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The Efficiency of the Regional Management Centres of the Tax Administration in Spain

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The objective of this paper is to evaluate the efficiency of the regional management centres that make up the tax administration in Spain. They are known as Special Tax Offices and coincide with the different Autonomous Communities which comprise the political structure of the Spanish State. The aim has first been to measure their results and then compare them, as they all use the same inputs and provide the same outputs. To achieve this, the authors have used a methodology based on data envelopment analysis (DEA) in order to estimate the technical efficiency of the Special Tax Offices in 2008. The results show, using the premise of variable returns to scale, that there are four offices which behave optimally compared with the others, namely the Special Tax Offices of Andalusia, Castile-La Mancha, Catalonia, and La Rioja. On the other hand, the offices of Castile and León and Extremadura stand out for being the most inefficient ones. This analysis shows which offices have the best results and should act as a model for those who have the worst results, as if this is done, it would be possible to reinforce the fight against tax fraud that is so widespread in Spain and tax revenues could be increased.

Keywords: Tax Administration Agency, Special Tax Offices, technical efficiency, data envelopment analysis (DEA)

In a crisis scenario such as the current one, the efficient use of resources is a determining factor in order to obtain, in this case, higher tax revenues in order to pay for budgeted expenses. The design of any system of tax administration should encourage voluntary compliance by taxpayers, pursue fraud, correct any possible inconsistencies or misrepresentations in the taxpayers' declarations, and in short, ensure that tax regulations are strictly complied with. This will not only improve the social image of the organisation responsible for tax management but also increase tax revenues, either directly, by means of the coercive mechanisms available to the administration, or indirectly, as the perceived risk of detection for tax evasion increases.

In Spain, soon after the tax reform of 1978, which was enacted at the time when democracy was established, there was a statement which became famous: "Any tax system is worth the same as the Authority that applies it" (Lasheras & Herrera, 1991). The main goal of this paper has been to conduct an exhaustive study of the levels of efficiency of the tax administration as an organisation. An ineffective administration can undermine fiscal policy (Faría & Yucelik, 1995), and the way in which a tax system is implemented will affect its efficiency, and of course the amount of tax collected. The organisation responsible for tax administration is a

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different type of organisation, whose importance resides in the fact that when it functions properly and generates confidence, it promotes solid economic development. A modern state that is committed to social welfare cannot have inefficient tax administration, as this damages the welfare mechanisms and foments tax fraud.

In Spain, the tax administration system is designed in such a way that all the tax management functions have been the responsibility of the State Tax Administration Agency (hereafter AEAT or Agency)[1] since January 1, 1992. This management model was copied from the IRS (Internal Revenue Service) and is the predominant model in advanced tax administrations. The tax administration is divided into territorial offices in order to make it more accessible to taxpayers, and also to bring it closer to the areas where fraud is most common. For this reason, it is made up of 17 main offices, known as Special Tax Offices, which coincide with the 17 Autonomous Communities[2] which comprise the political structure of the Spanish State[3].

Whereas the application of efficiency analysis to the wide range of activities undertaken by the public sector is certainly of interest, is believed to be particularly valuable and applicable in the case of tax administration, because efficient management by the tax administration legitimizes it in its activity, encouraging voluntary compliance by taxpayers and building trust between them to continue to finance public sector activities (Gale & Holtzblatt, 2000). The need to incorporate efficiency analyses into public decision-making is so great that some authors have even raised the question of whether efficiency should be classified as a legal state requirement (Bordas, 2012). The motivation for this work is the need for an analysis of the efficiency of the tax administration of this country.

Within the field of tax administration, only a few authors have undertaken efficiency analyses. Of these, the empirical analysis conducted by Jimenez and Barrilao (2001, 2003) on efficiency in the management of the AEAT, the analysis by Gonzalez and Miles (2000) on efficiency in the inspection of the AEAT, and the work of Esteller (2003) regarding efficiency in the administration of transferred taxes, all stand out.

However, internationally, despite the lack of analyses, there are a few more authors who have conducted studies on the tax efficiency of their respective countries, among them: Hunter and Nelson[4] (1996), Jha and Sahni[5] (1997), Jha, Mohanty, Chatterjee, and Chitkara[6] (1999), Hyun, Moon, and An[7] (2001), Maekawa and

[1] The State Tax Administration Agency was created under Article 103 of Law 31/1990 of the State Budget. It is a unique area within the Spanish public administration because it is configured as a Body of Public Law, with its own legal personality and wide autonomy in its budgetary and human resources policies.

[2] For more information on regional political participation and the impact of the European Union on the sub-national level of government in Spain, please see Boronska-Hryniewiecka (2011).

[3] There is also greater territorial decentralisation, with 56 offices known as provincial offices, belonging in most cases to the territory of the respective province, as well as local offices in several municipalities. There are a total of 239 of these local municipal offices throughout Spain, which are known as tax administration offices.

[4] The work of Hunter and Nelson (1996) aimed to analyse the allocative efficiency of the federal tax administration for the United States in the period between 1955 and 1990 by using time series. Collection resulting from inspections (including penalties) was taken as outputs, and the stock of capital, personnel and travel costs as inputs.

[5] Jha and Sahni (1997) conducted an analysis of technical efficiency using panel data for the Canadian tax administration in the period between 1971 and 1993. The total tax revenue was considered as outputs and the fiscal capacity as inputs (gross domestic product—GDP delayed).

[6] Jha et al. (1999) analysed the technical efficiency of the tax administration in India during the period between 1980 and 1993. The econometric technique used was the stochastic frontier, taking the total tax collection as outputs and the fiscal capacity as inputs.

[7] The work of Hyun et al. (2001) focused their analysis on the tax administration in Korea during the period of 1976-1997. It aimed to estimate the production function and verify the relationship between two outputs: revenue collection and collection from inspections, taking capital expenditure and personnel costs as inputs. The econometric technique used was the time series and GMM (to treat endogeneity of outputs).

Atoda[8] (2001), and Lewis[9] (2006).

This paper is divided into four sections. The first one (this introduction) provides the theoretical bases and a brief review of the literature on other empirical analyses related to the analysis of efficiency in tax administration. The second section gives the description of the methodology used, and the selection of the variables incorporated in the analysis, which serves as a basis for empirical analysis that will take place in the third section, which shows the results obtained. The fourth and final section describes the conclusions that summarize the results and implications of the study.

Methodology

The concept of efficiency can have diverse meanings, depending on the subject of the study and the conceptual framework which is used. Numerous types of efficiency have been defined: Pareto, technical, price, or allocative efficiency, overall or economic, scale, partial, dynamic, institutional efficiency, etc. Of all the types of efficiencies listed above, the three main types originally put forward by Farrell (1957) are technical efficiency, price efficiency, and overall efficiency.

In this paper, the concept of technical efficiency is used, which is understood to be the type of efficiency that shows the capacity of a unit to obtain the maximum output with a given set of inputs or, in other words, maximizing the results with a given level of resources. This is particularly important when the results are the obtention of tax revenues by ensuring that the regulations for each tax are complied with, as otherwise there is an underutilisation of resources which leads to an increase in tax fraud.

In order to conduct the analysis, the year of 2008 has been used, as it is the last year for which information is available for the set of variables analysed. And 14 of the 17 regional management centres or Special Tax Offices, have been included in the analysis, as the offices of Madrid[10], the Basque Country and Navarre[11] have been excluded, since they significantly skew the coherence of the results and create considerable distortions.

Consequently, output has been taken to be Revenue from Acts of Settlement (IAL). These are the revenues that each office collects through the application of its resources and using the coercive mechanisms available to it, as oppose to tax revenues allocated to the State Budget (ITAPE) which comprise the revenues obtained automatically, or without the direct use of the resources available to each office, as the majority of them come from self-assessments submitted by the taxpayer[12].

With regard to inputs (resources), the followings have been quantified: (1) current expenditure on goods and services[13]; (2) the number of staff[14] who provide their services at each Special Tax Office; and (3) the number of declarations handled by each of the Special Tax Offices, where a declaration is filed for each

[8] Maekawa and Atoda (2001) analysed the technical efficiency and institutional reforms of the tax administration in Japan (1995-1997). By using a stochastic frontier (pooled data), total tax revenue was taken as outputs, and administrative expenses (capital and labour) and fiscal capacity (GDP) as inputs.

[9] The paper by Lewis (2006) focused on an efficiency analysis of the administrative costs of the municipal tax agencies of Indonesia for 2003. The analysis was based on the use of a stochastic frontier analysis with a set of transversal data.

[10] The Central Office for Large Taxpayers is located in Madrid, and it generates revenues which are not comparable with the other Special Tax Offices.

[11] Excluding the Basque Country and Navarre, which are Autonomous Communities with their own tax system called *Régimen Foral* (*Foral Regime*), which are configured as a special regime within the Spanish State, where the AEAT office exists merely for the presentation of documents. In these communities, the *Órganos Forales* (*Foral Organs*), confined to the territory of the community, carry out the management and inspection of taxes.

[12] These are voluntary tax settlement declarations, and therefore the coercive measures available to each office are not required.

[13] They constitute chapter II of the Expenses Budget of the tax administration.

[14] The number of staff includes both civil servants and the non-civil servants.

taxpayer and each tax[15]. Details of the selected variables and their quantification by Special Tax Offices are set out in Table 1.

Table 1

Quantification of Outputs and Inputs Used, in 2008

Special Tax Office	Output Settlement acts income (thousands of €)	Input 1 Goods and services expenditure (thousands of €)	Input 2 Number of declarations	Input 3 Staffing
Andalusia	670,432	20,435	3,479,268	4,189
Aragon	109,578	2,944	748,820	847
Asturias	111,539	2,671	563,189	752
Balearic Islands	97,603	2,633	506,863	704
Canary Islands	146,409	5,359	841,554	1,001
Cantabria	42,249	2,213	294,397	435
Castile-La Mancha	127,162	3,789	948,830	878
Castile and León	194,698	6,547	1,325,154	1,648
Catalonia	697,381	20,876	3,776,312	4,121
Extremadura	55,746	2,479	490,791	537
Galicia	189,099	8,605	1,334,387	1,869
Murcia	108,935	3,373	625,647	724
La Rioja	29,706	1,143	174,744	236
Valencia	359,604	15,601	2,401,823	2,800
Total	2,940,141	98,668	17,511,779	20,741

Note. Source: Data from the Reports of the Tax Administration and the Financial Management Reports (2008).

Current techniques used in the measurement of public sector efficiency can be grouped into several typologies. It is possible to distinguish between parametric and nonparametric methods, while it is also possible to use statistical or non-statistical methods to estimate the frontier which can, ultimately, be specified to be stochastic (random) or deterministic. In this case, the method used was data envelopment analysis (DEA), a non-parametric and deterministic method, which allowed obtaining a measurement of relative efficiency between the Special Tax Offices, taken to be the decision-making units (DMUs), looking for those that behave optimally compared with the rest.

Owing to the peculiarities of the production process of the tax administration in Spain, it was considered opportune to use the DEA method in two stages[16], in an output-orientated way, and with low variable returns to scale, following the BCC model, which was developed by Banker, Charnes, and Cooper (1984), as it is considered that in the management of the tax administration priority should be given to joining efforts in order to obtain the maximum output possible with the given inputs, leaving little room for manoeuvre to act on the inputs.

[15] The number of tax declarations refers to the declarations of the taxes that generate the highest volume of activity in the tax administration, namely the income tax of individuals (IRPF) and the corporation tax (IS).

[16] The two-stage method involves solving two problems for each unit: (1) First stage: the objective of the first stage is to determine the optimum value of θ, that is to say, the maximum proportional increase that would have to take place in the outputs of the unit that is the subject-matter of the study; and (2) Second stage: on the basis of the optimum θ^* obtained in the first stage, the outputs are adjusted and the input and output slacks are maximised in order to radially move the point projected in the first stage, which satisfies Farrel's efficiency condition (1957), to a point on the efficient envelopment that satisfies the optimality condition of Parato-Koopmans.

Results

After the model had been formulated, the DEA analysis allowed analysing how the performance of each regional management centre, or Special Tax Office, matched the efficiency criteria, compared with the other tax offices in this analysis. The relation between IAL (output) with respect to inputs and the characteristics of the sector itself indicates the assumption of variable returns to scale. However, a constant scale model[17] has also been developed in order to discover the pure technical efficiency (PTE) and scale efficiency (SE) of the Special Tax Offices.

Considering the overall technical efficiency (OTE), which assumes constant returns to scale, we can classify offices as technically efficient (those with value "1") or inefficient (value greater than "1"), in proportion to their level of inefficiency with respect to the rest. So the office of Castile-La Mancha is shown to be efficient in terms of constant returns to scale, of the remainder, the most inefficient are Castile and León (2.137) and Extremadura (1.805) (see Table 2).

Table 2

OTE, PTE, and SE by Special Tax Offices, in 2008 (%)

Special Tax Office	OTE	PTE	SE
Andalusia	1.065	1.000	1.065
Aragon	1.381	1.295	1.065
Asturias	1.036	1.009	1.028
Balearic Islands	1.066	1.030	1.035
Canary Islands	1.179	1.174	1.047
Cantabria	1.431	1.307	1.094
Castile-La Mancha	1.000	1.000	1.000
Castile and León	2.137	2.088	1.025
Catalonia	1.111	1.000	1.111
Extremadura	1.805	1.742	1.037
Galicia	1.447	1.412	1.025
Murcia	1.178	1.155	1.020
La Rioja	1.208	1.000	1.208
Valencia	1.370	1.300	1.054
Average	1.315	1.251	1.058

Note. Source: From the DEAP (A Data Envelopment Analysis-Computer-Program) software version 2.1.

The efficiency of each office, when compared only with those of the same dimension, is reflected by the PTE, which assumes variable returns to scale and prevents comparison with others that show significant differences in dimension. This indicator, as expected (see Table 2), gives efficiency values higher than those obtained by the OTE, that is, in models with constant returns the number of efficient offices is lower than those with variable returns, so offices that appear as inefficient according to the OTE can appear efficient by studying the PTE, as with the offices in Catalonia and Castile-La Mancha (there is one efficient office with constant returns to scale and three which are considered efficient with variable returns). Also, Castile and León and Extremadura are still by far the most inefficient offices.

[17] This has followed the DEA-CCR model, which was developed by Charnes, Cooper, and Rhodes (1978), as in the BCC model with output orientation. The BCC model, unlike the CCR model, has the restriction of convexity, that is, whereas in the CCR models the projection point is a linear combination of efficient units which remain on the one side of the efficient envelope, in the BCC models the point of projection is a convex linear combination.

In the latter case, under variable returns to scale and with an output orientation, the BCC model measures the maximum proportional increase that could occur in the output, for each of the DMUs, without additional consumption of inputs. So, for example, the Murcia office could increase the output (IAL) by 15.5% by keeping the inputs constant, while in the case of Extremadura, with the same inputs, it could achieve an increase 74.2% of output if it operated efficiently.

Finally, the SE shows the relation between the two indicators (scale efficiency calculated as the ratio of overall technical efficiency and pure technical efficiency: SE = OTE/PTE) and shows to what extent a particular office shows inefficiency because of production structure. As reflected in Table 2, the average OTE of the offices is found to be 1.315. This indicates that, on average, inefficient offices would have to either increase their performance, or reduce their resources by 31.5% to reach the relative efficiency.

In addition, the DEA allows further study of relative efficiency, discriminating between efficient offices. It does this by taking the number of times that an office appears as a reference for efficient offices, and by means of the relative weight of each efficient office compared with the rest (results given in Table 3).

Table 3

Peers and Average Weights

Special Tax Office	Number of times that an office is another's peer	Average weight
Andalusia	3	0.2918
Aragon	-	-
Asturias	-	-
Balearic Islands	-	-
Canary Islands	-	-
Cantabria	-	-
Castile- La Mancha	10	0.5743
Castile and León	-	-
Catalonia	-	-
Extremadura	-	-
Galicia	-	-
Murcia	-	-
La Rioja	7	0.4831
Valencia	-	-

Note. Source: From the DEAP software version 2.1.

The DEA allows the identification, for each inefficient office, of a set of other efficient ones, which will form a reference group for it, the so-called peers, that is to say, they will form the reference for the improvement of the inefficient unit. If the inefficient office behaves like a mixture of the offices which form this reference group, it would become efficient. As an indicator of how good the measurement of efficiency is, one may observe the frequency with which an office appears as an example of inefficiency.

So if an efficient office did not appear as a reference for any other inefficient units, this could mean "either that the unit is efficient only in a very small sector, due to high specialization, or that it has a very rare Input/Output combination" (El-Mahgary & Lahdelma, 1995, p. 706). A point in case is Catalonia which, although it is identified as efficient, does not appear as a reference for any other office.

Among the offices considered, there are two that have a clearly efficient structure: Castile-La Mancha and La Rioja, as they appear as a reference for the inefficient ones 10 and 7 times respectively. In this sense, these

two offices can be described as exemplary, and the case of Castile-La Mancha can even be considered as a global leader, a term introduced by Oral and Yolalan (1990), and used to emphasize the unity of the sample, which can be regarded as having the best overall performance. As pointed out by El-Mahgary and Lahdelma (1995) and Avkiran (1999), the global leader will be the efficient unit that appears most frequently in the reference sets of the inefficient units. The tax office of Andalusia only appears as a reference for three offices, which leads one to question whether it can be a model.

An analysis of the weights of these reference units (benchmarks) has been carried out in parallel, indicating the extent to which each of the benchmarks of the reference set of an inefficient unit contributes to the objective values of the latter (see Table 3). In this case, it was considered appropriate to indicate the average weight[18], which provides a more accurate idea of the true intensity with which each benchmark is involved in the construction of the respective inefficient units.

The results from this analysis show that Castile-La Mancha has a higher average weight (0.5743) as a reference for other units, followed by La Rioja with an average weight of 0.4831, and in the last place the tax office of Andalusia, with an average weight of 0.2918.

Conclusions

The goal that has driven this research is to approach the relative efficiency of each one of the regional management centres comprising the tax administration, known as Special Tax Offices, using a set of variables that are considered essential for proper operation. In this way, as outputs, the authors have considered the IAL, which is the revenues collected through the application of the resources available to the office, and as inputs, the number of personnel, the expenditure on current goods and services and the number of tax returns handled, taking 2008 as the year that has been used for the analysis of each one of the variables.

The results drawn from this work show that there are significant differences between the levels of technical efficiency of the different Special Tax Offices comprising the State Tax Administration Agency in Spain. On the initial assumption of variable returns to scale, the evaluation of PTE indicates that there are four offices that show efficient management: Andalusia, Castile-La Mancha, Catalonia, and La Rioja. And in complete contrast, the high level of inefficiency detected in the Special Tax Offices of Castile and León and Extremadura is to be highlighted.

In order to rank the four efficient offices, a benchmark analysis has been conducted, in which both through the global leader method and the average weights, it is confirmed that the Castile-La Mancha office could be considered as the most efficient, being taken as a reference by a greater number of inefficient offices, and a greater weight or intensity in contributing to the target values of inefficient units.

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[18] Calculated as the ratio between the sum of all weights and the number of times, a corresponding efficient DMU appears as a reference (benchmark) for the inefficient ones.

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