

Local municipality productive efficiency and its determinants in South Africa

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This paper assesses the technical efficiency of 231 local municipalities in South Africa for 2007 and investigates the potential determinants of efficiency gaps using the non-parametric data envelopment analysis technique. Efficiency scores are explained in a second-stage regression model using a Tobit regression model. To the best of our knowledge, this is the first attempt, using such a technique, to assess technical efficiency at the local government level in the African context. The results show that, on average, B1 and B3 municipalities could have theoretically achieved the same level of basic services with about 16% and 80% fewer resources respectively. Furthermore, fiscal autonomy and the number and skill levels of the top management of a municipality's administration were found to influence the productive efficiency of municipalities in South Africa. Perhaps most importantly, the results depict a bleak picture of the democratic behaviour at the local level in South Africa. It appears that higher income and highly educated households do not feel the incentive to be active participants in public decision-making processes. The paper findings raise concerns over the future of local municipalities in the country, especially about their capability to efficiently deliver expected outcomes on a sustainable basis.

Keywords: municipalities; spending efficiency; sub-national government finance; fiscal decentralisation; data envelopment analysis; Tobit

1. Introduction

The traditional consensus in the theory of fiscal decentralisation generally emphasises that the devolution of expenditure responsibilities and revenue powers from a higher level of government to sub-national levels of government are bound to improve accountability, responsiveness, good governance, and higher efficiency levels of service delivery as local governments would provide goods and services according to their constituents' wishes and as the assignment of functions and allocations of resources would take into account economies of scale and jurisdictional spillovers.

However, in South Africa, the process of fiscal decentralisation has yet to produce the expected results. Specifically, in recent years South Africa has been experiencing growing dissatisfaction with service delivery at the local level. In fact, local municipalities in South Africa have hitherto been plagued by significant service delivery and backlog challenges, poor financial management, corruption, and poor capacity due to lack of skills. This situation resulted in a great number of local municipalities in financial distress and a loss of confidence and trust in local governments. The problems and challenges faced by local municipalities in South Africa are so crucial and alarming that questions have been raised concerning their

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capability to efficiently deliver on expected outcomes on a sustainable basis. Furthermore, and perhaps most alarmingly, the necessity to envisage a reverse tendency toward centralisation was proposed as a possible panacea.

With this background in mind, the objective of the paper is two-fold: to analyse the productive or technical efficiency of municipal service delivery in South Africa (i.e. to identify the most efficient local municipalities in the country in terms of providing the best possible public local services at the lowest possible cost); and to investigate the empirical determinants of local spending efficiency in order to draw policy conclusions about efficiency and effectiveness in local service delivery in South Africa. While allocative efficiency ensures as close a match as possible between public services and local needs and preferences, productive or technical efficiency, on the other hand, ensures that the best possible or the maximum local public services (i.e. outputs) are provided at the lowest possible cost (i.e. inputs) (Black, Calitz, & Steenekamp, 2009; PREM Notes, 2001).

This paper therefore assesses the spending efficiency of 231 local municipalities in South Africa for 2007 using the non-parametric data envelopment analysis (DEA) technique. Efficiency scores are explained in a second-stage regression model with potential explanatory factors such as income, education, and job vacancy using a Tobit regression model. The results show that, on average, B1 and B3 municipalities could have theoretically achieved the same level of basic services with about 16% and 80% fewer resources respectively; the difference between the most efficient and the least efficient municipalities being quite substantial. The results also show that B4 municipalities could have theoretically achieved the same level of basic services with about 62% fewer operating expenditures. Furthermore, fiscal autonomy and the number and skill levels of the top management of a municipality's administration were found to influence the productive efficiency of municipalities in South Africa.

The remainder of the paper is organised as follows: Section 2 outlines the structure and scope of the local government sector in South Africa. Section 3 reviews the municipal spending efficiency literature. Section 4 describes the empirical data and their sources as well as the empirical methodology used in the analysis. Section 5 discusses the empirical results obtained. Finally, Section 6 contains concluding remarks and potential policy implications of the analysis conducted.

2. Structure and scope of the local government sector in South Africa

The 1996 Constitution of the Republic of South Africa divided the country into three spheres of government: national, provincial, and local governments. These spheres operate through a bifurcated structure of government establishing direct relations and responsibilities between national government and provinces, on the one hand, and between national government and local governments on the other, thus creating two separate spheres of sub-national governments in South Africa. However, as stated in the Constitution, these spheres of governments are 'distinctive, interdependent, and interrelated' (section 40(1), Constitution of the Republic of South Africa, 1996, Act No. 108 of 1996).

After the 1996 Constitution and the 1998 Local Government Municipal Structures Act, local governments in South Africa were divided into three tiers or categories, namely: metropolitan municipalities (category A), which exclusively cover the large urban areas; local municipalities (category B), which cover smaller and medium-sized

jurisdictions located primarily in urban areas; and district municipalities (category C), which geographically cover several local municipalities. Their main purpose was clearly defined in section 153 of the Constitution (Constitution of the Republic of South Africa, 1996, Act No. 108 of 1996) and was to ‘structure and manage their administration and budgeting and planning processes to give priority to the basic needs of the community, and to promote the social and economic development of the community, and participate in national and provincial development programmes’ (Bahl & Smoke, 2003; Smoke, 2000).

Following the local government elections of 18 May 2011, the Municipal Demarcation Board changed the number and the geography of municipalities in South Africa. Currently, the local government structure consists of eight metro municipalities, 44 district municipalities, and 226 local municipalities.

The fiscal decentralisation provisions in the 1996 Constitution led to the devolution of substantial powers, functions, and duties to local governments in South Africa. The key service delivery municipal functions include water and sanitation services (potable water supply systems, domestic waste-water, and sewage disposal), refuse removal, electricity, roads, and storm water management. This assignment of powers and expenditure functions considerably varies within and across categories of municipalities, with municipalities in large urban areas with greater ability and capacity to provide an extensive range of services and with some category B and category C municipalities with limited ability to independently render few basic services (Smoke, 2000).

In terms of revenue assignment, local governments are granted a number of their own revenue sources by the Constitution in order to effectively carry out decentralised functions (section 229 of the Constitution of the Republic of South Africa, 1996, Act No. 108 of 1996). They are mainly dependent on two own sources of revenue: rates on property, and surcharges on fees for services provided by or on behalf of the municipality. They could also rely on other taxes authorised by national legislation with the exception of income tax, value-added tax, general sales tax, and customs duties. Overall, municipalities in South Africa are largely self-financing in that they raised a significant share of their revenue through the above-mentioned own sources of revenue. For example, during the 2008/09 and 2009/10 financial years, municipal own revenues amounted to 77% and 78% of total municipal operating revenue respectively – although these aggregate figures do not reflect the variations across municipalities (National Treasury, 2003/04–2009/10).

Additionally, the Constitution also entitles municipalities to an equitable share of national revenues to assist them in providing basic services to poor households (section 214 of the Constitution). The structure of the local government equitable share formula and its components are determined and updated each year in the Division Revenue Bill in its Annexure W1 to the Budget Review (Part 5). Revenues raised by the national government are also transferred to municipalities through conditional and unconditional grants.

According to a report produced in 2009 by the department of Cooperative Governance and Traditional Affairs (CoGTA, 2009), the overall state of local government in South Africa is not satisfactory or promising to say the least (CoGTA, 2009). However, it is important to keep in mind that there is a tremendous disparity within and across municipalities, economically and politically, and in terms of location (urban versus rural), topography, performance, and capacity (whether human resource, financial, and institutional). In

general, challenges faced by municipalities in South Africa mainly arise due to service delivery failures stemming from huge backlogs, inadequate revenue collection, corruption and fraud, poor financial management systems, and lack of high-skilled personnel.

In this context, it is essential to empirically revise the productive or technical efficiency of municipalities and its determinants in South Africa. The results of such an exercise will contribute to the understanding of contributory external and internal factors influencing the effectiveness and capability of municipalities in the country and will therefore help inform policy decisions aimed at improving local service delivery. An important challenge for South Africa would be to develop a comprehensive reform blueprint in its system of fiscal decentralisation that would best fit its very diverse local government landscape (Bahl & Martinez-Vazquez, 2006; UNDP, 2005).

3. Literature review and empirical methodology: The non-parametric data envelopment analysis

One of the most important end results of a sound fiscal decentralisation system would be the establishment of democratic and accountable municipalities closer to the people and equipped with substantial autonomy and resource to efficiently satisfy sub-national variations in the needs and preferences of their constituents (Boex, Martinez-Vazquez, & Timofeev, 2004). This pressure for efficiency – not only allocative, but technical or productive – in the provision of local government services is one of the greatest expectations of a sound fiscal decentralisation process (UNDP, 2010; Martinez-Vazquez, 1998).

3.1 Assessment of local government efficiency in the existing literature

This quest for efficiency in the provision of local public services however, has yet to generate a substantial body of literature. The scant empirical literature assessing the quality of local service delivery has primarily focused on productive or technical efficiency, while very few studies have attempted to address allocative efficiency in service delivery (Smoke, 2001).

In the literature, the measurement of the relative productive efficiency of a set of producers or decision-making units (DMUs) in general requires a variety of feasible and identical inputs and identical outputs used by these DMUs. In general, the best-performing DMUs in the set would have an efficiency score of one, while the performance of other DMUs would vary between zero and one relative to this best performance (Murillo-Zamorano, 2004; Ramanathan, 2003).²

Specifically, when assessing productive or technical efficiency in local service delivery, most empirical studies in the existing literature have used total current expenditures as municipal inputs (i.e. resources used in the provision of local services). As a measure of municipal outputs, while some studies have aggregated various municipal services into a single measure of municipal performance, other studies have evaluated one specific local service.³

²The efficiency scores estimated will be relative to the best performing or the most efficient DMU(s) (Ramanathan, 2003).

³See Afonso & Fernandes (2008) for a review of this literature.

Most of these previous studies have used the non-parametric frontier model or DEA technique to measure how efficiently a municipality would make use of the resources available (inputs) to generate a set of outputs. In a general frontier model, a production function frontier is estimated and efficiency scores are derived by measuring the relative distance of inefficient observations (located inside the frontier) from the observations located on the efficiency frontier that are considered technically efficient (Murillo-Zamorano, 2004; Farrell, 1957). A production frontier reflects the maximum output attainable by a given sets of inputs and existing production technologies. Technical efficiency is defined in terms of a maximum level of output produced from a given set of inputs (output orientation) or of a minimum amount of inputs used to produce a given level of output (input orientation) (Kokkinou, 2009).

In the DEA, the functional form of the efficient production frontier is not pre-established; that is, the functional relationship between inputs and outputs (or the production function) needs not to be predefined, but is calculated via a mathematical programming model or an econometric technique applied to a sample of observed data. From this sample of observed data, a frontier envelopment surface is defined and the DMUs (or local municipalities) that lie on that surface are termed productively efficient and are assigned a value or an efficiency score of one. Alternatively, the DMUs that do not lie on that surface are considered productively inefficient and an inefficiency score of less than one will then be calculated for each one of them (Murillo-Zamorano, 2004; Ramanathan, 2003).

Boetti et al. (2010), Kokkinou (2009), Afonso & Fernandes (2008), and Murillo-Zamorano (2004) provide a comprehensive overview of the mathematical foundations of the non-parametric DEA used in the present study.

In a study assessing the efficiency of Portuguese municipalities, Afonso & Fernandes (2008) for the most part adopted a similar methodology. In particular, they used per-capita municipal expenditures as a measure of municipal inputs, and as a measure of municipal outputs they constructed a composite local government output indicator that globally assesses various municipal services such as social services, basic education, cultural services, sanitation, territory organisation, and road infrastructures.

Boetti et al. (2010) conducted a similar study for Italian municipalites. They used measures of output indicators that are proxies for services, and expenditure functions that are in general exclusively assigned to local governments in Italy. Such services include the total length of municipal roads, amount of waste collected, total number of pupils enrolled in nursery, primary and secondary schools, and total number of people over age 75. With regard to measures of inputs, they departed from the existing literature in that they used disaggregated current expenditures in general administration, road maintenance and local mobility, garbage collection and disposal, education, elderly care and other social services, rather than a measure of current expenditure as a whole. They applied a parametric frontier model or stochastic frontier analysis approach in addition to the DEA technique to compute efficiency scores. Unlike parametric stochastic frontier techniques that allow for a clear distinction between the effects of random noise and the effects of inefficiency, the DEA technique does not take into consideration the usual random noise or, rather, considers random noise as part of the efficiency score, assuming that all deviations from the efficient production frontier are under the control of the DMU.

In the case of South Africa, the Financial and Fiscal Commission conducted a free disposal hull analysis of the efficiency of local municipality expenditure (Financial and Fiscal Commission, 2011). The report measured the efficiency of local municipalities and assessed the changes in efficiency over a four-year period from the 2005/06 to 2008/09 financial years. The report used municipal operating expenditure as a proxy for municipal input costs. Service-level data for water, sanitation, electricity, and refuse removal as well as total population were used as measures of municipal outputs.

3.2 Assessment of the determinants of local government efficiency in the existing literature

Most studies assessing the determinants of local efficiency would initially focus on estimating the level of technical efficiency for all municipalities using the DEA, the stochastic frontier analysis, or the free disposal hull (FDH) techniques. Subsequently, efficiency scores would be explained in a second-stage analysis by means of a Tobit regression model. The rationale behind the use of two-stage or even three-stage analyses is that both non-discretionary and discretionary inputs jointly contribute to outputs and, when using only the standard DEA technique, efficiency scores are calculated by taking account of only controllable or discretionary local inputs and outputs; therefore ruling out the role of non-discretionary inputs (Murillo-Zamorano, 2004).⁴ As a result, a second-stage analysis is required to account for non-discretionary inputs; that is, inputs outside the control of municipalities that might influence their productive efficiency.

The literature on the determinants of technical efficiency in the provision of local public service has also been equally restricted. The majority of existing studies investigated the role played by various socio-economic, political, and geographical location variables in local efficiency (Boetti, Piacenza, & Turati, 2010; Afonso & Fernandes, 2008).

In particular, levels of education (of the adult population), large-scale population, level of commercial activity, and density of the urban structure in general were found to be positively significant in explaining efficiency, while per-capita income, number of coalition parties, and level of unemployment were found to reduce local productive efficiency.⁵ With regard to location, Loikkanen & Susiluoto (2005) found that municipalities located at the periphery tend to have a lower efficiency in their service provision.

On the other hand, few studies have attempted to examine the effects of fiscal decentralisation on local government spending efficiency (Boetti, Piacenza, & Turati, 2010; Afonso & Fernandes, 2008). The various measures of fiscal decentralisation used in that literature involved factors that were found to have a positive impact on efficiency and factors that negatively affected efficiency (Afonso & Fernandes, 2008). Specifically, local tax rates were found to have a positive impact on efficiency in Belgian municipalities (De Borger & Kerstens, 1996; Van den Eeckaut, Tulkens, & Jamar, 1993) while per-capita tax revenues in Spain were found to have a negative

⁴According to Afonso & Fernandes (2008), discretionary inputs are those inputs whose quantities can be changed at the will of municipalities. The standard DEA model takes into consideration only these inputs while ignoring local socio-economic and demographic factors that are relevant in explaining performance outputs but are not within the control of municipalities.

⁵For a review of literature in that regard, please refer to Afonso & Fernandes (2008).

impact (Balaguer-Coll, Prior-Jimenez, & Vela-Bargues, 2002). Overall, most of these studies found that grants reduced the spending efficiency of municipalities while the share of fees and charges in municipal income and the share of local investment in total expenditures seemed to improve local efficiency (Athanasopoulos & Triantis, 1998).⁶

In 2008, Afonso and Fernandes (2008) found that socio-economic factors such as the level of education of the population, the purchasing power reflecting the impact of per-capita income and the wealth of citizens, and the geographical distance to the main decision centres tend to influence the performance outcomes of municipalities in Portugal. They argued that inter-municipal competition represented by the geographical distance between a municipality and its capital of district would provide greater choice to mobile citizens to move across jurisdictions that would provide the level and quality of public services they desire. As such, inter-municipal competition would provide an incentive to local official to reduce inefficiency (Boex, Martinez-Vazquez, & Timofeev, 2004; Tiebout, 1956). This hypothesis was confirmed in Afonso and Fernandes' (2008) study.

More recent research based on Italian municipalities highlighted the importance of tax decentralisation and the 'electoral budget cycle' argument in assessing local spending efficiency (Boetti, Piacenza, & Turati, 2010). Boetti, Piacenza and Turati (2010) measured tax decentralisation as a share of current spending covered by own local taxes. Their research supported the traditional fiscal decentralisation theory, according to which with revenue autonomy – which requires control over one's 'own' sources of revenue – local governments would match taxes paid with benefits received to the extent possible and would be more accountable; thus improving both the efficiency and the effectiveness of public services (McLure, 2007; Bird, 2001). The authors' findings were also in line with the 'electoral budget cycle' argument, which asserts that when closer to new elections, incumbent politicians tend to inefficiently increase spending to boost their chances to be re-elected. They also found that other factors such as age and gender of the mayor do not seem to have an effect on spending efficiency levels.

In the case of South Africa, a cross-sectional Tobit regression model was used in a second-stage analysis to identify factors that would have an impact on the computed efficiency scores for the 2008/09 financial year (Financial and Fiscal Commission, 2011). Results showed that fiscal capacity, measured as local taxes as a percentage of total revenue, had a negative impact on efficiency. This result goes against general theory and possibly highlights the large economic disparities across municipalities in the country. Additionally, the financial capacity of municipalities as well as the capacity and skills of municipal managers appeared to be important in improving municipal efficiency. The results also showed that the methods used in providing services and free basic services have a significant impact on efficiency.

4. Analysis of the efficiency performance of local municipalities in South Africa

After December 2000 local government elections in South Africa, municipalities were classified into seven groups: municipalities A, B1, B2, B3, B4, C1 and C2 (see Table 1).

⁶Most of the studies that examined the effects of grants on the local government spending efficiency found that they limited the efficiency of municipalities in the delivery of local public services (Van den Eeckaut et al., 1993; De Borger & Kerstens, 1996; Athanasopoulos & Triantis, 1998; Balaguer-Coll et al., 2002; Loikkanen & Susiluoto, 2005).

Table 1: Classification of municipalities in South Africa

Category	Description
A	Metropolitan municipalities: large urban complexes with populations over one million and accounting for 56% of all municipal expenditure in the country
B1	Local municipalities with large budgets and containing secondary cities
B2	Local municipalities with a large town as a core
B3	Local municipalities with small towns, with relatively small population and a significant proportion of urban population but with no large town as a core
B4	Local municipalities that are mainly rural with communal tenure and with, at most, one or two small towns in their area
C1	District municipalities that are not water service authorities
C2	District municipalities that are water service authorities

Source: Adapted from CoGTA (2009).

This system of categorisation was established to highlight the great disparity within and across municipalities in terms of the conditions and challenges they face in fulfilling their service delivery obligations as outlined in sections 152 and 153 of the 1996 Constitution.⁷ As a result, municipalities within the same cluster would share similar challenges in terms of revenue mobilisation, urbanisation, immigration, unemployment, poverty, and human resource and institutional capacity (CoGTA, 2009).

In this context, it appears essential to disaggregate the efficiency analysis following this typology in order to account for these wide disparities.

According to the Financial and Fiscal Commission (2011), district municipalities are in general only authorised to provide water and sanitation services, while metropolitan and local municipalities are authorised to provide all four basic services: water, sanitation, electricity, and refuse removal. For this reason, the analysis of local efficiency will exclude district municipalities (i.e. municipalities C1 and C2).⁸

Additionally, as explained in detail in the subsequent sections, metropolitan municipalities (i.e. municipalities A) are also excluded from the study because the Municipal Demarcation Board's capacity assessment is not done at the metropolitan municipality level and therefore data useful for this research are not collected at that level.

As a result, this paper analyses the relative production efficiency of 231 South African local municipalities in 2007 within each of the four municipal clusters, namely B1, B2, B3, and B4.

⁷Section 152 of the Constitution states that the objects of local government are: 'a. to provide democratic and accountable government for local communities; b. to ensure the provision of services to communities in a sustainable manner; c. to promote social and economic development; d. to promote a safe and healthy environment; and e. to encourage the involvement of communities and community organisations in the matters of local government'.

⁸There is an asymmetrical approach to service delivery in South Africa whereby a municipality might be either authorised to provide a service or not. This service delivery arrangement results in differences in the nature and level of municipal expenditure. This may skew the results, especially for B4 municipalities where local municipalities tend not to be authorised to provide water and sanitation functions because district municipalities have that authority (Financial and Fiscal Commission, 2011).

4.1 Input and output measures of local service delivery in South Africa

The most recent and comprehensive socio-economic and demographic data in South Africa is reported by the Statistics South Africa (StatsSA) 2007 Community Survey. This fact restricts the local efficiency analysis in this paper to the year 2007 and to the demarcations of municipal boundaries prevailing during that year. Municipal data are reported by the StatsSA Non-Financial Census (NFC) of municipalities. The National Treasury's local government budget database (preliminary in-year figures) and the Municipal Demarcation Board's Capacity Assessment both provide municipal financial data and other municipal-related data such as the qualification of the municipal administration's managers.

Following Boetti et al. (2010), municipal outputs that are selected in this paper are proxies for the main basic services that local governments are mandated to provide under Schedules 4B and 5B of the Constitution; that is, water, sanitation, electricity, and refuse removal. Additionally, total population per municipality is used as a proxy for the administrative services generally provided by municipalities (Boetti, Piacenza, & Turati, 2010). In particular, municipal outputs are represented in this paper by:

- the number of consumer units receiving water (inside the yard, less than 200 m from yard, and more than 200 m from yard),
- the number of consumer units receiving sewerage and sanitation (flush toilet connected to a public sewerage system, flush toilet connected to a septic tank, bucket system, ventilated improved pit latrine toilet, and other),
- the number of consumer units receiving solid waste management,⁹
- the number of consumer units receiving electricity, and
- the total population per municipality.

These municipal output measures were obtained from the 2007 NFC of municipalities, an annual survey conducted by StatsSA. The NFC provides a measure of the level of local basic services or municipal outputs that are represented by the number of 'consumer units' with access to these services.

It is important to note that the 2007 Community Survey also collected information about the number of 'households' with access to water, toilet facilities, refuse removal services, and electricity. However, the NFC of municipalities is a better source for the measure of municipal outputs because a consumer unit encompasses households, businesses, and other sectors to which municipalities provides basic services (Financial and Fiscal Commission, 2011). Consequently, the paper will focus on municipal outputs provided by the NFC. However, the analysis will make use of the measures of municipal output collected from the 2007 Community Survey in order to check the robustness of local efficiency scores. Additionally, as mentioned above, while in the NFC the questionnaire was administered at the municipality level, in the 2007 Community Survey it was administered at the household level. The former therefore represents the supply side of local basic service delivery while the latter represents the demand side of local basic services.

The municipal input indicator is represented by total municipal operating or current expenditures published by the National Treasury local government budget database. The composition of municipal operating or current expenditures in South Africa for

⁹Waste management (or refuse removal) refers to the collection, treatment, and disposal of waste (StatsSA's 2007 NFC).

2007/08 consists mainly of ‘other expenditure’ (37%), which unfortunately is not disaggregated further but is likely to include municipal administration costs important for providing services, and ‘employee costs’ (30%) and ‘material and bulk purchases’ (20%), which both represent input costs (labour, material, and capital costs) that are necessary to provide services. Repair and maintenance and finance charges amount to only 7% and 6% respectively of the total operating expenditures during the same financial year.

Following the Financial and Fiscal Commission (2011) and Boetti et al. (2010), this paper focuses on municipal operating expenditure not only to strengthen the connection between spending and the chosen measures of municipal outputs, but also because operating expenditures result in the immediate provision of municipal outputs unlike capital expenditures that mainly finance long-term infrastructure projects.

Table 2 provides the summary statistics of the measures of municipal outputs and input used in the empirical analysis in this paper. The definition of all variables used in the analysis and the data sources are presented in Table A1 in Appendix A. Table 2 highlights substantial variations that exist within and across the four categories of local municipalities that constitute the focus of this paper.

Table 2: Summary statistics of municipal input and outputs for 2007/08, by municipal category

pdgcategory	Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
B1	TotalOpEx	19	799 368	462 680	243 962	1 851 599
	Totalpop	21	392 058	188 346	124 351	752 906
	Cuwater	21	83 419	51 817	19 238	191 047
	Cuelec	21	76 019	60 263	21 550	235 491
	Cusan	21	72 287	44 291	24 800	149 861
	Cuwaste	21	64 328	42 602	24 800	182 686
B2	TotalOpEx	24	188 797	124 634	3 291	523 934
	Totalpop	29	140 902	94 133	32 840	444 830
	Cuwater	29	19 422	13 301	0	48 086
	Cuelec	29	22 570	11 394	8 544	53 004
	Cusan	29	17 887	13 763	0	53 609
	Cuwaste	29	20 435	11 841	0	48 086
B3	TotalOpEx	80	68 394	66 923	-16 481	435 155
	Totalpop	111	55 480	53 162	5 156	385 413
	Cuwater	111	10 462	11 415	0	95 281
	Cuelec	111	10 013	9 504	776	71 663
	Cusan	111	9 916	11 104	0	95 281
	Cuwaste	111	9 171	6 742	478	38 752
B4	TotalOpEx	49	52 962	55 830	1 867	300 489
	Totalpop	70	185 421	105 679	39 401	602 819
	Cuwater	69	14 843	28 749	0	120 000
	Cuelec	69	17 185	22 559	0	92 946
	Cusan	69	9 335	20 306	0	107 537
	Cuwaste	69	6 598	13 080	0	63 799

4.2 Potential determinants of efficiency performance in local service delivery in South Africa

From the previous literature on local government efficiency described in Section 3, from the 2011 Financial and Fiscal Commission report and the CoGTA (2009) report, various factors have been identified that would probably have an impact on the technical efficiency of municipalities in the South African context. The potential determinants of spending efficiency identified here are limited to those for which a quantifiable measure is readily available.

The main independent variables of interest may be grouped into four categories: fiscal autonomy, institutional capacity, socio-economic factors, and political factors.

Fiscal autonomy is measured as local taxes and service charges as a percentage of total revenue. This measure is also used to reflect the level of revenue decentralisation. According to the traditional fiscal decentralisation theory, a greater fiscal autonomy is expected to allow sub-national government officials to not only provide a level of services in accordance with the tastes and preferences of their citizens, but also to better match expenditures with revenue needs (correspondence principle). This link between expenditure and the price of public goods is essential to achieve efficiency because it would equalise the benefit per unit of service with the cost per unit of service. As a corollary, it should impose fiscal responsibility at the margin on sub-national governments.¹⁰ Furthermore, it is expected to increase accountability of sub-national governments with their citizens, in that those paying taxes will demand accountability for service delivery and will monitor municipal performance.

Additionally, a dummy variable equal to one if a municipality has the powers and functions allocated to provide all four basic services (i.e. water, electricity, sewerage and sanitation, and solid waste management) is used as a measure of expenditure decentralisation.

The institutional capacity of municipalities in South Africa is assessed by the job vacancies in local government and the education level of the municipal managers (MMs), the chief financial officers (CFOs), and the managers for technical services (TSMs). Two available measures of job vacancy are used: the percentage of vacant posts to total posts in section 57 of the Local Government Municipal Systems Act (No. 32 of 2000), which refers to the positions of MMs, CFOs, and other managers who are politically appointed for a period of five years; and the percentage of vacant posts to total posts in the organogram, which refers to other permanent positions within the municipality. In addition, the focus is on education levels of MMs, CFOs, and TSMs because they are responsible for doing the work of the municipality and implementing all programmes approved by the council. As a result, highly qualified and experienced technical and management professionals in a municipality should be positively related to efficiency in service delivery.

From the previous literature on local government efficiency, socio-economic factors such as income and average education levels of citizens are expected to be positively related to efficiency in that they give the citizenry ability and skills to be effective and active participants in a representative democracy and in public decision-making processes.

¹⁰In economics, a resource allocation mechanism is efficient when marginal (social) benefit is equal to marginal (social) cost. In general, overconsumption of public goods is a common characteristic of lack of correspondence and fiscal autonomy.

As such, they should be able to pressure local government officials and monitor their performance. Similarly, the presence of ratepayers' associations or taxpayers' associations in the municipality or the district as a proxy for citizen participation in decision-making and involvement in the matters of local government, especially in oversight and monitoring, is expected to have the same effect.

Additionally, population growth, as a proxy for economies of scale that might be realised when providing local public services to a larger population, is likely to increase municipal efficiency in service delivery. Population growth is measured as the percentage change in population of a municipality from 2001 to 2007.

The political leadership of a municipality, as measured by the percentage of council seats held by the majority party, might also play a role in its spending efficiency (Financial and Fiscal Commission, 2011); however, its impact could go either way depending on the strength of opposition parties present in the municipality. For example, political tensions between political parties within the municipal council may negatively affect service delivery; similarly, a high percentage of council seats held by the majority party may produce similar results due to a lack of democratic checks and balances provided by a healthy opposition party. Additionally, a political party with a strong majority experiencing very little factionalism and interference in decision-making might prove efficient in service delivery (CoGTA, 2009).

Finally, the number of consumer units receiving free water, electricity, sewerage and sanitation, and solid waste management from a municipality would add financial pressure on a municipality and is expected to be associated with lower levels of spending efficiency.

The summary statistics and the definition of all variables used in the empirical analysis are presented in [Tables A1](#) and [A2](#) of Appendix A.

5. Empirical results

In this paper, the efficiency performance of municipalities in South Africa is computed using a two-stage, input-oriented DEA-VRS (Variable Returns to Scale). A second-stage Tobit regression will then analyse the determinants of the DEA-VRS efficiency scores of municipalities.

This paper analyses the relative production efficiency of the 231 local municipalities in South Africa for 2007 within each of the four local municipality clusters, namely B1, B2, B3, and B4.

5.1 Local efficiency scores in South Africa

[Table 3](#) summarises the DEA-VRS input-oriented efficiency scores for all local municipalities in South Africa for which data are available. It shows that in 2007 approximately 7.6% of local municipalities were efficient relative to others with an efficiency score equal to one. The average efficiency score across all municipalities was 0.173, which suggests that, on average, municipalities in South Africa could have theoretically achieved the same level of output or basic services provided with about 83% fewer inputs.¹¹ In other words, in 2007, local municipalities could have theoretically extensively improved their efficiency performance without necessarily

¹¹The 83% value is obtained from $([1 - 0.173] \times 100)$.

Table 3: VRS input-oriented DEA efficiency scores for all local municipalities for 2007

Local municipality category	Number of municipalities	Efficient municipalities, efficiency score (VRS_TE) = 1	% of efficient municipalities	Average efficiency scores, RTS(VRS) ORT(IN) STAGE(2)
All	170	Aganang LIM352 Buffalo City EC125 ^a Bushbuckridge MP325 King Sabata Dalindyebo EC157 Koukamma EC109 Lekwa-Teemane NW396 Mangaung FS172 ^a Mbombela MP322 Mnquma EC122 Msunduzi KZN225 Thembisile MP315 Thulamela LIM343 Ubuhlebezwe KZN434 (13)	7.64	0.173

Note: ^aBuffalo City Municipality (East London) and Mangaung Municipality (Bloemfontein) became Metropolitan Municipalities after the local government elections of 18 May 2011.

increasing their operating expenditures. However, as aforementioned, these figure masks variations within and across municipalities.

When comparing the average efficiency scores within each municipal category (Table 3), one can observe that B1 municipalities have the highest scores although accompanied with the lowest number of municipalities, and B3 municipalities have the lowest efficiency scores. This suggests that, on average, B1 and B3 municipalities could have theoretically achieved the same level of output with about 16% and 80% fewer resources respectively; the difference between the most efficient and the least efficient municipalities being quite substantial. In order words, in 2007, local municipalities with small towns with a relatively small population and significant proportion of the urban population but with no large town as a core (i.e. B3 municipalities) could have theoretically improved their efficiency performance to a great extent (i.e. 80%) without necessarily increasing their operating expenditures.¹²

The results presented above refer to the DEA efficiency scores that were calculated using as municipal outputs the number of consumer units to which the basic service is delivered and which receive a bill if the service is billed. This represents the supply side of basic local service delivery by municipalities. In order to check the robustness of the findings, the number of households receiving basic local services was also used as measure of municipal output. This measure represents the demand side of basic local services and

¹²The complete DEA efficiency scores for all municipalities in each cluster and for which data are available in 2007 are available upon request.

Table 4: VRS input-oriented DEA efficiency scores by type of municipality for 2007

Local municipality category	Number of municipalities	Efficient municipalities, efficiency score (VRS_TE) = 1	% of efficient municipalities	Average efficiency scores, RTS(VRS) ORT(IN) STAGE(2)
B1, secondary cities	19	Buffalo City EC125 City of Matlosana NW403 Drakenstein WC023 Madibeng NW372 Mangaung FS172 Matjhabeng FS184 Mbombela MP322 Msunduzi KZN225 Stellenbosch WC024 (9)	47.36	0.838
B2, larger towns	24	Hibiscus Coast KZN216 King Sabata Dalindyebo EC157 Mafikeng NW383 Moghaka FS201 Mossel Bay WC043 Msukaligwa MP302 Oudtshoorn WC045 Randfontein GT482 (8)	33.33	0.625
B3, smaller towns	79	Abaqulusi KZN263 Amahlathi EC124 Koukamma EC109 Lekwa-Teemane NW396 Maluti A Phofung FS194 Matatiele EC441 Mkhondo MP303 Ngwathe FS203 (8)	10.12	0.201
B4, rural municipalities	48	Aganang LIM352 Bushbuckridge MP325 Greater Tzaneen LIM333 Mnquma EC122 Msinga KZN244 Nongoma KZN265 Thembisile MP315 Thulamela LIM343 Ubuhlebezwe KZN434 (9)	18.75	0.377

Source: Author's own calculations.

is collected in the StatsSA 2007 Community Survey. Overall, the results point to significant differences in the DEA efficiency scores whether we consider the supply side or the demand side of the basic local service delivery.¹³

¹³The detailed results and the complete DEA efficiency scores using the 2007 Community Survey, for all municipalities in each cluster and for which data are available in 2007, are available from the author upon request (cf. Table A3 of Appendix A for a summary of results).

5.2 Determinants of local efficiency performance in South Africa

Table 5 presents the results of the analysis of the potential determinants of local productive efficiency using the censored normal Tobit regression model. This specific model is used given that there is a right-censoring in the dependent variable (i.e. the DEA-VRS efficiency scores). In this second-stage analysis, the Tobit regression model was run on all local municipalities because there were not enough observations to estimate a separate regression for each municipal category. Three models are estimated depending on the type of the political variable used. The overall similarities in terms of the statistical significance and the sign of the estimated coefficients show that the results are somewhat robust to alternative specifications.

Table 5: Determinants of local efficiency performance in South Africa

Variable	(1) Model 1	(2) Model 2	(3) Model 3
FiscalAut	0.003* (0.002)	0.003 (0.002)	0.003* (0.002)
power_func	0.199 (0.126)	0.183 (0.125)	0.221* (0.125)
FisAut_power	-0.005** (0.002)	-0.005** (0.002)	-0.006*** (0.002)
FisAut_HE	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)
perc57vacant	-0.002* (0.001)	-0.002* (0.001)	-0.002 (0.001)
percorgavacant	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
popgrowth	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)
MMqual	0.170*** (0.061)	0.168*** (0.060)	0.170*** (0.060)
FMqual	0.039 (0.059)	0.034 (0.058)	0.028 (0.058)
TSqual	-0.015 (0.081)	-0.007 (0.080)	-0.022 (0.080)
percnoschooling	-0.002 (0.010)	-0.005 (0.010)	-0.004 (0.010)
percgrade12	0.015 (0.012)	0.016 (0.011)	0.020* (0.012)
perchigher	0.061 (0.044)	0.055 (0.044)	0.041 (0.045)
percnoincome	-0.019 (0.021)	-0.032 (0.022)	-0.039 (0.023)
perc12800zar	-0.006 (0.005)	-0.007 (0.005)	-0.008 (0.005)
perc12801zar	-0.121*** (0.042)	-0.115*** (0.041)	-0.114*** (0.042)

(Table continued)

Table 5: Continued

Variable	(1) Model 1	(2) Model 2	(3) Model 3
freewater	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
freeelec	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
freesan	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
freewaste	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)
More50Perc		0.114* (0.062)	
majseats			0.003* (0.002)
Constant	0.147 (0.171)	0.115 (0.169)	-0.025 (0.194)
sigma	0.212*** (0.015)	0.208*** (0.015)	0.209*** (0.015)
Observations	109	109	109

Notes: Dependent variable: DEA-VRS local efficiency scores, 2007. Bold data indicate statistically significant coefficients. Standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

The positive impact of fiscal autonomy on municipal performance efficiency confirms the traditional fiscal decentralisation theory according to which a greater fiscal autonomy is expected to allow sub-national government officials to better match expenditures with revenue needs and increase their accountability in terms of spending.

An additional fiscal decentralisation variable measuring the level of expenditure decentralisation was introduced in the analysis, the dummy *power_func*, which is equal to one for municipalities that have the powers and the functions allocated to provide all four basic local services: water, electricity, sewerage and sanitation, and solid waste management. This explanatory variable is found to have no significant impact on local efficiency, except in the third model specification where it takes on the expected positive sign, confirming that municipalities with higher expenditure decentralisation would achieve a higher level of spending efficiency compared with municipalities with a smaller degree of expenditure decentralisation.

However, the interaction term between this dummy variable and the fiscal autonomy appears to have a negative and significant impact on efficiency. This result implies that as the fiscal autonomy increases, municipalities that have the powers and the functions allocated to provide all four basic services will see a decrease in their efficiency compared with municipalities that have the powers and the functions allocated to provide some of the four basic services. This result is puzzling because, according to the traditional fiscal decentralisation theory, devolution of powers and expenditure responsibilities along with the capacity to raise revenue would lead to an efficient provision of local public goods. This puzzling result is probably influenced by the wide disparities across local municipalities in their ability to raise revenues.

The results also show a significant and negative effect of the vacancy rate in section 57 of the Constitution on efficiency. This confirms the premise that a higher proportion of job vacancies within a municipality would reflect its difficulty to attract qualified and experienced MMs, CFOs, and other managers, and it is thus bound to impact the day-to-day functioning of the municipality and therefore its efficiency in service delivery. On the other hand, the vacancy rate within the organogram is found to have no significant effect on local efficiency.

Another important factor that seems to have a significant positive effect on efficiency is the education level of MMs, who are the top management of a municipality's administration and also the accounting officers of the municipality. The results show that if a MM holds a postgraduate degree (whether honours, master's, or PhD), the efficiency score of the municipality he/she is managing would be approximately 0.170 higher than a municipality headed by a MM with no postgraduate degree. However, the education level of CFOs and TSMs appears to have no significant impact on efficiency. A possible explanation may lie in the fact that CFOs and technical managers do not decide how money is spent. The decision lies elsewhere in the council. This paints a worrying picture considering that the education level of CFOs, especially in accounting practices, should play an important role particularly in a context when so many municipalities are not receiving clean audit reports.

Similarly, the education level of the citizens does not appear to significantly affect efficiency levels, except in the third model where the percentage of the municipal population with secondary education appears to be positively related to the spending efficiency. This result might suggest that this particular group tends to be more active participants in a representative democracy and in public decision-making processes in South Africa. As such, they should be able to pressure local government officials and monitor their performance.

Where income is posited to have similar effects, the findings nonetheless show that the higher the percentage of the population with a gross monthly income greater than 12 800 ZAR, the lower the efficiency levels.¹⁴ On the one hand, this result may probably be ascribed to the presence of ratepayers' associations in some municipalities, which higher income individuals would tend to form and whose aim is to incite unhappy rate payers to not pay their taxes and user fees in an attempt to force municipalities to provide services. This Catch-22 would reduce municipal revenues and thus their efficiency levels. However, ratepayers' associations are only present in a few municipalities in South Africa. On the other hand, this result may depict a bleak picture of the democratic behaviour at the local government level in South Africa. It appears that higher income and highly educated households in South Africa do not feel the incentive or the need to be active participants in public decision-making processes. This behaviour might be explained by a political system perceived as unresponsive and dominated by a *partidocracia* (a political system characterised by political party domination), which tend to hamper citizen's motivation to be politically interested and participatory (Siavelis, 2009).

On the other hand, lower income and less educated households in South Africa would tend to be more involved in a participatory political process based on negotiations and bargaining because they are more likely to depend to a greater extent on local public services.

¹⁴As of 17 October 2011, US\$1 = 8.00 ZAR.

Additionally, it appears that the number of consumer units receiving free water and sanitation in local municipalities do have a positive impact on local efficiency; however, the effect is negligible.

Finally, spending efficiency is also positively related to the political leadership of a municipality, as measured by the percentage of council seats held by the majority party after the 2006 local government elections. From this variable, a dummy variable equal to one when the majority party won more than 50% seats is also introduced. The estimate for this dummy variable revealed a positive and significant coefficient, suggesting that a majority party that had more than 50% of seats after the 2006 local government elections had a greater efficiency performance than a majority party with less than 50% of seats. Overall, it would appear that less political tensions and factionalism between political parties within the municipal council might prove efficient in service delivery.

6. Conclusion and policy recommendations

The results of the DEA-VRS input-oriented efficiency scores for local municipalities in South Africa show that in 2007 approximately 7.6% of local municipalities were efficient with an efficiency score equal to one. The average efficiency scores across all municipalities was 0.173, which suggests that, on average, municipalities in South Africa could have theoretically achieved the same level of output or basic services provided with about 83% less in operating expenditures. To account for wide variations within and across municipalities, the DEA efficiency scores were computed for each of the four municipal clusters, namely B1, B2, B3, and B4.

When comparing the average efficiency scores within each municipal category, it was found that B1 municipalities (secondary cities) have the highest scores although accompanied with the lowest number of municipalities, and B3 municipalities (smaller towns) have the lowest efficiency scores. In other words, on average, B1 and B3 municipalities could have theoretically achieved the same level of basic services with about 16% and 80% fewer resources respectively; the difference between the most efficient and the least efficient municipalities being quite substantial. The results also show that B4 municipalities (rural municipalities) could have theoretically achieved the same level of basic services with about 62% less in operating expenditures. These findings raise concerns over the future of local municipalities in South Africa, especially B3 and B4 municipalities, about their capability to efficiently deliver on expected outcomes on a sustainable basis.

To identify the potential factors that may influence the productive efficiency of local municipalities in South Africa, a censored normal Tobit regression model was performed. The model was run on all local municipalities because there were not enough observations to estimate a separate Tobit regression for each municipal category.

In general, results demonstrate that it appears crucial to improve the second pillar of fiscal decentralisation by assigning greater revenue autonomy to local municipalities in South Africa while taking into account wide disparities across municipalities in their abilities to raise revenues. A corollary result would be to improve the allocation of local municipalities' equitable share of national revenue, especially transfer allocations to B3 and B4 municipalities.

In a context where the political system is perceived as unresponsive and dominated by a *partidocracia*, there is a need to devise new participatory methods to engage and increase citizen participation in local governance, such as public forums, public debates, popular communication outlets such as radio, soap opera, and so forth. There is a need to create new spaces in which citizens of all economic and social groups would unanimously engage with the local government, would mobilise and make demands, put pressure on local government officials, and monitor their performance to ensure an efficient provision of services. However, these initiatives might not work if the motivation of local officials is to keep control. In South Africa, where so many still lack access to basic services such as clean water, sanitation, electricity, and housing, local officials must be held accountable from the bottom up for the efficiency and effectiveness of every scarce rand available.

Additionally, it is important to increase the number and skill levels of the top management of a municipality's administration; that is, MMs, CFOs, and TSMs. Associated with this result would be the necessity to carefully review the constraints of municipal capacity and devise incentive mechanisms to attract skilled capacity in secondary cities and rural areas in the country.

Overall, given the substantial disparities within and across municipalities, it appears essential to reform the expenditure and revenue assignments under the current fiscal decentralisation framework in order to reflect and accommodate disparities in jurisdictional needs and financial and functional capacities.

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Appendix A. Variable definitions, data sources, and descriptive statistics

Table A1: Variable definitions and data sources

Variable name	Variable label	Data source
<i>Input</i>		
TotalOpEx	Total operating expenditure (in R × 1000) for financial year 2007/08	National Treasury, Local Government Budgets and Expenditure Review (preliminary in-year figures)
<i>Outputs</i>		
totalpop	Total population per municipality from 2007 Community Survey	2007 Community Survey, Statistics South Africa
cuwater	Number of consumer units receiving water from municipality	2007 Non-Financial Census of Municipalities, Statistics South Africa (P9115 Unit data 2007)
cuelec	Number of consumer units receiving electricity from municipality	
cusan	Number of consumer units receiving sanitation from municipality	
cuwaste	Number of consumer units receiving waste management from municipality	
HHelec	Number of households with access to electricity (for lightning)	2007 Community Survey, Statistics South Africa
HHwater	Number of households with access to clean water (piped water)	
HHrefuse	Number of households with access to adequate refuse removal service	
HHsanit	Number of households with access to toilet facilities	
<i>Fiscal autonomy/level of fiscal decentralisation</i>		
FiscalAut	Share of local own sources of revenue (taxes and service charges) in total revenue	National Treasury, Local Government Budgets and Expenditure Review (preliminary in-year figures)
power_func	Dummy variable = 1 if the municipality has the powers and functions allocated to provide all four basic services: water, electricity, sewerage and sanitation, and solid waste management	2007 Non-Financial Census of Municipalities, Statistics South Africa (P9115 Unit data 2007)
<i>Institutional capacity</i>		
perc57vacant	Percentage of vacant posts of total posts in section 57	2007 Non-Financial Census of Municipalities, Statistics South Africa (P9115 Unit data 2007)
percorgavacant	Percentage of vacant posts of total posts in the organogram	
MMqual	Dummy variable = 1 if the municipal manager has a postgraduate degree	Municipal Demarcation Board Capacity Assessment Database 2007/08
FMqual	Dummy variable = 1 if the financial manager has a postgraduate degree	
TSqual	Dummy variable = 1 if the manager for technical service has a postgraduate degree	

(Table continued)

Table A1: Continued

Variable name	Variable label	Data source
<i>Socio-economic factors</i>		
percnoschooling	Percentage of the population with no schooling	2007 Community Survey, Statistics South Africa
percsomesec	Percentage of the population with some secondary education	
percgrade12	Percentage of the population with secondary education	
perchigher	Percentage of the population with higher education	
percnoincome	Percentage of the municipality population with no income	
perc12800zar	Percentage of the population with a gross monthly income of $\leq 12\ 800$ ZAR	
perc12801zar	Percentage of the population with a gross monthly income of $> 12\ 800$ ZAR	
popgrowth	Population growth per municipality between 2001 and 2007, percentage	
<i>Political factors</i>		
Majseats	Percentage of council seats held by the majority party after the 2006 local government elections	The Independent Electoral Commission
More50Perc	Dummy variable =1 if the majority party won more than 50% of seats	
<i>Others</i>		
freewater, freelec, freesan, freewaste	Number of consumer units receiving free water, electricity, sewerage and sanitation, and solid waste management from municipality	2007 Non-Financial Census of Municipalities, Statistics South Africa (P9115 Unit data 2007)

Table A2: Descriptive statistics of the determinants of municipal productive efficiency

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
FiscalAut	161	48.5	24.9	0.2	97.8
popgrowth	231	2.0	18.1	-45.0	69.0
perc57vacant	228	15.9	20.5	0.0	100
percorgavacant	164	18.5	26.0	0.0	100
MMqual	231	0.2	0.4	0	1
FMqual	231	0.1	0.4	0	1
TSqual	231	0.1	0.2	0	1
percnoschooling	231	8.1	3.7	1.7	25.0
percsomesec	231	20.1	4.7	8.2	34.0
percgrade12	231	7.7	3.5	1.7	19.8
perchigher	231	3.3	2.0	0.5	11.6
percnoincome	231	1.9	1.0	0.1	5.3
perc12800zar	231	20.3	4.9	8.8	43.6
perc12801zar	231	1.5	1.1	0.1	5.4
majseats	231	71.3	14.5	33.3	96.3
More50Perc	231	0.87	.33	0	1

Table A3: VRS-input oriented DEA efficiency scores by type of municipalities for 2007, using 2007 Community Survey outputs

Local municipality category	Number of municipalities	Efficient municipalities, efficiency scores (VRS_TE) = 1	% of efficient municipalities	Average efficiency scores, RTS(VRS) ORT(IN) STAGE(2)
All	170	Buffalo City King Sabata Dalindyebo Mangaung Matjhabeng Moqhaka Thulamela Bushbuckridge Lekwa-Teemane (8)	4.70%	0.132 (86.8%)
B1	19	Buffalo City Mangaung Matjhabeng Mbombela Stellenbosch (5)	26.31%	0.748 (25.2%)
B2	24	King Sabata Dalindyebo Moqhaka (2)	8.33%	0.219 (78.1%)

(Table continued)

Table A3: Continued

Local municipality category	Number of municipalities	Efficient municipalities, efficiency scores (VRS_TE) = 1	% of efficient municipalities	Average efficiency scores, RTS(VRS) ORT(IN) STAGE(2)
B3	79	Nkonkobe Matatiele Masilonyana Nala Maluti A Phofung Ngwathe Abaqulusi Lekwa-Teemane (8)	10.12%	0.331 (66.9%)
B4	48	Mnquma Port St Johns Msinga Nongoma èNdongakusuka Thulamela Aganang Nkomazi Bushbuckridge (9)	18.75%	0.514 (48.6%)