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Spending Efficiency in South African Rural Local Municipalities

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Abstract: South African rural municipalities continue to experience difficulties in executing their constitutional obligations, despite the increasing amount of resources that are being channeled to them through the intergovernmental transfer system. The main objective of this study is to evaluate the efficiency of South African rural municipalities in utilizing their resources, particularly the intergovernmental transfers, as they account for more than half of their revenues. To empirical examine this, the Output Oriented Data Envelopment Analysis (DEA) method is applied on a panel data covering the period from 2008/9 to 2012/13. The results from the Output Oriented DEA suggest that rural local municipalities are inefficient in their spending. Furthermore, the findings from the budget analysis show that these municipalities are not prioritizing their spending, as they spent more of their resources on employee costs compared to vital expenditure needs such as repairs and maintenance of existing infrastructure.

Keywords: Spending efficiency; Data Envelopment Analysis; Rural municipalities; South Africa

JEL Classification: H72

1. Introduction

The South African constitution of 1996 entrenches the developmental role of the local government, which is further underscored in the National Development Plan (NDP). In terms of section 152 of the Constitution, municipalities are mandated to among other things: provide a democratic and accountable government for local communities; ensure the provision of services to communities in a sustainable manner; promote social and economic development; to promote a safe and healthy environment; and encourage the involvement of communities and community organisations in the matters of local government. According to Section 153 of the Constitution, municipalities are expected to: structure and manage their respective administrations, 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. In the NDP, the rural local government in particular has a pivotal role to play in reducing poverty and inequalities through providing basic services and infrastructure.

For the execution of this, the South African Constitution (1996) provides for a Local Government Fiscal Framework (LGFF) that includes municipal own revenue, borrowing and intergovernmental transfers as revenue instruments. Estimates from the National Treasury (2011) show that intergovernmental

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transfers in South Africa are the dominant source of funding for the sector, accounting for an average of 51% of the total revenue, especially in rural municipalities. Also, the amount of total transfers to these municipalities has grown considerably over the past few years. Ideally, increased resources should translate into improved delivery of basic services and thus development. However, this has not been the case with South African rural municipalities as they have difficulties in executing their constitutional obligations. The difficulties are signified by their limited revenue capacities, maladministration, under-spending on capital budgets, service delivery protests and backlogs in virtually all basic services. Rural municipalities are also failing to service their debt and have been unable to attract and retain skilled managers, professionals, and technicians (COGTA, 2009). Given the persistence of these challenges despite the increase in the amount of resources, this study examines the efficiency of South African rural municipalities in utilising their resources.

2. Expenditure Performance of Rural Municipalities

Rural municipalities in South Africa are known for their lack of capacity to use funds allocated to them, which manifests in the under-spending of especially conditional grants. The trend on spending by rural municipalities is presented in Figure 1.

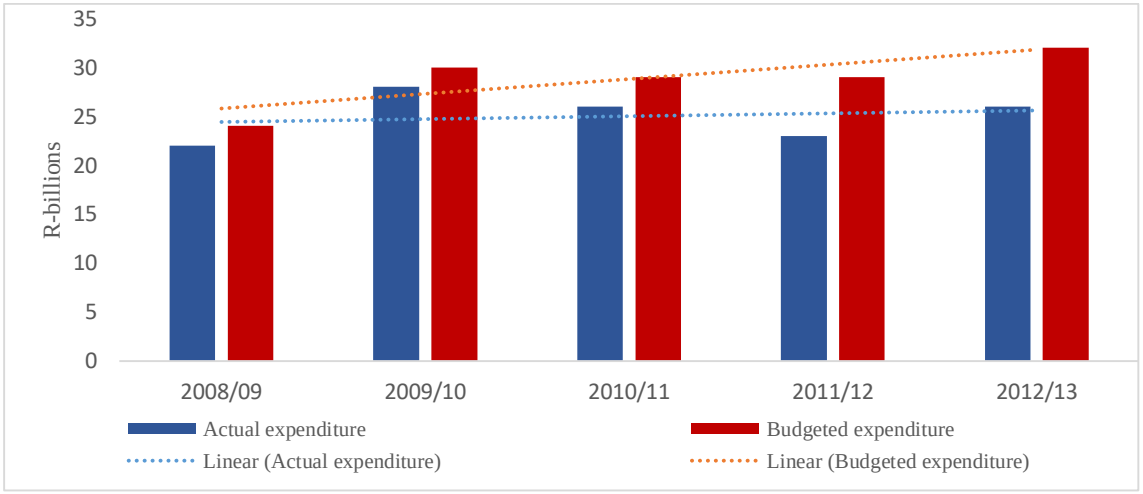

Figure 1. Actual vs Budgeted Expenditure in Rural Local Municipalities

Source: National Treasury (2012)

Between 2008/09 and 2012/13, rural municipalities spent less than their budgeted amounts, especially since 2009/10. Municipal spending consists of operating expenditure and capital expenditure. Operating expenditure refers to the day-to-day costs for municipal operations and service delivery. It includes employee-related costs, and the repairs and maintenance of existing infrastructure. Capital expenditure includes spending on large municipal social and economic infrastructure projects, such as electricity connections, and water and sanitation infrastructure. In rural municipalities, capital budgets account for a larger portion of the under-spending (National Treasury, 2012). Capital projects in these municipalities are largely financed through conditional grants, and so significant under-spending on capital budgets

implies the low absorption of conditional grants. Figure 2 shows Operating spending by service for rural municipalities over the period 2005/6–2012/13.

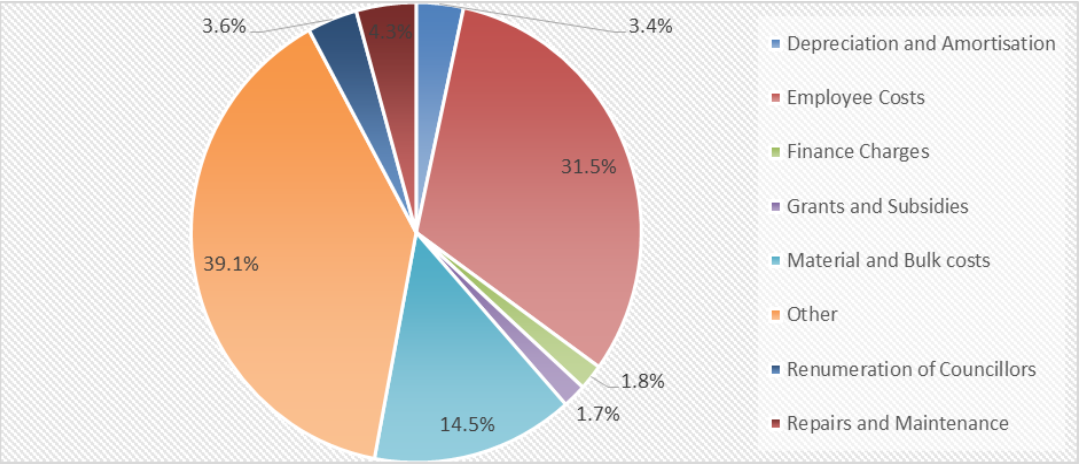

Figure 2. Operating Spending in Rural Municipalities by Expenditure Item

Source: National Treasury (2012)

Almost a fifth of municipal operational spending is on "other", which is not disaggregated, but the most notable issue is the employee-related costs. Although the South African National Treasury norm for salaries is between 25% and 40%, spending 31.5% of the operational budget on salaries is still a cause for concern, as items such as repairs and maintenance are not being prioritised, despite their importance for sustainable social and economic infrastructure. Rural municipalities only spend 4.3% of their operational budgets on repairs and maintenance, which is far below the national norm of 8%–10%.

3. Methodology

Efficiency[1] can be measured using parametric and non-parametric approaches, depending on the type of efficiency being measured. Parametric approaches measure economic efficiency, and the methods used include the stochastic frontier, thick frontier and distribution free approaches. (Vincova, 2005) Non-parametric approaches are commonly used to measure technical efficiency in a decision-making unit and include two methods: DEA and FDH. This study uses the DEA for the reason that it (i) does not require any assumptions about the functional form of the regression function (Diggle et al., 2000); (ii) allows the use of more than one input to produce a number of outputs[2] and requires the assumptions of convexity and does not require the price of inputs and outputs used.

(i) A Brief Description of Data Envelopment Analysis:

DEA is a linear programming approach that involves enveloping the observed set of input/output vectors with convex structure around a set of variables (Afonso & Fernandes, 2007; Kneip et al., 2015). Farrell (1957) introduced this approach, proposing a linear convex structure method to estimate the production frontier and assuming constant returns to scale. Charnes et al. (1978; 1984) suggested the assumption of

[1] Technical (spending) efficiency can be defined as the effectiveness with which a given set of inputs is used to produce an output http://www.economicshelp.org/blog/glossary/technical-efficiency/.
[2] See (Chovanec, 2005).

variable returns to scale and an input-oriented approach with constant returns to scale. This method measures technical efficiency in a decision-making unit by calculating maximum efficiency scores for that particular unit and comparing with the performance of other similar units. In addition, it treats all observations as non-stochastic.

The DEA can measure technical efficiency with output-oriented and input-oriented models. In the output model, inputs are kept constant but outputs change, while in the input model, inputs reduce and output levels remain the same. The DEA can be used with the assumption of constant returns to scale (CRS) or variable returns to scale (VRS). With CRS, the relevant units are assumed to be scale-efficient, while with VRS they are assumed to be not operating at optimal scale. As it is not known whether or not rural municipalities in South Africa are operating at an optimal scale, technical efficiency is estimated through VRS, which allows technical efficiency to be calculated without the effects of scale efficiency. The limitations of the DEA method includes their sensitivity to measurement error, input and output specification and sample size (Halkos et. al, 2005). The output-oriented DEA model is more applicable in South Africa, because municipalities do not have much control over the amount of resources that are channelled to them, but have control over the amount and quality of output produced with those resources.

The VRS output-oriented efficiency model can be expressed as follows:

$$\text{Max}_{n,m}\ (n'x_j/m'y_j) \quad \ldots\ldots (1)$$

$$\text{S.T.}\quad n'x_j/m'y_j \geq 1,\ j=1,2,3\ldots,\ldots\ldots L$$

$$m,n \geq 0$$

$$m'y_j = 1$$

Where:

X_j is the output measure for municipality j, Y_j is the input measures and j is municipality in question, n is the weight for the output measure for municipality j, m is the weight for the input measure for municipality j and L is the number of municipalities included in the sample.The model specifies three conditions: the first one is that the ratio of output to inputs is equal to one, the second is that the weights of each of these variables are not less than zero, and the third one is ensuring the efficiency scores are not more than one. In simpler terms, the linkage that the study attempts to test can be express as the following function:

$$X_j = f\,(Y_j) \quad \ldots\ldots (2)$$

(ii) Definition of Variables

Input and output variables are needed to measure spending efficiency in an organisation. Inputs measure the amount of resources used to produce a given amount of output. The type of variables used have a great influence on the type of results produced through DEA. The main limitation for many studies that have looked at spending efficiency is the lack of standard and direct variables that can be used for efficiency estimation.[1]

[1] See (Ngomuo & Kipesha, 2015).

(iii) Input and Output Variables

The study used two input variables: per capita capital spending and operational spending (following Afonso & Fernandes, 2003; Sousa & Stosic, 2005). Capital spending refers to spending on long-term projects, such as infrastructure for basic services, while operational spending includes employee costs, maintenance of the existing infrastructure, material and bulk costs, remuneration of councillors and depreciation. As mandated by the Constitution, South African rural municipalities spend a larger share of their resources on providing four major basic services: water, electricity, and sanitation and refuse removal. For this reason, access to these four services is used as output measures in this study. Municipalities also provide general administrative services and other small services to their communities, but no direct measure exists for these services. Therefore, the study uses total population per municipality as a surrogate for the demand for these services. One major weakness of this proxy is that it does not provide information on whether the service was actually rendered but only gives an ideal picture of the services that a municipality should be providing.

In this study the access to the four basic services is defined as follows:

- Number of households with access to water (communal piped water: less than 200m from dwelling at RDP-level);
- Number of household with access to electricity (for lighting and other purposes);
- Number of households with access to sanitation (ventilation improved pits);
- Number of households with access to refuse removal (removed weekly by authority).

4. Data and Analysis

The study measures spending efficiency in rural South African municipalities between 2008/9 and 2012/13. The choice of the study period is informed by the availability of municipal financial data. Data on municipal spending and other municipal budget variables was sourced from the South African National Treasury local government database. Non-financial variables, such as access to basic services, was sourced from Stats SA and Global Insight databases. The study covers a sample of 87 local rural municipalities that provide all four municipal basic services.

(i) Output-Oriented DEA Efficiency Results

Table 1 provides technical efficiency scores obtained from the DEA analysis for 87 local municipalities. These scores measure the ability of a municipality to achieve the maximum output given the set of resources at its disposal. A municipality with a score of 1 is regarded as efficient, while those with less than 1 are regarded as inefficient.

Table 1. Output-Oriented DEA (VRS) Efficiency Results

Years	2008/9	2009/10	2010/11	2011/12	2012/13
Number of Municipalities	87	87	87	87	87
Number efficient municipalities	2	1	6	8	11
Share of the total Sample	2%	1%	7%	9%	13%
Number of inefficient municipalities	85	86	81	79	76
Mean efficiency	0.31	0.32	0.40	0.37	0.38
Minimum efficiency	0.04	0.04	0.04	0.04	0.04
Maximum efficiency	1	1	1	1	1

Source: Own computations

The number of efficient municipalities is low but increased between 2008/09 and 2012/13, from 2 (2%) to 11 (13%). Over this period, the mean efficiency scores for local municipalities ranged between 0.31 and 0.38. This implies that the municipalities could produce, on average, more than 60% additional output with the same resources. The minimum average efficiency score was 0.04 throughout the period. This implies that certain municipalities have high technical inefficiencies and could produce about 90% additional output if they used their resources properly. Furthermore, most of these rural municipalities produce less than 50% of their expected output, for example, on average 76% of the municipalities have efficiency scores that are below 50%. Table 2 shows the list of municipalities that were 100% efficient in each year.

Table 2. 100% Efficient Municipalities

Year	2008/9	2009/10	2010/11	2011/12	2012/13
Municipalities	Matzikama	Mohokare	Bushbuck-ridge	Albert-Luthuli	Bushbuck-ridge
	Mohokare		Emthanjeni	Bushbuck-ridge	Dr JS Moroka
			Kou-Kamma	Hantam	Emalahleni
			Lephalale	Laingsburg	Hantam
			Mkhondo	Matzikama	Laingsburg
			Nkomazi	Mohokare	Mafube
				Ngwathe	Matzikama
				Thembisile	Mohokare
					Moretele
					Ngwathe
					Thembisile

Source: Own computations

Matzikama, Mohokare and Bushbuckridge appear to have been efficient in most of the years. Mohokare was the most consistently efficient municipality (except in 2010/11 when its efficiency score was less than 1). Table 3 presents a list of the 10 most relatively efficient municipalities for each year in the period under review.

Table 3. Ten Most Efficient Municipalities

Municipality	2008/9	Municipality	2009/10	Municipality	2010/11	Municipality	2011/12	Municipality	2012/13
Bushbuckridge	0.97	Albert Luthuli	0.69	Albert Luthuli	0.81	Dr JS Moroka	0.90	Albert Luthuli	0.94
Dr JS Moroka	0.70	Bushbuckridge	0.98	Emalahleni	0.92	Emalahleni	0.96	Emthanjeni	0.75
Emalahleni	0.90	Emalahleni	0.90	Hantam	0.89	Emthanjeni	0.74	Kamiesberg	0.63
Hantam	0.82	Hantam	0.85	Kamiesberg	0.81	Joe Morolong	0.72	Lephalale	0.76
Laingsburg	0.83	Laingsburg	0.88	Laingsburg	0.93	Mafube	0.95	Maluti a Phofung	0.65
Mafube	0.89	Mafube	0.87	Mafube	0.96	Maluti a Phofung	0.65	Modimolle	0.67
Maluti a Phofung	0.65	Matzikama	0.99	Matzikama	0.98	Moretele	0.79	Moses Kotane	0.95
Moretele	0.70	Moretele	0.71	Mohokare	0.89	Moses Kotane	0.81	Nala	0.78
Nkomazi	0.82	Nkomazi	0.81	Nala	0.74	Nkomazi	0.84	Nkomazi	0.87
Thembisile	0.92	Thembisile	0.87	Thembisile	0.87	Thabazimbi	0.71	Umjindi	0.60

Source: Own computations

Between 2008/09 and 2012/13, Bushbuckridge, Matzikama, Mohokare and Mafube were the most efficient municipalities, with scores ranging from 0.97 to 1. This suggests that they can produce between 0% and 10% additional outputs with their existing resources. The performance of most of the top ten municipalities has been improving. For example, Emalahleni and Laingsburg had an efficiency score of 1 in 2012/13 compared to 0.90 and 0.83 in 2008/9 respectively. Table 4 presents a list of the ten least efficient municipalities for each year.

Table 4. Ten Least Efficient Municipalities

Municipality	2008/9	Municipality	2009/10	Municipality	2010/11	Municipality	2011/12	Municipality	2012/13
Baviaans	0.06	Baviaans	0.06	Kannaland	0.07	Baviaans	0.07	Baviaans	0.06
Kareeberg	0.06	Kareeberg	0.06	Kareeberg	0.06	Kannaland	0.07	Kannaland	0.08
Karoo Hoogland	0.04	Karoo Hoogland	0.04	Kgatelopele	0.06	Karoo Hoogland	0.04	Kareeberg	0.06
Kgatelopele	0.05	Kgatelopele	0.05	Khâi-Ma	0.10	Prince Albert	0.04	Karoo Hoogland	0.04
Prince Albert	0.04	Prince Albert	0.04	Prince Albert	0.04	Renosterberg	0.11	Kgatelopele	0.08
Renosterberg	0.04	Renosterberg	0.04	Renosterberg	0.11	Richtersveld	0.05	Prince Albert	0.05
Richtersveld	0.04	Richtersveld	0.04	Richtersveld	0.04	Siyathemba	0.08	Richtersveld	0.05
Siyathemba	0.07	Siyathemba	0.07	Thembelihle	0.05	Thembelihle	0.05	Siyathemba	0.08

Source: Own computations

Most of these municipalities are constantly highly inefficient over the reviewed period. Prince Albert, Kareeberg and Richtersveld municipalities were relatively the worst performing municipalities, with efficiency score ranging between 0.04 and 0.06. This means that, if resources were used suitably, these municipalities could produce approximately 96% additional output without increasing the amount of resources. The performance of some municipalities has improved over the years. For example, Renosterberg municipality's efficiency score increased from 0.04 in 2008/9 to 0.11 in 2011/12.

5. Conclusion

The main objective of this study was to assess the efficient use of intergovernmental transfers in South African rural municipalities. The study found that rural municipalities in South Africa are not prioritising their spending, as shown by the resources spent on employee costs compared to vital expenditure needs such as repairs and maintenance of existing infrastructure. The analysis found that South African rural municipalities are less efficient in providing water, electricity, sanitation and refuse removal, with efficiency levels ranging from between 0.31 and 0.38. These levels imply that the municipalities in question are providing 31% to 38% of what they could provide given their resources. The performance of rural municipalities can be improved without necessarily increasing the amount of resources, as they could provide over 60% additional services on average, with the same resources. To ensure efficiency, the principles underlying intergovernmental transfers to rural municipalities should include more stringent expenditure supervision methods in order to minimise wastage and improve efficiency. Also, there is a need to evaluate the effectiveness of existing supervision methods with a view to strengthening them.

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