Article

Decentralisation and Efficiency in Municipal Sports Services: Expenditure vs. Cost

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Abstract: The choice of service delivery form (direct management, agencification, or indirect management) is one of the most important decisions in the strategic planning of sports systems. However, its influence on efficiency has not been adequately studied in the scientific literature. The aim of this paper is to analyse the service delivery form of sports services on cost efficiency and to study the implications the use of different inputs has for the analysis of cost efficiency in sports services. To answer the objectives of the study, the analysis is divided into three stages. First, the cost efficiency of municipal sports services is estimated through the partial order-m robust frontiers using two different measures of cost (budgetary expenditures and effective cost). Then, the two cost-efficiency estimations were compared by the Li test to analyse the existence of significant differences. Finally, cost efficiency was regressed on several environmental factors by a bootstrapped truncated regression. The results show that there is no significant relationship between the different forms of management when the effective cost is included as an input. However, there is a significant relationship when the budgetary expenditure is specified as input; in this case, direct municipal management is the delivery form with the highest efficiency.

Keywords: economic efficiency; sport governance; two-step analysis

1. Introduction

Municipal services have introduced several reforms in recent years, mainly influenced by the theory of New Public Management [1,2]. This theory suggests that public services should increase their efficiency through the introduction of a business culture and private sector tools [3,4]. To achieve this, governments have pressured local government services to increase their productivity and sustainability while also providing tools to increase their discretion and highlighting decentralisation and outsourcing [5]. Therefore, municipal governments have different organisational forms for delivering public services that will affect management performance [6,7].

To analyse the impact of these reforms, different performance management perspectives have been chosen [8], including control of costs and management indicators [9] and the financial condition [10–12]. Other studies, however, use efficiency as a measure of performance [13,14]. Initially, efficiency is understood as an optimisation of or reduction in costs [5,15]. In this sense, although the literature is scarce, previous studies have linked the level of decentralisation with efficiency in municipal governments [5,14,16].

These studies also analyse the overall productivity of the municipal government. Thus, although it is possible to find studies on the differences in efficiency between different service delivery forms in specific municipal services [17–19], there is hardly any literature on the subject in the field of municipal sports services [17]. Nevertheless, results from

previous studies demonstrate the importance of differentiating the nature of the service when studying its efficiency, as well as the differences between management models [5,7].

This situation contrasts with the importance of municipal sports services in the promotion of healthy habits among the population [20–25]. In the case of Spain, municipal governments have the ability to promote sport and sports facilities, with the goal of achieving the highest rate of sports practice and giving the entire population access to practice [21,26]. As a result, municipal governments have led to more than 90% of public expenditure in sport and about 50% of the active population uses public sports facilities [27]. Similar to other public services, sports services have also been very affected by decentralisation [28].

This study attempts to obtain empirical evidence on the differences in using data from diverse sources of information to estimate the cost efficiency of municipal sports services, and to analyse which factors, particularly the different service delivery forms, affect the efficiency of sport management. To evaluate municipal cost efficiency in Spain, budgetary and financial data have traditionally been used as proxies of the cost of municipal services [5,14,18,19,29–35] because internal control systems that establish costs of public services are absent at the municipal level [36]. New regulation (Law 27/2013, of December 27, on Rationalization and Sustainability of the Local) that requires local governments to calculate the effective cost of municipal services became mandatory in 2014 [37]. The effective cost consists of the direct costs, associated exclusively with each service; indirect costs, which are normally shared by several municipal services (these costs must be distributed according to the criteria established by Order HAP/2075/2014 of 6 November 2014), and an approximation of the expenses incurred by private companies in the provision of municipal service. Thus, in this study, the cost efficiency of the municipal sport service was estimated in consideration of both variables; two different measures of cost efficiency were obtained and regressed separately on several socioeconomic variables in order to determine if differences existed between them.

The results show that there are no significant differences between the different forms of management of the sports service when the effective cost is included as an input in the estimation of the service's efficiency. However, there are differences when the budgetary expenditure, a variable traditionally considered in efficiency studies, is specified as an input; in this case, the direct municipal management of the sports service had the highest efficiency. On the other hand, the socio-economic variables that affect the efficiency of the service are a population under 14, the average municipal income, and the budgetary result, which is an indicator of the financial situation of the local entity. This is one of the first studies to analyse the implications of the new effective cost indicator in efficiency analysis and, according to the analysis of the state-of-the-art, the first to develop it in the specific sector of municipal sports services.

The present study begins with the theoretical framework related to the efficiency of municipal sports services. The methodological application and variables used in the study are then developed, followed by a presentation of the main results. The final section outlines the main conclusions of the study.

2. Theoretical Framework

Most theories promoting efficiency gains in public services defend decentralisation in the provision of specific public services and private sector involvement through outsourcing or contracting-out [5]. Given the clear focus of direct services to the citizen held by local governments, it is possible to find a growing variety and expansion of reforms in municipal services [38]. As a result, several service delivery forms are discussed in many different studies, including direct management, the agentification or functional decentralisation, and the externalisation or contracting-out, all of which are the main delivery forms of services in Spanish municipalities [5,39,40].

In direct management, the administration, management, and control of public services are handled by the public administration itself. This is a centralised model that opposes

theories related to New Public Management but is in line with the recentralisation advocated by the neo-Weberian administration [41]. This model argues that decentralisation can lead to higher costs and lower efficiency due to worse coordination between services.

On the contrary, functional agencification or decentralisation allows for the creation of new independent entities with their own budgets and decision-making capacities [42]. In the first instance, it seeks to provide these entities with a greater flexibility and capacity to meet their objectives, depoliticising municipal services and providing greater discretion to managers and technicians [40]. Decentralisation and agencification lead to more specialised and citizen-friendly structures with a greater market orientation that can benefit can increase the final satisfaction of the citizen [43]. Thus, a reduction in cost and greater efficiency could be achieved through decentralisation [44]. In the field of sports services in Spain, the main entities developed for this purpose are the autonomous organisations: public bodies with their own legal personality that have an autonomous management system but continue to form part of the municipal administration.

Finally, through outsourcing or contracting-out, also known as indirect management, local governments allow private companies to exploit municipal services such as sports facilities. The local administrator retains ownership and maintains decision-making capacity and control to a large degree, but private entities provide and manage the services [39]. There are different levels of decentralisation, but in cases of direct provision to the citizen like that of sports facilities, the operational risk is more often transferred to a private enterprise that will be responsible for bearing the costs of the service and earning revenue from user fees.

Unlike other services, and despite the regulations on competences in public services, municipal sports services often compete with private sector gyms through very aggressive campaigns, as is the case in other countries [45]. The constant optimisation of processes in new sports facilities markets encourages the public sector to oblige to the incorporation of technical efficiency principles [46]. Municipalities with more direct management can mostly manage efficiency with public spending policies; however, depends, indirectly, on the solvency of the private company that manages the service.

The defence of this management model lies in lower costs for the municipal administration, the use of innovation, and private sector structures operating in a competitive environment [47,48]. In the case of Spain, after the process of economic recession, the municipalities focused on seeking management options that guaranteed better economic efficiency in order to guarantee budgetary stability [49]. As a result, resorting to management models focused on outsourcing services became a trend in municipal management [50,51].

However, other authors highlight that there is no better management formula than taking into account the individual characteristics of each municipality [7,52]. In this sense, services such as sports [27] are more likely to be outsourced than others due to their nature and financial needs [52]. Previous studies do not show greater financial solvency [40] or efficiency [5,29] with decentralisation formulas, although they do have a greater positive effect in particular circumstances such as situations of economic crisis [5]. Similarly, the efficiency produced by decentralisation tends to increase over time [14]; however, this empirical evidence refers to the overall efficiency of municipal government and does not analyse the effect of decentralisation on each particular service.

There are many studies in the literature on sport economics in terms of efficiency, including research that analyses the efficiency of investment in high-performance [53,54] or in professional clubs and leagues [55–57]. However, after a literature review, only three previous articles have been found that are dedicated to efficiency in municipal sports services. Liu, Taylor, and Shibli (2007) [58] analysed the efficiency in sports facilities of different fields and characteristics, but only focused on the individual sports facilities rather than the overall efficiency of the municipal sports service. In this sense, these authors used various inputs and outputs collected from a survey of facility owners (National Benchmarking Service, Sport England). Input included operational costs, opening hours, and facility area, and output included operating income and visits. Then, they related

efficiency to environment and management variables, finding greater efficiency in sports facilities managed directly by the City Hall. Benito, Solana, and Moreno (2012) [32] made the greatest approximation to date on the efficiency of municipal sports services. They calculated the efficiency of Spanish sports services using the expenditure on sport declared in the budget liquidations as input and the area of sports facilities as output. The aim of the study was to analyse the influence of the political and economic environment on efficiency, but the authors did not assess decentralisation in any way. Finally, Benito, Bastida, and García (2010) [49] analysed efficiency individually in several services including the provision of sports facilities. The data come from a survey that was answered by only 31 municipalities. In this case, the type of management was not related to efficiency in the service of sports facilities.

Taking the previous literature into account, this study aims to accomplish two main research objectives: to analyse the service delivery form of sports services on cost efficiency, and to study the implications of using different inputs in the analysis to determine the cost efficiency in sports services.

3. Materials and Methods

In order to fulfil the objectives of the study, the analysis is divided into three stages. First, the cost efficiency of municipal sports services is estimated using two different measures of cost. In the second stage, the two cost-efficiency estimations are compared in order to analyse the existence of significant differences. Finally, cost efficiency is regressed on several factors.

The cost efficiency of municipal sports services is estimated through the partial order-m robust frontiers proposed by Simar and Wilson (2007) [59]. Because this non-parametric technique allows observations to be located beyond the estimated efficiency frontier (super-efficient units), it is very useful when outliers are present [60]. It also assumes the Free Disposal Hull (FDH) non-convex conventions, but without enveloping all the data [61,62], so that order-m benchmarks each unit with a random subsample of *m* peers instead of the whole sample, as is benchmarked through DEA or FDH. Additionally, these estimations are obtained through a bootstrapping process in which the benchmarking is repeated B times (the bootstrapping has been run with B = 2000 which ensures the quality of the approximation (De Witte and Geys, 2013). We use the library FEAR 2.14 (Wilson 2008) within the statistical package R).

Therefore, the cost efficiency score (α_S^m) (in this study, the estimation of the order-m efficiency scores follows a cost orientation such that superefficient DMUs obtain efficiencies greater than 1) is estimated as the arithmetic mean of the estimated *B* efficiency coefficients ($\tilde{\alpha}_S^b$), which are computed by the repeated estimation of the cost efficiency score ($\tilde{\alpha}_s$), calculated by the benchmarking with a random subsample of *m* peers. The random sample of size m is generated from a given level of y_0, with replacement among those y_sm, such that y_sm $\geq$ y_0. Moreover, the efficiency scores ($\tilde{\alpha}$_S^b) depend on the level of m, so by increasing the value of m, more observations will be considered in the estimation and more units will meet the condition y_sm $\geq$ y_0. Thus, when m$\rightarrow\infty$, the order-m efficiency score will converge with FDH scores. Different values of m have been considered to compute the efficiency score and it was found that results were stable with m = 200, since super-efficient units marginally decrease (Daraio and Simar, 2005)

$$\alpha_S^m = \frac{1}{B} \sum_{b=1}^{B} \tilde{\alpha}_S^b \tag{1}$$

To obtain this cost efficiency score, the cost of the service is considered as input and two outputs were selected. Table 1 shows the variables considered in this first stage of the study, whose descriptive statistics are presented in Appendix A (Table A1. Summary Statistics of variables included in the first-stage: cost efficiency estimation).

Table 1. Inputs and outputs considered in the estimation of cost efficiency.

	Budget Efficiency (BE)	Effective Cost Efficiency (CE)
Input	Category 34 from municipal budget, including sport promotion, building and maintenance of sport facilities, and any other action directly related to sport or sports policy. Source: Ministry of Public Administration	Effective cost determined by the aggregation of direct costs exclusively associated with each service, and the indirect costs normally shared by several functions. Source: Ministry of Public Administration
Outputs	Sport facility surface. Source: Ministry of Public Administration	
	Population: number on residents of each municipality. Source: National Statistical Institute	

Source: Benito, Solana and Moreno (2012), Spanish Local Administration Act 2/2004, Order HAP/2075/2014 of 6 November 2014, and the authors' own elaboration.

As previously discussed, there are two different expenditure measures to estimate the cost efficiency of municipal services in Spain: the council budgetary data and the most recent effective cost. In this study, both types of magnitudes as inputs were considered, obtaining two different measures of cost efficiency of sports services: budget efficiency (BE), which refers to the use of municipal budgetary data, and effective cost efficiency (CE), when the effective cost is taken as input.

The budget expenditure includes operational costs such as expenditure on personnel (wages and salaries), and expenditure on goods and services, interests, and current transfers. Current expenditure is the most commonly used input indicator in the literature of municipal efficiency because it avoids the volatility caused by capital and financing expenses associated with the construction of large sports facilities that occur only in certain years [17]. The effective cost is determined by the aggregation of direct costs exclusively associated with public sport facilities and promotion of sports services (i.e., labour costs, current expenditure on goods and services, amortisation of investments, net interest payments for leasing operations, current and capital transfer expenses, and other expenses related to the provision of the service), the indirect costs (i.e., expenses related to the General Administration imputed proportionally to each service according to its volume of expenditure), and costs associated with the indirect management of services (i.e., income derived from the fees and subsidies covering the price of the service that may correspond to the local entity to which the ownership of the service corresponds). Therefore, it is expected that the effective cost will always be higher than the budgetary expenditure, especially in municipal sports services with a greater number of outsourced activities (indirect management). The budgetary expenditure includes only the expenses executed by the municipal sports services (inside the municipal budget). The effective cost for the same municipal sports service will include these expenses in addition to the estimated expenses of the companies that carry out the indirect management and a distribution of the general expenses of the rest of the municipal government (indirect costs).

Considering the selection of outputs, the review by Narbón-Perpiñá and De Witte (2018) [17] reveals that the main outputs used in the analysis of the efficiency of sport facilities are the surface of the installations and the number of users. Both this review and the study of Benito, Solana and Moreno (2012) [32] used the surface of sport facilities, which is a specific output of the management of sports services and includes both the indoor and outdoor facilities owned by the municipality. Since the number of users is not available, however, the municipal population was chosen as an output proxy because it is indicative of the volume of services that must be provided by the municipality [13,14,36,63].

Once the budget and cost efficiency were estimated, a comparative test was applied to analyse significant differences among them. A Li test [64,65] was used to analyse whether the distribution of the two measures of cost efficiency were statistically different, then both types of efficiency scores were regressed on several socioeconomic factors.

This two-step analysis has been previously applied in the study of sport management efficiency [32]. In this case, the bootstrapped truncated regression proposed by Simar and Wilson (2007) [59] was applied, which recommends that the efficiency scores are not observed directly, but are instead estimated according to the specific sample employed and

restricted to a certain interval. Due to the fact that order-m efficiency estimation allows for the existence of super-efficient units with efficiency scores greater than 1, the model is left-truncated in the present work [5,59,66]. This bootstrapped truncated regression assumes the following model estimation

$$\alpha_{Si}^m = a + z_i\beta + \varepsilon_i, \qquad i = 1, 2, \ldots \tag{2}$$

where:

α_{Si}^m is a dependent variable representing the order-m efficiency score;

a is a constant term;

z_i is a vector of independent variables;

ε_i is statistical noise.

Specifically, the independent variable vector (z_i) includes several socioeconomic factors summarised in Table 2, whose descriptive statistics and correlations are presented in Appendix B (Table A2. Summary Statistics of variables included in the second-stage: bootstrapped truncated estimation ($n = 296$).

Table 2. Second-stage variables.

Variable	Definition
Budget efficiency	Ratio that measures the relationship between municipal spending in relation to the outputs achieved (score obtained through order-m methodology using budget data)
Effective cost efficiency	Ratio that measures the relationship between municipal spending in relation to the outputs achieved (score obtained through order-m methodology using effective cost)
% Pop < 14	Percentage of residents under the age of 14
% Pop > 65	Percentage of residents over the age of 65
Income	Logarithm of municipal disposal income
Net saving index	Difference between the receivables from current budget resources and the budget obligations from non-financial current expenditures, reduced by annual amortisation payment including interest and principal
Budgetary result	Current budgetary payables and non-financial capital budgetary payables divided by non-financial current budgetary receivables and non-financial capital budgetary receivables
Income tax index	Income tax as a percentage of current income
Coverage ratio	Income tax as a percentage of financial burden
Management form	
Local government	Service managed directly by the council
Autonomous entity	Service managed by a dependent organisation of the local government
Other, indirect management	Service managed mostly by private companies through outsourcing or contracting-out

Source: National Statistical Institute, Treasury, Virtual Office of Local Government Financial Coordination of the Ministry of Public Administration.

According to previous studies [27,32,67], several variables related to population characteristics (percentage of population under 14 and over 65 years of age) and the economic and financial statistics of the local government, including the citizen's income, net saving index, budgetary result, income tax index, and coverage ratio, were used. The service delivery form was also included. In the municipal sports services, the main management forms are provided directly by the local government, the management of an autonomous entity depending on the municipality, and the management supported by the outsourcing of services (indirect management).

Concretely, the compulsory competence to provide public sport facilities services is limited only to municipalities with more than 20,000 inhabitants; for this reason, the population of this study is made up of all the Spanish municipalities of more than 20,000 inhabitants in 2015 (400 municipalities). However, after reviewing the database, several

missing data were found and a final sample of 296 municipalities was obtained, representing 74% of the total municipalities with more than 20,000 inhabitants.

4. Results and Discussion

The main results are included below in Table 3. First, the descriptive statistics of the estimates made in the first stage of the study are presented. In this sense, it is possible to assume that the average value of efficiency is higher when the budgetary expenditure of the sports service is used (38.77%), as compared to the estimate made through the effective cost of the service (18.37%). In order to verify whether there are significant differences between the two, the Li Test, which measures the distance between two density functions [31], was carried out so that the null hypothesis of equality is rejected at 99%, thus establishing the existence of significant differences between the distributions of both estimates.

Table 3. First stage: Efficiency estimation.

	Mean	Median	Min	Max	SD
Budget efficiency	0.38773907	0.30624664	0.01632977	1.08978031	0.3136159
Effective cost efficiency	0.18365378	0.04122342	0.00370908	1.0081782	0.29323563

Null hypothesis Li test (budget efficiency and cost efficiency density functions are not different) is rejected at 99% significance level. The values represent the efficiency score according to the applied formula. These results range from 0 (lowest efficiency) onwards. Values equal to or greater than 1 are considered very efficient.

The direction of the differences is graphically analysed in Figure 1, which includes the estimates of the density function for each of the efficiency variables divided by the type of management. In this sense, it is observed that in the case of budget efficiency there is one line that stands out from the others at the upper end, which means that there are more municipalities with high efficiencies in the indirect management group. However, when the same operation is performed with the cost efficiency variable, the graphs overlap with one another almost entirely.
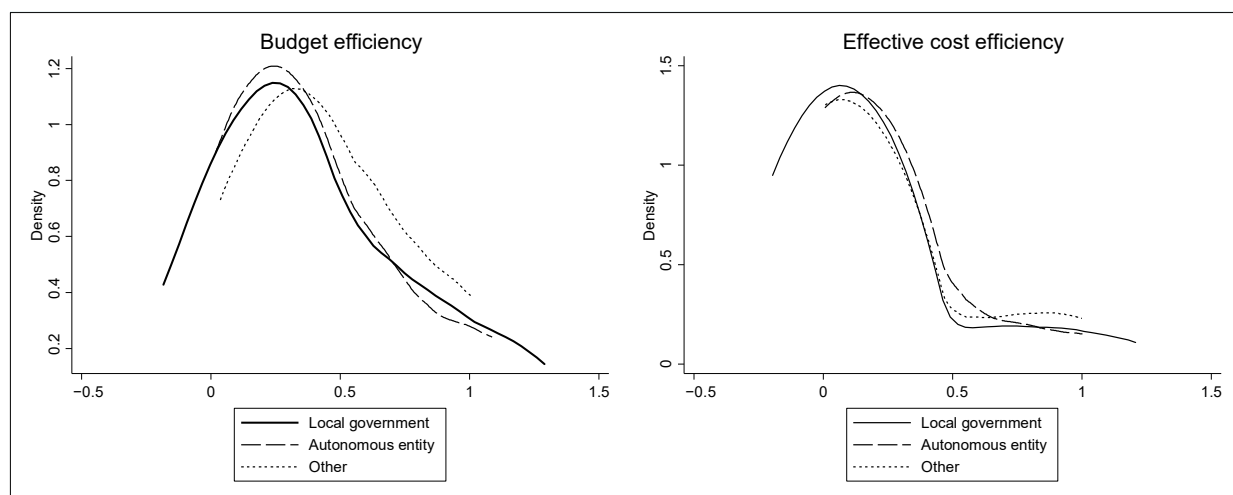

Figure 1. Density functions for each efficiency variable depending on the type of management.

Once the existence of significant differences was established, the results of the second stage analysis were presented to analyse the effect that the different explanatory factors have on the efficiency of the sports service (Table 4).

Table 4. Second stage results.

	Budget Efficiency Model	Cost Efficiency Model
Autonomous entity	−0.2089397 **	−0.5421813
	(0.0847206)	(1.17252)
Other	0.0299359	−0.4641553
	(0.0710031)	(1.156582)
% Pop < 14	0.3861504 ***	1.360275
	(0.0932601)	(1.561904)
% Pop > 65	0.0140972	0.8725696
	(0.0759014)	(1.659862)
Income	−0.4628968 **	−5.614103
	(0.201384)	(6.009497)
Net saving index	0.4303585	−0.344891
	(0.4082896)	(3.091291)
Budgetary result	−0.5975531 *	−3.835624
	(0.3137906)	(3.652112)
Income tax index	0.1855045	3.766581
	(0.4435268)	(4.951821)
Coverage index	0.0000729	0.0007801
	(0.0002988)	(0.0035575)
_cons	1.638641	33.66851
	(1.755862)	(46.70615)
/sigma	0.3719594 ***	0.7356056 ***
	(0.0247956)	(0.2344302)
Robustness	56.79%	58.34%

Notes: Bootstrap standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The robustness of the models is measured as the square of the correlation of the dependent variable with the predicted value. As observed in Table 4, both models obtain a high measure of robustness (in the interval 56–58%), with similar results to those obtained by Pérez-López, Prior and Zafra-Gómez (2015) [5], who applied this methodology to analyse the efficiency of municipal services globally.

The results of this study show an important finding regarding the differentiation and classification of municipal sports services by type of management and its relationship with performance. The budget efficiency model shows that sports services managed through agencies are significantly less efficient than when they are managed directly by the local entity, and therefore allocate more resources in proportion to the population they serve and the size of the sport facility's infrastructure. The advantages of direct management rely on keeping control and coordination over the local public service [5]; on the contrary, it is expected that this management form is less flexible than agencification [40]. However, our results only show that when considering public management, direct provision by the local government is more efficient than decentralisation. As Pérez-López, Prior and Zafra (2015) [5] pointed out, agencification is a complex process that may suffer from incoordination and can increase municipal debt. Furthermore, as already mentioned, the budget expenditures do not include the total cost of the sports service, executed on many occasions by companies that develop indirect management contracts. One reason for this could be that municipal sports services managed by autonomous entities develop fewer subcontracts and take on more services on their own.

On the other hand, the advocates of contracting-out defend the consecution of cost savings due to the expertise and innovative capacity of the private operator [5]. The coefficient associated with other types of management where indirect management predominates is not significant, so it is not possible to determine whether this management is more efficient than direct municipal management. This differs from the study by Liu, Taylor, and Shibli (2007) [58], who suggest that direct management is the most efficient in the provision of sports facilities services. However, the authors only compared direct management with indirect management, without differentiating between direct centralised or decentralised management. Furthermore, because only individual sports facilities were analysed, it was

quantified in terms of direct costs. The present study, on the other hand, analyses sports services in local entities, which includes the management of all its sports facilities and activities with a large amount of general service expenses. Taking the efficiency studies at a global level into account, and without differentiating by type of service, the results of this study are in line with the findings of Cuadrado-Ballesteros, García-Sánchez, and Prado-Lorenzo (2013) [39], and Pérez-López, Prior, and Zafra-Gómez (2015) [5], who suggest that there is no difference in short-term efficiency depending on the type of management.

However, if all the costs applied to the municipal sports service are considered (cost efficiency model), these differences between management models disappear. In other words, the effective cost per inhabitant of municipal sports services is the same regardless of the type of management. This means that the economic effort carried out (i.e., the competition to promote sports facilities for public use and provision of sports activities) by the municipalities is not influenced by the type of management if all the expenses are incurred by the agents involved in the management.

When considering the rest of the variables, we find significant results in terms of the environmental factors in the budget efficiency model. A higher proportion of the population under 14 years of age is positively and significantly related to efficiency. This has a coherent explanation in the context of municipal sports services: among its current competences, sports services acquire a fundamental weight in the provision of sports schools services. However, these types of services are the least profitable in economic terms as compared to those offered for adults [26], and may therefore affect the overall efficiency of the sports service [27].

The variable income shows a negative effect on budget efficiency. These results have had a double interpretation in the literature. On the one hand, studies carried out on global municipal efficiency suggest that higher income for the population implies higher taxes and therefore increases pressure to use resources efficiently [68]. However, only one other study on efficiency in sports facilities suggests that higher tax revenues lead to greater comfort in spending, and therefore lower efficiency [32], thus coinciding with the results found in this study. The budget result variable shows contradictory results to those found in the literature at a general level of municipal efficiency [5]. Again, this result reinforces the hypothesis that higher income and economic solvency lead to a relaxation in the execution of spending [5,32].

In the cost efficiency model, however, no significant relationship is found between environment variables and efficiency. This result contradicts the previous literature that states that the environment will always play a minimal role in the management results [69]. Much higher errors (and constant coefficient) are obtained in the individual results than in the budget efficiency model. It should be taken into account that the budget efficiency model uses the classic input in the calculation of efficiency in municipal sports services [68]. However, it is not possible to find references to cost efficiency in the literature. The results of this study suggest that the construction of said indicator is highly variable and not easily reproducible, making the development of an efficiency model unfeasible. Said indicator tries to include the expenditure executed by both the public administration and the private companies contracted to manage the service in the same figure. Therefore, the complexity of unifying the analytical accounting reported by private companies is added to the already difficult elaboration of analytical accounting in public administrations [9].

The specification of outputs of the municipal sports service is a main limitation of this study; because proxies such as the surface of the sports facilities and the municipal population and the cross-sectional nature are available in Spain, it is difficult to compare them through longitudinal studies. For this reason, the models were limited by not being able to include the same population size variable as an independent variable in the second stage.

5. Conclusions

This work attempts to demonstrate the validity of the input specification in efficiency studies within local governments. The study is applied to the Spanish economy where municipalities have been allowed to publish the effective cost of local public services since 2014. Thus, two efficiency models are carried out considering the traditional budgetary expenditure on the one hand and the recent effective cost as input of the municipal sports service on the other.

From the analysis of both models, it can be deduced that direct centralised management shows less efficiency in the provision of sports services when municipal budget spending is used as an input, while indirect management does not present significant differences. However, when effective cost is applied as an input (a new variable included in Spanish law), no significant relationship is found in either the type of management or in the environment variables, which suggests a lack of reproducibility of said indicator (the effective cost is calculated directly by the municipality, applying data from different sources and even estimating some of them).

Therefore, future studies should delve into the use of effective cost not only in sports services but also in other services in order to analyse its validity and reliability as a statistical indicator of the effort of spending for the provision of municipal services.

In the same way, future studies on sports should analyse efficiency by improving the use of outputs and incorporating the number of uses in sports facilities, since the square meters of sports facilities or the population remain proxy variables.

Finally, it should be noted that since this is a cross-sectional study, the results obtained may vary if a long period of time is considered. A future line of research should seek to analyse how the different considerations of the input (budget expenditure vs. effective cost) affect dashboard data environments.

Appendix A

Table A1. Summary Statistics of variables included in the first-stage: cost efficiency estimation (*n* = 296).

	Mean	Median	Min	Max	SD
Effective cost	3,278,322	1,454,299	269,04.91	1.86×10^8	1.13×10^7
Budget expenditure	2,638,702	1,285,021	18,815.85	1.07×10^8	6,823,542
Surface facilities	186,684.9	88,414	3000	7,426,875	508,211
Population	83,208.78	35,782.5	20,043	3,165,541	221,860.2

Appendix B

Table A2. Summary Statistics of variables included in the second-stage: bootstrapped truncated estimation (*n* = 296).

	Mean	Median	Min	Max	SD
Budget efficiency	0.3895769	0.3091034	0.0163777	1.090543	0.315885
Cost efficiency	0.1855079	0.0406683	0.003745	1.007864	0.2952909
% Pop < 14	9.084506	8.85445	7.910591	13.14352	0.7995053
% Pop > 65	8.91556	8.625868	7.303843	13.38096	0.9008184
Income	9.8824	9.875854	9.526755	10.57712	0.1804185
Net saving index	0.1163767	0.1150434	−0.2982756	0.3427883	0.0950583
Budgetary result	1.144989	1.134501	0.6550906	1.553228	0.1227488
Income tax index	0.6611325	0.6661985	0.4045371	0.8395618	0.0831865
Coverage ratio	51.31849	6.887147	1.301818	2821.627	320.7264
Management form:	**Freq.**	**Percent**			
Management by local government	164	55.41			
Management by autonomous entity	64	21.62			
Other	68	22.97			
Total	296				

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