Public Resource usage in Health Systems: A Data Envelopment Analysis of the Efficiency of Regional Health Systems in Spain.

M. S. Campos Lucena[a], F. Velasco Morente[a], J.M. Gavilán[a], A. Fernández-Montes[b]

[a]Departamento de Economía Aplicada
[b]Departamento de Lenguajes y Sistemas Informáticos
Universidad de Sevilla
{mscampos, velasco, gavi, afdez}@us.es

Abstract

The efficiency in the management of public resources is on of the main pillars of the welfare state. The objective of this work is to analyze the efficiency of the public resources that regional governments invest in health systems. To this end, Data Envelopment Analysis (DEA) is applied which enable researchers and managers to obtain measurements of efficiency of the analyzed regions, and proposing corrective steps to achieve efficiency for non-efficient regions.
Results show that not every health systems present technical efficiency, nor scale efficiency.

Keywords: efficiency, public health, regional public health, DEA, public resources.

1 Introduction

In the last decades the Spanish public health system has been radically transformed. The universality, equity and solidarity are the basic pillars of the current health system due to "*individuals' health and the quality of health systems are essential signs* of the level of welfare and social protection of the society" (CES 2010). Decentralization of the health system and giving the governance to the regions increased region development itself by managing health services in a better manner for each region, taking always into account the solidarity between each region of the nation.

This decentralization motivated the creation of a public health service in each region. The efficiency of these services is nowadays under study, proposing private management of services as an alternative to better management. This is the main reason for analyzing the efficiency of public resources in general and health services particularly, even more in this current economic situation.

The objective of this work is to study the efficiency of public regional health systems through the management of the resources invested in them and how much of these resources are invested in employing and by studying the frequency of admissions in hospitals, specialists or primary attention, nursing etc. that citizens receive. The fact of analyzing investments in employees is motivated by: the weight of the costs in employees comparing to the total cost of health systems (from 30% to 50% of costs) and motivated by the effects of investments in employing over the welfare status, even more with a rate of unemployment of 26%.

The analysis of the efficiency can be performed from two perspectives [Gonzalez, 2010] a) using managements indicators based on the analysis of ratios, which could return conflicting results depending on the indicators used [Smith, 2003], and b) using global indicators of efficiency that measure distances between the analyzed units (DMUs) and the production frontier which is established by the efficient units depending on the resources and obtained results.

DEA is a method of analysis of the second (b) perspective, considered as a very accepted system of measurement of efficiency of the public sector [Lowell, 2003]. DEA has the benefit of being able of including several variables as inputs and several variables as outputs. This system began as an extension of the work from Farrel in 1957, where it is shown a satisfactory measurement of the productive efficiency and how it can be computed [Coelli, 1996], [Coll, 2006], [Cooper, 2007]-

Performing DEA provide the distances between non-efficient units and the frontier established by the production functions of efficient units, when production factors operate in variable scale or constant scale, that means when the peculiarities of each measurement units (each health system) are taken into account or when the global efficiency is the main objective and not taking into account these peculiarities.

DEA analysis technique requires an input or output orientation. Researches has to choose between one or another depending on which variables are susceptible to be changed or not. The input-orientated model should be chosen when inputs variables are adaptable, while output-oriented model should be chosen when output variables are adaptable [Ramanathan, 2003].

In this work the model input-oriented is going to be chosen due to inputs variables include: expenses per individual, percentage of expenses to cover employing costs. Regional governments control both variables. Outputs variables are the number of health visits for 1000 inhabitants and the number of primary and nursing attention for 1000 inhabitants. These variables depend on factors that are not controlled by regions like times individuals ask for attention or the type of attention required. However, in this second case

variables could be controlled applying management systems based on objectives or incentives.

Acknowledgments

References

[Gonzalez-Rodriguez, 2010] Gonzalez-Rodriguez, M., Velasco-Morente, F., & González-Abril, L. (2010). La eficiencia del sistema de protección social español en la reducción de la pobreza. Papeles de población, 16, 123–154.

[Coelli, 1996] Coelli, T. (1996). A guide to DEAP version 2.1: A data envelopment analysis (computer) program by. Frontiers A Journal of Women Studies, 96/08, 1–49.