XIII ENCUENTRO DE ECONOMÍA APLICADA

Sevilla, 10-11 Junio 2010

"An assessment on performance and efficiency in European public services"

MAROTO SÁNCHEZ, Andrés*
DI MEGLIO, Gisela**

ABSTRACT:

The current economic crisis as well as new socio-economic concerns are exerting pressure on public sector budget and have placed the discussion on how to allocate scarce resources in the most efficient way on the top of the political agenda. Therefore, assessing the performance and efficiency of these activities is a matter of interest in its own right and also due to the indirect influence they exert upon the rest of the economy. Despite considerable progress, research on this topic at the technical and conceptual level is still needed. The goal of the paper is to measure public services performance and efficiency in the enlarged EU using an extended approach which accounts for long-term impacts for the society in terms of welfare. First, we discuss conceptual and methodological issues. Then, we compute performance scores and rankings for 1995 and 2005 by constructing composite indicators on the basis on a wide-ranging set of 21 indicators for 27 European economies. In a later stage, efficiency indices are estimated considering labour and capital compensation data.

KEY WORDS: Service sector, Performance, Efficiency, Public sector.

JEL CLASSIFICATION: L80, O04, C67

*   Profesor Ayudante Doctor, Departamento de Análisis Económico: Teoría Económica, Universidad Autónoma de Madrid. Investigador, Instituto de Análisis Económico y Social (IAES), Universidad de Alcalá.
C/ Francisco Tomás y Valiente, 5
28049 Cantoblanco (Madrid)
Tfo: +34 91 497 2955
Fax: +34 91 497 6930
Email: andres.maroto@uam.es

**   Investigadora, Departamento de Economía Aplicada, Universidad de Alcalá
Plaza de la Victoria, 2
28805 Alcalá de Henares (Madrid)
Tfo: +34 91 885 5213
Fax: +34 91 885 5211
Email: gi.dimeglio@uah.es

XIII ENCUENTRO DE ECONOMÍA APLICADA

Sevilla, 10-11 Junio 2010

"An assessment on performance and efficiency in European public services"

MAROTO SÁNCHEZ, Andrés
DI MEGLIO, Gisela

1. Introduction[1]

The current economic crisis as well as new socio-economic concerns are exerting pressure on public sector budget and have placed the discussion on how to allocate scarce resources in the most efficient way on the top of the political agenda. The key policy documents in Europe - the *Lisbon Reform Agenda* and the *Stability and Growth Pact* - also call for the efficiency and effectiveness of public policies. In particular, the provision of public services represents a crucial aspect as they account for a significant share of value added and employment generation in the European Union[2]. Therefore, assessing the performance and efficiency of these activities is a matter of interest in its own right and also due to the indirect influence they exert upon the rest of the economy. Despite considerable progress, research on this topic at the technical and conceptual level is still needed.

What we could call a technical approach has traditionally assessed public services performance on the basis of productivity gains (Wölfl, 2005; Kox and Rubalcaba, 2007; Timmer *et al*, 2007). On the other hand, performance of public service-providing agencies has also been evaluated from a management viewpoint (see Osbourne and Gaebler, 1992; Osbourne and Plastrik, 2000, Boland and Fowler, 2000; Propper and Wilson, 2003; de Brujin, 2002). In fact, Pestieu (2007: 6) advocates to measure public service performance only on the basis of productive efficiency,

---

[2] Public services include public administration, defence and compulsory social security (sector L according to NACE rev. 1), education (sector N), health and social work (sector M), other community, social and personal services (sector O), private households with employed persons (sector P). In EU25 they have represented nearly a quarter of value added and a third of employment in 2005. *Source*: EUKLEMS Database, March 2008 Release.

even if he admits that it is a partial indicator of overall performance. Due to the conceptual and methodological problems related to the measurement of productivity in public services, some have started to advocate the adoption of a more holistic perspective of this concept where the well-being of the labour force/population, as well as the sustainability of the environment determine long-term economic growth (Andersen and Corley, 2009). Indeed, several international projects and programmes have been developed during the last years with the aim to assessing economic performance from an environmental and social perspective[3]. Furthermore, academic studies have already identified a hidden economic performance related to sustainable development, socio-economic and ecological issues (Djellal and Gallouj, 2009).

Within this framework, this paper aims to contribute to the measurement of performance and efficiency of public services from an *extended* perspective, which accounts for multidimensional long-term impacts on welfare. The paper addresses three main research questions: (i) How to evaluate extended performance of European public services at the sectoral and aggregated level? (ii) How large is the dissimilarities in extended performance and efficiency indicators within the enlarged EU? (iii) Which are the relatively leaders that might serve as a role model for those laggards economies? In the following analysis, we consider that public services encompass four major activities: public administration, education, health, and other community, social and personal services[4].

At present there are very few international comparative analyses of performance of public services, mainly due to data limitations (Djellal and Gallouj, 2008). Recent exceptions are the works by Afonso et al (2005 and 2006). Afonso et al (2005) compute public sector performance and efficiency scores on the basis of composite indicators for public tasks such as allocation, distribution and stabilisation as well as administration, education, health and public infrastructure for 23 OECD countries in 1990 and 2000. Using non-parametric frontier techniques they find out that small government (which spend less than 40% of GDP) are on average more efficient than others. Afonso et al (2006) uses a similar methodology to compare new member states with other emerging economies in 2001/2003. The Social and Cultural Planning Office of the Netherlands (2004) examined the overall performance of public sector in

---

[3] For example, 'Beyond GDP conference Istambul Declaration', OECD Global Project on Measuring the Progress of Societies. See also Stiglitz et al, 2009; European Commission, 2009.

[4] These sectors represent 93% and 98% of EU25 non-market services employment and value added in 2005. Private households with employed persons accounts for the rest. *Source*: EUKLEMS Database, March 2008 Release.

twenty-two countries on the basis of indicators of four functions: stabilisation, distribution, allocation and quality of public administration. Nevertheless, most international cross-country studies have focused on analysing a particular public service. Afonso and St Aubyn (2004) investigate health and education efficiency in OECD countries using measures of expenditure and quantity inputs. An empirical study on efficiency of education spending in 40 countries with a particular emphasis on transitioning countries in the former Soviet Union is made by Clements (2002). In a similar line, Sutherland and Price (2007) analyse educational efficiency and policy and institutional settings in OECD economies.

The contributions of our paper in comparison to recent literature are threefold. First, we adopt a sectoral definition of the term public services, analysing the four major sectors were public sector is the main or an important service provider. This definition is not fully inclusive since some public services (e.g. railway transport) are not considered in the analysis, but it supposes a minimum level of comparability of public activities. This is a way of evaluating the 'big picture' of public services performance and efficiency. Second, our study develops a comparison of extended performance and efficiency across the enlarged EU (27 countries). To our best knowledge, this kind of evaluation has not yet been conducted on a country sample that is meaningful due to the economic and political relevance of the enlarged EU. Third, instead of assessing public services efficiency on the basis of public expenditure as exemplified in other relevant studies, our investigation focuses on labour and capital compensation as the main costs incurred to achieve a given performance level in public services. In this way we do not relate the outcomes of these activities to the use of public resources but rather to the expenditure for inputs involved in their provision. In doing so, we set the ground for conducting future comparative analyses of efficiency between public and private services provision.

The paper is organised as follows. First, we discuss broader aspects of public services having effect on the measurement of their performance. Then, a literature review on the use of composite indicators is presented. In the fourth section, we compute extended public services performance indicators (*SPI*) for 27 European economies on the basis on a wide-ranging set of 21 indices, addressing changes across countries over 1995 and 2005. Also, services efficiency indicators (*SEI*) are estimated considering labour and capital compensation costs. Last section provides conclusions.

2. Discussion of literature: Public services, performance and efficiency measurement:

Public services perform different activities for citizens and businesses that are not easy to evaluate on the basis of traditional productivity measures, which relate the output of the production process to inputs. Unlike market services, public services are mostly not sold on the market and the information on their prices is not available, hence the output is difficult to measure and quantify. In addition, equating the output of public services with value added and its comparison with inputs (e.g. number of employees or hours worked) implicitly hinders the change in productivity of public services if account is not made of the quality change. Until recently, output volumes of public services were estimated by input volumes, due to a lack of data on prices in the national accounts implying that the larger the inputs (budget expenditure) the greater the output or benefits for consumers. It was argued long ago that this is not the case (Tanzi, 1994). Most European countries have only recently begun to directly measure the volume of government outputs for health, education and other public services that will eventually provide information on more appropriate measurement of public services productivity[5].

Notwithstanding the importance of public services' productivity and efficiency, their fundamental purpose relates much more to the performance reflected in benefits for final users and for increasing public welfare. While the output of public services matter it is however the outcome that is of ultimate importance for final users, especially so in the longer term (Gadrey, 1996). This is often neglected in discussions on public services indicating that their performance is most often addressed from the supply side while the demand side and the broader perspective of service users/consumers are fairly overlooked (Stare and Rubalcaba, 2008). Furthermore, the performance of public services has to take into account multiple objectives, such as accessibility, quality, and equality in services provision, that are even more difficult to measure. Finally, the outcome of public services depends not only on inputs and outputs, but also on a broader set of institutional, behavioural and regulatory issues. Arguing for the need to introduce performance measurement of public services Pestieau suggests that apart for input and output measures reflecting both the quantity and

---

[5]   The following initiatives are trying to improve price and volume estimates for non-market outputs: the *OECD Statistics Directorate and Committee for Public Management* (PUMA), the *Eurostat Handbook on Price and Volume Measures on National Accounts*, the *Atkinson Report on Measurement of Government Output and Productivity for the National Accounts* (in the UK).

the quality, it is as important to introduce information on institutional environment. In his view, the factor that explains most of the performance of health care is not the quantity or quality of health care interventions, but a set of environmental factors and lifestyle aspects[6] (Pestieau, 2007: 14). In the same direction, OECD points to a very significant difference between the output and the outcome and relates it to the fact that it is usually reasonable to hold the government responsible for outputs but not entirely for the outcomes, as the latter are influenced by many other factors beyond government's control (OECD, 2009: 10). It suggests that any assessment of public services performance needs to take into account the perspective of different actors – from service providers and service users to society in general – with implications for the selection of measures that capture various aspects of performance.

Understanding the complexity of public services performance and their impacts requires an appropriate conceptual framework, measurement methods and data availability. In the last two decades attempts to cope with difficulties in measuring the performance of public services have intensified due to the increasing weight of public services in advanced economies related to the aging of population, emphasis on the role of knowledge and education in increasing the competitiveness, etc. Additional impetus has come from the need to monitor the efficiency of public spending that requires new methods and approaches to assess the performance of public services as a necessary input to efficiency studies[7]. The issue of increasing the quality of public sevices for citizens has gained in importance as well and consequently the attempts to measure quality in public services[8]. A conceptual framework is proposed for measuring quality of public services based on the extent to which the service succeeds in delivering intended outcomes and responds to user needs (Simkins, 2007) thereby also contributing to output growth (Patterson, 2009).

---

[6]   Nutrition patterns of the population in a country/region and the extent of risky behaviour of individuals (e.g. alcohol and tobacco consumption, obesity, etc.) can exert significant influence on the health performance indicators.

[7]   In parallel, new public management approach to public sector produced a set of different practices to cut the budget and improve the efficiency of resources spent, such as for example contracting-out of services, public private partnerships and other mechanisms for providing public services via markets.

[8]   Here we do not deal with the management perspective of measuring the quality of public services. Even though, it necessary to acknowledge that standard methods and measurement tools (e.g. SERVQUAL, SERVPERF, critical incidents techniques, focus group interview, total quality management, etc.) are frequently applied for assessing the quality of individual public services (health, public libraries, education, etc.). Data for such exercise is mostly collected via questionnaires and surveys of a sample of users of individual services that limits generalisation of results and hinders the comparisons across industries and countries.

Despite the improvements made so far it is being argued that measurement of productivity in public services is in a pre-paradigmatic phase in which various approaches are being tested, hence the comparisons in time and space are often risky. As a point of departure in discussing and evaluating public services performance it is of utmost importance to distinguish on one hand between inputs, outputs and outcomes, and on the other hand between different aspects of performance of public services (e.g. productivity, efficiency and effectiveness). While inputs to public services supply could be measured in physical units of production factors (e.g. number of employees, hours worked) or in financial resources much bigger problems are encountered when defining the output, due to different perspective that consumers may have (consumers as final users or as society in general). Further difficulties appear in defining and measuring the outcome of public services where external factors exert significant influence on the end result (e.g. individuals' behaviour, culture, social norms).

Agreeing on an appropriate definition of performance of the public sector is certainly a challenging exercise (Lovell, 2002). Actually, this concept has been assessed in diverse ways, capturing quality and quantity aspects of inputs, process, outputs and outcomes (OECD, 2009). Figure 1 illustrates the conceptual framework that allows distinguishing the various forms of performance. Inputs (physical and monetary) are transformed in the production process into outputs which influence outcomes. The outputs relate to the immediate impact of a service provision (e.g. amount of teaching consumed by pupils) while the outcome relates to its effects in terms of welfare and growth in the medium and long term (e.g. level of knowledge of the population). For the European Commission (2001:33-34) outcomes are 'for example, indicators of the level of education of the population, life expectancy, or level of crime'. Atkinson (2005) adopts the same notion of the outcome. In a similar way, Schreyer (2010) further distinguishes between direct and indirect outcomes, the former being closer to the act of provision. Moreover, outcome is influenced by external factors such as lifestyle or socio-economic background (Mandl et al, 2008). In the view of these concepts, several performance indicators may be defined (Djelal and Gallouj, 2009): productivity (or productive efficiency, as the ratio outputs-inputs), effectiveness (the ratio outcomes-inputs), economic efficiency (the ratio outputs-costs), and economic effectiveness (the ratio outcomes-costs).

Figure 1: **Conceptual framework for measuring performance. The case of education**
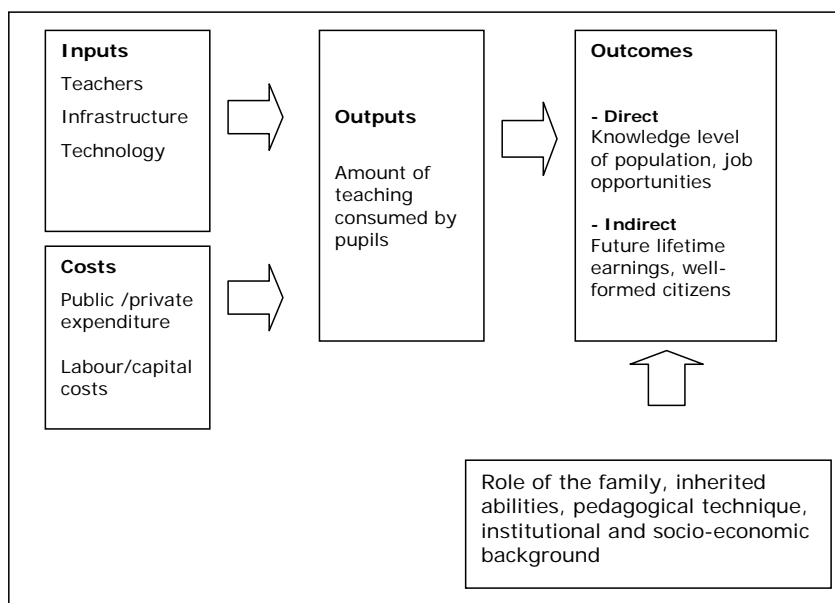
Source: Own elaboration

The availability of 'real world data' for the measurement of different aspects of performance in public services is frequently frail, crude or simply missing, that hinders national assessment of performance as well as international comparisons. To overcome these gaps measures are being developed for the assessment of output volume of individual public services[9] that would also allow for international comparisons. Given the absence of data on output volume for public services accross countries complementary approaches to assessing the performance of public services have been introduced by constructing composite indicators (e.g., Afonso et al., 2003, 2005, 2006; Mandl et al., 2008; St. Aubyn et al., 2009; Di Meglio et al., 2009; Brand et al., 2007). In this paper we use similar approach and identify relevant indicators to approximate the output/outcome[10] of individual public services and to capture the 'extended performance' of public services in a comparative setting of EU27. What follows is a discussion on data used and on building the composite performance indicators.

---

[9]   Eurostat - OECD Task Force on non-market services is investigating the use of output methods for comparisons of education and health services across countries. For details see draft *OECD Handbook on Volume Measures in Education and Health* (OECD, 2008b).

[10]   Output and outcome of public services are sometimes not properly distinguished and the borderline between the two is hard to draw (Afonso et al., 2005).

3. Dataset and methodological issues:

The next empirical section seeks to assess public and private service impacts from a broader approach than the effects these activities have on employment, vale added and productivity growth. Following other authors we have constructed composite indicators for measuring performance and efficiency. This approach which compares country performance and efficiency are increasingly recognised as a useful tool in policy analysis and public communication (Haq, 1995; Nardo et al., 2005a,b; Bandura, 2006) and in benchmarking country performance (Saisana et al., 2005; Saltelli, 2007; UN, 2005; Freudenberg, 2003) as being easier for the general public to interpret them than to identify common trends across many separate indicators (Thiessen, 1997; Booysen, 2002; Sharpe, 2004). However, they also might send misleading messages if they are poorly constructed or misinterpreted (Saisana and Tarantola, 2002; Saltelli et al., 2005; Cherchye et al., 2007). Why there is so little overlap in internationally used indicator sets is a complicated issue, but clearly there is a lot of room for improvement (de Vries, 2001; Stiglitz et al., 2009).

As in other previous similar works, the selection of the socio-economic indices that compose the different performance indicators guarantees further debate (Cherchye et al, 2007; Saisana and Cartwright, 2007). We acknowledge that the degree of suitability of the indicators in approximating the extended performance of public services is not homogeneous. Their selection reflects our best attempt conditioned by data availability. As a first step, a performance indicator for different public services is built. The sectors included in the analysis are: public administration, education, health and other community, social and personal services (NACE Rev. 1.1 codes L, M, N and O, respectively). Data for EU27 countries have been compiled for two time steps: 1995 and 2005.

We assume that **services performance indicator** (*SPI*) in each public service industry *i* and country *j* depends on the values of certain economic and social indicators (*I*) which measure the *k* outcomes of the activity considered, using a linear aggregation technique (Debreu, 1960, Krantz et al., 1971), we can then write:

$$SPI_{ij} = \sum_{k=1}^{n} f(I)_{ijk} = \sum_{k=1}^{n} w_k I_{ijk} \qquad (I)$$

with $\sum w_k = 1$ and $0 \leq w_k \leq 1, \forall k = 1,...,n$.

Following the Atkinson Review (2005) the outcomes indicators used change according to the type of service concerned. Therefore, they will be heterogeneous across industries reflecting in this way the multiple dimensions of social welfare related to their supply. Figure 2 illustrates the different indicators included in our analysis which attempt to reflect as close as possible public services outcomes. Note that data availability has played an important role in the definition of the outcomes considered.

Figure 2: **Public services performance (*PSP*) indicators**

QUALITY — ATTAINMENT — EDUCATION
Enrolment — ATTAINMENT
Maths and Science Results — ATTAINMENT
Human Resources — ACCESS TO SERVICES
Technical Resources — ACCESS TO SERVICES
Drop-out — PROVISION SUCCESS
Tertiary ducation — PROVISION SUCCESS

Mortality — PROVISION SUCCESS — HEALTH
Life Expectancy — PROVISION SUCCESS
Human Resources — ACCESS TO SERVICES
Infrastrucrure capacity — ACCESS TO SERVICES

PUBLIC SERVICES

PUBLIC ADMINISTRATION — SHADOW ECONOMY — Shadow Economy
AGGREGATE GOVERNANCE — Effectiveness
AGGREGATE GOVERNANCE — Regulation
AGGREGATE GOVERNANCE — Judiciary System
AGGREGATE GOVERNANCE — Corruption

OTHER SOCIAL SERVICES — WELFARE — Social Inclusion
ENVIRONMENT — Water
ENVIRONMENT — Sewage Treatment
INCOME DISTRIBUTION — Poverty
INCOME DISTRIBUTION — Equality

Source: Own elaboration

Public administration performance index comprises outcomes that reflect the extent of undergrounded economy (measured by the size of the shadow economy[11]) and governance aspects (such as effectiveness, red tape, judiciary quality and corruption computed by the World Bank indices[12]). For assessing **education** performance the results on the system attainment are a particularly important outcome. We use data on secondary school enrolment and science and maths results[13] as proxies. However, achievement results can be interpreted

---

[11]   In terms of % of GDP (currency demand approach) according to Schneider (2002, 2009).
[12]   *Source*: World Bank's *Worldwide Governance Indicators*. They are measured in units ranging from -2.5 to 2.5, with higher values corresponding to better governance outcomes.
[13]   *Source*: Executive opinion surveys by the World Economic Forum in units ranging from 1 to 7, with higher values corresponding to better results on math and sciences in the schools.

meaningfully only in the context of the system that produced them. Therefore, we also consider other outcomes such as success in the provision which is measured by drop-out rates (early school leavers) and completion of regulatory education (participation in tertiary education). Accessibility (assessed by human and technical resources) and other qualitative aspects[14] are included in the analysis as well. In the case of **health** the outcomes considered are success in the provision (both maintenance -infant mortality rate- and restoration -life expectancy[15]) and accessibility (approximated by human and infrastructure capacity). Finally, the index for *social and community services* performance is based on diverse outcomes such as income distribution (measured by poverty rate and inequality), welfare aspects (approximated by social inclusion variables) and environmental issues (quantified by waste and sewage treatment).

The *SPI* for each service activity is compiled in such a way to attribute equal weight to each indicator, following the approach by Afonso and others[16], as there is insufficient knowledge of causal relationships or little consensus on other alternative weighting tools. Additionally, this equal weighting is compatible with both linear and geometric aggregations used in the paper. For those indicators where a higher value reflects a less favourable outcome (e.g., size of the shadow economy, infant mortality rate, and poverty rate) we use the reciprocal of the original values. To facilitate the compilation and comparability we standardized the values converting them to a common scale (Ebert and Welsch, 2004). The values for each country are then recalculated relative to this average.

In the second stage, efficiency indicators are estimated. As mentioned earlier, our approach differs from previous analyses (e.g. by Afonso et al. 2005, 2006) that considered public expenditures to reflect the opportunity costs of achieving the performance indicators. We have approximated the input costs by labour and capital compensation (relative to GDP) in

---

[14]   Education system quality. *Source*: World Economic Forum, Executive Opinion Survey.
[15]   For measuring the outcomes of Health services the most suitable indicator is the "Healthy Life Years" (also called disability-free life expectancy) which measures the number of remaining years that a person of a certain age is still supposed to live without disability. The emphasis is not exclusively on the length of life, as is the case for life expectancy, but also on the quality of life. However, we have not used this indicator for building the performance indicator since data for new member states prior to 2005 is scarce.
[16]   This introduces a strong assumption (Freudenberg, 2003; Jacobs et al., 2004; OECD, 2008; Gall, 2007). For this reason, results are also verified when changes in the weightings structure of the different subsectors are introduced (see Appendix), suggesting that the findings are relatively robust.

each economic activity[17]. Based on the equation (II) we compute ***public services efficiency indicator*** (*SEI*). We relate the performance of services (as measured by the composite indexes previously estimated) with the average amount of input costs (*SIC*) used to achieve a given performance level. The overall *SEI* for any industry *i* and country *j* is given by:

$$SEI_{ij} = \frac{SPI_{ij}}{SIC_{ij}} = \frac{SPI_{ij}}{\alpha_{ij}LC_{ij} + \beta_{ij}KC_{ij}} \qquad \text{(II)}$$

where α and β are weights, and *LC*$_{ij}$ and *KC*$_{ij}$ are the labour and capital costs (compensation) in industry *i* and country *j*.

In order to compute efficiency scores, labour and capital compensation was standardized across countries, attributing 1 to the average value for each of the four public service industries analyzed in the paper. Following a similar approach to Afonso et al (2005) we have considered average input compensation over decades, as we would assume a lagged effect from input expenditures on performance. As Atkinson (2005: 13) has posited 'there are lags between inputs and outputs' since an increase in public expenditure, for example, may improve output indicators at a later stage. This is particularly important in public sectors like health or education. Considering ten-year averages also allow us to capture long-term trends and to avoid the potential effects of cycles.

4. Empirical findings: Public Services Performance and Efficiency in an enlarged European Union:

Table 1 presents the results for the constructed SPI indicators for the year 2005 in the EU25. The first issue to underline is the notable but not extreme differences across countries. Countries with the highest SPI include Austria (Public Administration and Other public services), Finland (Education) and the Czech Republic (Health). Average performance is around 1 and the variability of the performance index is the highest in the subsector of other social, community and personal services. Small economies like Austria and also Nordic countries (Finland, Denmark, Sweden and The Netherlands) report the top SPI indices. These results are

---

[17] As expected, labour compensation represents the largest component of total public services input costs (on average, 80% during 1995-2005). However, some differences can be observed across services activities: in education labour compensation has accounted on average 91% of total input costs during that period while in other social, personal and community services this has been approximately 68.5%.

also verified when changes in the weightings structure of the different subsectors are introduced, suggesting that the findings are relatively robust[18].

Table 1: **Services performance (SP) indicators in the EU25, 2005**

	PUBLIC SERVICES PERFORMANCE				
	PUBLIC ADMINISTRATION	EDUCATION	HEALTH	OTHER PUBLIC SERVICES	TOTAL
AUSTRIA	1,32	1,08	1,14	1,38	1,23
BELGIUM	1,05	1,10	1,20	0,90	1,06
BULGARIA	0,70	0,85	0,91	0,79	0,81
CYPRUS	0,91	0,96	0,84	0,98	0,92
CZECH REPUBLIC	1,00	1,15	1,21	1,05	1,10
DENMARK	1,20	1,1	0,95	1,35	1,15
ESTONIA	0,88	1,11	0,93	0,96	0,97
FINLAND	1,21	1,24	1,18	1,15	1,20
FRANCE	1,11	1,00	1,13	1,00	1,06
GERMANY	1,19	0,89	1,17	1,11	1,09
GREECE	0,82	0,99	1,14	0,71	0,92
HUNGARY	0,87	1,00	0,98	1,02	0,97
IRELAND	1,15	1,02	0,99	1,20	1,09
ITALY	0,82	0,84	1,01	0,94	0,90
LATVIA	0,79	0,98	0,94	0,78	0,87
LITHUANIA	0,85	1,12	1,05	0,87	0,97
LUXEMBOURG	1,20	0,84	1,14	1,34	1,13
MALTA	0,94	0,82	1,06	0,74	0,89
NETHERLANDS	1,23	0,99	0,96	1,35	1,13
POLAND	0,93	1,15	0,85	0,64	0,89
PORTUGAL	0,96	0,78	0,75	0,85	0,84
ROMANIA	0,66	0,87	0,74	0,73	0,75
SLOVAKIA	0,96	1,07	0,93	0,77	0,93
SLOVENIA	0,90	1,21	0,91	0,96	1,00
SPAIN	0,99	0,82	0,96	1,03	0,95
SWEDEN	1,15	1,10	1,11	1,22	1,15
UNITED KINGDOM	1,22	0,97	0,81	1,35	1,09
Less intensive LAB	0,87	0,98	0,97	0,84	0,92
Medium intensive LAB	1,06	0,98	0,99	1,11	1,04
High intensive LAB	1,19	1,10	1,09	1,20	1,14
Small EXP	0,93	0,97	0,96	0,99	0,96
Medium EXP	0,98	1,00	0,99	0,96	0,98
Large EXP	1,20	1,07	1,08	1,24	1,15

Source: Own calculations based on the sources in the Appendix

---

[18]   In the Appendix we present the SPI with alternative weighting schemes. We have considered the share of the different subsectors in total public services employment, value added and also other possible weights to some extent ad hoc. Correlations with the tested changes in weights are in the (0.92-0.99) range.

The old industrialised countries seem to be the best performers in public administration services. In particular, this is the case of the Netherlands, the United Kingdom and some Scandinavian countries (Finland and Denmark), together with Austria. In contrast, new member states post a below average performance in this sector. In education, Finland and some Central and Eastern countries present the highest indices (Slovenia, Poland, Czech Republic and Lithuania). Some previous studies have already showed the relatively strong performance of new member states on education (for instance, Afonso et al, 2006; Roeger, 2006; van der Ploeg and Vengelers, 2007; van Ark et al., 2008). In health and social work the Czech Republic, Belgium, Finland, Germany and Greece are the top performers while in other social and community services, Austria, the United Kingdom, Netherlands, Belgium and Luxembourg are the leading countries. In general it can be noted that Southern European countries (Greece, Italy, Spain, Cyprus, Malta and Portugal) and many Eastern European countries (Poland, Slovakia or Latvia) are the worst performers in public services.

Another striking fact is that countries where public services labour compensation is large (above 85% of GDP) perform better than countries where these costs are medium (between 80% and 85% of GDP) or small (below 80%). This verifies mainly in public administration domain and other public services while in education and health differences are less pronounced. This result suggests that in some services such as public ones, the capitalization of the production process may not bring improvements in terms of extended performance. When considering data on public spending, we find that the larger the size of the government the higher returns as regards improved performance (Afonso and St. Aubyn, 2010). As Table 1 shows, Sweden, Denmark, France and Austria which total spending surpass 50% of GDP post a higher SPI than the average. This opposes to those results obtained earlier works by Afonso et al (2005, 2006) where small governments report better performance scores[19]. This is mainly due to the differences in the country sample analysed since scores are measured relatively to the other economies included in the analysis.

Figure 3. **Total public services performance, 1995-2005**

---

[19]   They consider small government to those countries with public spending below 40% of GDP. Afonso et al (2005) studied EU15 plus OECD economies; Japan, Australia, Switzerland, Luxembourg and the US were included in this category. Afonso et al (2006) focused on EU10 and other developing economies; Latvia, Lithuania, Estonia were included in small government group.

Improving leaders | Improving followers
Worsen leaders | Worsen followers
Approaching leaders
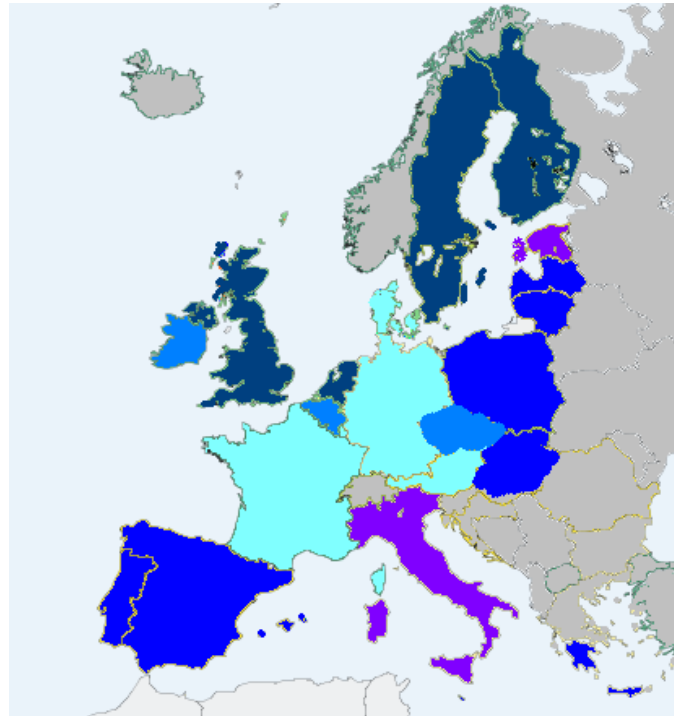
Due to the availability of the data set we are able to compare the SPI for 2005 and 1995 and to assess the changes over time[20] (Figure 3). Nordic countries (Finland, Sweden, Netherlands) and United Kingdom are top performer nations which have improved their scores since 1995; thus they can be considered as '*improving leaders'*. In contrast, France, Germany, Luxembourg, Austria and Denmark are top performer nations which experienced a decrease in SPI during the last decade. Therefore, they may be group in a category called '*worsen leaders*'. Some countries have surpassed average EU performance scores in recent years (Ireland, Belgium, and Czech Republic), hence they may be considered as '*approaching leaders'*. However, most new member states and Mediterranean countries (like Spain, Portugal, Greece, Cyprus) are still below EU average SPI despite increasing performance scores since 1995, so they may be labelled as '*improving followers'*. On the other hand, Italy and Estonia still remain below European average indices and have deteriorated public services performance ('*worsen followers'*)[21].

---

[20]   Although one should bear in mind that data are not fully comparable. Some data are not available for individual countries in any of both years.

[21]   Slovenia may be considered as a 'withdrawing leader', since SPI has decreased to a lower level than the average in 2005.

Based on the previous analysis, we now compute public services efficiency indicator (*SEI*) that relates the performance of services to input costs in 2005 for the EU25 (Table 2). Differences seem to be much larger across countries when we consider efficiency scores. Finland, United Kingdom, Austria, Ireland and Sweden show the highest values for total public services. On the other hand, Malta, Slovakia, Hungary, Latvia, Poland appear as the less efficient countries. These results are quite robust to changing weights schemes[22].

Table 2: **Services efficiency (SE) indicators in the EU25, 2005**

|	PUBLIC SERVICES EFFICIENCY				
	PUBLIC ADMINISTRATION	EDUCATION	HEALTH	OTHER PUBLIC SERVICES	TOTAL
AUSTRIA	1,41	1,06	1,55	1,47	1,37
BELGIUM	1,33	1,23	1,36	0,92	1,21
CYPRUS	1,27	0,82	0,69	0,94	0,93
CZECH REPUBLIC	0,92	0,67	1,07	0,97	0,91
DENMARK	1,34	1,10	1,21	1,32	1,24
ESTONIA	0,92	0,99	1,04	0,99	0,99
FINLAND	1,41	1,19	1,93	1,20	1,43
FRANCE	1,11	1,08	1,00	1,05	1,06
GERMANY	1,28	1,29	1,02	1,06	1,16
GREECE	1,32	1,80	0,68	0,67	1,12
HUNGARY	0,72	0,69	0,95	0,99	0,84
IRELAND	1,13	1,86	1,22	1,16	1,34
ITALY	0,73	1,19	0,98	0,95	0,96
LATVIA	0,59	0,88	0,92	0,74	0,78
LITHUANIA	0,92	0,95	1,23	0,77	0,97
LUXEMBOURG	1,16	0,98	1,06	1,45	1,16
MALTA	1,04	0,67	1,02	0,65	0,85
NETHERLANDS	1,07	0,87	0,93	1,59	1,12
POLAND	0,77	1,10	0,65	0,62	0,79
PORTUGAL	1,03	1,30	0,67	0,87	0,97
SLOVAKIA	0,64	0,89	1,03	0,72	0,82
SLOVENIA	0,87	1,21	0,96	1,05	1,02
SPAIN	0,95	0,74	0,97	1,00	0,92
SWEDEN	1,15	1,01	1,36	1,46	1,25
UNITED KINGDOM	1,48	1,51	1,02	1,50	1,38
Small PS	1,01	1,07	0,94	0,97	1,00
Medium PS	0,96	1,03	1,04	0,99	1,00
Big PS	1,30	1,19	1,31	1,24	1,26

Source: Own elaboration

---

[22]   In the Appendix we present the SEI with alternative weighting schemes. Correlations with the tested changes in weights are in the (0.91-0.99) range.

To further refine our analysis on the relation between the performance and efficiency, **Figure 4** shows the comparisons between these two indicators for service subsectors in 2005 that allow us to distinguish four types of countries: '*leaders'* (with performance and efficiency scores above 1), '*followers'* (performance and efficiency scores below 1), '*efficient'* (performance below 1 and efficiency above 1), and '*wasteful'* countries (performance above 1 and efficiency below 1).

Figure 4: **Performance *versus* efficiency in some public services, 2005**
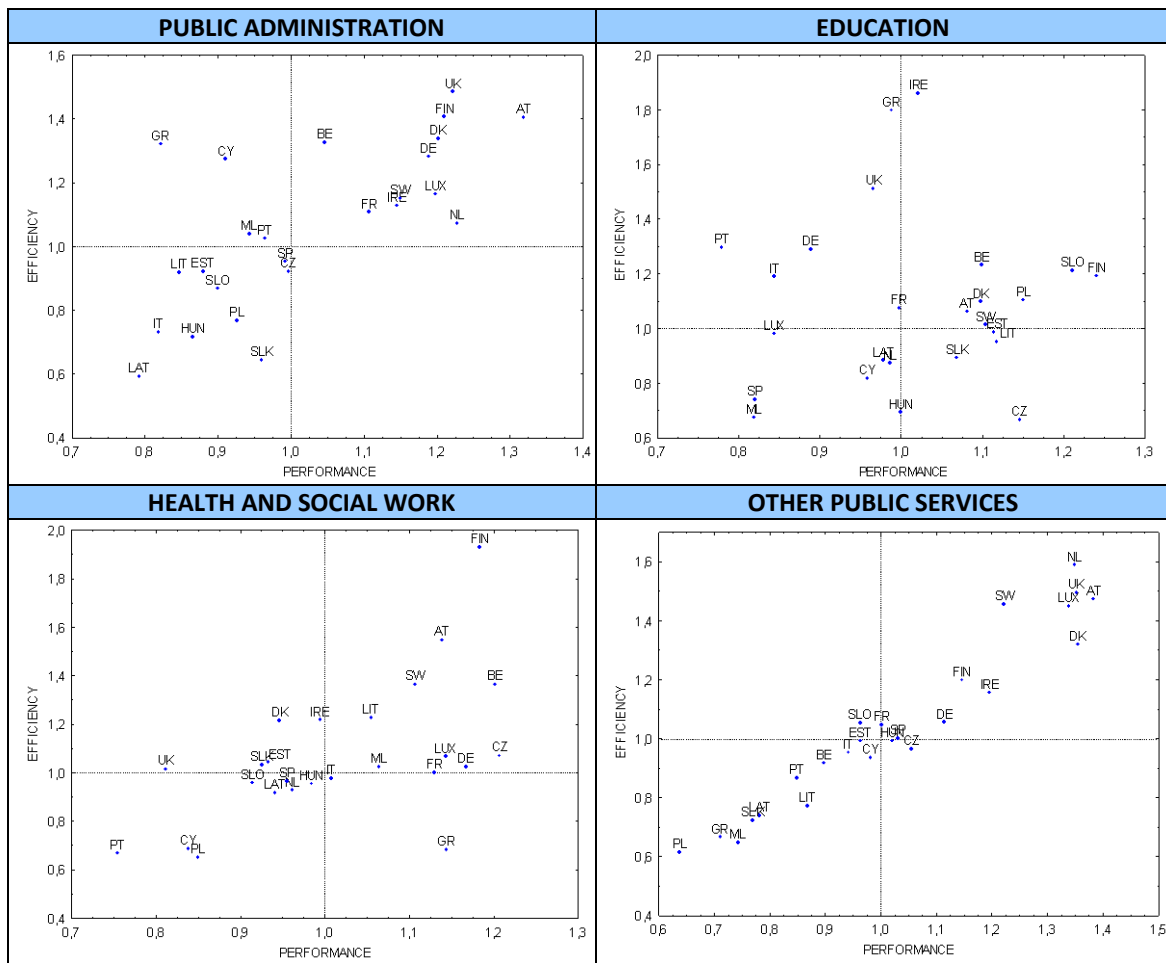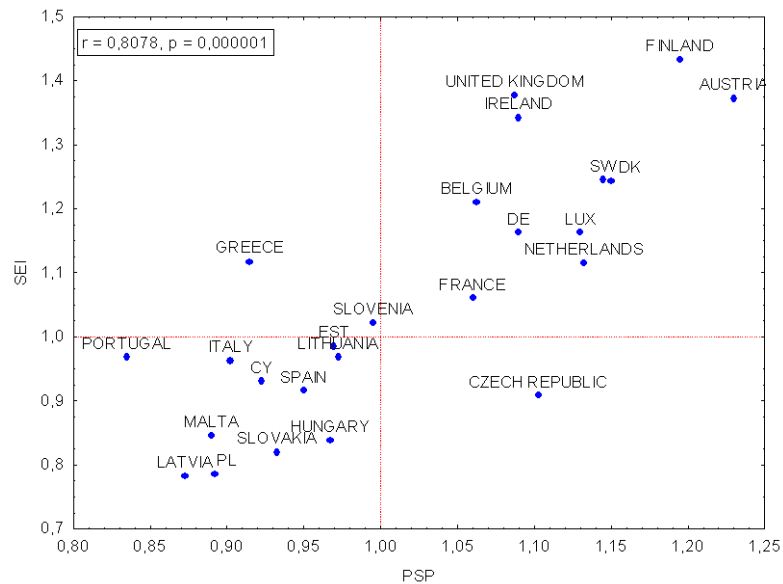

Source: Own elaboration

According to this typology in public administration services almost every country in 2005 fits either among leaders or followers. Only four countries (Portugal, Greece, Malta and Cyprus) show a different pattern, spending relatively less than the average and showing higher efficiency scores despite not performing so well. The results suggest a significant and direct correlation between performance and efficiency indicators in this sector (correlation coefficient = 0.70). On the contrary, there is no correlation in education (coefficient = 0.04) and

health (coefficient = 0.57[23]). A notably heterogeneity arises in these service industries where performance and efficiency are not clearly related. In other social and community services the correlation is 0.97.

Figure 5 shows the relationship between public sector performance and efficiency in the analyzed European countries. The main fact we conclude is that those countries which perform better also achieve the higher efficiency results. This might suggest that in these activities the behaviour of service suppliers is closer to private services suppliers than in other public sector activities, so the efficiency might reflects almost entirely the performance issues.

Figure 5: **Total public services performance *versus* efficiency, 2005**

Source: Own elaboration

The results of the empirical investigation present an exploratory and preliminary attempt towards measuring public and private services impacts from a broader perspective. Several caveats apply to our analysis. Not only labour and capital compensation but also public expenditure, tax and regulation policies affect the efficiency of public services. Factor compensation may be considered as a proxy of public spending, but ignores the composition and other characteristics of the expenditure scheme. Moreover, even though we try to approximate outcomes rather than outputs this distinction is not always possible (as in Afonso, 2005). It is not easy to identify the impacts caused by other influences or factors such as population preferences, habits, climate or geographical conditions or even culture and

---

[23] However, if we disregard Greece as potential outlier, the correlation coefficient rises up to 0.67

tradition. These exogeneous facors may also play a role on extended performance and efficiency of services across countries. In our analysis, the degree of suitability of the public services outcomes and indicators that approximate them is not homogeneous. The selection has been conditioned mainly by data avaiability. Lastly, the equal weighting scheme adopted to measure the performance and efficiency indicators introduces a strong assumption in our analysis.

5. Final remarks:

The emerging trends that shape the socio-economic environment on a global scale, including the population ageing, environment problems and climate change require the provision of more efficient, higher quality services able to meet the demand of business and final users. Within this framework private and public services play a complementary role, increasing on one hand the efficiency of economies and on the other hand producing effects on sustainable development and welfare. Short survey of literature confirms multi-dimensional character of service impacts and the need to take account of the perspective of service providers, service users and society in general. Capturing other dimensions of public services performance such as quality, outcome for services users and their impact on welfare presents a big challenge for researchers and necessitates a combination of different theoretical, conceptual and methodological approaches, along with and sistematic collection of data.

With this in mind, the paper presents an attempt to extend the assessment of the impacts of public services beyond the traditional indicators. Apart from traditional indicators, services impacts are assessed in a broader perspective where other dimensions are considered. Accordingly, the focus is on the outcomes rendered to end users (individual, enterprises or public institutions) rather than on outputs. The use of composite indicators enables the adoption of a multi-criteria or multi-dimensional framework for measuring performance and efficiency in public services. The empirical analysis shows that services performance differs across countries although not in an extreme way. Countries with the highest performance scores for public services include Austria (Public Administration and Other public services), Finland (Education) and the Czech Republic (Health). On average, countries scoring the highest in efficiency of the public services are also those achieving the highest efficiency in private services. This suggests that in their daily operations private services suppliers aim at goals related to efficiency while this might not be the most important aim of the suppliers of the

public services, where other objectives are leading the agents' performance (related to equality, welfare gains or long run stability).

In summary, results suggest that it is possible to approach services impacts both from the conventional perspective of performance (mainly associated to productivity and growth) and from an extended performance point of view (related to outcomes and quality aspects) even if the proxy variables for measuring this have important limitations. The same applies to indicators of efficiency. Secondly, the analysis of data may suggest that in most cases quantity-related and quality-related indicators move in the same directions.

The results of the empirical investigation present an exploratory and preliminary attempt towards measuring public services impacts from a broader perspective. Several caveats apply to our analysis. Not only labour and capital compensation but also public expenditure, tax and regulation policies affect the efficiency of public services. Factor compensation may be considered as a proxy of public spending, but ignores the composition and other characteristics of the expenditure scheme. Moreover, even though we try to approximate outcomes rather than outputs this distinction is not always possible (as in Afonso, 2005). It is not easy to identify the impacts caused by other influences or factors such as population preferences, habits, climate or geographical conditions or even culture and tradition. These exogeneous factors may also play a role on extended performance and efficiency of services across countries. In our analysis, the degree of suitability of the dimensions and indicators that approximate the outcome of public services is not homogeneous. The selection has been conditioned mainly by data avaiability. Lastly, the equal weighting scheme adopted to measure the performance and efficiency indicators introduces a strong assumption in our analysis.

It is hoped however that these results will inspire the discussions on the possible improvements in measuring services and more fully grasp their impacts as services play a dominant role in advanced economies. The contributions of this paper are very relevant and timely also in the context of various, recent initiatives for better measurement and understanding of progress in a changing world.

References:

Afonso, A. and St Aubyn, M. (2004), 'Non-parametric approaches to education and health expenditure efficiency in OECD economies', *Working Papers* 2004/01, Department of Economics at the School of Economics and Management (ISEG), Technical University of Lisbon.

Afonso, A. and St. Aubyn, M. (2010), 'Public and private inputs in aggregate production function. A cross-country efficiency approach', *ECB Working Papers Series*, 1154, European Central Bank

Afonso, A., Schucknecht, L. and Tanzi, V. (2003), 'Public sector efficiency: An international comparison', *ECB Working Paper Series*, 242, European Central Bank

Afonso, A., Schuknecht, L. and Tanzi, V. (2005) 'Public sector efficiency: An international comparison', *Public Choice*, 123: 321-47.

Afonso, A., Schuknecht, L. and Tanzi, V. (2006) 'Pubic sector efficiency. Evidence for new EU member states and emerging markets', *Working Paper Series*, 581, European Central Bank, January 2006.

Andersen B. and M.Corley (2009), *Productivity and the Service Sector: Theories, Concepts and Measurements*. Cheltenham: Edward Elgar (forthcoming).

Atkinson Review: final report (2005), *Measurement of Government Output and Productivity for the National Accounts,* Palgrave Macmillan

Bandura R. (2006), *A Survey of Composite Indices Measuring Country Performance: 2006 Update*, United Nations Development Programme – Office of Development Studies, available at http://www.thenewpublicfinance.org/background/Measuring%20country%20performance_nov2006%20update.pdf

Boland, T. and Fowler, A. (2000), 'A systems perspective of performance management in public sector organisations', *The International Journal of Public Sector Management*, Vol. 13 Nº 5, pp: 417-446.

Brand D.A., Saisana M., Rynn L.A., Pennoni F., Lowenfels A.B. (2007), 'Comparative Analysis of Alcohol Control Policies in 30 Countries', *PLoS Medicine*, 0759, Vol. 4, 4, e151

Clements, B. (2002), 'How efficient is education spending in Europe?', *European Review of Economics and Finance*, Vol. 1, n.º 1 - January 2002

Cherchye, L., Moesen, W., Rogge, N., van Puyenbroeck, T., Saisana, M., Saltelli, A., Liska, R. and Tarantola, S. (2007), Creating composite indicators with DEA and robustness analysis: the case of the Technology Achievement Index, *Journal of the Operational Research Society,* 59, 239-251

De Brujin H. (2002),' Performance measurement in the public sector : strategies to cope with the risks of performance measurement', *The International Journal of Public Sector Management*, Vol. 15 Nº 7, pp: 578-594.

Debreu G. (1960), Topological methods in cardinal utility theory, in Arrow K.J., Karlin S. and Suppes P. (eds.) *Mathematical methods in social sciences*, Stanford University Press, Stanford

Di Meglio, G., Stare, M., Maroto, A. and Rubalcaba, L. (2009): 'Impact assessment of private and public services in Europe', Deliverable 1.1, ServPPIN Project (previous version presented at XIX RESER Conference, Budapest, September, 2009)

Djellal, F. and Gallouj, F. (2008) *Measuring and improving productivity in services: Issues, strategies and challenges*, Edward Elgar: London.

Djellal, F. and Gallouj, F (2009) 'Public services and the productivity challenge', *Deliverable 2.1-A2.1*, ServPPIN Project

Ebert U. and Welsch H. (2004), Meaningful environmental indices: a social choice approach, *Journal of Environmental Economics and Management*, Vol. 47: 270-283

European Commission (2001), *Handbook on price and volume measures in national accounts*, Luxembourg: European Communities.

European Commission (2009), 'GDP and Beyond- Measuring Progress in a Changing World', Communication from the Commission to the Council and the European Parliament, COM(2009) 433 final.

Freudenberg M. (2003), Composite indicators of country performance: a critical assessment, OECD, Paris

Gadrey, J. (1996) *Services: La productivité en question*, Desclée de Brouwer : Paris

Gall M. (2007) Indices of social vulnerability to natural hazards: A comparative evaluation, PhD dissertation, Department of Geography, University of South Carolina

Haq M. (1995), *Reflections on Human Development*, Oxford University Press, New York.

Jacobs R., Smith P. and Goddard M. (2004), Measuring performance: an examination of composite performance indicators, Centre for Health Economics, *Technical Paper Series* 29

Kox, H. and Rubalcaba, L. (2007), 'The Contribution of Business Services to European Economic Growth', in Rubalcaba and Kox: *Business Services in European Economic* Growth, Palgrave/Macmillan, 74-94.

Lovell, C.A.K. (2002), 'Performance assessment in the public sector', In: Kevin J. Fox (ed.), *Efficiency in the Public Sector*, Springer Netherlands, pp: 11-35.

Mandl U., Dierx, A. and Ilzkovitz, F. (2008), *The effectiveness and efficiency of public spending*, European Commission, Economic papers, no. 301. http://ec.europa.eu/economy_finance/publications/publication11902_en.pdf

Nardo, M., Saisana, M., Saltelli, A. and Tarantola, S. (2005) 'Handbook of constructing composite indicators: Methodology and user guide', *OECD Statistics Working Paper* STD/DOC, 2005/03, OECD, Paris

OECD (2008a) Handbook of constructing composite indicators. Methodology and user guide, OECD, Paris

OECD (2008b) *OECD Handbook on Volume Measures in Education and Health* (preliminary draft, 10 October 2008), Statistics Directorate, Committee on Statistics, OECD, Paris.

OECD (2009), *Measuring Government Activity,* OECD Publishing, Paris.

Osbourne, D. and Gaebler, T. (1992), *Reinventing Government*, Lexington MA, Addison-Wesley.

Patterson, H. (2009), Progress in Implementing the Atkinson Review Recommendations, Uk Centre for Measurement of Government Activity. http://www.statistics.gov.uk/cci/article.asp?ID=2255

Pestieau, P. (2007) 'Assessing the performance of the public sector', *CREPP Working Paper*, 2007/03, HEC-Management School, University of Liege.

Propper, C. and Wilson, D. (2003), 'The use and usefulness of performance measures in the public sector', *CMPO Working Paper Series* Nº 03/073.

Roeger, W. (2006) 'The production function approach to calculating potential growth and output gaps. Estimates for EU Member States and the US', paper prepared for the workshop on Perspectives on potential output and productivity growth, Banque de France and Bank of Canada, April

Saisana, M. and Cartwright, F. (2007) 'Composite indicators: Science or artifacts?', communication presented at the *2007 Biannual Conference of the European Survey Research Association*, Prague, June 25-29

Saisana M., Nardo M. and Saltelli A. (2005b), Uncertainty and Sensitivity Analysis of the 2005 Environmental Sustainability Index, in Esty D., Levy M., Srebotnjak T. and de Sherbinin A. (2005) Environmental Sustainability Index: Benchmarking National Environmental tewardship. New Haven: Yale Center for Environmental Law and Policy, pp.75-78

Saisana, M. and Tarantola, S. (2002) 'State of the art report on current methodologies and practices for composite indicators development', *Report prepared by the Applied Statistics Group*, Institute for the Protection and Security of the Citizen: European Commission, June 2002

Saisana M., Tarantola S. and Saltelli A. (2005a), Uncertainty and sensitivity techniques as tools for the analysis and validation of composite indicators, *Journal of the Royal Statistical Society* A, 168(2), 307-323

Saltelli A. (2007) Composite indicators between analysis and advocacy, *Social Indicators Research*, 81: 65-77

Saltelli A., Tarantola S., Campolongo F. and Ratto M. (2004), *Sensitivity Analysis in practice, a guide to assessing scientific models*, New York: John Wiley & Sons. Software for sensitivity analysis is available at http://www.jrc.ec.europa.eu/uasa/prj-sa-soft.asp.

Schneider, F. (2002), 'The size and development of the shadow economies of 22 transition and 21 OECD countries', *IZA Discussion Paper Series*, 514, IZA, Bonn

Schneider, F. (2009): 'The size of the shadow economy for 25 transition countries over 1990/00 to 2006/2007: What do we know?', *mimeo*, Johannes Kepler University of Linz

Schreyer, P. (2010), 'Measuring the production of non-market services'; In: Bieggeri, L. and Ferrari, G. (eds.): Price indexes in Time and Space: methods and practice, Physica-Verlag, Springer, pp: 167-187.

Sharpe A. (2004), *Literature Review of Frameworks for Macro-indicators*, Centre for the Study of Living Standards, Ottawa

Simkins, A. (2007), Measuring Quality as Part of Public Service Output - Strategy following consultation, http://www.statistics.gov.uk/articles/nojournal/UKCeMGA_Strategy_Paper.pdf

St. Aubyn, M., Pina, A., Garcia, F. and Pais, J. (2009): 'Study on the efficiency and effectiveness of public spending on tertiary education', *Economic Papers*, 390, European Commission, Brussels

Stiglitz, J.; Senn, A. and Fitoussi, J.P. (2009), *Report by the Commission on the Measurement of Economic Performance and Social Progress*, www.stiglitz-sen-fitoussi.fr

Social and Cultural Planning Office of the Netherlands (2004), *Public Sector Performance: An international comparison of education, health care, law and order and public administration,* SCP-publication 2004/8, The Hague.

Sutherland, D. and Price, R. (2007), 'Linkages between performance and institutions in the primary and secondary education sector', OECD Economics Department Working Papers, № 558, OECD Publishing.

Tanzi, V. (1994), Redistributing Income through the budget in Latin America, Banca Nationale del Lavoro, Quarterly Review, March.

Timmer, P. Marcel, Mary O'Mahony and Bart van Ark (2007), 'EU KLEMS Growth and Productivity Accounts: Overview'. EUKLEMS, http://www.euklems.net

United Nations (2005), *Human Development Report*. United Kingdom: Oxford University Press. http://www.undp.org

Van Ark, B., O'Mahony, M. and Timmer, M. (2008) 'The productivity gap between Europe and United States: Trends and causes', *Journal of Economic Perspectives*, 22(1): 25-44

Van der Ploeg, F. and Veugelers, R. (2007) 'Higher education reform and the renewed Lisbon strategy: The role of Member States and the European Commission', EUI Working Papers, ECO 2007/33, European University Institute, Firenze

Wölfl, A. (2005) 'The service economy in OECD countries', *STI Working Paper*, 2005/3, OECD: Paris

Appendix:

Table A1. **Public services dimensions, subindices and sources**

DIMENSIONS	SUBINDICES	SOURCE
PUBLIC ADMINISTRATION		
Transparency	Size of the shadow economy, % of GDP, currency demand approach, reciprocal value (1/x)	Schneider (2002 and 2009)
Governance	Government effectiveness Index [-2,5; 2,5] rescaled [0; 5] from surveys	World Bank, Aggregate Governance Indicators
Red tape	Regulatory quality Index [-2,5; 2,5] rescaled [0; 5] from surveys	World Bank, Aggregate Governance Indicators
Judiciary quality	Rule of law Index [-2,5; 2,5] rescaled [0; 5] from surveys	World Bank, Aggregate Governance Indicators
Corruption	Control of corruption Index [-2,5; 2,5] rescaled [0; 5] from surveys	World Bank, Aggregate Governance Indicators
EDUCATION		
Education improvement		
-Drop-out	Early school leavers, % , reciprocal value (1/x)	Eurostat
-Completion of regulatory education	Tertiary participation, %	Eurostat
Access to services		
-Human resources	Ratio students to teachers, reciprocal value (1/x)	Eurostat
-Technical resources	Internet access in schools, [1; 7].	World Economic Forum, Executive Opinion Survey
Attainment		
-Enrolment	Secondary education enrolment, % of population	Eurostat
-Science results	Math and science results, [1; 7].	World Economic Forum, Executive Opinion Survey
Other qualitative aspects		
-Quality	Education system quality Index [1; 7].	World Economic Forum, Executive Opinion Survey
HEALTH		
Health improvement		
-Mortality	Infant mortality rate, %, reciprocal value (1/x)	Eurostat
-Life expentancy	Life expectancy at birth, years	Eurostat
Access to services		
-Technical resources	Number of hospital disponible beds, per 100000 hab	Eurostat
-Human resources	Physician density, per 1000 hab	World Economic Forum
OTHER SOCIAL AND COMMUNITARY SERVICES		
Income distribution		
-Poverty	Poverty rate, % of population, reciprocal value (1/x)	Eurostat
-Equality	S80/S20 income quintile share ratio, reciprocal value (1/x)	Eurostat
Welfare		
-Social inclusion	Unemployment rate, %, reciprocal value (1/x)	Eurostat
Environment		
-Waste treatment	Water waste treatment, % of total	Eurostat
-Sewage treatment	Sewage sludge production per capita	Eurostat

Source: Own elaboration

Table A.2: **Public services performance (SP), 2005, alternative weighting scheme**

	Alternative weighting structure considering:						
	Equal weights[a]	Employment[b]	Value added[c]	Public Adm[d]	Education[e]	Health[f]	Other social services[g]
AUSTRIA	1,23	1,21	1,21	1,26	1,18	1,20	1,28
BELGIUM	1,06	1,09	1,08	1,06	1,08	1,11	1,01
CYPRUS	0,92	0,91	0,92	0,92	0,94	0,90	0,94
CZECH REPUBLIC	1,10	1,12	1,11	1,07	1,12	1,14	1,09
DENMARK	1,15	1,12	1,13	1,17	1,13	1,08	1,22
ESTONIA	0,97	0,97	0,97	0,94	1,02	0,96	0,97
FINLAND	1,20	1,20	1,20	1,20	1,21	1,19	1,18
FRANCE	1,06	1,07	1,07	1,08	1,04	1,08	1,04
GERMANY	1,09	1,09	1,09	1,12	1,02	1,12	1,10
GREECE	0,92	0,95	0,94	0,88	0,94	0,99	0,85
HUNGARY	0,97	0,97	0,96	0,94	0,98	0,97	0,99
IRELAND	1,09	1,07	1,08	1,11	1,07	1,06	1,13
ITALY	0,90	0,91	0,89	0,88	0,88	0,94	0,92
LATVIA	0,87	0,89	0,88	0,85	0,91	0,90	0,84
LITHUANIA	0,97	0,99	0,98	0,93	1,02	1,00	0,94
LUXEMBOURG	1,13	1,11	1,10	1,15	1,03	1,13	1,20
MALTA	0,89	0,92	0,91	0,91	0,87	0,95	0,84
NETHERLANDS	1,13	1,10	1,11	1,17	1,09	1,08	1,21
POLAND	0,89	0,91	0,93	0,91	0,98	0,88	0,81
PORTUGAL	0,84	0,82	0,84	0,88	0,82	0,81	0,84
SLOVAKIA	0,93	0,95	0,95	0,94	0,98	0,93	0,88
SLOVENIA	1,00	0,99	1,00	0,96	1,07	0,97	0,98
SPAIN	0,95	0,94	0,94	0,96	0,91	0,95	0,98
SWEDEN	1,15	1,14	1,14	1,15	1,13	1,13	1,17
UNITED KINGDOM	1,09	1,04	1,06	1,13	1,05	1,00	1,18
Mean	1,02	1,02	1,02	1,02	1,02	1,02	1,02
Std. Dev.	0,11	0,10	0,10	0,12	0,10	0,10	0,14

a) Equal weights assigned to each sub-sector (1/4)
b) Weights assigned according to each subsector share in total public services employment in EU25 (2005 data). 24% assigned to public administration, 25% to education, 34% to health and 17% to other social services.
c) Weights assigned according to each subsector share in total public services value added in EU25 (2005 data). 30% assigned to public administration, 28% to education, 27% to health and 15% to other social services.
d) 1/2 assigned to public administration and 1/6 to the other sectors
e) 1/2 assigned to education and 1/6 to the other sectors
f) 1/2 assigned to health and 1/6 to the other sectors
g) 1/2 assigned to other social services and 1/6 to the other sectors

Table A.3: **Public services efficiency (SP), 2005, alternative weighting scheme**

	Alternative weighting structure considering:						
	Equal weights a	Employment b	Value added c	Public Adm d	Education e	Health f	Other social services g
AUSTRIA	1,37	1,38	1,36	1,39	1,27	1,43	1,41
BELGIUM	1,21	1,25	1,25	1,25	1,22	1,26	1,11
CYPRUS	0,93	0,90	0,94	1,04	0,89	0,85	0,93
CZECH REPUBLIC	0,91	0,92	0,90	0,91	0,83	0,96	0,93
DENMARK	1,24	1,23	1,23	1,28	1,20	1,23	1,27
ESTONIA	0,99	0,99	0,98	0,96	0,99	1,00	0,99
FINLAND	1,43	1,50	1,46	1,43	1,35	1,60	1,36
FRANCE	1,06	1,05	1,06	1,08	1,07	1,04	1,06
GERMANY	1,16	1,16	1,18	1,20	1,21	1,12	1,13
GREECE	1,12	1,11	1,18	1,19	1,35	0,97	0,97
HUNGARY	0,84	0,84	0,81	0,80	0,79	0,88	0,89
IRELAND	1,34	1,35	1,36	1,27	1,52	1,30	1,28
ITALY	0,96	0,97	0,96	0,89	1,04	0,97	0,96
LATVIA	0,78	0,80	0,78	0,72	0,82	0,83	0,77
LITHUANIA	0,97	1,01	0,99	0,95	0,96	1,06	0,90
LUXEMBOURG	1,16	1,13	1,13	1,16	1,10	1,13	1,26
MALTA	0,85	0,87	0,87	0,91	0,79	0,90	0,78
NETHERLANDS	1,12	1,06	1,05	1,10	1,03	1,05	1,27
POLAND	0,79	0,79	0,81	0,78	0,89	0,74	0,73
PORTUGAL	0,97	0,95	0,98	0,99	1,08	0,87	0,94
SLOVAKIA	0,82	0,85	0,83	0,76	0,84	0,89	0,79
SLOVENIA	1,02	1,02	1,02	0,97	1,09	1,00	1,03
SPAIN	0,92	0,91	0,90	0,93	0,86	0,93	0,94
SWEDEN	1,25	1,24	1,21	1,21	1,17	1,28	1,32
UNITED KINGDOM	1,38	1,33	1,37	1,41	1,42	1,26	1,42
Mean	1,06	1,06	1,07	1,06	1,07	1,06	1,06
Std. Dev.	0,20	0,20	0,20	0,21	0,21	0,21	0,21

a) Equal weights assigned to each sub-sector (1/4)
b) Weights assigned according to each subsector share in total public services employment in EU25 (2005 data). 24% assigned to public administration, 25% to education, 34% to health and 17% to other social services.
c) Weights assigned according to each subsector share in total public services value added in EU25 (2005 data). 30% assigned to public administration, 28% to education, 27% to health and 15% to other social services.
d) 1/2 assigned to public administration and 1/6 to the other sectors
e) 1/2 assigned to education and 1/6 to the other sectors
f) 1/2 assigned to health and 1/6 to the other sectors
g) 1/2 assigned to other social services and 1/6 to the other sectors