PUBLIC PROVISION AND PERFORMANCE

CONTRIBUTIONS FROM EFFICIENCY AND PRODUCTIVITY MEASUREMENT

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tices that might underlie their superior performance, and which might successfully transfer to the Capital Region.

Chapter 14 concludes the book and provides the reader with some retrospections. Five major issues are being discussed. First, it is stressed that the public sector has a large impact on national economy. An efficient public sector may easily improve GNP by more than 5%. Second, much efficiency research has been conducted, but unfortunately has not been implemented. There is only a small number of examples of successfully implementing research outcomes into concrete policy. Third, theories on efficiency measurement contain advanced mathematics and statistics. The lack of transparency of the methodologies used prevents a widespread use of efficiency measurement amongst policy makers and managers. Nevertheless, various examples in the book show the importance of a valid choice of model specification, a valid choice of empirical technique and a proper definition of service provision and resource usage. The cumbersome theories and techniques are more than just scientific hobbyism. Fourth, efficiency analysis can be beneficiary in various ways. It may be helpful in improving managerial processes, but also in determining financing systems, planning of capacities and choosing the right system of property rights. Fifth, much of the validity of the efficiency measurement depends on the data availability. Much improvement can be accomplished in this area, especially where it comes to the measurement of the quality of service provision and the environmental characteristics.

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12 What Is Known about Municipal Efficiency? The Belgian Case and Beyond

Bruno De Borger and Kristiaan Kerstens [1]

12.1 Introduction

Although other alternatives exist for the evaluation of the performance of municipal governments (e.g., financial performance), most economists are convinced that technical and cost efficiency are relevant criteria for performance measurement at the local level. The purpose of this chapter is to briefly discuss the difficulties involved in capturing municipal efficiency, and to summarize the most important results of recent research on the efficiency of municipalities in Belgium. More specifically, we discuss the difficulties to benchmark local governments, we summarize the determinants of municipal efficiency in Belgium, and we contrast our findings to results available in the literature. Finally, we try to assess the policy implications resulting from this research.

Structure of the chapter is as follows. By way of introduction, we start out in Section 12.2 with a brief discussion of the role of municipal governments. We review the allocative and distributive role of municipalities as it is typically described in the economic literature, and we summarize the actual functions assigned to local governments in Belgium and in a number of other European countries. We also emphasize the importance of efficiency measurement as a partial but crucial assessment of municipal performance. In Section 12.3 we discuss the conceptual, methodological and practical problems in benchmarking local governments. The next section introduces the data and sample utilized. Available empirical results on the efficiency of Belgian municipalities are reported in Section 12.5. Both global performance evaluations and efficiency analyses for specific municipal services are reviewed. In addition, we provide some new evidence related to scale efficiencies. For purposes of comparison, a number of findings for Belgian municipalities are contrasted with results on municipal efficiency in other countries, as reported in the literature. Finally, Section 12.6 briefly reiterates what is known about municipal efficiency and, equally importantly, it points out what remains to be done.

12.2 THE ROLE OF LOCAL GOVERNMENTS AND THE NEED FOR PERFORMANCE MEASUREMENT

Any evaluation of the performance of municipalities should keep in mind the role and objectives of local governments. We therefore begin by briefly reviewing the allocative and distributive roles typically assigned to municipalities. We then provide some information on the specific functions assigned to sub-central governments. Finally, we emphasize the need for performance evaluation in general and for efficiency measurement in particular.

12.2.1 The Allocative and Distributive Roles of Local Governments

From an allocative viewpoint the early analyses by Olson (1969) and Oates (1972) have emphasized that, at least in theory, efficient decentralization involves a perfect correspondence between the spatial impact of any given public service and the jurisdiction responsible for decision-making with respect to, and financing of, the service considered. Of course, since the theoretical ideal of optimal jurisdictions and optimal decentralization is not feasible, assigning certain functions to the municipal level should be based on a comparison of the costs and benefits of decentralized decision-making. The benefits of decentralization include, among others, the close association between preferences, decision power, and financing responsibility, some possible informational advantages, and the efficiency-enhancing potential associated with mobility of the population at the local level. The disadvantages of decentralization are related to the spillover effects of some local public services, to possible inefficient tax competition between municipalities, to potential tax exporting behavior by local governments, and to the possible existence of economies of scale in the provision of local public services.[2]

The literature has convincingly shown that the relative magnitude of costs and benefits of decentralization and the related optimal division of responsibilities between different levels of government should depend on: (i) the degree to which preferences for public services differ across jurisdictions; (ii) the spatial impact of local public goods; (iii) the mobility of production factors (e.g., labor and capital) and of the tax base across jurisdictions; (iv) the potential existence of economies of scale in the production of local public services; and (v) the informational advantages associated with decentralized decision-making.

Whereas the literature generally agrees on the factors that determine the precise allocative role of local governments in providing local public services, there is less agreement on the potential for municipalities to engage in redistribution policies. However, most economists agree that redistribution is difficult due to the mobility of the population across

jurisdictions. This generates a problem of adverse selection. For example, if low-income people hope to benefit from redistribution they are attracted to municipalities pursuing an active redistribution policy towards the poor. High-income earners on the other hand, expecting to pay the bill for this policy, may prefer to migrate to municipalities with little redistributional activities. It is often argued, therefore, that municipalities have no formal role via distributive local taxation but that they should focus on the implementation of overall national distributional policies via local tax progressivity, local tax credits etc. Moreover, it is clear that from the viewpoint of the national government distributional issues may justify grants to correct for income inequalities between municipalities, unequal provision of public services or differences in the capacity to generate tax revenues.

12.2.2 The Functions Assigned to Local Governments

It is clear that there may be substantial differences in the way different countries implement the above broad principles in practice. In this subsection we therefore consider some information on the assignment of functions to and the financing of sub-central governments in a number of European countries, with a specific focus on the relative position of Belgium.

Comparative studies concerning tasks accomplished by sub-central authorities reveal large similarities between different countries, although some remarkable differences remain. This can be illustrated by considering Table 12.1, adapted from King (1992). Note that this table deals with all sub-central government levels and not just municipal governments. It includes a broad variety of different institutions situated at different tiers, whose precise functions and interrelationships largely depend on historical contingencies. For instance, in Belgium one can distinguish regional, provincial and municipal authorities, public centers for social welfare, intermunicipal agencies, etc. Despite the level of aggregation underlying Table 12.1, it does provide some relevant information. First, it is notable that sub-central authorities not only provide local public goods (parks, roads, police, justice, town planning, etc.) but also some merit goods (various categories of education, sports and leisure pursuits, etc.).[3] Some activities can even be grouped under a regional development function, since they focus on stimulating economic activity in the area. Second, remarkable differences can be observed for justice, ports, airports and electricity, among others. Third, Belgium appears quite decentralized on the basis of this table. However, this is mainly due to the importance of the regions in the Belgian institutional framework. It certainly does not imply a large assignment of power to municipal governments because many of the functions included in Table 12.1 are assigned to the regional and not the municipal governments. This is confirmed by looking at public sector employment data.

Table 12.1

FUNCTIONS OF SUB-CENTRAL AUTHORITIES IN WESTERN EUROPE

	Austria	Belgium	Denmark	France	Germany	Ireland	Italy	Luxembourg	Netherlands	Norway	Portugal	Spain	Sweden	Switzerland	UK
Slaughterhouses	•	•	•	•	•	•		•	•	•	•		•	•	•
Theaters, concert halls	•	•	•	•			•	•	•	•			•	•	•
Urban road transport	•		•	•	•			•	•	•	•	•	•		•
Ports		•			•		•		•	•	•		•	•	
Airports				•			•		•	•			•	•	•
District heating	•	•	•	•	•		•		•				•	•	
Agriculture, forestry, fishing, hunting	•			•		•		•	•	•					•
Electricity		•	•		•		•		•	•	•		•	•	
Commerce	•	•		•	•		•		•		•	•	•		
Tourism	•	•		•	•		•		•	•	•	•	•		•
Security, Police	•	•		•	•		•	•	•				•	•	•
Justice				•	•		•		•			•			•
Pre-school education	•	•		•	•	•		•	•	•		•	•		•
Primary & secondary education	•	•	i	•	•				•	•		•	•	•	•
Vocational & technical training	•			•	•		•		•	•		•	•	•	•
Higher education		•			•		•		•			•	•	•	•
Adult education	•	•	•	•	•			•	•			•	•	•	•
Hospitals & convalescent homes	•	•	•	•	•		•	•	•	•			•	•	•
Personal health	•	•	•	•	•			•	•	•			•	•	•
Family welfare services	•	•		•	•		•		•	•			•	•	•
Welfare homes	•	•	•	•	•			•	•	•			•	•	•
Housing	•	•		•	•	•	•	•	•	•	•	•	•	•	•

Common to all countries: refuse collection and disposal; museums, art galleries and libraries; parks and open spaces; sports and leisure pursuits; roads; water supply; town planning; fire protection.

Source: Adapted from King (1992: Table 3.1)

While about 25% of all civil servants are employed within the overall sub-central public sector, only about half of these actually work for municipalities (Heyndels 1996).

Sub-central authorities across Western Europe also differ in their share in government spending and in their capacity to generate tax revenues from different sources (see also Owens 1992). While a huge variety of local financing resources exist, apparently many countries rely predominantly on just a few tax sources. In Belgium, income and property taxes are the most important local taxes. Moreover, conditional or general grants from higher tiers of government provide another major revenue source. As reported in Heyndels (1996), slightly less than half of Belgian municipal financial resources are received under the form of grants, mostly unconditional ones. This number is not exceptional among European countries. Over time grants do seem to be a declining source of revenue.

In Table 12.2 we report the attribution of tax revenues to municipalities. This provides an indication of the degree of tax autonomy of municipalities in individual countries. Notice the large variability in the shares attributed to municipal governments among countries. Belgian local government tax shares are at the lower end of the distribution, reflecting rather limited tax autonomy of municipalities. This is not surprising, given the focus of the federalization process in Belgium on the regional government level. Moreover, it confirms that in a European context, decentralization towards Belgian local governments is quite limited.

12.2.3   Local Government Objectives, Control, and Efficiency

Given the role and tasks assigned to the local public sector in providing public services and generating tax revenues, there is an obvious problem of control. Local politicians (managers) can be viewed as agents responsible for implementing efficient policies facing two principals: on the one hand the national government, and on the other hand local residents. The public choice literature (see e.g. Mueller 1989) suggested a large number of sources of inefficiency that may result from this principal-agent relation. We enumerate, without aiming at completeness, a series of potential problem areas. First, there are the differences in objectives between principal and agent, whereby municipal politicians and officials pursue goals (e.g., budget maximization, emoluments of all kinds, etc.) independent of the preferences of their constituency. Second, the local political agenda may dictate compromises. Third, there is a lack of monitoring instruments and the cost of setting up adequate control mechanisms may be non-negligible. Fourth, there may exist informational asymmetries inhibiting a perfect control by either central government or residents.

Table 12.2

SHARE OF TOTAL TAX REVENUES ATTRIBUTED TO MUNICIPALITIES 1975-1995
(PERCENTAGE OF TOTAL TAX REVENUE)

	1975	1985	1995
Federal countries			
Australia	4.2	3.7	3.4
Austria	12.4	10.7	10.8
Belgium	4.7	5.2	5.7
Canada	9.9	9.3	9.5
Germany	9.0	8.9	7.3
Switzerland	19.5	16.7	15.8
United States	14.7	12.6	13.0
Unitary countries			
Czech Republic	-	-	10.7
Denmark	29.8	28.3	31.6
Finland	23.6	22.4	21.9
France	7.6	8.7	9.9
Greece	3.4	1.3	1.2
Hungary	-	-	3.6
Iceland	18.7	18.6	20.4
Ireland	7.3	2.3	2.4
Italy	0.9	2.3	4.8
Japan	25.6	26.0	24.2
Korea	10.1	-	19.5
Luxembourg	6.6	6.6	6.4
Netherlands	1.2	2.4	2.6
New Zealand	7.7	6.5	5.2
Norway	22.4	17.7	19.7
Poland	-	-	7.5
Portugal	-	3.5	5.6
Spain	4.3	11.2	12.8
Sweden	29.2	30.4	32.4
Turkey	-	10.2	12.8
United Kingdom	11.0	10.1	3.9

Source: OECD (1997, Table 137: 210)

Public sector organizations should ideally achieve a variety of goals simultaneously. Among the social objectives of the public sector one finds technical efficiency, allocative efficiency, redistribution, and macroeconomic objectives (unemployment absorption, price stability, etc.). Of course, not all organizations in the public sector necessarily contribute to all of these goals. Municipalities, for instance, should mainly focus on efficiency goals, and, as argued above, have little role to play in redistribution. Marchand, Pestieau and Tulkens (1984) show that the interaction of different objectives leads to complex decision rules that are hard to evaluate in practice. They suggest a performance approach to public sector analysis that gives a pre-emptive priority to technical efficiency, since it is the only goal compatible with all others.

Therefore, the first step in identifying appropriate institutional structures and their impact on efficiency is to develop proper measures of technical inefficiencies and carefully analyzing their determinants. The next section is entirely devoted to the issue of measuring technical efficiency at the municipal level. A second, consequent step is to implement incentive structures that include corrective measures based on efficiency scores in order to reduce observed technical inefficiencies.

12.3 EFFICIENCY MEASUREMENT AT THE MUNICIPAL LEVEL: DIFFICULT BUT NECESSARY

The performance of municipalities can be evaluated using a wide variety of performance indicators, including financial measures (debt ratios, expenditures per resident, tax revenue per resident, etc.), efficiency measures and indices of effectiveness (i.e., of the degree to which the objectives have been realized). We focus on the measurement of efficiency because, unlike the other concepts, it is a requirement that any society has good reason to impose on local governments. Moreover, since the definitions of various efficiency measures (e.g., technical efficiency, scale efficiency, cost efficiency) have been spelled out elsewhere in this book (see Chapter 2), we assume the reader is familiar with the meaning of these concepts.

12.3.1 Efficiency Measurement: Informational Requirements

In principle, measurement of all efficiency concepts is easy if reliable data are available on both quantities and prices of all inputs and outputs of the production process. In many cases, however, the unavailability of some necessary information places restrictions on the type of efficiency that can be measured and on the quality of

the resulting performance indicators. For example, technical efficiency can in principle be estimated using input and output data only, and it does not require price information. Allocative efficiency can only be estimated if price information is available in addition to information on both inputs and outputs. If for some reason input data are unavailable but only total costs and output information can be obtained, then overall cost efficiency can be measured, but it is impossible to separate it into technical and allocative efficiency. Consequently, the type of information available determines the flexibility of performance measurement (see Färe and Primont 1988 for details).

Of course, a prerequisite to estimate any of the efficiency notions is to translate the production process at the local government level in terms of the economist's standard notion of transforming inputs into outputs. This is not a trivial problem. In general, one distinguishes three stages in the production process (see, e.g., Bradford, Malt and Oates 1969, De Groot and Goudriaan 1991, and Levitt and Joyce 1987). A first stage is the transformation of primary inputs (labor, equipment) into activities, which can be considered intermediate outputs (e.g., teaching in municipal schools, police surveillance, administrative work, etc.). Associated with this transformation of primary inputs into quantities of the intermediate outputs (hours of teaching, number of police patrols, etc.) one can define process indicators that reflect the efficiency of the production process. Second, the transformation of intermediate outputs into direct outputs (D-outputs) for 'consumption' (e.g., number of graduating students, number of crimes solved, etc.) can be measured by performance indicators reflecting technical efficiency in the transformation of activities in outputs. Third, the transformation of direct outputs into their ultimate welfare effects on consumers (e.g., increased knowledge in society due to education, increase in safety as perceived by inhabitants, etc.) is captured by effect indicators. They reflect the degree to which the direct outputs of municipal activities translate into welfare improvements.

Clearly, in principle efficiency measures can be defined at each stage of the production process, but in practice data are typically unavailable to distinguish between primary inputs, intermediate outputs, direct outputs, and final welfare effects. In many cases, the analysis is limited to the relation between primary inputs or activities and direct outputs. The third step in the production process is rarely studied. One exception is the Lovell, Walters and Wood (1994) study developing a stratified model of the educational production process.[4]

The next question is what constitutes reasonable indicators of inputs and direct outputs of the municipal production process. On the input side the problem is to find reasonable measures of the production factors labor, capital equipment, and other inputs (e.g.,

various materials). Neither of these inputs is homogeneous, however. Although one could argue in favor of using labor input in terms of full-time equivalent person-hours, it is clear that the personnel of municipalities form a heterogeneous group in terms of educational background, age, and overall productivity. It is unclear how to correct labor hours for quality differences. For the capital input, measurement of the usage of municipal capital services is hampered by the lack of systematic registration of municipal capital accounts in many countries. Moreover, heterogeneity in quality and vintages of capital inputs should ideally be accounted for. On the output side severe measurement problems arise as well. Although for very specific services reasonable direct output measures may be available (e.g., the number of loans in public libraries) in other cases no clear-cut output can be defined (e.g., how to measure the output of purely administrative departments).

Information on input prices suffers from similar measurement problems. First, in many European countries there is limited flexibility for municipalities to determine wage structures. Seniority and hierarchical level are by far the most important determinants of wages. Therefore, even if they are available (in many cases they are not) average municipal wages mainly capture institutional factors, differences in average seniority and in labor quality rather than pure wage differentials. Prices for capital goods typically do not vary across municipalities at all, since municipalities operate on the same financial markets and obtain the same conditions.

Finally, even if reasonable data are available the question remains to what extent variations in the relation between inputs and outputs really reflect variability in performance. Indeed, in many cases municipal output is demand-driven. In case the inputs are insufficiently flexible, municipalities may have to adjust output quality in response to unexpected demand variations. For example, an unexpected increase in the number of students at municipal schools may result in larger average class sizes rather than in an adjustment of inputs. Although a simple comparison of inputs and outputs will indicate an increase in efficiency, this may reflect a quality reduction rather than a true efficiency gain. This example underscores the necessity to obtain a sufficiently rich and complete description of technology.

12.3.2 Global Versus Specific Efficiency Measurement

At this point it is instructive to note the difference between efficiency measurement on a global scale and evaluating the efficiency in the provision of a specific municipal service (such as green services, road construction and maintenance, fire protection,

public libraries, education, etc). In the latter case, it may be somewhat easier to obtain good proxies for the relevant inputs and outputs. For example, although one can disagree about the best set of output indicators for a municipal library, it seems logical that the number of loans should be one important element. However, if one is interested in evaluating the performance of a municipality in the global provision of services, then the problem of defining a comprehensive set of reasonable output indicators fully describing municipal activities is much more difficult. What are appropriate outputs for a municipality as a whole? How to define proxies for the various aspects of local production in the fields of education, administrative services, social and recreational services, transportation, etc?

One reaction to these differences in data problems is to argue in favor of limiting performance measurement to specific local public goods. Not surprisingly, many studies in the literature have focused on efficiency of municipalities in providing very specific goods. However, although such studies may yield valuable information for local governments, from a policy viewpoint evaluating global performance may be much more important. For example, to improve the design of appropriate grant mechanisms between central and local governments an evaluation of the performance of municipalities is required. If current municipal production is not evaluated, grant mechanisms may well be compensating, and in fact rewarding, inefficiencies instead of promoting economy of resource use. Another example for the need of global efficiency measures relates to the appropriate size of municipal production. This cannot be ascertained on the basis of specific efficiency studies.

In view of the above discussion and despite the difficulties involved in defining inputs and outputs, it is extremely important to provide a global evaluation of local government performance. The best one can do is to use proxies that are strongly positively correlated with the true, but unobservable outputs, and to include output categories that as much as possible capture all major categories of service provision. Of course, it goes without saying that this global analysis can benefit from being complemented by detailed performance studies focusing on specific local public goods.

12.3.3 Efficiency Estimation: Alternative Methodologies

The efficiency measures discussed in the empirical part of the chapter have been estimated using non-parametric and econometric approaches. For readers unfamiliar with these various approaches, we very briefly provide the thinking behind these methods. For more details the reader can consult, among many others, the excellent paper by

Lovell (1993) and Chapter 2 in this book. He also discusses the merits and disadvantages of various methods.

Econometric approaches specify parametric functional relations between outputs and inputs (technical efficiency) or between costs, outputs and input prices (cost efficiency). The production (cost) frontier is determined by estimating the parameters of the specified functional form using appropriate econometric techniques. The deviations of the observations from the estimated frontier form the basis for the calculation of efficiency scores for individual observations. The specified parametric frontiers can either ignore or allow for measurement error: the former is labeled deterministic; the latter approach yields stochastic frontiers. Deterministic parametric frontiers interpret any deviation from the frontier as inefficiency. Stochastic parametric frontiers try to separate the effects of measurement error and inefficiency.

The non-parametric approaches known as Free Disposal Hull (FDH) and Data Envelopment Analysis (DEA) are not based on the specification of a functional form for the frontier. Instead the frontier is determined by 'enveloping' the data as tightly as possible. This results in piecewise linear frontiers. Imposing the least assumptions, FDH yields the closest envelopment of the data. Graphical representation of the frontier yields a staircase shape in input-output space. Contrary to FDH, the DEA-approach assumes convexity of the production possibilities set. Graphically, the DEA-frontier 'convexifies' the staircase FDH-frontier. In both cases, inefficiency is again measured in terms of the deviation of an individual observation from the frontier.

12.4 DATA DESCRIPTION

In this section we provide some information on the type of data used to study the global efficiency of Belgian municipalities. Of course different studies in the literature have used somewhat different data sets and tested a wide variety of specifications. Apart from the seminal paper by Tulkens (1990), the most relevant studies of global efficiency of Belgian municipalities are Vanden Eeckaut, Tulkens, and Jamar (1993), De Borger, Kerstens, Moesen, Vanneste (1994) and De Borger and Kerstens (1996a, b). The former two studies were limited to the 235 municipalities of the Walloon region, whereas the others analyzed the performance of all 589 Belgian municipalities. Moreover, some studies focused on technical efficiency using explicit input and output indicators (e.g., De Borger, Kerstens, Moesen, Vanneste 1994), whereas others analyzed cost efficiency (e.g., Vanden Eeckaut, Tulkens, and Jamar 1993 and De Borger and Kerstens 1996a). Finally, a variety of efficiency measures have been used. For example, the analy-

sis in Tulkens (1990) and De Borger, Kerstens, Moesen, Vanneste (1994) is restricted to FDH only, while De Borger and Kerstens (1996a) studied cost efficiency using a variety of frontier methodologies.

To avoid going into a detailed description of the precise data used in the various studies, we focus in this section on a standard data set used in De Borger and Kerstens (1996a). It serves to illustrate both the strength and the shortcomings of efficiency measurement. This same data set has also been used in the empirical work on scale efficiency reported below.

The sample consists of observations on total current municipal expenditures and on various output indicators for each of the 589 local governments in 1985. This combination of expenditures and outputs implies that our focus is on cost efficiency. The output indicators used include the number of beneficiaries of minimal subsistence grants, the number of students enlisted in local primary schools, the surface of public recreational facilities, the total population, and the fraction of the population older than 65. Descriptive statistics for all outputs and costs are provided in Table 12.3.

Table 12.3

DESCRIPTIVE STATISTICS ON OUTPUTS AND INPUT

	Mean	Stand. Dev.	Minimum	Maximum
Number of beneficiaries of subsistence grants	74.2	269.2	0.99	4,430
Number of students	3,070	7,500	1	1,050
Surface public recreational facilities (x 1,000)	1,020	1,020	6	10,200
Total population	16,700	28,800	100	483,000
% Population above 65	0.18	0.03	0.07	0.29
Total expenditures (million BEF)	450	2,020	1.14	38,500

Notice the wide range and large standard deviations for almost all variables. This simply reflects the important size differences among municipalities. All data come from a more elaborate database constructed at the research institute CADEPS (Free University of Brussels) on the basis of information from the Nationaal Instituut voor de Statistiek (NIS) and from the Gemeentekrediet van België (GKB).

As previously emphasized, many of these 'output' variables are to be considered as crude proxies for the services delivered by municipalities. For example, population is assumed to proxy for the various administrative tasks (e.g., maintaining the register of births, marriages, and deaths; issuing certificates, passports, etc.) performed by municipal governments, but it is clearly not a direct output of local production. Similarly, the fraction

of the population older than 65 is a crude proxy for the supply of social services to the elderly (e.g., retirement homes, medical services in public hospitals, general assistance, etc.). Minimal subsistence grants are related to the services provided to low income families, where it should be noted that Belgian local governments cover 50% of the costs.

The quality of these output indicators is less than desirable, as they are rather loosely related to the services delivered by municipal governments. This illustrates the general problem inherent in the definition of inputs and outputs for the public sector alluded to in the previous section. Also note that it was not possible to correct for unobservable variations in quality, since no reliable quality indicators were available. Fortunately, the focus on cost efficiency slightly reduces the severity of the latter problem. Indeed, using total costs at least guarantees that all inputs are accounted for. Although variations in quality are hard to capture in explicit input indicators, they should at least partly show up in the price being paid (information that is unknown) and consequently in the budget.

With few exceptions studies on the efficiency of Belgian municipalities deal with cost efficiency.[5] There are good reasons for this tendency. Estimating cost efficiency implies that the efficiency measures capture a conglomerate of pure technical and allocative inefficiency. However, one could argue that the risk of misspecifying the inputs is more important than the eventual bias of mixing up technical and allocative inefficiency. Using total expenditure at least assures no input is ignored. Furthermore, in the Belgian context, it is not unreasonable to assume there is no input price variability: there is little wage flexibility as salary scales of municipal personnel are completely fixed, and all municipalities in fact obtain most funds from a single specialized financial institution.[6] Therefore, cost efficiency is the main focus of the global efficiency results in this article.

12.5   RESULTS OF EFFICIENCY STUDIES

The purpose of this section is twofold. First, we summarize the results and the policy implications of studies analyzing the efficiency of Belgian municipalities. Second, we compare our results to other studies available in the literature to see how robust these findings are. We thereby initially focus on results derived from the analysis of global efficiency of local governments (Section 12.5.1). We then briefly report some new results on scale efficiency (Section 12.5.2), comparing it with available evidence. Finally, we summarize a small but representative sample of studies that look at the performance of municipalities in producing specific services (Section 12.5.3).

12.5.1 Global Efficiency of Municipalities

Let us first consider studies dealing with global efficiency of municipal governments. Our initial focus is on Belgian studies, part of which have been introduced in Section 12.4. Furthermore, also a brief comparison with the few existing papers on overall efficiency of municipalities in other countries is provided. Table 12.4 summarizes a number of relevant references and it provides some additional information on the data and methodology used in each of these analyses as well as on their most important findings.

Focusing on the data set presented in Section 12.4, the cost efficiency measures were estimated using FDH, DEA, and econometric approaches. Several frontier methods were estimated to check for the robustness of results. Mean efficiency was estimated at 0.94 in the FDH case, 0.73 for the DEA application, a remarkably low 0.57 when the deterministic parametric frontier method was used and, finally, about 0.78-0.81 in the case stochastic parametric frontiers were estimated. A detailed analysis revealed that parametric and non-parametric approaches differed markedly in terms of both efficiency levels and their implied rankings. Among non-parametric methods, it was confirmed that FDH and convex DEA models differ in important ways, in line with Tulkens (1990) and Vanden Eeckaut, Tulkens, and Jamar (1993). Given our ignorance about public sector production in general and about municipal production at the aggregate in particular, these findings have, among non-parametric methods, favored the FDH.

The resulting efficiency scores were further used in an explanatory analysis. In general, it was found that the fiscal revenue capacity, the financing mechanisms of local governments, and the political characteristics of local governments are important determinants of inefficiencies. To be slightly more specific, it is necessary to consider the results of the explanatory analysis in more detail.

First, it was consistently found (both for the explanation of cost efficiency and technical efficiency) that higher per capita incomes and wealth of citizens decreased estimated efficiencies of municipal governments. A potential explanation is that high incomes reduce the incentives of both politicians and taxpayers to monitor expenditures. Politicians have fewer incentives to control expenditures because higher incomes increase the fiscal capacity of municipalities (see e.g. De Groot and Van der Sluis 1987, Spann 1977, Silkman and Young 1982, and Wyckoff 1990). Citizens may be less motivated to carefully monitor expenditures due to the high opportunity costs of time and effort.

A second systematic finding is that the way local public services are financed is important for performance. In particular, local tax rates and the size of intergovernmental grants

seem to matter a great deal. The literature has pointed out that high tax prices alert voters to control public expenditures, especially if cost comparisons between municipalities are easy (see e.g. Spann 1977). In line with this observation we consistently find that the local income tax contributes positively to efficiency. The size of the per capita block grant yields a negative impact on performance. This is not surprising in the Belgian institutional environment. Quite a lot of these funds take the form of unconditional block grants, and there exists relatively little ex-post control on actual spending. The cost of inefficient behavior is increasingly shared by a broader constituency (national taxpayers) as the proportion of outside funding increases, so that grants reduce efficiency (see, in another context, De Groot and Van der Sluis 1987, Silkman and Young 1982, and Wyckoff 1990). Apart from a 'flypaper' effect in the traditional sense (see e.g. Hamilton 1983) we indeed consistently find a negative relation between efficiency and per capita grant size.

Third, although they were introduced in various different ways, the studies on municipal efficiency in Belgium consistently find that political indicator variables are relevant in explaining efficiency. The literature offers several avenues of explanation. Indeed, both the property rights and principal-agent literature suggest reasons why politicians and public managers lack proper incentives to effectively audit and control expenditures. For example, the process of political decision making itself may impede the effective control of the public sector (Mueller 1989, Bartel and Schneider 1991). In particular, efficiency may be affected by the size and composition of political coalitions, as arbitrage in the bargaining process may require explicit or implicit side payments (e.g., logrolling) depending on the number and nature of the coalition partners. The results for Belgium suggest that the number of coalition parties may have a negative effect on efficiency. Moreover, it is found that the presence of the socialist party has a positive effect. The effect of liberals in the coalition is not clear, as the sign of the coefficient was found not to be robust across specifications.

A fourth systematic finding is related to the fact that the political participation of citizens themselves seems to enhance the performance of a municipality. Though difficult to quantify directly, evidence in the literature suggests that political participation is closely related to education (Mueller 1989). The educational level of the adult population was found to consistently improve cost and technical efficiency. Although this variable may to some extent also capture the impact of population characteristics on costs (Schwab and Oates 1991) it provides partial support for the hypothesis formulated above.

In view of this discussion the determinants of the global efficiency of Belgian municipalities are easily summarized. The most relevant factors seem to be the fiscal revenue capacity (proxied by income), the financing mechanisms of local governments (local

taxes and grants), the political characteristics of local governments and the political participation of the local population. A relevant question is whether these Belgian results are in line with research in other countries. Some information to investigate this question has been included in Table 12.4. It summarizes a number of relevant references: it provides some additional information on the data and methodology used in each of these analyses, and it briefly describes their most important findings.

Some remarkable results are the following. Focusing on a sample of Greek municipalities, Athanassopoulos and Triantis (1998) find mean cost efficiencies somewhat below ours. In their explanatory analysis, a high share of fees and charges in municipal income improves performance, while the share of grants does the opposite. This is line with our own results. The positive effect of the investment share may be related to the unmeasured quality of services provided. Population density affects cost efficiency negatively, which may be interpreted as evidence that some of the municipalities in their sample suffer from scale diseconomies. This study is of importance, since Greece is, together with Belgium, among the most centralized countries in Europe.

In their US study Hayes, Razzolini and Ross (1998) analyzed the determinants of slack using variables representing socioeconomic characteristics, costs, and measures of municipal competition for residents (tax competition). The results suggested that inefficient behavior was associated with richer communities, lower education levels, and a lack of competition for residents among municipalities. The former two findings are entirely consistent with the Belgian results. The latter finding raises an interesting issue that could not be studied in the Belgian context, viz. the relation between tax competition and technical efficiency. Although Hayes, Razzolini and Ross (1998) suggest that competition reduces efficiency, the evidence is mixed. In an earlier study, Hoyt (1990) did not find a significant relation between tax competition and efficiency. While not explicitly measuring technical efficiency, he tested whether the flight of capital and residents affected local public service expenditures and did not find evidence for a limiting impact of municipal competition. Since the evidence is even mixed for the USA, it seems implausible that the much lower population mobility in Europe exerts a strong disciplining effect on efficiency.

Little evidence was found in the international literature on the effects of purely political factors. In the Greek case, Athanassopoulos and Triantis (1998) report that parties affiliated to the central government perform poorly at the local level. Hayes and Chang (1990) study whether or not the city manager form of government is more efficient than the mayor-council form of government in formulating and implementing public policies. The theoretical model shows that depending on compensation and the labor mar-

Table 12.4

GLOBAL PERFORMANCE OF MUNICIPALITIES: DESCRIPTION OF FRONTIER MODELS AND KEY RESULTS

	Database Sample Size Country	Frontier Method	Inputs (I) Outputs (O)	Key Results
Athanassopoulos and Triantis 1998	Cross-section 1986 N = 172 municipalities Greece	DEA-CRS, DEA-VRS, Stochastic parametric cost frontier	Total current expenditures I Actual households O Average house area O Built-up area O Heavy industrial use area O Tourist area O	- mean CE varies between 0.50 and 0.88, depending on the frontier methodology - a high % of fees and charges in income improves CE positively, as does a high investment share - grants and population density affect CE negatively - parties similar to central government perform poorly
Conceição Sampaio de Sousa and Ramos 1999	Cross-section 1991 or 1992 N= 701 & 402 municipalities in states Minas Gerais & Bahia Brazil	DEA-CRS, DEA-VRS, FDH	Total current expenditures I Actual residents O Domiciles with safe water O Domiciles with garbage collection O Illiterate population O # students primary & secondary schools O	- mean CE varies between 0.56 and 0.91 (0.55 and 0.75), depending on the frontier methodology for Minas Gerais (Bahia) - most municipalities enjoy increasing returns to scale - TE smallest among small municipalities - more technical inefficiency than scale inefficiency
De Borger, Kerstens, Moesen and Vanneste 1994	Cross-section 1985 N = 589 municipalities Belgium	FDH	Total personnel I [alternative: Blue collar workers I; White collar workers I; Municipal building surface I] # min. subsistence grants O # students primary schools O Surface recreational facilities O Total population O % of population > 65 O	- mean TE varies between 0.86 and 0.99, depending upon specification - scale and education affects TE positively - per capita block grant and income affect TE negatively

De Borger and Kerstens 1996a	Cross-section
	1985
	N = 589 municipalities
	Belgium
		FDH, DEA-VRS,
		COLS, Stochastic
		parametric cost
		frontier
			Total current expenditures I
			# min. subsistence grants O
			# students primary schools O
			Surface recreational facilities O
			Total population O
			% of population > 65 O
				- mean CE varies between 0.57 and
				  0.94, depending on the frontier
				  methodology
				- local tax rates and education
				  affect CE positively
				- per capita block grant and inco-
				  me affect CE negatively
				- methodological: differences
				  among nonparametric determi-
				  nistic methods are as large as
				  between parametric and nonpa-
				  rametric methods

Hayes and Chang 1990	Cross-section
	Year: n.a.
	N = 191 municipalities
	USA
		Stochastic
		parametric cost
		frontier
			Police protection O
			Fire protection O
			Refuse collection O
			Labor price I
			Capital price I
			% owner occupied housing E
			% minorities E
			% population over 25 E
			fire rating E
				- current costs only include the
				  3 services
				- CE: mean = 0.81; mode = 0.84
				- mayor-council and city manager
				  forms of government perform
				  equally well

Hayes, Razzolini and Ross 1998	Cross-section
	Year: n.a.
	N = n.a. municipalities
	USA
		Deterministic
		indirect
		output distance
		frontier
			Ratio of population to crimes O
			Median housing value O
			Input information: n.a.
				- high median income and
				  population growth decreases TE
				- more high school graduates
				  affect TE positively
				- suburban municipalities are
				  more efficient (Tiebout effect)

Vanden Eeckaut, Tulkens and Jamar 1993	Cross-section
	1986
	N = 235 Walloon
	municipalities
	Belgium
		FDH, DEA-VRS	Total current expenditures I
			# min. subsistence grants O
			# students primary schools O
			Road length O
			Crime rate O
			Total population O
			% of population > 65 O
				- strongly decreasing returns to
				  scale
				- municipalities run by nation-
				  wide parties are more efficient,
				  while composite majorities are
				  less efficient
				- methodological: convex non-
				  parametric deterministic
				  methods yield less credible
				  results than FDH

ket for city managers, either of both government forms can be more efficient. Empirically, they find no statistically significant difference in efficiency. Finally, Liner (1994) provides evidence on the role of institutional restrictions on efficiency. For a sample of cities from 43 US states, he studies how changes in institutions, in particular restrictive versus nonrestrictive annexation laws, influence municipal expenditures and employment. Municipalities operating under municipal-determination annexation laws are not found to experience significantly different growth rates in costs and employment per resident from that of cities operating under annexation laws that imposed a greater number of barriers to annexation.

12.5.2 Scale Efficiency of Belgian Municipalities

We now briefly turn to a rather under-explored issue in municipal performance gauging, i.e., the question of scale efficiency. The data set is the one described earlier in Section 12.4 of the chapter. Results using FDH and DEA type of technologies are reported in Tables 12.5 and 12.6.[7] Average scale efficiency based on FDH is estimated at about 0.77, which is much lower than average technical efficiency.[8] In the DEA-model the opposite is observed: average scale efficiency is larger than average technical efficiency. These differences between FDH and DEA should be interpreted in view of different maintained assumptions. A second finding is that the FDH analysis suggests that an overwhelming majority of Belgian municipalities seem to be operating under decreasing returns to scale (84%). Only 6% of municipalities enjoy increasing returns to scale, while about 10% are situated in a region of constant returns. For DEA the results are qualitatively similar, but slightly more extreme (93%, 5% and 2% operates under decreasing, increasing and constant returns to scale, respectively). Attaching most weight to the FDH findings, this implies that the poor performance of Belgian municipalities can only be partly remedied in the short run by improving management. More fundamental, structural solutions require reconsidering the current scale of production.

Table 12.5

TECHNICAL (TE) AND SCALE EFFICIENCY (SCE) RESULTS

	FDH		DEA	
	TE	SCE	TE	SCE
Average	0.94	0.77	0.78	0.85
Standard deviation	0.12	0.16	0.17	0.15
Minimum	0.44	0.20	0.32	0.18
Number of efficient observations	391	57	64	14

Table 12.6

RETURNS TO SCALE RESULTS PER TYPE OF TECHNOLOGY

	FDH		DEA	
	Number	%	Number	%
Increasing returns to scale	36	6.11	28	4.75
Constant returns to scale	57	9.68	14	2.38
Decreasing returns to scale	496	84.21	547	92.87

These scale findings are in line with parametric Cobb-Douglas and DEA results reported in Vanden Eeckaut, Tulkens and Jamar (1993) for the Walloon region. More recently, Vanden Eeckaut (1997) reported similar FDH-based scale results for the same region. However, the results are not necessarily consistent with the interesting conclusion reported in Moesen (1990). In his study of the 1977 municipal territorial reform (i.e., a merging operation of on average four to five municipalities to one), he concludes that this operation was successful in terms of reducing municipal costs per capita. Although this may have been the case, our evidence, based on a different data set and a different time period, suggests that this reform operation may have created entities that are too large, on average. Casual evidence in favor of this view, though it definitely merits further study, is that Belgian municipalities are, in terms of population, on average among the bigger ones in Europe (see Moesen 1990). The only other study reporting scale findings is Conceição Sampaio de Sousa and Ramos (1999) who find for Brazil exactly the opposite problem: most municipalities are far too small. Clearly, there is a definite need for additional studies to clarify this matter.

12.5.3 Efficiency of Municipalities in the Provision of Specific Local Services

In addition to studies of the global performance of municipalities, a series of contributions has explored the efficiency of specific municipal services. They are briefly summarized in Table 12.7, together with a number of relevant international studies. The selection of papers is quite restrictive; in certain areas many more articles are available. Though it is clear that not all local goods and services have been covered in the literature, there are studies in existence on waste collection, public libraries, green services, police, civil registries, etc.[9]

Table 12.7

PERFORMANCE IN SPECIFIC MUNICIPAL SERVICES: DESCRIPTION OF FRONTIER MODELS AND KEY RESULTS

	Database Sample Size Country	Frontier Method	Inputs (I) Outputs (O)	Key Results
Waste Collection				
Burgat and Jeanrenaud 1990, 1994	Cross-section Survey 1987 N = 98 Switzerland	COLS FDH (primal)	Labor in hours I Capacity (m3) I Tons/year O	- distance between collection and disposal site influences TE negatively (COLS) - TE (inputs): 67 inefficient municipalities with range 0.33-0.98 (ibid. for output orientation)
	Cross-section Survey 1987 N = 88 Switzerland	COLS (dual)	See above	- cost efficiency for 53% of DMUs within range 0.4 and 0.6 - impact environmental variables: outsourcing to private companies increases cost efficiency (e.g. by reduced wages). Using user charges (instead of general revenue) has the same effect for smaller municipalities
Courcelle, Kestemont, Tyteca and Installé 1998	Panel 1990-1994 N = 9 programs Different European countries	FDH	Extra cost of waste management program I Diversion ratio (% material recovered) O Residue ratio (% residue in sorting process) O	- 5 to 12 efficient observations depending upon specification
Distexhe 1993	Cross-section 1990 N = 176 municipalities Belgium	DEA-VRS, FDH and costfunction	Labor in hours I Capacity I Tons/year O Frequency O	- mean TE (inputs) = 0.72 for 2I/2O DEA model - results TE depend on specification of production process - private companies and competitive tendering increase TE

Police

Davis and Hayes 1993	Cross-section 1982-1986 N = 141 IL municipalities USA	Stochastic parametric cost frontier	1/per capita crime rate O Labor price I Capital price I Community median income E % minorities E % high school graduates E	- mean CE: 0.76 - high tax rates increase CE - population size affects CE nonlinearly - high homeownership increases CE - urban status and mayor versus city manager have no impact
Grosskopf, Hayes and Hirschberg 1995	Time Series 1977-1987 Monthly data Dallas Police Dept. USA	Deterministic parametric input distance frontier	Corrected arrest rates for car theft O Corrected arrest rates for murder O Reported car thefts I Reported murders I Police officers I Sergeants I Civilians I	- estimated shadow price ratios relative to observed prices ratios indicate AE - budget tightening and escalating crime rates improved allocative inefficiencies early in the period
Hayes and Wood 1995	Cross-section 1982-1986 N = 319 IL municipalities USA	Stochastic parametric money metric utility frontier	Police expenditures O Uniformed labor price I Civilian labor price I Capital price I	- CE: mean = 0.96 - less inefficiency in rural areas - high % of owner occupied housing yields less inefficiency - other potential determinants like education and tax rates are insignificant

Road Maintenance

Deller and Nelson 1991	Cross-section 1984 N = 446 USA (IL, MI, WI)	DEA-VRS	Personnel I Road graders I 1-axle trucks I Surfacing material I Length roads (3 types) O	- mean TE (inputs) = 0.975 (radial) & 0.488 (non-radial) - mean SE (inputs) = 0.691 - mean AE (inputs) = 0.349 - positive relation between size and efficiency
Deller and Halstead 1994	Cross-section 1987 and 1990 N = 104 USA	Stochastic parametric cost frontier	Personnel I Road graders I 1-axle trucks I Length roads (3 types) O	- increasing returns to scale - mean cost E (inputs) = 0.594 - 50% of observations is in range 0.40-0.75 - decision makers with formal training perform better

Road Maintenance

Hjalmarsson and Odeck 1996	Cross-section 1983-1985 N = 72 departments Norway	DEA-CRS DEA-VRS	Labor Cost I Energy Cost I Cost Rubber Materials I Maintenance Cost I Vehicle-km O [alternative: Effective production time O]	- mean TE (inputs) = 0.76 for Vehicle-km and 0.88 for Effective production time - mean SE (inputs) = 0.85 for Vehicle-km and 0.94 for Effective production time - no differences between brands and age of vehicles - regional differences in terms of climate (snowclearing in the inland)

Civil Registry

Bouckaert 1993	Cross-section 1989-90 N = 11 regional cities Belgium	FDH	Personnel I Delivered documents O [alternative: Population O]	- 3 cities are technically inefficient - mean TE (inputs) = 0.839 for Delivered documents and 0.913 for Population[4] - quality indicator little effect

Fire Services

Bouckaert 1992	Cross-section 1987 N = 13 regional cities Belgium	FDH	Tot. Expenses I Fire related interventions O [alternative: Other emergency interventions O]	- 5 to 6 cities are cost inefficient - mean CE (inputs) = 0.919 for fire-related interventions and 0.963 for all emergency interventions[2]

Public Libraries

Depré, Bouckaert and De Smet 1991	Cross-section 1990 N = 11 regional cities Belgium	FDH	Labor in hours I Loans and inter-library loans O	- mean TE (inputs) = 0.94[2] - 3 cities are technically inefficient and also deliver a poor quality (quality indicator in terms of location, opening hours, etc.)
Vitaliano 1997	Cross-section 1992 N = 235 public libraries (72 municipal ones) USA	Stochastic parametric cost frontier	Labor Cost I Total circulation O Total hours opened O New collection O	- mean TE (inputs) = 0.79 - government run libraries are more efficient - % of local funding and gifts has a negative effect

Green Services			
Cross-section	FDH	Labor Cost I	- 4 to 5 cities are technically inef-
1990		Surface in ha	ficient depending on whether
N = 11 regional cities		(weighted by frequency) O	temporary (subsidized)
Belgium			personnel is included or not
			- mean TE (inputs) = 0.89/0.85
			with/without temporary
			personnel[a]
			- quality indicator little effect

(left margin, rotated: Depré, Bouckaert and Wijns 1991)

a   *Own calculations.*

With few exceptions, the Belgian contributions are best considered case studies because of their small sample sizes. Examples of this approach include Bouckaert (1992, 1993), Depré, Bouckaert and De Smet (1991), Depré, Bouckaert and Wijns (1991), and Courcelle, Kestemont, Tyteca, and Installé (1998). Most of these studies are based on a small sample of medium-sized Flemish cities and study their efficiency in the provision of fire services, civil registration services, in the operation of municipal libraries, and in the supply of green services. They have the merit of considering the production process in quite some detail and thereby provide interesting information for the municipalities. In fact, some of these studies, e.g. Bouckaert (1993), were validated by the benchmarked units and led to effective behavioral changes. But given the small sample sizes, these studies deliver limited general information on underlying causal mechanisms.

In addition, they are useful from another perspective, viz., they confirm the intrinsic difficulties of evaluating municipal performance. Probably the best example is Bouckaert (1994), who, in a follow up study to Depré, Bouckaert and Wijns (1991), analyses in great detail the functioning of green services in 11 regional cities in Belgium. Enumerating in great detail their activities, he observes an enormous heterogeneity in the amount provided (e.g. whether the unit buys or grows its own plants, whether it is responsible for green inside municipal buildings or not, etc.) and in the organization of these services (e.g. whether all or parts are outsourced). This microscopic view reveals the large number of decisions that underlie aggregate behavior that may not be observable in terms of inputs (labor, capital, etc.) or costs.

The only Belgian study that is based on a relatively large sample of municipalities is Distexhe (1993). She investigated waste collection in the Walloon region (the French speaking region of Belgium) using FDH, DEA, and econometric approaches. Interestingly, she finds that both private provision of waste collection services and a for-

mal process of competitive tendering increase efficiency. Her results are broadly consistent with e.g. Burgat and Jeanrenaud (1990, 1994) and Tickner and McDavid (1986), who also indicate that contracting out is more efficient.

Some systematic findings in this more focused literature can be linked to the global performance evaluation above. For example, in view of the Belgian results it is interesting to note that Davis and Hayes (1993) found strong evidence of a positive relation between tax rates and monitoring effort in the US police system. This suggests that the impact of tax rates on efficiency might indeed be related to monitoring. The same study confirmed the earlier results that mayors versus city managers forms of government have no impact on efficiency.

12.6   WHAT HAVE WE LEARNT AND WHAT REMAINS TO BE DONE?

This chapter has emphasized the necessity and the difficulty of global performance evaluation at the level of municipal governments. While in our view the global efficiency measures should not be used for ranking individual municipalities or to formulate policies towards specific local services, the attempts to unveil causal mechanisms is certainly worth going for. However, despite huge problems in defining proper inputs and outputs of the municipal production process some consistent results do follow from the available empirical studies. At the global level the fiscal revenue capacity, the financing mechanisms of local governments, the political characteristics of local governments and the political participation of the local population all are important determinants of efficiency. Specifically, we consistently found that citizens' average income and the size of per capita grants negatively affect municipal performance. Local tax rates and the educational achievements of the population stimulate efficiency. Moreover, it was shown that political factors are important as well.

As to the Belgian literature on specific municipal services which have been subjected to performance gauging, it seems clear that their analysis so far has contributed more to managerial remedies than to a general body of knowledge about causal influences. However, both the analysis of the global and specific performance of municipal services is seriously hampered by the lack of readily available data. Both Bouckaert (1996) and Moesen (1994) emphasized the poor situation in Belgium with respect to performance auditing. Bouckaert and Van Reeth (1998) underline that the Flemish region at least accepted the principle of moving towards a performance-centered budgeting and auditing process, but that other countries are moving faster in this respect. Only when a performance perspective will be ingrained into the public sector, the data will become

available to comprehensively assess municipalities as well as other parts of the public sector.

We conclude by pointing to three important avenues for further research. First, so far no published study used panel data to trace down the evolution of global municipal performance over time. This could provide a firmer test ground for the suggested causal links. Second, a fundamental question that hitherto received too little attention is about the proper production model for municipalities, and public sector organizations in general. It has specifically been argued that the cost indirect output correspondence is well suited to model public sector behavior. It assumes that organizations maximize outputs, but, by including a budget constraint, it recognizes that most organizations have some degree of freedom in choosing their input mix. Recent applications of this indirect production model in the public sector include Blank, Eggink and Merkies (1998), Glass, McKillop and O'Rourke (1998), Grosskopf, Hayes, Taylor and Weber (1997) and Chapters 4 and 6 of this volume. Clearly, more work needs to be done to assess its merits and drawbacks.

Finally, most studies have focused rather narrowly on performance gauging. A fruitful area for future research is to integrate performance measurement into more general planning procedures at the local and regional level. A first effort in this direction is available. Indeed, a recent study (Athanassopoulos 1995) integrated the application of frontier methods into a planning model including equity concerns and resource constraints. It links DEA models to multi-level planning problems and applies the model to a sample of Greek local authorities. It evaluates municipal efficiencies, meanwhile accounting for equity and effectiveness objectives and common resource constraints (in this case intergovernmental transfers) at the aggregate level.[10] More research in this field may over time result in a much-needed practical policy instrument.

NOTES

[1]   We thank J. Blank for his detailed comments. We bear sole responsibility for the final text.

[2]   Note that some of the disadvantages of decentralization can be reduced or even eliminated by the introduction of centralized tax collection, by imposing certain restrictions on local tax rates, and by the introduction of a grant system from higher to lower level governments.

[3]   For Belgium, the variability in the expenditure shares of nine functional categories of local services, covering a wide variety of the above functions, has recently been studied in Bastiaens, De Borger and Vanneste (1999).

[4]   A highly indirect way to evaluate final welfare effects of municipal services is to assess their performance by comparing aggregate property values among municipalities (Grossman, Mavros and Wassmer, 1999). This assumes the desirability of the municipal mix of services is fully capitalized into the value of the stock of housing and other properties. In a somewhat similar vein, Prieto and Zofio (2000) recently combine need variables (population and housing) with detailed direct outputs to assess the provision performance of Spanish municipalities. Assuming that the state applies the same financing rules to each demand by municipalities, differences in provision indirectly reveal eventual differences in efficiency in production.

[5]   De Borger, Kerstens, Moesen, Vanneste (1994) studied technical efficiency on the basis of a three input-five output model. The inputs included white-collar staff, blue-collar workers and capital services (crudely proxied by the surface of buildings owned by the municipality). The outputs were as defined above, except that the two population variables were replaced by the surface of municipal roads and a proxy for the services delivered to residents of other municipalities. so as to capture spillovers of local services to other municipalities.

[6]   If the assumption of identical input prices were not valid, then Färe and Primont (1988) show that our estimates of cost efficiency would provide a lower bound to the true technical efficiency.

[7]   To avoid conflating scale and technical efficiencies, scale efficiency is defined as the ratio between an efficiency measure calculated on a constant returns to scale technology and one computed on a variable returns to scale technology. The constant returns to scale model provides a long run competitive equilibrium benchmark. The volume of the resulting production possibility set is always larger (never smaller) than in the variable returns to scale case. Qualitative scale information can be obtained by further comparing these technologies to a third, non-increasing returns to scale technology. Traditionally, this is done using non-parametric, convex DEA technologies, but Kerstens and Vanden Eeckaut (1998) developed an analogous method based on FDH-based technologies. We prefer the latter method given its weaker assumptions, although, for comparative purposes, we also report the DEA findings.

[8]   Computing scale efficiency using costs instead of proper inputs yields normally different results. Färe and Grosskopf (1985) indicate conditions under which these dual and primal approaches to scale efficiency coincide.

[9]   Additional studies and new results for police efficiency can also be found in Chapters 10 and 11. One topic we will pay no attention to education, since no studies are available for the Belgian case. Existing studies on school performance are summarized in Chapters 7 to 9.

[10] In the same vein, but less systematically, Ali, Lerme and Nakosteen (1993) used DEA to assess US municipalities in terms of both their needs and fiscal efforts in order to suggest changes in the current patterns of inter-governmental transfers.

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13 EFFICIENCIES IN UNITED STATES METROPOLITAN AREAS

Harold O. Fried and J. Douglas Klein [1]

13.1 INTRODUCTION

The Capital Region of New York State is one of 332 metropolitan areas (MAs) in the United States. People, resources and firms are free to move among these and other areas of the country. This implies that just as firms compete, so do locations, as people and businesses vote with their feet. The result is that some locations benefit and thrive, whereas others lose and decline.

There are numerous determinants of regional economic growth. Some are outside the control of government (exogenous), and others can be influenced by government action (endogenous). Very few variables are purely exogenous, perhaps the best example is the weather. However many variables are more or less exogenous, depending upon the time frame. With enough time, government can influence many of the major determinants of growth and location choice, such as taxes, utility costs, recreational amenities, education, transportation services, and so on.

Given competition between regions, prosperity, growth and even survival depend upon government actively striving to provide the most attractive environment for people to live and for firms to do business (Dilorenzo 1983). The stakes are high: failure to act will result in losses to other areas. The objective of this paper is to demonstrate an approach a region can use to identify policies to improve the effectiveness of the provision of government services. This approach is applied to the Capital Region of New York State.[2]

Often with the assistance of external consultants or professional associations, government agencies monitor performance using a long list of partial productivity ratios.[3] Conferences and journals are devoted to the search for the best partial productivity performers around the world. The underlying premise is that these stellar performers