



Performance measurement of police forces at the local level: A non-parametric mathematical programming approach



Aleksander Aristovnik*, Janko Seljak, Jernej Mencinger

Faculty of Administration, University of Ljubljana, Slovenia

ARTICLE INFO

Keywords:

Performance measurement
Data Envelopment Analysis
Police management
Slovenia

ABSTRACT

The paper attempts to measure the relative efficiency of police activities in the Slovenian police at the local level. As the state allocates a relatively large amount of budget funding to police operations and more than one-quarter of public employees is employed in the police, the efficient use of limited public funds is even more important. In particular, a three-stage Data Envelopment Analysis (DEA) technique is presented and then applied to measure the relative efficiency of police-work-related data for selected police units at the local level (i.e., police stations (PSs)) in 2010 with additional controlling for external (environmental) factors. The results of the DEA empirical analysis reveal that approximately 80% of the observed PSs are inefficient relative to their peers. More detailed analysis also shows that, in general, PSs with more than 50 posts occupied are on average less efficient. To some extent, the differences in efficiency scores are a consequence of external factors which the management of police stations cannot influence, yet they are even more a result of better governance and organized and police work. Thus, the presented methodology and obtained efficiency results can be a valuable tool in the hands of police management when deciding how to optimally allocate the limited public resources.

© 2013 Elsevier Ltd. All rights reserved.

1. Introduction

It is impossible to envisage a modern state without an efficient and effective public and/or state administration. The latter should ensure that politics corresponds to the (social) needs of the citizens and advocates a managerial approach to efficiency and effectiveness. An efficient and effective government accomplishes everything that the citizens want – *efficiency* (the rational use of budget funds), *quality* (the provision of legal services at the right time and at the right place, responsiveness, equality) and *effectiveness* (ensuring freedom, peace and safety as well as attaining the most important goals). One of public sector management's key tasks is to ensure that the functioning of administrative bodies at all levels is public, responsible and reasonable, with an emphasis on attainment of the set goals (Verbič, 2009). In this respect, the introduction of a new way of managing the public sector requires a clear definition of the goals of the functioning, a detailed allocation of funds and the development of indicators to measure the efficiency and effectiveness of the public sector.

Like the whole state administration, the Slovenian police should necessarily join the process of adjusting to modern trends in the public sector. Nowadays, the global financial and economic crisis

offers an additional window of opportunity for deep structural reforms of the police since police activity is a cornerstone of all other institutions of the rule of law, freedom and security; without the police service there can be no development, democracy, economic progress or social and legal equality. Slovenia does not have a modern system for objectively monitoring the state of security as well as the performance, efficiency and quality of the police's work, particularly at the local level (Klun, & Setnikar-Cankar, 2013; Pevcin, 2013). Therefore, the main aim of the presented empirical study is to obtain additional expert backgrounds and guidelines for the streamlining and rationalizing the work of local police in Slovenia.

The police service is important budget user¹ and clearly a relatively centralized part of the state administration in Slovenia. The legislative solutions differ by country, but in most countries the police are organized hierarchically. In Slovenia, police organizations can be defined at three levels: local (Police Stations), regional (Police Directorates) and national (the General Police Directorate). Each of these levels of the structural organization of the police has its own characteristics that facilitate comparisons (Aristovnik, Seljak, & Mencinger, 2013). The main focus of the paper is on the local level where police officers most often have direct contact with people,

* Corresponding author. Address: Faculty of Administration, University of Ljubljana, Gosarjeva Ulica 5, 1000 Ljubljana, Slovenia. Tel.: +386 1 580 55 48; fax: +386 1 580 55 21.

E-mail address: aleksander.aristovnik@fu.uni-lj.si (A. Aristovnik).

¹ The state allocates a relatively large amount of budget funding to police operations (e.g., in 2010 the Republic of Slovenia allocated about EUR 330 million to the police, accounting for 3.1% of total budget expenditure) and a large share of public employees work in the police (i.e., 8989 employees, accounting for 26.3% of state administration staff in Slovenia in 2010).

which is why their activities are the most visible. However, the organizations at the local level are relatively small and the value of the related indicators is strongly influenced by individual extraordinary events, which makes a reliable comparison even more complicated. Moreover, the autonomy of these units is relatively low as all resources (money, people and technical equipment) are usually allocated at higher regional levels. Nevertheless, there is some degree of flexibility when it comes to the allocation of financial, technical and human resources at the local level. In this respect, police activity at the local level (i.e., the level of Police Stations (PSs) in Slovenia) appears to be the appropriate level for measuring relative efficiency.

The rest of the paper is organized as follows. The next section presents and briefly discusses previous studies that have influenced the present work. The methodology and some data regarding the selection of the input and output measures for use in a three-stage DEA model are then presented. The empirical results obtained from the DEA assessment are set out and discussed in the fourth part of the paper. The paper concludes with a summary of the findings regarding the use of DEA to improve the performance of police stations in Slovenia.

2. Literature review

In the last decade the estimation of police efficiency has been the subject of many studies related to the evaluation of public sector performances. Regarding the performance of police departments, we can distinguish between the terms efficiency as providing the police service with the least costs, and effectiveness as achieving the police's objectives (Verschelde & Rogge, 2012). Despite some limitations on evaluating police efficiency, a number of studies evaluating the efficiency of police performance employing DEA methodology can be found. Namely, specification of the inputs and outputs when measuring the performance of the police using DEA is relatively hard to determine due to subjectivity in the selection of variables and conditioned influence by a variety of demographic and socio-economic factors, which are beyond the control of police authorities (Akdogan, 2012; Verma & Gavirneni, 2006; Verschelde & Rogge, 2012). Further, the literature reveals that studies on the efficiency aspect of police performance based on the DEA framework focus on the country or regional level and at the local level, respectively.

For instance, Thanassoulis (1995) was the first to apply the DEA methodology to measure the performance of police efficiency at the regional level. The research included 41 police forces in England and Wales. It analysed three outputs (number of violent crimes, burglaries, and other crimes' clear-ups) against four inputs (number of employed officers in each force, number of violent crimes, burglaries, and other recorded crimes). In this research the author identified some apparent weaknesses in the accountability of performance due to omitted external factors, which may lead to dissimilarities in the identification of efficient performance units and their comparison with other peers. In this context, Drake and Simper (2005) mitigated the limitation bias on relative efficiency scores and rankings by including environmental, socio-economic, and demographic variables in their comparative analysis. With a two-stage procedure the authors verified that the exclusion of external factors may lead to inaccurate efficiency scores with respect to some police units of analysis. Further, some authors, such as Gorman and Ruggiero (2008) analysing police efficiency in the United States, and Wu, Chen, and Yeh (2010) evaluating the performance of the police in Taiwan, confirmed that the omission of external environmental factors may distort the efficiency measures of each unit when evaluating the police's performance. In contrast, Sun (2002) and Carrington, Puthuchery, Rose, and Yaisawarn (1997) disputed the significant impact of

environmental and socio-economic variables on efficiency rankings in most police departments.

Although a substantial number of studies apply the DEA methodology to measure the performance of the police in terms of efficiency at the national level, e.g., Thanassoulis (1995), Drake and Simper (2000, 2003, 2005) for the United Kingdom, Nyhan and Martin (1999), Gorman and Ruggiero (2008) for the United States, Diez-Ticio and Mancebon (2002), Verma and Gavirneni (2006) for India, Aristovnik et al. (2013) for Slovenia, Hu, Tung, Shieh, and Lo (2011) for Taiwan, there is a lack of studies concentrating on an analysis of the efficiency of police performance at the local level of the organizational structure in the police sector (Akdogan, 2012; Barros, 2006, 2007; García-Sánchez, 2009).

In the Portuguese context, Barros (2007) conducted a two-stage DEA analysis on 33 Lisbon police precincts to measure and compare the technical and technological efficiency change in total productivity from 2000 to 2002. In particular, in the first stage the research evaluated DEA efficiency scores considering eight inputs (number of police officers, cost of labor, cars, other costs, theft crimes, burglary crimes, car robbery crimes, and drug crimes) and six outputs (clear-ups of theft and burglary, clear-ups of stolen cars, clear-ups of drug related crimes, raids, stop operations, and minor offences). The second stage employed a Tobit model to control for external factors by regressing socio-economic determinants with the efficiency scores obtained in the first stage. The research provides benchmarks for enhancing the efficiency performance of precincts and identification of external (socio-economic) factors causing the deterioration of the operations of organizational units. In the same vein, García-Sánchez (2009) evaluated the efficiency of local police in Spain regarding public and road safety using the DEA methodology. Moreover, application of the procedure prior to the analysis reduces the subjectivity in the statistical selection of variables by measuring the impact of each activity in the proposed area on the overall performance of the police. However, in contrast with previous studies, the purpose of our empirical study is to evaluate the efficiency of police performance at the local level, which may be crucial for identifying the strengths and weaknesses of local police departments' performances.

3. Methodology and preliminary data review

To examine the relative efficiency of local police units in Slovenia, we use a non-parametric technique that has recently started to be commonly applied to public sector efficiency analysis, i.e., Data Envelopment Analysis (DEA). DEA is a non-parametric frontier estimation methodology originally introduced by Charnes, Cooper, and Rhodes (1978) who built on the work of Farrell (1957) and others. It is a linear programming-based methodology that has proven to be a successful tool in measuring relative efficiency. It computes the comparative ratio of outputs to inputs for each unit, with the score between 0 and 100. A decision-making unit (DMU) (in our case a police station) with a score of less than 100 is inefficient compared to other units. It is used to identify best practices and is increasingly becoming a popular and practical management tool. DEA was initially used to investigate the relative efficiency of non-profit organizations, but now its use has spread to hospitals, schools, banks, and network industries, among others (Avkiran, 2001).

To measure efficiency, DEA is the choice here because it does not require us to specify the functional form or distributional forms for errors. In essence, it is more flexible than the parametric approach. Further, DEA has been extensively used to measure public sector efficiency in many countries by a host of researchers, like Ouellette and Vierstraete (2004), Verma and Gavirneni (2006), Hauner (2007), or Adam, Delis, and Kammas (2011) who point out that DEA is so popular because it is easy to draw on diagrams

Download English Version:

<https://daneshyari.com/en/article/382488>

Download Persian Version:

<https://daneshyari.com/article/382488>

[Daneshyari.com](https://daneshyari.com)