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## Global public spending efficiency in Tuscan municipalities

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## ABSTRACT

The paper presents a Data Envelopment Analysis aimed at studying the efficiency of Tuscan municipalities' public expenditure. Five strategic functions of Tuscan municipalities are first considered carrying out a non-aggregate analysis; then the overall expenditure composition of each municipality and the global spending efficiency are analysed by a proposed composite indicator. The main determinants affecting the municipalities' efficiency were further investigated. In particular, the obtained results may be consistently included in the long-standing debate on the municipal size, proving that the bigger the municipality, the greater its level of public expenditure efficiency.

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## 1. Introduction

After decades of research, the local government efficiency evaluation is still at the centre of political and academic debate, in the public sector literature, and even more, in the public administration and management literature. The economic performance measurement and comparison at each government level remain a relevant issue in the current agenda, being a recurrent theme during the evolution of the public sector management along its three different phases [55]. The first one goes from the late 19th century through the late 1970s/early 1980s; at least in the majority of the European countries, the state was supposed to satisfy all the social and the economic needs of its citizens. Recalling a very famous sentence, this should have been done “from the cradle to the grave”. “Administration”, “bureaucracy” and “public service provision” characterized the activity of the public administration in that period. The second phase can be associated with the “New

Public Management (NPM)” paradigm [45]. In this era, “market”, “managerialism”, “input and output control”, “performance evaluation” got a foothold in public administration [56]; both theoretical and political debate faced the necessity of combining public service provisions with the containment of public spending. So, since the beginning of the 1990s, “efficiency”, “effectiveness” and “quality service” have become the keywords of the public sector management [54]. From the late 1990s, the New Public Management paradigm has been heavily criticized and many empirical evidences underlined its failure: this has led to new proposals which attempt to give a more modern idea of Public Management Governance (see for example [39,55]). Even in these new contexts, performance evaluations are still considered as a key tool, something essential for policy makers' decisions. The provision of a robust efficiency measurement and the implementation of an effective system of incentives are in the agenda of both politicians and academics [29].

Local governments are the most involved organizations in the evaluating process; during the last years, many key public functions have been transferred from national to local authorities and hence these latter ones have increased their importance [3,4,38,50]. As it is better specified in Section 2, there is a growing number of papers dealing with the efficiency evaluations of local governments and

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the identification of those environmental variables which may affect the efficiency. Several different aspects of local government activity have been evaluated with different techniques. The present paper fits into this wide literature and in particular it aims at evaluating the efficiency of the Italian municipalities located in Tuscany.

To respect the budget constraints, the national government often makes cuts in transfers to regional and local governments and tries to reorganize public services supply. Referring to Italy, this subject is very relevant due to the stringent budget constraints imposed at European level, like the Stability and Growth Pact and more recently the Fiscal Compact. Of course, this strengthens the importance and the usefulness of efficiency evaluations. In Tuscany and, in general, in the Italian context, the presence of inefficiency in the municipal expenditure is due to at least three aspects: the presence of much too small municipalities, the partial overlapping of functions carried out both by provinces and municipalities and the lack of an unitary management for densely populated metropolitan areas [46]. In this paper the first aspect is specifically investigated: small municipalities turn out to be inefficient because they are unable to exploit scale economies in the provision of public goods and services and, as a consequence, the services they can provide are poorer and limited to essential needs. So, the issue of the local governments optimal size to settle these diseconomies is still controversial and matter of debate. In particular, Tuscany has promoted institutional and administrative reforms to overcome the presence of too many fragmented municipalities and to define appropriate territorial areas for planning and supply of public services: since the 1970s, there was awareness among scholars and regional administrators that very small municipal dimensions affected public services supply and that institutional boundaries were de facto already overcome in the everyday life of families and businesses. The 68/2011 regional law represents an example of the legislator attempt to define the optimal municipal size to offer fundamental public services by promoting the joint management and/or the merger among the smallest Tuscan municipalities. In this context, the expenditure efficiency analysis of Tuscan municipalities is proposed through a Data Envelopment Analysis (DEA). This paper contributes to the literature by supplying new evidences concerning the efficiency analysis of local governments and by proposing an innovative use of a composite indicator. Additionally, the obtained results can help the policy-maker to identify the inefficient municipalities and to give suggestions on possible reorganizations of the local governments.

The remainder of this paper is organised as follows. Section 2 provides a literature review to place this research into context. Section 3 introduces the model specification, describing the 3-stage DEA based approach performed in the analysis. Section 4 presents the empirical analysis, explaining the data choice and the critical discussion of the obtained results. Finally, Section 5 concludes the paper.

## 2. Literature review

Despite the measurement of the efficiency in the private sector dates from the seminal contribution of Farrell [41], the issue of the local governments efficiency has been addressed just since the 1990s. The existing literature on the municipal efficiency analysis can be divided into two-branches [38]. On the one hand, there are numerous studies on individual public services, such as solid waste, sewage disposal, water, energy provision, hospitals,

municipal savings banks, public libraries, road maintenance, fire protection, care for the elderly sector, local police services, public transportation and pre-school education (for an overview see Ref. [18]). On the other hand, there are studies that analyse global municipal efficiency for various countries: Belgium [30,32,43], Finland [51], Norway [19], Brazil [61], Spain [9,10,13,28,57], Portugal [2–4,29], Czech Republic [64], Japan [52,53], Germany [42,47], Greece [8,38] and Italy [5,15,17,49,50] (for earlier studies review see Refs. [31,69]). This second type of studies sometimes attempts to analyse the relationship between municipal performances and some important topics, like the relevance of the municipal size, the effect of public function decentralization on the municipalities, the impact of fiscal decentralization, the influence of the effects of spatial closeness between municipalities, and other aspects. According to many authors, there is an advantage in the use of a comprehensive approach, compared to the studies focused on specific functions: it is the ability to take into account the opportunity cost perceived by the municipality in deciding the allocation of resources to different services, the possible synergies of expenditure and the quantification of the total savings of resources. Following this part of the efficiency literature, in this paper the global public expenditure efficiency analysis of the Tuscan municipalities is performed through DEA and, as far as the authors know, this is the first application for the Tuscan region. The choice of the Tuscan framework is undoubtedly linked to its topical feature: even the Tuscan legislator has promoted institutional and administrative reforms to overcome the presence of inefficiency in the municipalities expenditure, in particular in relation to the municipal size. For this reason, in this context a specific attention is dedicated to the municipal size effect on the expenditure efficiency, adding new evidences to the existing literature (see for example Refs. [18,38]).

From a methodological point of view, there are alternative available methods for the efficiency analysis of production processes in both private and public sector. They differ mainly in the way the unknown and unobservable “efficiency frontier” is inferred from the data. These different techniques can be classified basically in two alternative approaches: the econometric and the optimization approach. The first one specifies a production function and normally recognizes that the deviation away from this given technology (as measured by the error term) is composed of two parts, one representing randomness (or statistical noise) and the other inefficiency. Among the various techniques belonging to the econometric approach the “stochastic frontier analysis” (SFA), introduced by Aigner et al. [7], plays a central role. Following Worthington [68], the first studies of local government cost efficiency with this approach are proposed by De Borger and Kerstens [30], Deller et al. [33] and Hayes and Chang [44]. Using this technique, a sizeable structure is imposed upon the data from a strict parametric form and distributional assumption, to determine the absolute economic efficiency of the units under analysis against some imposed benchmark [37]. On the contrary, the mathematical programming approach seeks to evaluate the relative efficiency of one unit compared to the others. The most commonly employed version of the optimization approach is the linear programming model referred to as “data envelopment analysis” (DEA), introduced by Charnes et al. [21], based on the concept of efficiency proposed by Farrell [41]. DEA essentially calculates the economic efficiency of a given organisation with respect to the performance of other organizations producing the same good or service, rather than against an idealised standard of performance. Given its non-parametric basis, it is possible to

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