Foreword to the Special Issue

Multidimensional objective functions and institutions: Efficiency assessment of public services

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1. Introduction

The objective of this special issue was to produce theoretical and empirical work that provokes and fertilizes the scholarly debate on the role of public service providers and their institutional backbone, namely the public administration. More specifically, with this end goal at the center of our priorities, we expect to help advance our understanding on the antecedents and challenges ahead of research dealing with the efficiency in the public sector. The primary role of public administrations—at national and local level—as leading agents for the provision of public services has gained increased attention as a result of the economic challenges resulting from the economic downturn that hit most countries after 2008 (e.g., Lake and Baum, 2001; Kim and Warner, 2016). During the last decade scholars and policy makers have witnessed how different policy efforts have materialized in economic reforms that condition the funding and performance of public services. Regardless of the outcomes of any specific performance evaluation, many of the concerns that led to reforms promoted after 2008 are currently escalating mostly because of the handling of the global Covid-19 pandemic by public administrations, especially in health care areas.

In parallel to the reforms and developments, scholars and policy observers have fueled the debate on what elements form the objective function of public service providers as well as on how to model the technology of public services for evaluation purposes. These aspects have become evident in the approach adopted by many academic studies dealing with efficiency assessments in a number of public services, including among others higher education, health care, and the functioning of local governments. Notwithstanding the large stock of knowledge on public service analyses generated in the last decade, various questions on the role as well as the assessment of public services remain unaddressed in the literature.

The first central question relates to the multidimensionality of the objective function of public sector agents. What methodological developments can contribute to improve our understanding of the sources of efficiency of public service providers? While academic work offers insights on how public service providers can benefit from different performance- and governance-led strategies (e.g., Lake and Baum, 2001; Speer, 2012), it is crucial to provide clear nuances of the factors shaping efficiency among both public administrations and public service providers so that scholars can build a significant and informative stock of research on this subject.

The second central question deals with the operationalization and analytical approaches chosen to evaluate public services. What policy lessons can be drawn from empirical applications focused on efficiency evaluation of public services (e.g., frontier estimation methods, performance measurements and other techniques)? Because methodological choices condition the implications that can be extracted from reported empirical findings, our objective was to promote the publication of theoretically rooted work that helps to better evaluate public services, while acknowledging their specific attributes (e.g., production technology, economic/social function).

The relevance of accurate efficiency analyses of public services and public administrations for academics and policy makers is unquestionable. In this special issue we therefore encouraged contributors to produce research that challenges canonical approaches and adopts a critical perspective that sheds valuable insights on the efficiency of public services, as well as of specific policies designed to enhance the functioning of public services, as well as of public administrations and other market agents interacting with the public sector.

We started this enriching journey in 2019 seeking to satisfy our academic curiosity by bringing together different perspectives on the analysis of public services as well as public administrations. Mostly thanks to the work sessions at the 7th International Workshop on "Efficiency in Education, Health and other Public Services" (Universitat Internacional de Catalunya, Barcelona, September 5th-6th 2019), this special issue received great support from scholars and policy observers working in the field. Obviously, all our efforts simply would not have been possible without the support and nurturing of the journal's Editor-in-Chief Vedat Verter to whom we express our deepest gratitude.

As a result of our efforts, throughout this editorial note we address the two subjects outlined above, and then provide an overview of the collection of papers included in this special issue.

2. The contributions of this special issue to the literature on public services' efficiency

After an exhaustive peer review process, this special issue includes 13 articles that contribute significantly to advance the efficiency assessment of public services and public administrations.

By analyzing the approaches adopted by the selected papers, we observe that public services' efficiency can be researched from multiple angles, and that the unit of analysis varies from organizations (public service: 5 studies; private firms: 1 study), to different territorial levels (municipality: 2 studies; region: 3 studies; country: 2 studies). Note that part of the value of the papers included in this special issue is the capacity to bring together theoretical premises from different fields, including organizational as well as arguments closer to economic geography.

The richness of these papers also becomes evident in the variety of methods employed— spanning from parametric (3 studies) and non-parametric (8 studies) frontier approaches to regression models and spatial econometrics (3 studies)—and in the geographic diversity of the analyzed settings, covering different European countries (7 studies), Latin America (2 studies), Africa (1 study), Asia (1 study) as well as multi-country comparisons and cross-regional studies (2 studies). By using multiple analytical methods on cross-sectional (7 studies) and longitudinal (6 studies) data sets, the selected papers contribute to identify different patterns that are conducive to superior efficiency among public services and administrations. The diversity of the selected papers is consistent with and further reinforces the logic presented above on the need to analyze the drivers of efficiency in public services and local administrations from multiple perspectives.

Overall, the collection of papers included in this special issue focus on three main topics which are summarized in Table 1: analysis of education centers, efficiency assessment of public administrations, and the analysis of resource allocation and the provision of public goods.

2.1 Analysis of education centers

Seven of the manuscripts deal with the *analysis of education centers* from an organizational (4 studies) and a more territorial (3 studies) perspective. The paper by **Johnes et al. (2020)** employs stochastic frontier methods (SFA) to assess the cost structure of Indian higher education institutions (HEIs). The authors find an exhaustion of economies of scale in the teaching function of HEIs. This finding indicates that promoting the growth of smaller HEIs seems a more promising strategy if policy makers are interested in expanding the provision of higher education in India. Also, scale economies of the research function remain unexhausted, which suggests that a concentration of research activities may produce benefits among Indian HEIs.

Table 1. Methodology and geographic scope of the articles included in the special issue

Topic	Geographic scope of the collection of papers included in the special issue		
	Organizational analysis	Cross-regional / single-country analysis	Cross-regional / multiple-country analysis
Analysis of education centers	1) **Johnes et al. (2020)** - Unit of analysis: HEI (India) (94 HEIs) - Method: SFA, latent cost frontier 2) **López-Torres and Prior (2020)** - Unit of analysis: school (Catalonia, Spain) (124 public primary schools) - Method: conditional panel data DEA 3) **Giménez et al. (2020)** - Unit of analysis: kindergarten (Chile) (712 kindergartens) - Method: centralized DEA, BoD model 4) **Sturaro et al. (2020)** - Unit of analysis: class group (Italy) (108 groups) - Method: SFA model	5) **Horváth and Berbegal-Mirabent (2020)** - Unit of analysis: region (Spain) (47 provinces) - Method: spatial econometrics	6) **Agasisti and Bertoletti (2020)** - Unit of analysis: region (30 European countries: EU, Norway, Switzerland, and UK) (284 regions) - Method: GMM model 7) **Cordero et al. (2020)** - Unit of analysis: country (35 OECD countries) - Method: flexible non-parametric location-scale model
Policy: performance assessment of public administrations	8) **Vendrell-Herrero et al. (2020)** - Unit of analysis: firm (33 African and Asian countries) (949 firms) - Method: logit model	9) **Lafuente et al. (2020)** - Unit of analysis: municipality (Costa Rica) (81 municipalities) - Method: BoD model, panel data (FE) model 10) **D'Inverno et al. (2020)** - Unit of analysis: municipality (Belgium) (307 Flemish municipalities) - Method: conditional DEA, conditional BoD	11) **Ravanos and Karagiannis (2020)** - Unit of analysis: country (193 countries) - Method: BoD model
Policy: resource allocation and public goods provision		12) **Titl and De Witte (2020)** - Unit of analysis: region (Czech Rep.) (13 regions) - Method: conditional BoD 13) **Arocena et al. (2020)** - Unit of analysis: municipality (Navarra, Spain) (271 municipalities) - Method: DDF model	

Note: In the table BoD = 'benefit of the doubt' method, DEA = data envelopment analysis, DDF = directional distance function, HEI = higher education institution, SFA = stochastic frontier analysis, FE = fixed effects regression model, and GMM = generalized method of moments.

By employing a conditional panel data DEA model on a sample of 124 Catalan primary schools during 2009-2014, **López-Torres and Prior (2020)** found that efficiency differences between top-performing and poor performing schools has drastically reduced over the analyzed period. This suggests that Catalan primary schools have improved their decision making processes—in terms of resource allocation—during the crisis that characterized the period 2009-2014, and this finding is in line with prior work highlighting that budget constraints are effective tools for narrowing efficiency differences of primary schools.

The paper by **Giménez et al. (2020)** employs a centralized DEA approach and a 'benefit of the doubt' (BoD) model to evaluate the relative efficiency level of preschool education centers (kindergarten) in Chile. In a second analytical stage, the authors use decision trees to identify variables explaining the composition of homogeneous preschool groups according to their effectiveness. Results point to an average efficiency level of 70.54% with important heterogeneity across Chilean regions, a figure that is significantly lower than the 84.47% reported by the BoD model. The findings underline the importance of three factors shaping the effectiveness of Chilean kindergartens: size of the center, household income, and location (rural or urban).

Building on the educational value added theory, **Sturaro et al. (2020)** analyze how class groups' efficiency is improved by transforming non-cognitive skills (linked to traits and abilities forming individual's personality and attitudes that can affect goal-directed effort, social relations, and decision-making) into cognitive skills (linked to acquired abilities and skills that allow people to perform mental activities associated with learning and problem solving). Using a sample of 108 Italian school groups, the results of the SFA model indicate that actions targeting the development of non-cognitive skills improve cognitive skills' performance in school years. This suggests that conventional teaching can be challenged by encouraging the adoption of innovate teaching methods that stimulate other, equally important soft skills and, subsequently, help realize students' potential.

Among the studies evaluating the role of education on territorial outcomes, the paper by **Horváth and Berbegal-Mirabent (2020)**, which was handled by Vedat Verter (Editor-in-Chief), employs longitudinal spatial econometrics models to evaluate how the local configuration of universities (i.e., number of universities and the proportion of public universities in a region) impact the regional rate of new knowledge-intensive business service (KIBS) firms on a sample of 47 Spanish provinces during 2009-2013. Results support that regions with a greater concentration of universities and a higher proportion of public universities attract more new KIBS. Also, the authors report a substitution effect between university-based variables and regions' industry specialization: new KIBS tend to locate in regions where they expect either greater knowledge input from universities or a higher presence of potential industrial partners.

Agasisti and Bertoletti (2020) study the impact of HEIs on regional economic growth among 284 European regions during 2000-2017. Similar to **Horváth and Berbegal-Mirabent (2020)**, the authors find a positive relationship between the number of universities at regional level and regional economic growth (GDP). Further analyses reveal that the quality of research and academic specialization in STEM (science, technology, engineering and mathematics) subjects are the main channels through which universities impact the regions' economic performance.

Cordero et al. (2020) focus on the Program for International Student Assessment (PISA) and evaluate how organizational (resource endowment) and local heterogeneity (contextual factors) affect the efficiency analysis of PISA results. By employing a flexible non-parametric location-scale model on a sample of 35 OECD countries for 2015, the core finding of this study indicates that organizational factors—linked to resource availability and decision-making—and environmental factors—linked to location (rural or urban) and accountability—significantly impact the performance analysis of PISA results as well as country rankings based solely on student results.

2.2 Analysis of public administrations

By focusing on different, equally relevant aspects of local governments, the second group of four papers proposes an *efficiency assessment of public administrations* at different territorial levels.

In their study of the interplay between firm productivity and perceived corruption as a determinant of the probability to obtain government contracts among 949 firms located in 33 African and Asian developing countries, **Vendrell-Herrero et al. (2020)** find that corruption negatively moderates the relationship between firm productivity and a positive outcome in public procurement processes (i.e., a government contract) for pro-market firms, while this moderation effect turns positive for rent-seeking firms. The implication, in terms of public procurement policy, of this study is clear: the exclusion of productive (pro-market) firms from public procurement processes increases the cost and potentially reduces the quality of public services. In this sense, the authors suggest that encouraging the participation of internationalized (exporting) firms may constitute a valid mechanism both to ensure a more efficient public procurement decision-making and to improve the quality of outsourced public services.

The study by **Lafuente et al. (2020)**, which was handled by Vedat Verter (Editor-in-Chief), employs a BoD model to build a composite indicator that evaluates the competitive efficiency of 81 Costa Rican counties during 2010-2016. The authors find that the informative power of the proposed BOD composite indicator (based on a participatory method) outperforms alternative specifications using homogeneous weight restrictions or weights estimated via principal component analysis. The analysis of counties' competitiveness has proved itself useful for monitoring local

competitiveness. In a second analytical stage, the study findings reveal how the analysis based on the BOD approach may offer useful information to policy makers on what strategic actions may potentially optimize the allocation of local resources and, subsequently, enhance economic outcomes related to business creation rates and employment figures.

By applying conditional models (DEA and BoD) on a sample of 307 Flemish municipalities, **D'Inverno et al. (2020)** explore the relationship between municipality size and the provision of local services (i.e., administration, culture, care services, education, housing, local mobility, security, and environment). The findings highlight the presence of diseconomies of scale among Flemish municipalities, especially for those with more than 10,000 citizens. From a policy perspective, the results of the study suggest that optimal public service provision can be realized by promoting inter-municipality collaborations in the provision of some services (e.g., waste disposal or recycling).

Ravanos and Karagiannis (2020) evaluate the implications of ideal and anti-ideal decision-making units on the BoD model. The authors propose that, in the presence of an ideal (anti-ideal) decision-making unit, the efficiency scores of the BoD (inverted BoD) model can be computed without solving the corresponding linear program. The authors show the value of their approach by evaluating the e-Government Development Index (e-GDI, United Nations) for 193 countries. The findings indicate that countries with a relatively balanced performance fall into the top-performing group (green group), while countries with a less balanced performance are classified as poor performing territories (red group). The proposed analytical tool can help guide policy makers. Countries in the red group should pay more attention to the component indicators at which they are relatively worse in order to gradually transform their operating mix to a more balanced one.

2.3 Analysis of resource allocation policies and the provision of public goods

Finally, the last group includes two papers that specifically analyze *resource allocation policies and the provision of public goods* from a territorial perspective.

The study by **Titl and De Witte (2020)** evaluates how the political ideology—i.e., left-wing, populist, and extremist parties—of regional administrations in the Czech Republic influence the relative efficiency of public service policies—in terms of education, health care, and infrastructure spending—between 2007 and 2017. To compute the relative efficiency measures in each policy area, the authors use conditional non-parametric efficiency models that take into account the quality of service provision (outputs). The main findings of the study reveal that the share of left-wing members in regional councils is negatively correlated with public service spending efficiency. This overall negative relationship appears to be explained by the low performance in health care

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provision, while education efficiency outperforms in councils governed by left-wing councils. Also, the authors failed at finding any significant relationship between the share of populist councilors in regional councils and overall spending efficiency; however, they found a significantly lower efficiency level in education provision in those councils with high presence of populist members.

The last paper included in this special issue by **Arocena et al. (2020)** focuses on the efficient allocation of public resources. Using a sample of 271 municipalities from the Spanish region of Navarra, the authors propose a directional distance function (DDF) in order to accurately deal with grant allocation problems that upper-tier local governments face among the municipalities under their corresponding jurisdiction. The authors found that policy priorities condition local administrations' efficiency: the total amounts of grants and taxes could be reduced by up to 9.4 and 28.8%, respectively (relative to their current level) while simultaneously increasing the level of all local services by the same proportion. The proposed model constitutes a valid tool to inform policy makers on how to achieve a more efficient and equitable utilization of public resources.

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