis (DEA), Decision Making Units (DMU), State Road Transport Undertakings (SRTU), Variable Returns to Scale (VRS)

1. INTRODUCTION

Passenger transportation has an impact on all aspects of mobility and is an important part of overall economic development. Improving the performance of public transport undertakings is becoming more and more critical due to the paucity of public funds, increased demand on transport services and expanding social needs. Of late, the performance measurement and evaluation systems have been gaining importance (Kittelson Associates et al., 2003, Sulek & Lind, 2000). Increased urbanization has increased the number of passenger vehicles in the cities in developing countries such as India. The Road Transport Corporations Act came into effect in India in 1950 and led to various state governments setting up respective State Road Transport Corporations with an objective of providing affordable transport services within
the state as well as across states. Over the years, these corporations have become loss making. The trade-off between commercial objectives and social responsibility goals of these state owned corporations became an issue of major concern.

The oldest Indian state transport undertaking is North Bengal State Transport Corporation founded by the Raj Durbar of Koch Bihar Kingdom regime on 1 April 1945 with three buses and three trucks. It is still vibrant and running, providing service to commuters of North Bengal region. Buses take up over 90% of public transport in Indian cities, and serve as a cheap and convenient mode of transport for all classes of society. Services are mostly run by state government owned transport corporations. However, after the economic liberalization, many state transport corporations have introduced various facilities like low-floor buses for the disabled and air-conditioned buses to attract private car owners to help decongest roads. Bengaluru was the first city in India to introduce Volvo B7RLE intra-city buses in India in January 2006. Bengaluru is the first Indian city to have an air-conditioned bus stop, located near Cubbon Park. It was built by Airtel. The APSRTC has introduced Buses with two coaches. These Buses are allowed to operate only in the Greater Hyderabad. It is acknowledged as the single corporation having the largest fleet in the world. This has been certified by the Guinness World Records for being the largest bus operator in the world.

The city of Chennai houses Asia’s largest bus terminus, the Chennai Mofussil Bus Terminus. In 2009, the Government of Karnataka and the Bangalore Metropolitan Transport Corporation flagged off a pro-poor bus service called the Atal Sarige. The service aims to provide low-cost connectivity to the economically backward sections of the society to the nearest major bus station.

Almost all the Indian states have their own state road transport corporation, providing transport facility within the state and the neighboring states. Apart from the public transport corporations, private operators also play a major role in fulfilling the needs of the public. Some of the state transport corporations offer city bus services and also to some of the adjoining areas of the city. The city bus services provide comfortable, affordable and on-time service to the public.

As a step towards streamlining the operations of State Transport Undertakings leading to reduction in the administrative overhead expenses and avoidance of wasteful competition in the operation of services among the Corporations, Though the present arrangement of Transport Corporations in the State is compact and efficient, it is essential to identify the factors for the efficient and inefficient units and to make useful suggestions for the improvement of inefficient units. So the study of evaluating the relative efficiency among the public transport corporations is taken here.

1.1. Data Envelopment Analysis

Data Envelopment Analysis (DEA) is a non-parametric linear programming method used for determining the efficiency of a set of companies as compared to the best practice frontier. It can be employed to analyze organizations. The application of the method in the transport sector is widespread, especially in the evaluation of airports, ports, railways and urban transport companies (Markovits-Somogyi, 2011a). The aim of the present article is to review and summarize the most common methods for fully ranking decision-making units (DMUs) in data envelopment analysis. As is well known, DEA assigns the efficiency value of one to the DMUs which are strongly or weakly efficient (i.e. in the latter case input or output slacks are present). All the DMUs lying on the efficiency frontier are considered efficient and thus there might be several units with an efficiency value of unity. To be able to distinguish the performance of these units, numerous ranking methods have been developed since the introduction of the DEA technique. The current review follows the lead of Adler et al. (2002) who give a very good summary of the ranking techniques available at the given date.
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