



Inefficiency of public road transport and internal corporate governance mechanisms



Sami Jarboui^{a,*}, Pascal Forget^b, Younes Boujelbene^c

^a Unit of Research in Applied Economics URECA, Faculty of Economics and Management, University of Sfax, Airport Road km 4, Sfax 3018, Tunisia

^b School of Engineering, Department of Industrial Engineering, University of Quebec at Trois-Rivieres, Canada

^c Faculty of Economics and Management of Sfax, University of Sfax, Tunisia

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ABSTRACT

The aim of this paper is to determine the incidence of internal corporate governance on the efficiency of public transport operators. We use a stochastic analysis frontier model of a sample of 54 public road transport firms, during the period of 2000–2011. We also explain the inefficiency of public transport operators by the internal corporate governance. The stochastic frontier approach is used to assess firms' efficiency, and also to identifying factors explaining inefficiency. To our knowledge, this is the first research that examines the interrelations among ownership, board and manager characteristics and firm efficiency in a sample of public road transport operators. These governance characteristics, designed to maximise efficiency are operationalised in terms of board characteristics, ownership structure and CEO characteristics. For corporate governance mechanisms, firms with larger board size are inefficient. More specifically, our findings show that there is a positive correlation between the proportion of independent directors on the board and firm efficiency. We also find that firm efficiency is viewed as a proxy for CEO effort and, therefore, CEO's tenure has a positive impact on efficiency.

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1. Introduction

In recent years, the economic growth of developing countries has led to an expansion of urban cities (Saxena and Saxena, 2011). Public road transport is effectively an important participant in citizens' mobility and is a fundamental component in the quality of life available to citizens (García Sánchez, 2009). The transport sector plays a significant role in the overall development of a nation's economy. Road transport is the primary mode of transport, linking remote areas with the rest of the country (Agarwal et al., 2011). In the absence of a transport system, dependency on personalised modes of transport increases leading to waste of energy (Saxena and Saxena, 2011). Generally, public road transport operators of passenger vehicles offer a public service with a social

aim. In most cases, they are controlled by the government. Efficiency evaluation in public transportation is therefore an issue of foremost importance.

Several approaches have been adapted to measure transport operators' efficiency. Parametric and non-parametric frontiers are the two main approaches used to measure technical efficiency (Jarboui et al., 2012). The parametric frontier approach (Aigner and Chu, 1968; Aigner et al., 1977; Meeusen and Van den Broeck, 1977) establishes a functional form for the cost, profit, or production relationship among inputs, outputs, and environmental factors, and allows for random error. Both inefficiencies and random errors are assumed to be orthogonal to the input, output, or environmental variables determined in the estimating equation (Boame, 2004). The non-parametric approach, the data envelopment analysis (DEA) method, was developed by Farrell (1957), Charnes et al. (1978), and Färe et al. (1985). The DEA frontier is formed as the piecewise linear combinations that connect the set of best practice observations, yielding a convex production possibilities set. DEA does not require explicit specification of the form of the underlying production relationship. The non-parametric approaches, however, do not allow for random error. If random error exists, measured efficiency may be confounded with these

* Corresponding author at: Unit of Research in Applied Economics URECA, Faculty of Economics and Management, University of Sfax, Airport Road km 4, Sfax 3018, Tunisia/Tenour Road, km 35, Boujarboua, 3092 Sfax, Tunisia. Tel.: +21622368150/+21650390151.

E-mail addresses: sami.rec.fseg@gmail.com, sami.jarboui@fsegs.rnu.tn (S. Jarboui).

random deviations from the true efficiency frontier. As well, statistical inference and hypothesis tests cannot be conducted for the estimated efficiency scores (Boame, 2004).

The aim of our research is to exploit the contribution of the corporate governance literature on explaining the shortfall Y^*-Y (the difference between optimal production and actual production). Next, our goal will be to propose the optimal corporate governance structure that may reduce the inefficiency term. To the best of our knowledge, this study is an original essay in transport literature that sets out to introduce the effect of the internal organisation of transport firms' control system as a reason for distortions in their production strategy and to account for the observed inefficiency term. The major contribution in this paper is to identify the inefficiency determinants. As opposed to other studies on the public transport operators' efficiency, this study attempts to explain inefficiency by variables under operators' control.

In this paper, we present an original essay that seeks to explain how the corporate governance mechanism can affect public transport efficiency, and how this approach can limit managers' mistakes leading to public transport operators' inefficiency. We also aim to investigate certain personal characteristics of CEOs and their pull on orienting transport firm production strategy and technical efficiency. Our investigation is highly motivated by Bernard and Schoar (2003) who demonstrate that CEOs (Chief Executive Officer) can be influenced by personal characteristics that can affect their management style and in turn firms' decisions and value.

In this study, we focus on the relation between internal governance mechanisms and public transport operators' efficiency, as well as test the impact of CEOs' characteristics on public road transport operators' efficiency.

The rest of this paper is developed as follows: in the first section, we begin with literature review studying corporate governance and firm efficiency in a general manner. In the second section, we concentrate on hypothesis development. The third section will present our methodology and variables measures. Section four presents our data. The fifth section is oriented towards presenting and interpreting our results and conclusions are drawn in the final section.

2. Literature review

2.1. Public transport operators efficiency

Efficiency has long been a critical consideration in both policy and operational decisions of public transport operators, and public transport efficiency has recently become even more vital (Barnum et al., 2011). Passenger road transportation is a "service business" and evaluating the efficiency of a service business is a complex matter. Transport efficiency is often more difficult to evaluate than manufacturing business efficiency, because it is difficult to determine the correct amount of resources required to produce various service outputs. The manufacturing standard can be used to identify operating inefficiencies through classical cost accounting variance analyses. However, in service organisations like the road passenger transportation system, it is difficult to identify the specific resources required to provide a specific service output (Agarwal et al., 2011).

In economics, the term efficiency refers to the comparison between the observed values of outputs and inputs with the optimal values of the outputs and inputs used in a production process (Karlaftis and Tsamboulas, 2012). Economic efficiency requires that producers of a good or of a service make the best use of the resources available to them. To properly define the concept of economic efficiency, it is necessary to distinguish between technical efficiency and allocative efficiency. Technical efficiency reflects the extent to which transport operators achieve maximum

output with provided inputs. Allocative efficiency reflects the minimum level of inputs used to produce a certain level of output.

The literature on assessing efficiency or, more generally, public transport efficiency is extensive. Analyses have focused both on developing methods for assessing public transport efficiency and on using efficiency findings to make different policy recommendations (Karlaftis and Tsamboulas, 2012; Jarboui et al., 2013a). Such efficiency assessment studies have been very popular in public transport literature in large part because of the interest in reforming public transport operations and assessing the effects of these changes on efficiency. On this subject, Jarboui et al. (2012) offer an interesting overview.

Agarwal et al. (2011) measure the technical efficiency of 35 Indian transport operators through the DEA method. They obtain an average efficiency score equal to 83.26% and it is interesting that these operators will reduce their used quantity of inputs. Barnum et al. (2011) identify the individual technical efficiencies of each type of transit employed in an urban area. The objectives are to identify allocation and technical efficiency in the DEA aggregated score, to estimate the effect of changes in each type of transit' efficiency on overall public transportation efficiency and to offer a method for reallocating resources in order to improve efficiency.

Kumar (2011) assesses the technical efficiency, pure technical efficiency and scale efficiency of 31 Indian public transport operators between 2006 and 2007. The results suggest that, by adopting best practices, transport operators can reduce their inputs by less than 22.8%. The observed operators studied lose about a quarter of their resources in production operations. Kumar (2011) affirms that managerial inefficiency is the dominant source of technical inefficiency.

In studying 23 public transport companies in Taiwan, Yu and Fan (2009) showed that a unified DEA framework is constructed for gauging production efficiency (PE), service effectiveness (SEV) and operational effectiveness (OEV) simultaneously and dependently. The proposed model also deals with the situation where shared inputs are needed to allocate the activities and/or processes in the operation of a transit firm.

Despite significant research in transport operators' efficiency, evaluation of inefficiency determinants is generally ignored. The majority of studies focus on the choice of empirical evaluation method and on measuring the technical efficiency of transport operators. The results of these studies showed that technical inefficiency relates to exogenous factors, and market organisation, regulatory system degree and nature and network characteristics are important inefficiency determinants (De Borger et al., 2002).

Most research that has studied the determinants of inefficiency has shown that inefficiency is always associated to exogenous factors outside the firm's control. These results are more interesting for policy-makers than transport operators. The purpose of public transport efficiency studies is to provide an explanation and results to improve public transport operators' efficiency; therefore, it is interesting to find inefficiency determinants which are directly related to transport operators. In his framework, Cowie (2002) affirms that improving transport operators' efficiency may be based on a number of sources such as improving work practices, better operations management and increased investment. It is worthwhile searching the most robust empirical methods to measure efficiency levels, but it is more interesting to find the determinants and sources of inefficiency which help us enhance efficiency.

2.2. Corporate governance and firm efficiency

Corporate governance refers to the system by which firms are controlled and directed. The governance structure specifies the distribution of responsibilities and rights among different participants in the firm (such as the board of directors, managers,

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