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PUBLIC SECTOR PERFORMANCE MEASUREMENT IN SLOVENIA – SELECTED CONCEPTS AND CASES

In this paper the authors discuss and review different conceptual and methodological issues related to the performance measurement in the public sector. In particular, a composition of Public Sector Performance (PSP) and Public Sector Efficiency (PSE) indicators as well as Data Envelopment Analysis (DEA) are presented and applied to Slovenia. The results show that Slovenia has relatively low efficiency in the public sector, even in comparisons to some new EU member states (such as Cyprus and Estonia). Additionally, the system of performance indicators developed for a particular public administrative institution (i.e. tax administration) in Slovenia will be reviewed. The purpose of the analysis is to set a system of performance indicators that eliminates most of the imbalance in the information available to managers and owners in planning and comparisons between public institutions, makes decision-making easier for management, and promotes efficiency and effectiveness within an institution.

1. INTRODUCTION

Measuring performance has been increasingly important in the public sector recently. However, for many reasons, both political and technical, performance measurements have only become an integral part of relatively few governments' management or decision-making systems. The threat of privatization and spending cutbacks, made without due consideration on the impact of these changes in the future, has certainly helped increase the interest. In addition, several other factors led to the recent focus on performance measurement such as the pervasive dissatisfaction with government employees' unresponsiveness to the public, the dynamics of Wagner's Law, which states that the size of the government tends to systematically increase, and hence puts pressure on public finances, and the implementation of the New Public Management paradigm. But the introduction of performance indicators into public management has been also carrying both a potential for greater effectiveness and substantial risk. It is thus necessary to unbundle the concept of performance, and review the country- and sector-specific conditions that determine the success or failure of reforms. The key determinant of success or failure is whether the changes were realistic, introduced gradually, and consistent with both the methodological complexity of the topic and the specific country realities (especially administrative capacity and the governance regime).

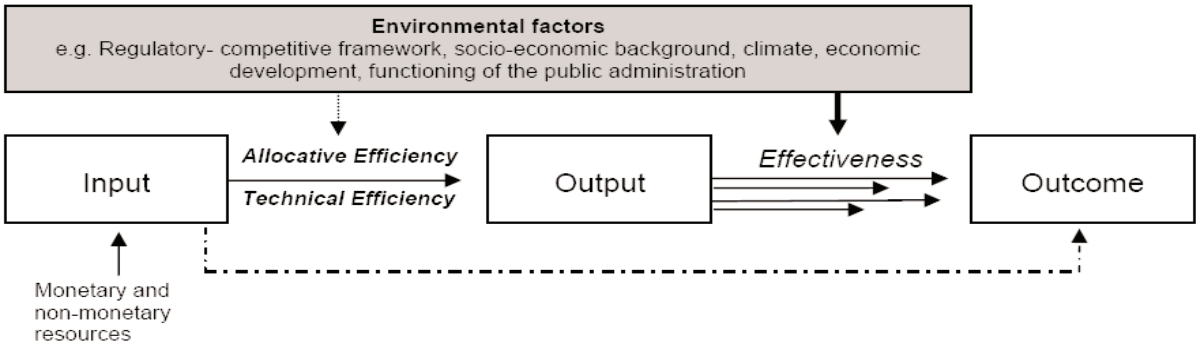
The purpose of the paper is essentially twofold: first to discuss and review different conceptual and methodological issues related to the performance measurement in public sector. In particular, a composition of Public Sector Performance (PSP) and Public Sector Efficiency (PSE) indicators as well as Data Envelopment Analysis (DEA) is presented and applied to Slovenia. Second, the system of performance indicators developed for a particular public administrative institution (i.e. tax administration) in Slovenia will be reviewed. The purpose of the analysis is to create a set of

performance indicators that eliminate most of the imbalance in the information available to managers and owners in planning and comparisons between public institutions, make decision-making easier for management, and to promote efficiency and effectiveness within an institution.

The paper is organized as follows. In the next section we present the theoretical background and empirical results of public sector performance (PSP) and efficiency (PSE) indicators as well as a DEA analysis. Section 3 sets out the public administration performance indicators and their application to the tax administration in Slovenia. Section 4 provides concluding remarks.

2. ASSESSING EFFICIENCY IN THE PUBLIC SECTOR

The measurement of efficiency generally requires: (a) an estimation of costs; (b) an estimation of output; and (c) the comparison between the two. Applying this concept to the spending activities of governments, we can say that public expenditure is efficient when, given the amount spent, it produces the largest possible benefit for the country's population.[1] Often efficiency is defined in a comparative sense: the relation between benefits and costs in country X is compared with that of other countries. This can be done for total government expenditure, or for expenditure related to specific functions such as health, education, poverty alleviation, building of infrastructure and so on. If in country X the benefit exceeds the costs by a larger margin than in other countries, then public expenditure in country X is considered more efficient. However, the measurement of public efficiency is relatively complicated as comparison and measurement of both costs and benefits may be difficult. Deficient budgetary classifications, lack of reliable data, difficulties in allocating fixed costs to a specific functions, and failure to impute some value to the use of public assets used in the activity can also hamper the determination of real costs.2



Source: Mandl et al. [2008].

Figure 1: Conceptual Framework of Efficiency and Effectiveness

1 The word benefit is used because economists often make a distinction between output and outcome.
2 For more about measuring costs and efficiency of public spending see Drake and Simper (2001) and Afonso et al. (2006).

Figure 1 illustrates the link between input, output and outcome, the main components of efficiency and effectiveness indicators. The monetary and non-monetary resources deployed (i.e. the inputs) produce an output. For example, education spending (input) affects the number of students completing a class (output). The input-output ratio is the most basic measure of efficiency.[3] However, compared to productivity measurement, the efficiency concept incorporates the idea of the production possibility frontier, which indicates feasible output levels given the scale of operations. The greater the output for a given input or the lower the input for a given output, the more efficient the activity is. Productivity, by comparison, is simply the ratio of outputs produced to input used.

On the other hand effectiveness relates the input or the output to the final objectives to be achieved, i.e. the outcome. The outcome is often linked to welfare or growth objectives and therefore may be influenced by multiple factors (including outputs but also exogenous 'environmental' factors). Effectiveness is more difficult to assess than efficiency, since the outcome is influenced by political choice. The distinction between output and outcome is often blurred and output and outcome are used in an interchangeable manner, even if the importance of the distinction between both concepts is recognized. For example, the outputs of a health system are often measured in terms of the number of operations performed or days spent in a hospital. The final outcome, however, could be how many patients got well enough to return to an active life. Thus, the effectiveness shows the success of the resources used in achieving the objectives set.

2.1. METHODS FOR MEASURING PUBLIC SECTOR PERFORMANCE AND EFFICIENCY

2.1.1. Public Sector Performance and Efficiency Indicators

The measurement of public sector performance (PSP) (defined as the outcome of public sector activities) and efficiency (PSE) (defined as the outcome relative to the resources employed) is still very limited. Afonso et al. [2003] provide a proxy for measuring public sector performance and efficiency.[4] Their paper compares the performance of the public sector and relates it to resource use. These authors use indicators relating to effectiveness and in a number of major policy areas: education, health care and infrastructure. In addition, they draw on indicators of the quality of public administration, based on survey data. Finally, the authors operationalize the conventional functions of government: distribution, stabilization and allocation [Musgrave and Musgrave 1984]. These indicators are aggregated by means of unweighted totaling of standardized component scores. Performance is then relat-

3 When measuring efficiency, a distinction can be made between technical and allocative efficiency. Technical efficiency measures the pure relation between inputs and outputs taking the production possibility frontier into account. On the other hand, allocative inefficiency occurs if the distribution of particular public sector outputs is not in accordance with personal preferences (Bailey, 2002).

4 Some other authors and papers have tried to improve and supplement on the work by Afonso et al. [2003], such as SCP/CERP [2004], Sancez and Bermejo [2007], Afonso et al. [2006; 2008], etc.

ed to resource use on two levels: in each concrete policy area, and for the public sector as a whole.

Figure 2 displays the composition of PSP indicators. As to the "opportunity indicators", administrative performance of government is measured as a composite of the following indices: corruption, red tape, quality of the judiciary, and the size of the shadow economy. The education indicator contains secondary school enrolment and the OECD educational attainment indicators in order to measure both the quantity and quality of education. The health performance indicator contains infant mortality and life expectancy. The public infrastructure indicator contains a measure of the communication and transport infrastructure quality. All these indicators change slowly so that observations every 10 years provide a good impression of changes over time except in the case of public infrastructure where period averages have been used.

Afonso et al. [2003] distinguished public sector performance (PSP), defined as the outcome of public policies, from public sector efficiency (PSE), defined as the outcome in relation to the resources employed. Assume that public sector performance (PSP) depends on the values of certain economic and social indicators (I). If there are i countries and j areas of government performance which together determine overall performance in country i, PSPi, (where PSPij = f(Ik)) we can then write:

$$PSP_i = \sum_{j=1}^{n} PSP_{ij} \qquad (1)$$

However, public sector performance must be set in relation to the inputs used to gauge their efficiency. In order to get some values of efficiency of the state, public sector efficiency (PSE) is composed, taking into account the expenditure related to each selected sub-indicator. In this respect, the public sector performance (PSP) indicator is weighted by the relevant category of public expenditure (PEX) as follows[5]:

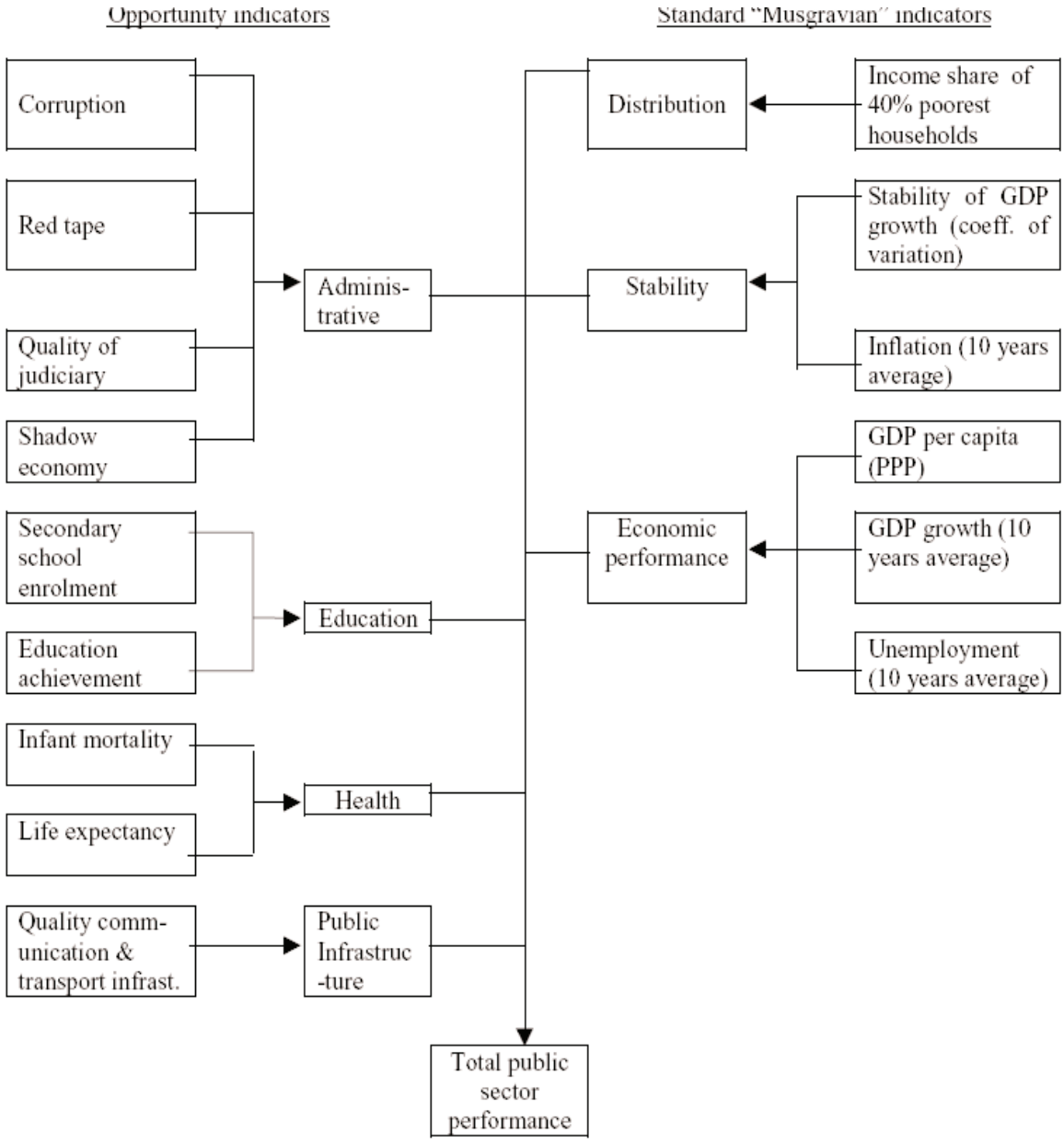
$$PSE_i = \frac{PSP_i}{PEX_i} = \sum_{j=1}^{n} \frac{PSP_{ij}}{PEX_{ij}} \qquad (2)$$

2.1.2. Other Parametric and Non-Parametric Methods

An alternative approach is based on the concept of efficiency frontier (productivity possibility frontier). There are multiple techniques to calculate or estimate the shape of the efficiency frontier. Most investigations aimed at measuring efficiency are based either on parametric or nonparametric methods. The main difference between the parametric and the non-parametric approach is that parametric fron-

5 The input measures for opportunity indicators (see Figure 2) are public consumption, health expenditure and education as proxy for inputs to produce administrative, health and education outcomes, respectively. On the other hand, the inputs for standard "Musgravian" indicators are: transfers/subsidies and total spending as proxies for input to affect income distribution and economic stabilization/economic efficiency, respectively. For some caveats of such an approach see Afonso et al. [2003].

tier functions require the ex-ante definition of the functional form of the efficiency frontier.



Source: Afonso et al. [2003].

Figure 2. Public Sector Performance (PSP) Indicator

A very common parametric approach is Stochastic Frontier Analysis (SFA). It is a statistical method to fit the frontier and is based on econometric methods. This approach assumes a specific functional form for the relationship between input and output. The advantage of this method is that it is able to cover the effects of exogenous shocks, i.e. nondiscretionary factors. The model can specify the equations based on such assumptions [Mandl et al. 2008].

On the other hand, the non-parametric approach constructs an efficiency frontier using input/output data for the whole sample following a mathematical programming method.[6] This frontier provides a benchmark by which the efficiency performance can be judged. This technique is therefore primary data-driven. Among the different non-parametric methods the Free Disposal Hull (FDH) technique imposes the fewest restrictions.[7] It follows a stepwise approach to construct the efficiency frontier. Along this production possibility frontier one can observe the highest possible level of output/outcome for a given level of input. Conversely, it is possible to determine the lowest level of input necessary to attain a given level of output/outcome. This allows identifying inefficient producers both in terms of input efficiency and in terms of output/outcome efficiency [Afonso et al. 2003].

An alternative non-parametric technique that has recently started to be applied to public expenditure analysis is Data Envelopment Analysis (DEA).[8] DEA approach is based on a linear combination of input and outputs in order to specify the efficiency frontier. Convexity of the set of input-output combinations is assumed since this method constructs an envelope around the observed combinations. According to DEA methodology, the general relationship can be given by the following function for each country i (Afonso, 2006):

$$Y_i = f(X_i),\ i = 1,...,n \qquad (3)$$

where we have Y_i – a composite indicator reflecting our output measure; X_i – spending or other relevant inputs in country i. If $Y_i < f(x_i)$, it is said that country i exhibits inefficiency. For the observed input level, the actual output is smaller than the best attainable one and inefficiency can then be measured by computing the distance to the theoretical efficiency frontier.

2.2. EMPIRICAL EVIDENCE OF PUBLIC SPENDING EFFICIENCY IN THE SELECTED EU MEMBER STATES

From the empirical results indicators suggest notable but not extremely large differences in the public sector performance across countries (with a few exceptions) (see Table 1). Starting with the overall PSP indicator, the best performers seem to be Cyprus, Ireland and Malta. Interestingly, Slovenia is just behind Malta and in front of Portugal and Greece which post a broadly average result. When comparing the best performers in Afonso et al. [2006] with those from Afonso et al [2003] (23 OECD countries), the results confirm that most of the new EU member countries show lower public sector performance than developed OECD countries.[9] However, some

6 For an overview of non-parametric techniques see Simar and Wilson [2003].

7 FDH analysis was first proposed by Deprins et al. [1984].

8 DEA analysis, originating from Farrell's [1957] seminal work was originally developed and applied to firms that convert inputs into outputs [e.g. Coelli et al. 1998].

9 Indeed, it is noteworthy that the US and particularly Japan report above-average for the total PSP measure and the EU (weighted average) performs below average (for more see Afonso et al. [2003]).

of the new EU member countries (such as Cyprus, Malta and Slovenia) are already on the average performance level of the "old" industrialized countries.

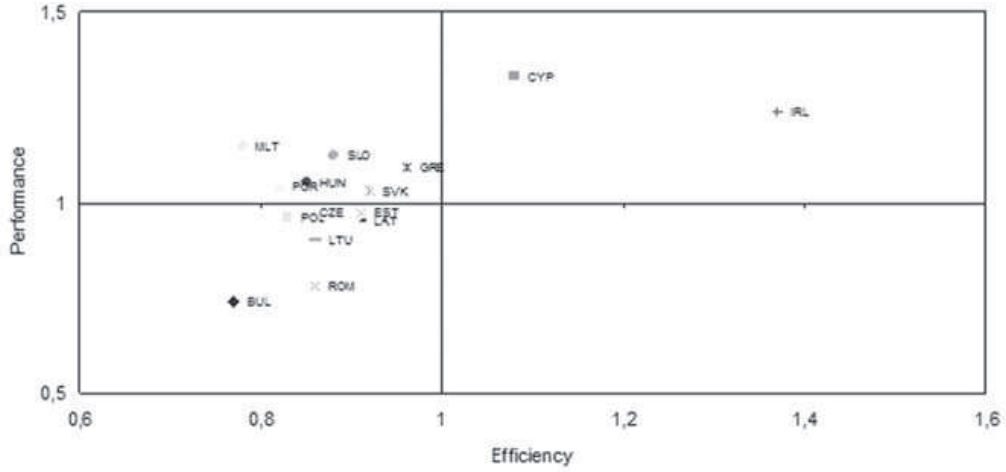
Countries with the highest values for sub-indicators include Estonia (administration), Hungary (human capital), Slovakia (distribution), Greece (economic stability) and Cyprus (economic performance). Slovenia as one of the most developed new EU member states shows relatively good performance on human capital and stability, and lags behind on administration. Indeed, it is interesting that the new EU member states are particularly good performers on human capital and income distribution (both probably show a heritage from socialist system) and relatively weak on administration, economic performance and stability (last two probably due to the turbulent transition process).

Table 1: Comparison of Public Sector Performance (PSP) in Selected EU Countries

Country	Opportunity Indicators						"Musgravian" Indicators						Public Sector Performance (PSP)	
	Administration		Education		Health		Distribution		Stability		Economic performance			
	Score	(Rank)	Score	(Rank)	Score	(Rank)	Score	(Rank)	Score	(Rank)	Score	(Rank)	Score	(Rank)
Bulgaria	0.80	(13)	1.09	(9)	0.99	(12)	1.17	(4)	0.06	(15)	0.31	(15)	0.74	(15)
Cyprus	n. a.		1.12	(5)	1.04	(1)	n.a.		1.59	(3)	1.54	(1)	1.33	(1)
Czech R.	1.00	(8)	1.14	(2)	1.02	(7)	1.19	(3)	0.74	(11)	0.74	(13)	0.97	(9)
Estonia	1.25	(1)	1.11	(7)	0.99	(12)	1.00	(12)	0.57	(12)	0.88	(6)	0.97	(9)
Greece	0.95	(10)	1.04	(12)	1.04	(1)	1.07	(10)	1.67	(1)	0.76	(12)	1.09	(5)
Hungary	1.09	(5)	1.16	(1)	1.00	(10)	1.21	(2)	0.97	(8)	0.88	(6)	1.05	(6)
Ireland	1.17	(2)	1.11	(7)	1.03	(4)	1.02	(11)	1.64	(2)	1.47	(2)	1.24	(2)
Latvia	1.03	(7)	0.98	(14)	0.98	(15)	1.08	(8)	0.76	(10)	0.88	(6)	0.95	(12)
Lithuania	0.98	(9)	1.12	(5)	1.00	(10)	1.08	(8)	0.37	(13)	0.84	(9)	0.90	(13)
Malta	1.11	(3)	1.03	(13)	1.04	(1)	n.a.		1.45	(4)	1.12	(3)	1.15	(3)
Poland	0.92	(12)	1.08	(10)	1.01	(8)	1.09	(7)	0.83	(9)	0.81	(10)	0.96	(11)
Portugal	1.11	(3)	0.88	(15)	1.03	(4)	0.98	(13)	1.30	(6)	0.91	(5)	1.04	(7)
Romania	0.63	(14)	1.13	(3)	0.98	(15)	1.10	(6)	0.18	(14)	0.63	(14)	0.78	(14)
Slovakia	0.95	(10)	1.07	(11)	1.01	(8)	1.28	(1)	1.09	(7)	0.77	(11)	1.03	(8)
Slovenia	1.07	(6)	1.13	(3)	1.03	(4)	1.14	(5)	1.35	(5)	0.99	(4)	1.12	(4)

Source: Afonso et al. (2006), own calculations.

Indicators of Public Sector Efficiency (PSE) are computed weighing performance by the amount of relevant public expenditure. One can find significant differences in public sector efficiency across countries. Ireland, Cyprus and Greece show the best values for overall efficiency. In this respect, the results for measuring public sector efficiency show an accentuation of the findings for public sector performance. This suggests that more public spending often has relatively low returns as regards improved performance (which is consistent with the findings of Afonso [2003] for OECD countries). Most low performers, range between 0.8 and 0.9 and Cyprus is the only new EU member country with an average PSE score. Slovenia, in this respect, significantly lags behind Ireland and even Cyprus and shows approximately the same efficiency performance as most of the new EU member countries.



Source: Afonso et al. [2006], own calculations.

Figure 3: Public Sector Performance (PSP) and Efficiency (PSE) in Slovenia and Selected EU Countries

When taking into account sub-indicators, it can be found that differences in efficiency are much more pronounced than in performance across countries. New EU member countries with the highest values for efficiency sub-indicators include Estonia (administration), Romania (human capital), Cyprus (health, economic stability and performance) and Lithuania (distribution). Slovenia in this respect shows relatively poor efficiency performance especially in the field of health and distribution. Generally, a relatively average performance (PSP) of the new EU member states is related with relatively high level of inputs, reflecting public sector inefficiency (low PSE) in the region.

Table 2: Comparison of Efficiency in Selected EU Countries by PSE and DEA Methods

Country	Public Sector Efficiency (PSE)		DEA Analysis			
			Input Oriented		Output Oriented	
	Score	Rank	Score	Rank	Score	Rank
Bulgaria	0,77	15	0,461	7	0,483	15
Cyprus	1,08	2	0,489	4	0,867	1
Czech R.	0,85	10	0,439	8	0,637	9
Estonia	0,91	5	0,489	4	0,632	10
Greece	0,96	3	0,369	14	0,713	5
Hungary	0,85	10	0,355	15	0,687	6
Ireland	1,37	1	0,576	1	0,813	2
Latvia	0,91	5	0,486	6	0,624	12
Lithuania	0,86	8	0,535	2	0,588	13
Malta	0,78	14	0,408	11	0,753	3
Poland	0,83	12	0,412	10	0,627	11
Portugal	0,82	13	0,385	13	0,678	7
Romania	0,86	8	0,528	3	0,509	14
Slovakia	0,92	4	0,406	12	0,674	8
Slovenia	0,88	7	0,431	9	0,731	4

Note: Countries included in the analysis but not included in the table: Brazil, Chile, Korea, Mauritius, Mexico, Singapore, South Africa, Thailand and Turkey.
Source: Afonso et al. [2006], own calculations.

A DEA approach largely confirms the findings of the PSE composite indicators reported in Table 2. By using a PSP composite indicator as output measure and the government expenditure as a ratio of GDP as input measure the results show that Slovenia could use about 57 per cent less resources for the attained output. According to this score, Slovenia is even less efficient than Bulgaria, Czech R. and Latvia. Moreover, from an output perspective, Slovenia presents a slightly better ranking as for the level of its input obtains around 73 per cent of the output it should deliver. The top efficiency performers in the selected group of the EU countries are Cyprus (input oriented score) and Ireland (output oriented score), but both significantly lag behind the most efficient country, Singapore.

3. PUBLIC ADMINISTRATION EFFICIENCY AND EFFECTIVENESS INDICATOR SYSTEM - THE CASE OF SLOVENIAN TAX ADMINISTRATION

The performance of public sector can also be measured on a "micro" level, i.e. for a particular public organization (or institution). However, monitoring efficiency and effectiveness does not ensure customer satisfaction on its own. The users of public services are citizens, so careful attention must be paid to providing the public with an influence over determining outputs and outcomes. Hence, the purpose of measuring efficiency and effectiveness on a "micro" level is also to create as high an output as possible with the resources available, and hence to achieve the set outcome. This means sufficient public participation must first be ensured when setting objectives and monitoring operations. In democratic countries this means using social responsibility, whereby an institution is socially responsible in its operations to stakeholders, who are the public, non-governmental organizations, interest groups, associations and other interest parties. Once a public institution's operative objective has been set, and social influence ensured, the next issue is the institution's organization and control over its operations. Managers can derive considerable assistance in that area from efficiency and effectiveness monitoring using a measurement system like the one presented in this paper. First the areas that have a significant impact on any institution (in the private or public sector) must be defined. Each of these areas must be assigned an appropriate weighting with respect to their importance, in order to determine the overall efficiency and effectiveness. All areas may be given the same weighting, or a range of weightings may be assigned. The definitions of these areas and connections between them are based on OECD definitions, findings from other professional literature on public sector economics, as well as the nature of the Slovenian public administration. This led to five basic areas within the system, with indicators in each area giving a measurement of efficiency and effectiveness.

It is vital to ensure in the first phase of analysis that the selected indicators actually offer a realistic presentation of efficiency and effectiveness in the specific area. This means, for instance, that the indicators should provide an accurate measurement of the state of and changes to operational quality in the Tax Administration of the Republic of Slovenia or the Culture Inspectorate of the Republic of Slovenia. Many of the main indicators for these institutions of course differ and cannot be

mutually comparable, but that is not relevant at this phase of the analysis. The system of indicators built on this basis also proves useful in the next phase for calculating the aggregate indicators. It has been found in (public and private) institutional practice that decisions adopted on the basis of logically structured indictors are better than those made on the basis of intuition alone. A database incorporating a system of indicators has to be created to ensure the tool is available to the management directly involved; this is its primary purpose.

Defining the system of indicators requires the prior definition of the basic classification areas for the indicators of the most significant factors. The following factors are those mentioned most frequently in the professional literature [Rozman 2002: 265-275):

- technical /technological factors,
- human factors,
- organisational factors.

Some other factors can be added to these, especially those with an impact on effectiveness. Improving effectiveness measurement has a direct effect on costs, which is seen in the profit (performance/effectiveness). Rozman [in Pučko and Rozman 1992] and Tekavčič [and Možina et al. 2002] state that the same group of factors affect both efficiency and effectiveness indicators. Effectiveness in the public sector can also be expressed in non-financial terms, so this must be reflected in the set of indicators. This primarily involves indicators on the quality of services, which are becoming increasingly important. There is also a need to define indicators relating to achieving the organisation's outcome or the socially defined rational operation of an institution. The latter indicator in particular directly indicates effectiveness in terms of meeting operating objectives.

3.1. AGGREGATE PERFORMANCE INDICATOR IN PUBLIC ADMINISTRATION

Measuring efficiency and effectiveness in public administration is a very complex area. Economic theory makes clear that a number of factors affect efficiency and effectiveness. A set of indicators has to be defined to include all these factors. An unsystematic approach might have a negative impact on the analysis results so it makes sense to define the indicators in terms of the areas set out in the preceding chapter. The approach used by international institutions (e.g. UN or OECD) to assess sustainable development, which is a similar problem, was another reason in favour of using the aggregate indicators. In the case at hand this involves aggregating simple indicators from a lower level to a higher level to achieve transparency and a systematic approach.

Absolute data is only rarely used in comparisons between operative units. Better quality information can be obtained on relations between various phenomena if relative figures are used. The relative figure method is simple and based on basic mathematic functions. Creating simple efficiency and effectiveness indicators depends on the definition of basic categories: inputs, outputs and outcome. When these categories have been defined in line with the theory described above, actually composing the indicators is a simple process, and depends on the institution being studied.

It is essential to acquire data on the output and outcomes of individual institutions, which must be defined in relation to their objectives. Only if they are defined correctly will the indicators actually measure what they are intended to measure.

The multi-stage combination of data is the most suitable model for measuring efficiency and effectiveness in the public administration. This enables a large number of factors that affect value, but that are relatively difficult to define in similar terms, to all be taken into account. This model provides aggregate indicators at different levels of aggregation which indicate the state or changes in each of the areas included. The diversity of public administration agency activities means that only the first and second level of aggregation will be uniform, and the creation of aggregate indicators at lower levels of aggregation and simple indicators will be left to the management of individual institutions. This will lead to each institution producing an aggregate indicator for the first aggregate level and first second level indicators (see Table 3).

Table 3: Including indicators in the efficiency and effectiveness indicator

UNIFIED BETWEEN INSTITUTIONS		DIFFERENT BETWEEN INSTITUTIONS
First level of aggregation	Second level of aggregation – unified for public admininstration	Simple indicators – different for instiutions with different services
Aggregate Performance Indicator for Public Administration – PIPA1	Technical indicators (PIPA2-1)	Simple indicators or aggregation on level PIPA3, PIPA4…
	Employee capabilities indicators (PIPA2-2)	Simple indicators or aggregation on level PIPA3, PIPA4…
	Organisational indicators (PIPA2-3)	Simple indicators or aggregation on level PIPA3, PIPA4…
	Quality (PIPA2-4)	Simple indicators or aggregation on level PIPA3, PIPA4…
	Outcome (PIPA2-5)	Simple indicators or aggregation on level PIPA3, PIPA4…

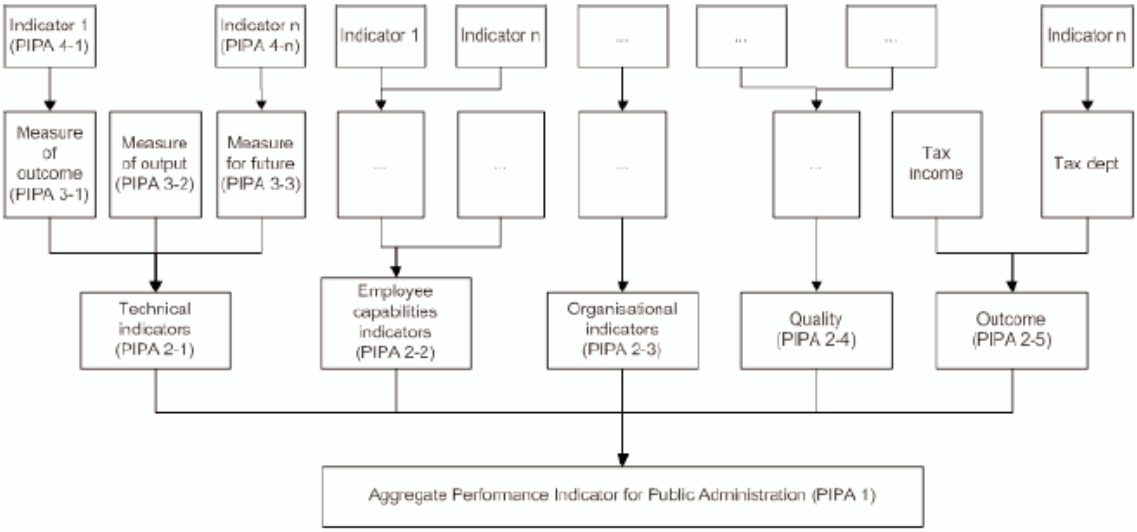
Source: Setnikar-Cankar and Andoljšek [2005].

This procedure produces a system of public administration efficiency and effectiveness indicators (PIPA), which will be prearranged and uniform for the first two levels (PIPA1 and PIPA2), while at the lower levels (PIPA3, PIPA4, simple indicators) managers will be able to select the indicators or areas most suited to their institution. The five basic sets of second level indicators can be supplemented with additional aggregate levels, suitable for different types of activity. A third and fourth level of aggregate is used in measuring the efficiency and effectiveness of tax offices (see Figure 4).

3.2. AGGREGATE PERFORMANCE INDICATOR FOR TAX ADMINISTRATION IN SLOVENIA(PIPA)

The analysis starts by selecting indicators at the lowest level (fourth), which will be aggregated into higher level indicators. Despite the diversity of tax office, they can

be compared because they all share the same organization, rules and perform the same tasks. A total of 223 simple indicators were defined at these levels, which are aggregated into an aggregate indicator according to the theoretical scheme. The aggregation scheme produces 13 third-level (PIPA3) aggregate indicators, five second-level (PIPA2) indicators, and one first-level (PIPA1) indicator for evaluating the efficiency and effectiveness of tax offices. The 223 proposed indicators were narrowed down to 178, which were included in the system and in the second phase calculation of aggregate indicators. Since the database in the observed institution was not configured to calculating all these indicators, it was not possible to calculate 45 of them. Nevertheless, this data is in the tax administration system, and a partial adjustment would mean that all 223 indicators could be calculated.



Source: Setnikar-Cankar and Andoljšek (2005).

Figure 4: Selection of aggregate indicators for the Tax Administration

First and second level indicators (PIPA1 and PIPA2)

The highest level of aggregation provides the most condensed form of information on efficiency and effectiveness. This level is only intended to give a rough comparison between institutions, but its simplicity means it will probably be the one most frequently used. This level can reveal that something is bad (or good), but to ascertain what is wrong (or right), one must look at a lower level - all the way down to the simple indicators.

The last two columns in the Table 4 give the non-standardized and standardized values of the first-level efficiency and effectiveness indicators. The highest score was achieved by Tax Office 4, with Tax Office 7 in second place and Tax Office 10 third; these tax offices are in the upper quarter of the 0–1 scale. Tax Office 1 would be classified at the very start of this scale and Tax Office 5 at 0.15. The management of Tax Office 1 and Tax Office 5 undoubtedly must take action. Looking at the second level (PIPA2) reveals in which general areas action should be taken. Tax Office 1 achieved

its lowest scores in the area of technical resources (PIPA2-2), while its outcome (PIPA2-5) and staff capabilities (PIPA2-1) also scored poorly. The scores were relatively poor in Tax Office 5 for technical resources (PIPA2-2) and organization (PIPA2-1). However, these are just rough assessments of the state of a specific area. Taking specific measures means investigating the state at the third and fourth levels of aggregation.

Table 4: First and second level indicators (PIPA1 and PIPA2)

	Second level indidators (PIPA 2) – standardised values					First level indicator (PIPA1)	
	Employee capabilities (PIPA2-1)	Technical indidators (PIPA2-2)	Organisational indicators (PIPA2-3)	Quality (PIPA2-4)	Outcome (PIPA2-5)	Non-standardised values	Standardised values
Tax Office 1	0,25	0,00	0,71	0,68	0,24	0,38	0,00
Tax Office 2	0,47	0,97	0,70	0,47	0,18	0,56	0,66
Tax Office 3	0,63	0,37	0,00	0,66	1,00	0,53	0,55
Tax Office 4	0,64	0,85	0,66	0,83	0,30	0,65	1,00
Tax Office 5	0,63	0,19	0,24	0,65	0,38	0,42	0,15
Tax Office 6	0,70	0,71	0,06	0,67	0,44	0,52	0,50
Tax Office 7	1,00	1,00	0,33	0,00	0,74	0,61	0,86
Tax Office 8	0,67	0,61	0,89	0,36	0,30	0,57	0,68
Tax Office 9	0,29	0,52	1,00	0,77	0,29	0,57	0,71
Tax Office 10	0,56	0,90	0,79	0,52	0,20	0,59	0,77
Tax Office 11	0,35	0,14	0,30	0,87	0,61	0,46	0,28
Tax Office 12	0,16	0,10	0,45	1,00	0,65	0,47	0,35
Tax Office 13	0,80	0,94	0,42	0,42	0,00	0,52	0,51
Tax Office 14	0,00	0,89	0,63	0,46	0,73	0,54	0,60

Source: Setnikar-Cankar and Andoljšek (2005).

Third (PIPA3) and fourth level indicators

The application of multi-stage aggregation means content-based areas can be formed that make it easier to adopt measures to make improvements, as they can be linked to management functions (or department organization). The increased complexity of calculations for a procedure due to the large number of different areas partially reduces the transparency of the system (at the third level - PIPA3 - there are 13 aggregate indicators), but this is largely a higher level problem, and should not be too problematic at lower levels, as individual managers can control "their" part of the system. Analysis at the second aggregation level indicates that Tax Office 1 achieved poor results in three areas, the poorest of which was in technical resources. The technical resource indicators were classified into three groups.

Indicators within this group should offer an overview of the efficiency and effectiveness of technical resources in an individual tax office. It is clear that Tax Office 1 was not the worst in any area (no indicator has the value 0), but it achieved such low results that it was last in the group comparison. The backgrounds to the low

scores in the first two areas (PIPA3-4, PIPA3-5) are low tax revenues (outcome) and number of points achieved (output) for technical resource inputs (ongoing expenditure for goods and services, computers, vehicles). The third-level figures revealed that Tax Office 1 is in a poor state in every technical resource area, but more detailed data is needed to take action. Even in Tax Office 7, which had the highest score for technical resources, there are sufficient grounds for improvements to be made. In the first two areas (outcome and outputs) it achieved the best scores, but for the third indicator, which measures technical resource characteristics that could affect future efficiency and effectiveness (PIPA3-6) it had the lowest score.

The third-level indicator values revealed that the situation is poor in some areas. Taking concrete action requires a more accurate analysis of the situation, which can be found by looking at fourth-level indicators. It is essential that the system ensures the traceability of the main causes of good or bad efficiency and effectiveness, so that measures to improve them can be defined in more detail.

A characteristic of the method used is that we can observe the step-by-step aggregation of indicators according to the indicator groups defined theoretically at individual levels. The analysis took into account theory on efficiency and effectiveness. Taking this and the dynamics of the environment in question, we selected an aggregate indicator method, although there also exist multi-variate analyses that group indicators mathematically. For this reason we used factor analysis to verify if the indicator groups had been defined correctly and the tax offices ranked correctly. This defines groups of indicators on the basis of variable values. Indicator aggregation takes place directly from the fourth to second level. The classification of indicators by group cannot be externally influenced (see Table 5).

Table 5: Classifying tax offices using different standardization methods

	Tax Office 1	Tax Office 2	Tax Office 3	Tax Office 4	Tax Office 5	Tax Office 6	Tax Office 7	Tax Office 8	Tax Office 9	Tax Office 10	Tax Office 11	Tax Office 12	Tax Office 13	Tax Office 14
Standardisation	14	6	8	1	13	10	2	5	4	3	12	11	9	7
Factor analysis	13	8	9	1	14	10	2	5	3	4	12	11	6	7

Source: Setnikar-Cankar and Andoljšek [2005].

The classification of tax offices by factor analysis is almost the same as classification by standardisation at all levels of aggregation. The author considers that classification by factor analysis is more mathematical and cannot be influenced. In classification by standardisation, the selection of indicators can be subjectively influenced. It is also important that standardisation takes into account the absolute gap between

tax offices and eliminates different units of measurement. Familiarity with the tax offices and ongoing monitoring offer even more realistic results.

4. CONCLUSION

The first aim of the paper was to discuss and review different conceptual and methodological issues related to the performance measurement in public sector. In recent years, the debate of the role of the public sector has shifted significantly towards empirical assessments of the efficiency and usefulness of its activities. In particular, a composition of Public Sector Performance (PSP) and Public Sector Efficiency (PSE) indicators as well as Data Envelopment Analysis (DEA) was presented and applied to Slovenia. The empirical results show that Slovenia has relatively low efficiency in public sector, even in comparisons to some new EU member states (such as Cyprus and Estonia).

The second aim of the paper was the review of the system of performance indicators developed for a particular public administrative institution (i.e. tax administration) in Slovenia The purpose is not just to produce an analysis and ranking of tax institutions, but to define tools allowing managers to manage their institution more efficiently. The indicator system offers a wide range of information that provides an overview of how the organizational structure is functioning, and makes decision-making easier. This is an internal justification of the benefits. Even more, publishing results provides the public with information on the use of budget funds and the functioning of the public administration. If opinion surveys on taxpayer satisfaction also formed part of the assessment process, the quality and outcome indicators would be even more representative. This would further improve responsiveness to public demands, which is one of the main objectives of performance measurement.

Nevertheless, at least two caveats should be pointed out. Firstly, the applications of presented techniques are hampered by lack of suitable data to apply those techniques. Quality data are needed because the techniques available to measure efficiency are sensitive to outliers and may be influenced by exogenous factors. This also suggests applying a combination of techniques to measure efficiency and effectiveness. Secondly, the precise definition of inputs, outputs and outcomes may significantly influence the results. Finally, it seems important to bear in mind that by using a non-parametric approach, and in spite of DEA being an established and valid methodology, differences across countries are not statistically assessed, which can be considered as a limitation of such methodology.

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