

1. Introduction

During the first half of the nineties, many efforts were made in the attempt to redress the ruined financial and economic situation characterizing the Italian local public transit (LPT) industry. Nevertheless, these interventions were only stopgap measures, that turned out to be inadequate to achieve the general goal of a structural readjustment of accounts. A legislative reform started with Law 549/1995, which introduced the financial responsibility for the Regions, and subsequently continued with the *Decreti Legislativi* 422/1997 and 400/1999. These normative actions met the need of a deep shake-up of the entire industry, that many experts indicated as the only way to achieve a remarkable improvement in terms of productive efficiency and effectiveness of the service.

The core of the present study is to put forward information on x-efficiency (Leibenstein, 1966) of the Italian public transit systems, so as to highlight distortions from the best-practice behavior of cost minimization. Moreover, in view of the importance of regulatory constraints in the production analysis of public utilities, as emphasized by recent empirical literature¹, we investigate how subsidization mechanisms affect firms' efficiency levels. The results of this analysis, which includes companies operating under two different regulatory schemes (cost-plus or fixed-price), should provide some insights regarding the appropriate mechanism of granting subsidies, and in turn they might be useful to assess the ongoing reform of the sector.

A seven-year unbalanced panel data of 45 Italian public-owned LPT companies is used in the empirical analysis. In the light of purposes of this work, the observed time period (1993-1999) is particularly informative, since it encompasses both years before and after the start-up of the reform. The estimation of a stochastic cost frontier model is carried out by applying the Battese and Coelli (1995) methodology, which assumes the inefficiency terms to be a function of a set of explanatory variables including firm-specific and time effects. In particular, the present investigation analyses how regulation, network characteristics, and their interaction affect cost inefficiency.

The rest of the paper is organized as follows. Section 2 briefly summarizes the regulation of the Italian LPT industry in the last decade, focusing on the subsidization schemes and the related incentive mechanisms. In Section 3, we develop the econometric model. Section 3.1, in particular, specifies the stochastic cost frontier,

¹ For the LPT industry, see Dalen & Gomez-Lobo (1997), Ivaldi (1997) and Gagnepain & Ivaldi (1998).