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ABSTRACT

This study analyses the extent to which the poor benefit from Free Basic Services (FBS), which include free basic water, free basic electricity, free basic sanitation and free basic solid waste removal. Unfortunately, none of the data sets analysed could be used to conduct fiscal incidence analysis because none of the surveys asked appropriate questions with regard to consumption/usage or tariffs/costs of FBS, the non-survey data from DWAF and NT were self-reported from municipalities, with several municipalities and district municipalities not providing any information at all, and the main data set provided by National Treasury was found to be riddled with inconsistencies and errors. The easiest and ideal solution to the data problem would be to have municipalities report household consumption data at monthly intervals throughout.

Keywords: Publicly provided goods, National government expenditures
JEL codes: H4, H5

¹ This study was undertaken as part of a fiscal incidence study conducted by Prof. Servaas van der Berg on behalf of the National Treasury. The paper is also available on the website of the National Treasury: <http://www.treasury.gov.za/publications/other/Fiscal%20Incidence%20Study/default.aspx>

Introduction

As part of the National Treasury Fiscal Incidence Study, the University of Stellenbosch research team was also requested to analyse the extent to which the poor benefit from Free Basic Services (FBS), which includes free basic water, free basic electricity, free basic sanitation and free basic solid waste removal. In addition, several municipalities provide other free basic services to the indigent, such as rebates on property taxes and additional free basic water. This report provides a brief overview of the methodology followed in the National Treasury Fiscal Incidence Study, as well as a review of the findings and suggestions for future research.

Methodology

As a starting point, the team identified the data requirements needed to successfully complete the task, with some of the key requirements being:

- Household level data
- Consumption, tariff and/or cost data
- Background information (i.e. additional incentive structures by municipalities, how the indigent is defined, etc.)

In addition, other potential data sources were identified and reviewed to ascertain whether they could be used for this study. These additional data sources were:

- Income and Expenditure Survey (IES)
- General Household Survey (GHS)
- Community Survey (CS)
- Statistics South Africa's Non-Financial Municipal Census (NFMC)
- DWAF FBS data
- NT FBS data²

Furthermore, given the interest in the field, other institutions and researchers on FBS were contacted to determine whether alternative data sets, articles or other information were available. These institutions/researchers included, amongst others, DBSA, DPLG, Norwegian Centre for

² As promised on commission of the study.

Human Rights, selected Local Government officials, Mvula Trust, Centre for Applied Legal Studies, academics from WITS and Stellenbosch University's Business School. For the most part, most of these institutions were unable to assist with data, but showed keen interest in the potential results from a fiscal incidence study on FBS.

Review of findings

Unfortunately, none of the data sets analysed could be used to conduct fiscal incidence analysis. Firstly, none of the surveys asked appropriate questions with regard to consumption/usage or tariffs/costs of FBS³. Consequently, even though the surveys provide household level data, the key data requirements as noted earlier were not fulfilled. This problem was also encountered in the NFMC data. Secondly, the non-survey data from DWAF and NT were self-reported from municipalities, with several municipalities and district municipalities not providing any information at all. Thirdly, the main data set provided by National Treasury was found to be riddled with inconsistencies and errors to such an extent that, after analysing four provinces, 66 clear errors/corrections were encountered⁴. Notably, even after all these corrections, the quality of the data is of such a nature that it is strongly suggested that the NT FBS data should not be used for any analysis at all.

Examples of the inconsistencies in the NT data set include:

- Large discrepancies in population figures.

In order to ascertain the validity of the municipal population figures, Census 2001 municipal population weights were applied to Statistics South Africa's mid-year estimates for 2007, and compared with data provided in the NT data set. Several municipalities still made use of Census 2001 data, whilst others noted large increases (in some cases in excess of 20 per cent). This inflated the overall population figures by province, and in the case of the Eastern Cape, 20 municipalities (out of 45, including district municipalities, municipalities, and the metropolitan area in the province) represented approximately 83 per cent of the total population in the province (using the Mid-year estimates for 2007).

- Missing and/or incorrect data

³ See Appendix A.1 for a more complete description, with specific reference to the results obtained from GHS 2005.

⁴ Some of the errors and corrections made to the NT data set are provided in Appendix A.2.

In many cases, data for the number of poor households, number of poor, or other demographic data, as well as cost of FBS data were missing. In addition, certain errors, such as the “1 household, but 3 poor households” in the Inxuba Yethemba municipality bring the reliability of the entire data set into question.

- Large variations in average cost of FBS across municipalities

The data per province (for the four provinces that were analysed) were aggregated and analysed. This provided additional concerns as large variations in average costs were found, for example the average cost of free basic water in the Eastern Cape ranged between R18 to R882 per household, whilst the average cost of free basic sanitation ranged between R23 to R1121 in the Western Cape per household. Also note that the NT data is annual data, which makes these figures even less believable.

In summary, given the quality and nature of the current data sets available, the research team was unable to conduct fiscal incidence analysis of FBS, and proceed with suggestions for future data collection methods and future research topics.

Suggestions for future data collection and research

The GHS2005 was the most promising of the surveys in providing information about household water consumption, and by natural extension, information about free basic water. Unfortunately, as mentioned in greater detail in Appendix A.1 to this addendum, the question on consumption in litres – although asked in a format which could intuitively be understood by those collecting water in containers – appears to have been answered by all households and not equally well when one compares the monthly water expenditure (in Rand) question.

The easiest and ideal solution to the data problem would be to have municipalities report household consumption data at monthly intervals throughout. Ideally the data would also have geographical location (area) information, race, gender of household head and asset variables such as municipal valuations of property which municipalities already have in their possession. Indeed, this type of data will be required in future by National Treasury, although not at a household and geographical level, as noted in the FBS Indicators and Budget Allocation Guidelines, Schedule A1: Worksheets A10 - SerDel, SA9, SA11, SA12&13, SA14.

This should be relatively easy to do, especially for Metro municipalities who would have replaced legacy systems with much more user-friendly software. If it is possible to print

statements for consumers, it must be possible to extract and compile reports on consumption for water and electricity.

Regarding electricity, the only information one is able to extract (again with caveats) is whether households in 2000 still did not have electricity five years later. The survey remains silent on electricity consumption, which is possibly the most prudent choice due to the relatively high rate of illegal electrical connections in South Africa.

Instead of municipalities being unable to produce coherent or consistent data, we suggest the following for survey data:

- Ask what the household's consumption level of the service is in non-monetary terms. Due to the high rate of non-payment in South Africa, what one pays is often not that closely related to actual consumption. This is more important than actual payment for fiscal incidence analysis, but the existing questions, if asked consistently, could be extremely helpful for cost-benefit analysis.
- Align access questions more closely to government objectives.

As suggested above, if National Treasury can obtain Metro-level household data, several research aims can be achieved. These include the following:

- Fiscal incidence of Free Basic Services

Although the billing data from Metro's would not provide information about households who do not have access to FBS, such data would allow the research team to accurately measure the impact of FBS to the upper deciles. In addition, survey data can be used to estimate the size of the population who do not have access to FBS. Although NT proposes to request Local Government to provide information about the number of households that do not have access to services (or make use of alternatives, e.g. wood for fuel, water from streams, etc.), it is unclear whether Local Government, in general, has the capacity to provide accurate data in this regard.

- Measure and compare the performance of Metro's in providing FBS

Given the poor quality of the FBS data provided by Local Government to National Treasury, it is clear that the performance of Metro's and extent of service provision cannot be estimated with any degree of accuracy. Such a study would, for instance, allow National Treasury to compare efficacy of spending on FBS, analyse various techniques and methods used to collect revenue, and possibly to determine the extent of cross-subsidisation and the impact of the Regional Electricity Distributors (REDs) on municipal finances and ability to provide basic services.

- Water Demand Research

Tariff and consumption data will allow further research to be conducted in this field as highlighted during the presentation to National Treasury by Mrs. Ada Jansen on the 13th of February, Stellenbosch.

- Capacity, ability and constraints faced by Local Government to provide accurate data to National Departments

It is likely that this topic is currently under investigation by DPLG; however, it is not clear whether this view is appropriate as DPLG was unavailable for discussions.

In conclusion, we reiterate the fact that, given the quality and nature of the current data sets available, the research team was unable to conduct fiscal incidence analysis of free basic services. However, given our current understanding, it is possible to obtain suitable data to conduct such a study with the assistance of National Treasury. Given the constitutional importance of free basic services, the need for additional research in this field is of paramount importance.

APPENDIX

A.1 The General Household Survey 2005

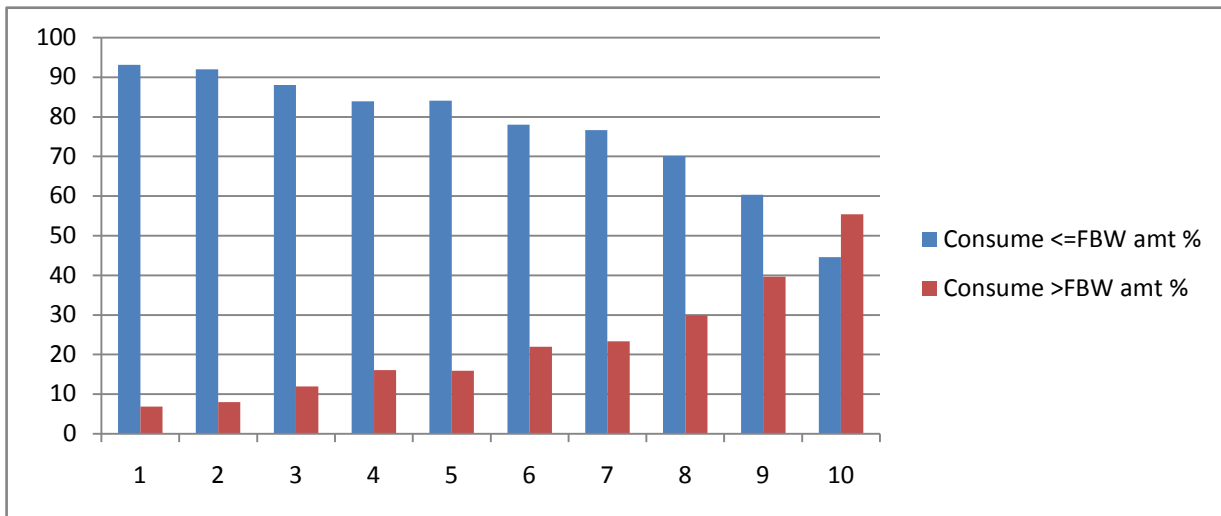
The General Household Survey 2005 had many questions which promised insight into the distribution of basic services in South Africa. Unfortunately, either the questions asked were suitable for our purposes but yielded inconsistent answers, or the questions were too abstract to successfully translate into plausible answers for the desired questions.

For instance, question 4.21 of the GHS 2005 asks:

*How many 20 litre-containers, on average, does the household use per day?*⁵

The answers were in interval form (1 – 20 litres, 21 – 60 litres, etc.). Using the Pareto midpoint calculation method to estimate average household consumption within categories, we then attempted to calculate individual water consumption. The aim was to determine whether the governmental target of 25 litres per person per day was indeed provided, and who benefited most from free water provision by decile. However, one should note the caveat that this target is only observable from government’s perspective in those homes with piped water from municipalities – only 48 percent of South Africans resided in such homes in GHS2005. Figure 1 shows the proportion of individuals who only consume the free basic amount per decile before social grants.

Figure 1. Proportion of individuals who only consume the free basic amount per decile



Source: Own calculations based on GHS 2005 data.

⁵ Although the universe for this question was “all household members without water on site or in the dwelling”, the question appears to have been answered by all households.

The intention here is to determine who benefits most from free water provision (in terms of only consuming the free basic water amount). The graph above paints an encouraging picture as it indicates that of those households receiving piped water, the poor are more likely to pay nothing for water consumption than the middle class or rich.

We also attempted to determine the progress of government in providing access to acceptable water service levels for all South Africans. The GHS2005 does not fully accommodate an investigation based on the strict definition of RDP water service levels, therefore the criteria for RDP service levels were modified to all households where individuals reside consuming more than or 25 litres of water per day and had water on site. Other RDP possibilities are the neighbour's tap and public/ communal tap. There were very few households in these categories (less than 20%) who reported having a water source within 200m of the home, so these water sources were generalised as being below RDP level. Table 1 shows the service level of households by race.

Table 1. Access to RDP water service levels by race

BY RACE					
RDP water access level	Black	Coloured	Indian	White	Total
Yes	58.7%	99.3%	100.0%	100.0%	71.8%
No	41.3%	0.7%	0.0%	0.0%	28.2%
	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Own calculations based on GHS 2005 data.

Question 4.25 of the GHS2005 asks:

How much does the household pay for water per month?

The intention here was to calculate the household water expenditure by decile and then simulate what the effect of free basic water is by:

1. initially assuming that block tariffs exist for all municipalities;
2. then calculating actual consumption by dividing the relevant midpoint categories by the tariff prevailing at that consumption level;
3. applying an average tariff to all households to determine what the monthly water bill would be like in the absence of block tariffs;

4. and then using the difference between the initial water bill in (1) and the water bill calculated in (3) to determine the impact of incremental block tariffs and free water.

Again the answers were coded in intervals with a minimum of R1 to R10 to an open category maximum of R301 or more. This format did not allow for the inclusion of those households paying nothing for water as they only consume the free amount, although this figure is theoretically quite easy to estimate as there are other questions in the GHS2005 which act as suitable qualifiers.

Table 2 shows the midpoint water consumption levels of households in South Africa receiving piped water, excluding those households not able to quantify their expenditure on water.

Table 2. Water consumption by decile of households receiving piped water

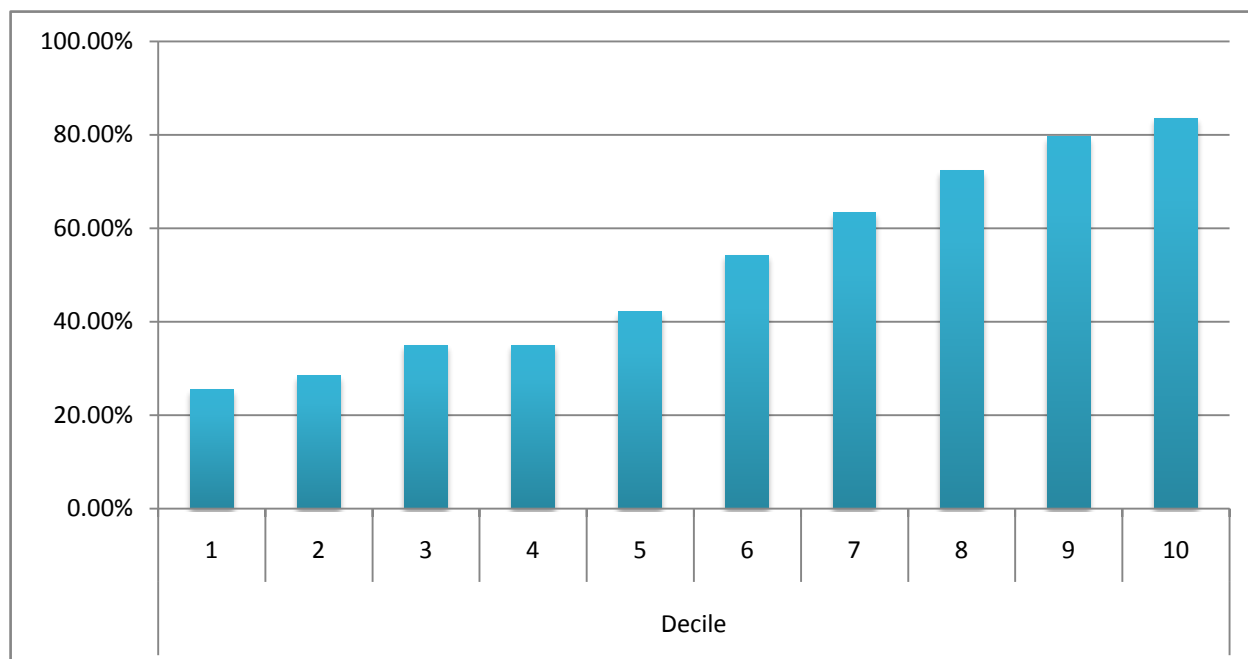
	Decile									
MP ⁶ⁱ	1	2	3	4	5	6	7	8	9	10
0	20,805	26,334	49,871	34,149	39,455	36,383	38,350	26,484	7,146	877
5	11,947	17,943	32,674	34,779	48,464	35,471	33,766	33,704	6,154	24,525
15	12,684	13,527	25,332	39,432	48,337	89,596	76,975	72,060	49,790	47,209
35	11,216	15,138	37,161	54,249	86,473	131,196	177,106	169,325	150,245	129,040
75	7,150	12,613	20,364	27,733	42,962	95,730	144,887	161,273	217,463	195,040
150	4,166	9,646	7,206	7,570	32,903	54,562	94,125	134,583	212,218	281,304
250	613	740	654	3,906	10,057	14,551	23,770	72,745	129,703	262,865
400	1,346	1,592	2,161	2,044	2,626	7,889	17,017	51,883	101,022	277,374
	69,927	97,533	175,423	203,862	311,277	465,378	605,996	722,057	873,741	1,218,234

Source: Own calculations based on GHS 2005 data.

However, a substantial number of households were unable to quantify their monthly water expenditure either because it was a fixed monthly cost included in their rent (52%) or because they did not know (1.5%). Furthermore, poorer households are much less likely to be able to estimate their monthly water bills than richer households, making consumption distribution analysis an even more arduous task. Figure 2 shows the under-reporting bias by decile, using the ability to quantify monthly water expenditure as the criterion.

⁶ Midpoint.

Figure 2. Monthly water expenditure reporting bias by decile



Source: Own calculations based on GHS 2005 data.

One method to theoretically correct this under-reporting bias would be to calculate the inverse of the under-reporting proportion per decile and multiplying each decile with these respective coefficients. The results (or ‘corrected’ version of Table 2) are shown in Table 3.

Table 3. Water consumption by decile of households receiving piped water (after ‘correction’ for under-reporting)

M P	Decile									
	1	2	3	4	5	6	7	8	9	10
0	80,886	92,322	142,980	97,607	93,672	67,148	60,507	36,588	8,966	1,050
5	46,448	62,905	93,676	99,407	115,061	65,465	53,275	46,563	7,721	29,358
15	49,313	47,423	72,627	112,707	114,759	165,356	121,449	99,552	62,471	56,512
35	43,606	53,071	106,540	155,058	205,300	242,133	279,432	233,926	188,510	154,469
75	27,798	44,219	58,383	79,268	101,998	176,677	228,598	222,802	272,848	233,475
150	16,197	33,817	20,660	21,637	78,117	100,698	148,507	185,929	266,267	336,739
250	2,383	2,594	1,875	11,164	23,877	26,855	37,504	100,499	162,737	314,666

40 0	5,233	5,581	6,196	5,842	6,235	14,560	26,849	71,677	126,751	332,034
	271,864	341,934	502,936	582,691	739,019	858,892	956,121	997,537	1,096,272	1,458,303

Source: Own calculations based on GHS 2005 data.

One can then simply multiply each column to determine what the monthly water bill would be, assuming that all households were subject to block tariffs. We had the benefit of having water consumption data from a sample of households in Cape Town which we could use to corroborate our results. Unfortunately, when calculated in this manner from the GHS data, the monthly water bill estimated for South Africa is only R 775 965 383, which is incongruent with the water bill extrapolated for South Africa from more reliable municipal data. This finding here renders the further analysis as outlined in points 3 and 4 above a futile exercise, as the magnitude of the water bill is wrong in the underlying household data.

A.2 Selected rectifications and errors found in the National Treasury Free Basic Services data set

Eastern Cape

1. The Amatole District Municipality (DM) data was dropped as the total number of people (971 833) compares poorly with Census 2001 (1.66 million) and weighted StatsSA mid-year estimates (1.74 million).
2. The Ngqushwa Local Municipality (LM) was dropped as it contained no FBS data.
3. The Nxuba LM was dropped as it contained no FBS data.
4. The Mquma LM was dropped as it only had total number of households (HH) who received FBS , with no indication as to how the data is split in the different categories (i.e. FBS for water, electricity, etc). In addition, there is no cost data.
5. Cacadu DM was dropped as the total number of people (2 192) does not compare favourably with the total number of people in the DM in Census or the weighted StatsSA mid-year estimates for the DM, nor the equivalent figures for the Cacadu DMA.
6. Ikwezi LM contains approximately 1500 more people than expected, but the data is retained.
7. Makana LM contains 11 000 more people than expected, but is retained.
8. Sundays River LM contains 13000 more people than expected.
9. Emalahleni LM contains 10-15 000 less people than expected
10. Gariiep LM contained 30000 more people than expected.
11. Ikwanca LM contains 21000 more people than expected.
12. Intsika Yethu LM contains 12000 more people than expected.
13. Inxuba Yethemba LM was dropped as it only contained one HH.
14. King Sabata Dalindyebo LM was dropped as it contained no HH or poor HH data.
15. Matatiele LM was dropped as the HH data was confused with the total number of people in the LM, and no HH data (number of poor HH and total number of HH) was included.
16. Nelson Mandela Bay Metro contains 400 000 more people than expected.
17. The data for 2008/09 and 2009/10 was excluded for all provinces as not all LMs provided such data.
18. The Mbizana LM data was dropped to avoid double counting within the O.R. Tambo DM. The O.R. Tambo DM number of people data coincides closely with the expected figure.

19. Note the large difference in the total cost to provide FBS to HH in Mbizana LM (R148 per HH) as compared to the O.R. Tambo DM (R53 per HH). The reason for this is unclear, and cannot be examined with current data.
20. The total number of people presented in the National Treasury data represents 82.5% of the total EC population as presented by StatsSA's 2007 mid-year estimates. This is unexpectedly high as only 27 municipalities (includes the Metro and the O.R. Tambo DM that consists of 7 LMs and the DM itself) out of 45 are represented in the "cleaned" data.
21. The "Total cost per HH per annum for all FBS" calculation had to be redone in nearly all instances as the original answer could not be replicated, no matter what combination of numbers provided in the data were used. It was assumed that "HH" were meant to only refer to HH receiving FBS, i.e. "poor HH that receive FBS" as described in the data.
22. The variable "Total FBS provided in municipal area (total social package)" is deceptive in terms of number of HH. This HH number is likely to include double-counting as it only adds the number of HH receiving any basic service - it is likely that HH may receive more than one FBS and would therefore be counted more than once.
23. In order to avoid the problem noted above, we have calculated the average cost per HH per FBS (i.e. for water, electricity, etc.)

Gauteng

1. Ekurhuleni Metro reports a population of 3.5million, whereas the expected figures was between 2.5 and 2.8 million
2. The Ekurhuleni Metro does not provide data on poor people or poor households, but the data is retained.
3. Note that 805 000 out of 850 000 (95%) HH receive FB water in Ekurhuleni Metro.
4. Emfuleni LM does not provide population numbers, only total number of HH and number of poor HH.
5. The Emfuleni LM data is surprising as the average cost per HH for all FBS is well below R20!
6. Kungwini LM does not provide population numbers, only total number of HH and number of poor HH.
7. Lesedi LM poor population was calculated assuming that non-poor and poor HH have the same size.
8. Lesedi LM has approximately 40 000 more people than expected.

9. Nokeng Tsa Taemane LM has 10 000 more people than expected.

10. Westonaria LM has 5000 people more than expected.
