

2015/2016 TECHNICAL REPORT

SUBMISSION
FOR THE DIVISION
OF REVENUE

For an Equitable Sharing of National Revenue





For an Equitable Sharing of National Revenue

Technical Report: Submission for the Division of Revenue 2015/2016

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2nd Floor, Montrose Place, Bekker Street,
Waterfall Park, Vorna Valley, Midrand, South Africa
Private Bag X69, Halfway House 1685
Tel: 086 1315 710, Fax: +27 (0) 11 207 2344

www.ffc.co.za

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ANA	Annual National Assessment
ANC	African National Congress
ASGISA	Accelerated and Shared Growth Initiative for South Africa
BAU	Business As Usual
CAPS	Curriculum and Assessment Policy Statement
CDG	Care Dependency Grant
CES	Constant Elasticity of Substitution
CGE	Computable General Equilibrium
CHC	Community Health Centre
CMIP	Consolidated Municipal Infrastructure Programme
CNA	Costed Norms Approach
CPD	Corporation for Public Deposits
CPI	Consumer Price Index
CSDP	Central Securities Depository Participant
CSG	Child Support Grant
CT	Cash Transfer
DBSA	Development Bank of Southern Africa
DCoG	Department of Cooperative Governance and Traditional Affairs
DFID	Department for International Development (UK)
DG	Disability Grant
DOTS	Directly Observed Treatment, Short-Course
ECD	Early Childhood Development
EDL	Essential Drug List
EMIS	Education Management Information System
EU	European Union
FBE	Free Basic Electricity
FBS	Free Basic Services
FCG	Foster Child Grant
FE	Fixed Effects
FFC	Financial and Fiscal Commission
FRA	Forward Rate Agreement
FUNDEF	Fund for Primary Education Administration and Development and for the Enhancement of Teacher Status
GDE	Gross Domestic Expenditure
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution

ACRONYMS

GFCF	Gross Fixed Capital Formation
GIA	Grant In Aid
GVA	Gross Value Added
GWI	Global Water Intelligence
HRM	Halifax Regional Municipality
HSRC	Human Sciences Research Council
IEA	International Energy Agency
IMF	International Monetary Fund
IT	Information Technology
JSE	Johannesburg Securities Exchange
KIDS	KwaZulu-Natal Income Dynamics Study
KZN	KwaZulu-Natal
LCR	Liquidity Coverage Ratio
LG	Local Government
LGD	Loss Given Default
LGES	Local Government Equitable Share
LGFF	Local Government Fiscal Framework
LTSM	Learning and Teaching Support Material
LTV	Loan To Value
M1	Money Supply Narrowly Defined
M3	Money Supply Broadly Defined
MDB	Municipal Demarcation Board
MDG	Millennium Development Goals
MEC	Member of the Executive Council
MFMA	Municipal Financial Management Act
MIG	Municipal Infrastructure Grant
MS	Micro Simulation
MSA	Municipal Systems Act
MTBPS	Medium Term Budget Policy Statement
NCD	Negotiable Certificate of Deposit
NCR	National Credit Regulator
NDP	National Development Plan
Nersa	National Energy Regulator of South Africa
NGP	New Growth Path
NHI	National Health Insurance

NIDS	National Income Dynamic Survey
NIR	Non-Interest Revenue
NNSSF	National Norms and Standards for School Funding
NPC	National Planning Commission
NPL	Non-Performing Loans
NPNC	Non-Personnel Non-Capital
NSFR	Net Stable Funding Ratio
OAG	Old Age Grant
OECD	Organization for Economic Cooperation and Development
ORT	Oral Rehydration Therapy
PED	Provincial Education Department
PES	Provincial Equitable Share
PFMA	Public Finance Management Act
PHC	Primary Health Care
PPP	Public-Private Partnership
PS	Propensity Score
PSCE	Private Sector Credit Extension
PSM	Propensity Score Matching
RDP	Reconstruction and Development Programme
REER	Real Effective Exchange Rate
RWA	Risk Weighted Assets
SACMEQ	Southern and East African Consortium for the Monitoring of Education Quality
SALGA	South African Local Government Association
SAM	Social Accounting Matrix
SARB	South African Reserve Bank
SASA	South African Schools Act
SENS	Stock Exchange News Service
SFA	Stochastic Frontier Analysis
SGB	School Governing Body
SOAP	State Old Age Pension
Stats SA	Statistics South Africa
STRATE	Share Transactions Totally Electronic
TIMSS	Trends in International Maths and Science Surveys
UIF	Unemployment Insurance Fund
USDG	Urban Settlements Development Grant

FOREWORD AND EDITORIAL

The Financial and Fiscal Commission (the Commission) provides independent, impartial advice and recommendations on intergovernmental fiscal relations (IGFR), including the technical evaluation and design of provincial and local fiscal and economic policy. Established in 1994 by the Constitution of South Africa, the Commission provides all organs of the state with information to help them make informed decisions on matters that affect, or are related to, the management of finances. In this respect, one of the Commission's main objectives is to help inform the following year's budget by making recommendations on the division of revenue among the three spheres of government and to support government's policy-making on IGFR. This is done by submitting annually to Parliament an advisory document summarising the recommendations that the executive should take into account when crafting the next year's budget. This Submission for the Division of Revenue is made in terms of Section 214(2) and Section 229(5) of the Constitution, Section 9 of the Intergovernmental Fiscal Relations Act of 1999 and the Financial and Fiscal Commission Act of 1997, which is the national legislation in terms of which the Commission must function. On 30 May 2014, the Commission tabled at Parliament its Annual Submission for the 2015/16 Division of Revenue.

This volume of technical chapters is published as a companion document to the Submission for the Division of Revenue 2015/16 that the Commission tabled in Parliament. Collectively, the chapters in this Technical Report argue that at a time of uncertainty for the world economy and financial system, South Africa is facing economic and fiscal challenges that are more severe than many people realise. In particular:

1. *Potential public debt unsustainability*, which is more long term. To prevent this will require fiscal discipline that does not jeopardise short-term economic growth, but enhances longer-term economic growth and employment prospects.
2. *High levels of poverty and inequality*. This is a pressing economic problem and will require bold policies, new partnerships and a continuing commitment to social programmes that help the country's most vulnerable citizens.

Government has set a clear course of comprehensive economic and social reforms, with the National Development Plan (NDP) being a key element. To finance these socio-economic programmes, government needs to have steady and dependable revenue growth. This means having an economy that is growing fast enough to provide revenue necessary for these programmes. Ensuring that public spending has a greater impact, through efficient and effective delivery of public services, will also stimulate growth. Nevertheless, trade-offs will have to be made, to strike a balance between fiscal sustainability and protecting (if not extending) existing socio-economic gains. Under the theme of *Balancing Fiscal Sustainability with Socio-economic Impact*, the volume looks at ways of achieving this balance and the need for excellent and affordable public services.

Creating a dynamic economy requires three basic investments: in people (**human capital**), in equipment and physical structures (**infrastructure**) and in new ideas and technologies (**innovation**). Upgrading **human capital**, through quality education, health and nutrition, produces an economic growth dividend. This makes growth more inclusive and also reduces inequality, as the less well-off are also able to enjoy many of the gains from growth. South Africa already spends significant amounts of money on health, education and other human capital investments but, while access has improved dramatically, quality has lagged. Upgrading and extending **infrastructure**, such as transport, energy, telecommunications and housing, is also crucial for economic and social development. The focus here is on municipal infrastructure, as local government has an important developmental role to play through the roll-out and maintenance of infrastructure. The outcomes of the substantial investment in infrastructure have not been as high as expected, in part because of poor planning and implementation, escalating costs, supply chain management fraud and inefficiency, and inadequate maintenance.

Excellent public services, at a cost that South Africans can afford, are fundamental to ensuring these investments produce the desired outcome and fulfil the NDP's vision. The Commission believes that affordability and excellence are not incompatible and can be accomplished through greater efficiency, which makes sense fiscally and will mean better run socio-economic programmes. Such programmes will need to be integrated across different departments and spheres of government, so that the population's needs are met. Vulnerable people and their families do not care which sphere of government

or which department is responsible for providing support – they just want help. South Africa can create better conditions for inclusive growth, encourage participation in the economy and improve equity through the intergovernmental system of allocating resources. However, effective resource allocation is not just about sharing resources fairly across spheres of government. An often-ignored issue is the effect on resource allocation of changes to municipal boundaries (re-demarcation), which is explored in the last part of the Technical Report.

The Technical Report contains 12 chapters:

Chapter 1 is on public debt challenges and the need for reform to fiscal frameworks. South Africa's economic growth has been insufficient to generate the income levels envisaged by the NDP. Under such circumstances, meeting the financing requirements to translate the ambitious goals of the NDP into reality would be difficult or impossible. While South African fiscal policy continues to be prudent, public debt has increased during and in the aftermath of the recent global economic and financial crisis, as in many other countries. In the absence of expenditure reform, the risk of decline or subdued growth in output constitutes a threat to fiscal stability. This chapter discusses the evolution of public debt and its impact on the economy in order to make recommendations on how to mitigate the risks of domestic debt. It argues that, to prevent an explosion of debt over time, policy-makers have to respond to the changing conditions in their tax base (economic growth) and to the cost of finance (interest rates). Policy rules can help to ensure that, at given moments, the specific fiscal policy stances taken by government are adjusted to changes in the environment, so that debt will not explode. This chapter defines the conditions that will ensure compliance with the intertemporal budget constraint. The empirical part of the chapter further shows public debt is sustainable in this respect. However, while compliance with the intertemporal budget constraint is a necessary condition for debt sustainability, it may not be sufficient. Fiscal policy must find a delicate optimum between insufficient consolidation, which undermines financial markets' trust in fundamental solvency, and excessive consolidation, which reduces growth. Such equilibrium cannot be established by ex-ante rules. It is subject to the broad consideration of many policy parameters and must be part of government's comprehensive economic and debt management strategy.

Chapter 2 reports new findings on anti-poverty programmes and the need for reform. As South Africa seeks to boost economic growth, pressures on socio-economic outcomes may intensify, jeopardising the sustainability of that growth and the wellbeing of the population. The social security system plays a central role in alleviating and reducing poverty, vulnerability, social exclusion and inequality. The social protection system, as defined within the fiscal framework, has two separate but inter-related entities: social assistance (the grants system, through which the state provides basic minimum protection to relieve poverty), and social insurance (mandatory employee contribution schemes). This chapter's particular area of interest is the Comprehensive Social Assistance Programme, which incorporates both social assistance and social insurance. While a number of studies have looked at the impact of the programme on the beneficiaries, the novelty of research described in this chapter is twofold. First, a state of the South African economy without social grant beneficiaries is built to serve as a counterfactual simulation scenario. This provides useful insights on the biases introduced by social grants into the South African economy and enables the overall impact of the social grant system to be assessed. Results from the counterfactual scenario are compared to those from the reference scenario, i.e. the actual performance of the economy with the social grant scheme. Second, the chapter considers several grants at the same time to get an overall picture of their effect. The main hypothesis confirmed by the findings is that social grants have significant and important indirect effects through labour market participation and households' total consumption patterns, consumption budget shares and saving-investment behaviour. This becomes important as the size of the programme continues to increase. While fiscal prudence and consolidation are pursued in the medium term, the analysis shows that social security spending contributes to faster economic growth and to reducing inequality. This warrants targeted demand stimulus today, not contraction, which is now holding back growth.

Chapter 3 is on equitable resourcing of schools for better outcomes. The chapter evaluates how resources to schools are allocated and the effect such resources have on outcomes, given the renewed emphasis of government on performance and quality outcomes. The findings are that the basic education system is fraught with performance weaknesses and disparities, arising from long historical systematic under-investment and policy failures. Successive years of education and school

financing reforms have improved resource distribution between affluent and less affluent schools. However, equitable education remains elusive, as revealed by variations in resources and learner achievements across provinces, districts and schools. This is in part because resource allocations and funding of other critical inputs disregard historical disparities and other constraints experienced by disadvantaged schools. Continuing to use the current school resourcing framework is likely to reinforce inequalities and perpetuate a vicious cycle of underdevelopment. Therefore, the chapter recommends that government allocates resources to schools on the basis of minimum inputs required to deliver the curriculum outputs. This will require aligning learner subsidy allocations with national policy requirements and priorities, reprioritising provincial education budgets and standardising the monitoring of school-level expenditure and performance.

Chapter 4 is on understanding South African housing demand. The chapter evaluates how the country is facing rapid urbanisation and under-supply of housing in urban areas. Part of the problem is a lack of understanding of the different dimensions of housing demand and how housing demand changes over time. Using data from the City of Tshwane, the chapter develops a housing-demand model that looks at type, tenure and location of housing under two scenarios: Business as Usual (BAU) and future housing aspirations of households. The model found that, by 2030, demand for housing will be the greatest in urban areas and rental accommodation will be the most desired form of housing. Housing typology will shift, from free-standing housing to flats and townhouses. The chapter recommends that municipalities (especially metros) should monitor housing demand and plan for rental accommodation (flats and townhouses) in CBDs and intermediate suburbs.

Chapter 5 explores self-build housing initiatives. Self-build housing encourages households to improve their housing conditions (thereby reducing housing backlogs), lessens the burden on the fiscus and enables state resources to be directed towards the most disadvantaged households. However, compared to other countries such as Brazil, households in South Africa are not very active in addressing their own housing needs. The chapter highlights some key levers for self-build initiatives and identified poor households that are able to use the assisted self-build option. Two groups of households earning less than R2,500 per month are likely to need government to provide fully subsidised housing: female-headed households with children under the age of 20 years and households containing adults above the age of 40 years who are likely to remain unemployed. Government could achieve remarkable progress in housing delivery if households were encouraged to participate in self-build initiatives and government resources were targeted at the most vulnerable. The chapter therefore recommends that government should prioritise subsidised housing for the two most vulnerable groups, as well as land ownership registration processes in appropriately located informal settlements, and provide infrastructure in areas with the potential for self-build housing.

Chapter 6 is on the impact of government spending on food security. The Constitution entitles all citizens access to adequate food, and so food security is a human right that must be protected. The increases in commodity prices and in food inflation have raised concerns about the impact on poor households, which spend a larger proportion of their income on food. Government's response has been to introduce policies aimed at stimulating small-scale agriculture development and agro-processing industries. This chapter assesses the impact of government spending on household food security and the effectiveness of the existing policy framework. It finds that the three agricultural grants should be better coordinated and integrated, while reporting requirements should include more appropriate indicators. In the case of non-agricultural programmes, government programmes that enable households to buy more food were found to be the most promising for improving food security. However, assessing whether government is meeting its statutory obligation is very difficult because the food security function is fragmented across different spheres and sectors. The chapter recommends reviewing the agricultural conditional grants, improving the planning and procurement processes of food-security programmes, clarifying the municipal legislative mandate and responsibility for food security, and finalising without delay the terms of reference for the committee to review the agricultural conditional grants.

Chapter 7 is on the design of public transport subsidies. The current public transport subsidy framework is not aligned to the national transport policy, which promotes an efficient and effective public transport system. The transport system is fragmented, subsidies are paid to rail and bus modes that have a limited coverage compared to minibus taxes, and expenditure of public transport subsidies

continues to rise, without any proportionate benefits to the public. An integrated public transport network would make it easier to align the transport subsidy (where appropriate) to network objectives. The chapter found that a desirable subsidy framework should address social equity, encourage public transport operational productivity and incentivise a modal shift from private to public transport. A revised subsidy framework, which incorporates these three aspects, would cost government more than 2.6 times the current subsidy bill (although the current subsidy supports a tiny proportion of the population). The chapter recommends that the Department of Transport (DoT) uses the research findings to formulate and implement a transport subsidy framework that explicitly incorporates these three aspects.

Chapter 8 explores effective assignment of public transport functions for an optimal transport system. Transport policy and previous research agree that the responsibility for transport functions belongs at local government level. This can result in improved service delivery to passengers. However, at the same time, institutional arrangements need to be considered. Over 300 entities are involved in delivery transport services in South Africa, and yet critical gaps exist between what is required and what currently exists. These gaps (and related constraints) must be taken into account when public transport functions are assigned to municipalities. Two critical functions are the contracting function and the regulatory function, but the necessary skills and technical capacity are limited at local government level. There are three possible institutional arrangements for managing public transport, and the ideal one (or combination of models) needs to take into account the challenges and the different capacity levels across municipalities. Institutional arrangements and municipal capacity need to be improved. Therefore, the chapter recommends that all municipalities prepare proper integrated transport plans and develop the skills required to manage a complex public transport system, with the assistance of the DoT and SALGA.

Chapter 9 identifies municipal funding constraints for capital investments. Municipal capital investments (capex) in infrastructure stimulate the local economy and enable the roll-out of services to poor communities. However, in 2011, the Commission found that infrastructure grants allocated to local government were not enough to cover expenditure needs, as other municipal revenue sources were limited. This chapter looks at the factors that affect municipal own-revenue contributions to capex. Municipal capex is increasingly funded by intergovernmental transfers. Factors affecting municipal own capital funds include declining economic activity, which means that municipalities receive less income in the form of local taxes, and the income levels of communities within the municipalities. The other factor is the ability of municipalities to manage their internal financial affairs, as reflected in whether they receive an unqualified audit or not. The research found that, surprisingly, local demand for infrastructure does not affect a municipality's decision to contribute own revenue to capital expenditure. Aggravating the situation of limited funds is the persistent under-spending of municipal budgets. The chapter recommends that the monitoring and evaluation of municipal capital planning and investment spending are improved, that alternative and innovative methods are found to fund infrastructure, and that a new infrastructure funding model is developed for poorly resourced (rural) municipalities.

Chapter 10 investigates the impact of electricity prices on municipalities. Municipalities purchase bulk electricity from Eskom and resell to end users at a cost. The distribution of electricity is thus an expenditure and revenue item for municipalities. As a result of Eskom's push towards more cost-reflective tariffs, the price of bulk electricity has risen rapidly. Tariff increases affect not only end users of electricity but also municipalities. An assessment of the impact of higher electricity prices on municipalities found that these increases negatively affect municipal expenditure and revenue, jeopardising maintenance and asset renewal of electricity infrastructure. Given developments in the pipeline (for example the implementation of the Carbon Tax in 2016) that will effectively result in an increase in bulk electricity purchases and therefore negatively affect municipalities, the chapter calls on government to put in place a comprehensive plan to manage the risk attached to increasing bulk electricity prices.

Chapter 11 explores adequacy and efficiency in primary health care financing. Despite the increasing growth in health spending, the sector is beleaguered by challenges such as suboptimal quality of care, inefficiencies in the system, the heavy burden of disease, input cost pressures, the growing number of those who are uninsured, inequitable distribution of resources and the widely

held perception that health care is underfunded. If left unchecked, these challenges will continue to undermine the performance and delivery of the health care system and negatively affect progress towards the implementation and roll-out of National Health Insurance.

Chapter 12 investigates the financial and fiscal consequences of changing municipal boundaries. Concerns have been raised about the impact of demarcation, or reconfiguring of municipal boundaries, on municipal finances. This chapter's findings reveals that demarcation processes result in unintended economic consequences, significant transaction costs and negative impacts on human resources and other municipal processes. The costs associated with demarcation are both direct and indirect, ranging from perverse incentives to administrative and infrastructure costs. The chapter recommends that before any decision is taken regarding demarcation, the costs involved should be established and funding identified. A transitional demarcation grant is suggested as the most appropriate funding instrument.

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Ramos Mabugu,

Research and Recommendations Programme Director

Ramos Mabugu is Head of the Research and Recommendations Division at the FFC and a Fellow at the University of Stellenbosch in South Africa. He has published on topics related to applied economics, public finance, tax policy, and intergovernmental fiscal relations. Most of Ramos's economic modelling work is on the application of computable general equilibrium models, Social Accounting Matrix Methods, Input Output Methods and Macroeconomic models. In collaboration with a few colleagues, Ramos has pioneered the first applications of computable general equilibrium (CGE) microsimulation (static and dynamic) in two southern African countries. He has taught and supervised at postgraduate level at the University of Zimbabwe and the University of Pretoria in South Africa. While at Pretoria University, Ramos was instrumental in setting up a collaborative environmental economics MSc and PhD training programme, served as consultant for many organisations and was an external examiner for several universities. Ramos has also taught economic modelling courses on two occasions at the Ecological and Environmental Economics Programme at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Italy. In 2003/04, Ramos gave technical advice at the Centre for International Forestry Research (CIFOR) and Sida. In 2006, Ramos was awarded the visiting fellowship award from Curtin University in Australia, in recognition of his contributions to intergovernmental fiscal relations modelling. He earned his PhD in Economics from the University of Gothenburg.

Ismaël Fofana holds a PhD in Economics and currently heads the International Food Policy Research Institute AGRODEP Office for East and West Africa. Previously, he served as a member of the Centre Interuniversitaire de Recherche sur les Politiques Economiques et l'Emploi and of the Poverty and Economic Policy (PEP) research network at Laval University (Canada). From September 2005 to August 2007, he acted as Director of the African office of the PEP research network in Dakar (Senegal). Ismaël's principal area of interest and expertise is the impact assessment of macro policies and shocks. He conducts research and provides scientific support to researchers in developing countries on building social accounting matrices and CGE models related to fiscal policy, gender and poverty issues. In collaboration with the Africa Centre for Gender and Development of the United Nation Economic Commission for Africa, Ismaël has developed a macroeconomic framework that integrates both market and non-market activities, as well as male and female work to evaluate impacts of policy reforms on poverty reduction and on the wellbeing of men and women in Africa, with a pilot study applied to South Africa.

Hélène Maisonnave holds a PhD in Economics and specialises in development economics and CGE models. She has been working with the PEP network since 2007 as a resource person, and, since September 2012, as the Scientific Coordinator for the MPIA programme. In September 2014, she was appointed Assistant Professor at the University of Le Havre in France. Hélène has developed several CGE models, mostly on African countries, dealing with trade reforms, education and labour market issues, and the Millennium Development Goals. She worked as a researcher for the European Commission, in the Environmental and Climate Unit in Seville. Prior to this, she also worked for the FFC and completed a post-doctoral degree at the University of Free State in South Africa.

Margaret Chitiga-Mabugu is Professor, Director and Head of School of Public Management and Administration (SPMA) at the University of Pretoria. Previously she was the Executive Director of the Economic Performance and Development Research Unit at the Human Sciences Research Council. Margaret obtained her PhD in Economics at the University of Gothenburg in Sweden. Her thesis work was on the economy-wide impacts of public policies on income distribution. She was previously Professor of Economics in the Economics Department at the University of Pretoria, where she taught microeconomics, public sector economics, development economics, economic modelling and mathematics for economists. Margaret has also been involved in teaching public finance at the Joint Facility for Electives at the African Economic Research Consortium (AERC) and economic modelling at the Collaborative MSc in Agricultural and Applied Economics. She has been invited twice to be part of a five-member international team of resource persons to run an international course on policy impact analysis modelling for the Ecological and Environmental Economics Programme, a joint programme of the Abdus Salam International Centre for Theoretical Physics (ICTP), the Fondazione Eni Enrico Mattei (FEEM) and the Beijer International Institute of Ecological Economics. She is the project coordinator for the Centre for Environmental Economics and Policy in Africa (CEEPA) and co-editor of CEEPA publications. Margaret is a board member on the African Economic Research Consortium's training sub-committee, and is an associate editor of the Environment and Development Economics Journal, published by Cambridge Press.

Mkhululi Ncube holds a PhD in Economics from Gothenburg University in Sweden. He is currently a Programme Manager in the Local Government Unit of the FFC. Previously, Mkhululi lectured in various universities in and outside South Africa. His present research interests are climate change and fiscal policies, local government budget analysis and gender budgeting. He is passionate about local economic development issues and sustainable resource utilisation in urban spaces. He enjoys reading widely and his interests include reading history and playing golf.

Babatunde Abidoje is a Senior Lecturer at the Department of Agricultural Economics, Extension and Rural Development, University of Pretoria. He holds a PhD in Economics from Iowa State University, USA.

René Glynnis English is a medical doctor with a doctoral degree. She is a public health medicine specialist with experience in clinical and health systems research, information management, monitoring and evaluation, development of responsive and innovative solutions for the public health system, and initiatives that address priority diseases. René Glynnis has a robust knowledge and understanding of the public health system, legislation, and of policies, particularly of the district health system as a key vehicle for service delivery. She also has advanced competency in epidemiology, biostatistics, monitoring and evaluation of the public health system, and in designing health information management improvement interventions. René Glynnis was instrumental in developing the first syndromic respiratory guideline for nurses, using a range of theoretical frameworks and mixed methods research. She was also a lead investigator in an HMIS project in the Western Cape Department of Health (DoH), where she developed a multifaceted health information solution to improve information management. She is on the HIS Task Team, the National Health Information Systems of South Africa (NHISSA) Committee and is coordinating the development of the five-year HIS strategy for the national DoH. She currently manages the Health Systems Research Unit at the Health Systems Trust

Ghalieb Dawood is the Programme Manager for the Provincial Budget Analysis Unit at the FFC. He holds an MSc (Economics) from the University of Cape Town and is a qualified adult education specialist. His work at the FFC focuses mainly on budget analysis, division of revenue and fiscal frameworks, provincial sector priorities and costing. Ghalieb's current research interests are in the areas of food security, public transport systems, the public sector wage bill and productivity analysis. Prior to joining the FFC, Ghalieb was a Programme Manager at the Applied Fiscal Research Centre and worked as an independent consultant, where his focus was mainly on public finance, institutional development, monitoring and evaluation, costing, intergovernmental fiscal relations, budget analysis, governance and oversight.

Sasha Peters has an MPhil in Public Policy from the University of Cape Town. She is currently the Programme Manager of the National Budget Analysis Unit at the FFC. At present, her focus areas are budget analysis, electricity, municipal debt, service delivery arrangements and local government capacity in South Africa. Previously, Sasha was employed at the Presidency and within IDASA's Budget Information Services, where her focus was mainly on social sector departments of education, health and social development.

Eddie Rakabe is a Programme Manager in the Fiscal Policy Unit of the FFC. In 2007, he joined the FFC from the National Treasury, where he had worked as a policy analyst in the Local Government Finance Policy Unit and as a Senior Economist in the provincial Policy Unit. His research interest focuses mainly on intergovernmental grants design, public expenditure efficiency and miscellaneous provincial and local government fiscal framework issues. Eddie is also part of the Research Project on Employment, Income Distribution and Inclusive Growth (REDI3x3) where he publishes occasionally on aspects related to low income markets, second economy activities and inclusive growth. He holds a Master's in economics policy and development from the University of Johannesburg. In 2004, Eddie received an award in the postgraduate category of the Nedbank/Budget speech competition for writing a paper on black economic empowerment (BEE).

Vandudzai Mbanda is an economist with a Master's degree and about eight years' experience working on economic research and analysis mainly using CGE modelling techniques. Her areas of research interest include poverty and inequality analysis, unemployment, applied econometrics and assessing the sectoral and economy-wide impacts of various socio-economic policies.

Jugal Mahabir is a lecturer at the Department of Economics and Econometrics at the University of Johannesburg. He holds a BSocSc (Honours) degree in Economics from the University of KwaZulu-Natal and an MCom in Economics from the University of Johannesburg. Jugal previously worked at the National Treasury and the FFC, where his primary focus was on local government financing issues. His main areas of interest are public economics, public finance and fiscal decentralisation issues.

Nanja Churr obtained her Town and Regional Planning Degree cum laude in 2001 and now has 12 years' experience in socio-economic development, including the dynamic impacts associated with evaluations and strategic frameworks. She has acquired excellent skills in social, socio-economic and economic development of rural and urban communities. Nanja has undertaken numerous studies of human settlement delivery, socio-economic impact assessments, monitoring and evaluations, development plans, revitalisation studies, local economic development plans/strategies, socio-economic research, baseline surveys and needs assessment, macroeconomic analysis, feasibility and business plan development, and enterprise development. Nanja has also obtained valuable international training in Canada on regional planning and economic investment analysis, and on the theory and practice of economic development. Her on-the-ground experience is in local projects/businesses/co-operatives and project implementation, with an emphasis on job creation.

Sabelo Mtantato holds a Master's in Economics from the University of KwaZulu-Natal. Sabelo's work at the FFC focuses mainly on intergovernmental fiscal relations issues in a number of areas, including human settlements and land-use planning and management. He has also worked on a number of research projects relating to public transport and roads infrastructure. Before joining the FFC, Sabelo worked in the Public Finance Division at the National Treasury and Mergers and Acquisition Division at the Competition Commission.

Mathetha Mokonyama is a passenger transport research group leader at the CSIR. He holds a degree in Civil Engineering from the University of the Witwatersrand, a Master's in Transport Engineering from the University of Pretoria and is registered as a professional engineer with the Engineering Council of South Africa. Mathetha previously worked for the City of Johannesburg and in private civil engineering consultancy, in the areas of transport planning, transport modelling, traffic engineering and development engineering. He has published peer-reviewed technical papers and book chapters on topics related to transport operations and modelling. He has also consulted on transport planning and operations for all spheres of government in South Africa and for international clients, including the International Association of Public Transport. Mathetha's current research interests include the modelling of the dynamic needs of public transport customers and the specification of their needs in public transport service contracts.

Nomonde Madubula is a Senior Researcher in the FFC's Fiscal Policy Unit. She holds a Master's in Economics from the University of the Witwatersrand. Her research is focused on social sector issues (education and health) and environmental regulation and policy. Nomonde has been responsible for path-breaking work on the provisioning of learner support material, funding mechanisms for further education and training and the feasibility of extending the National School Nutrition Programme. In the current financial year, her focus area has been on adequacy and efficiency in primary health care financing. Prior to joining the FFC, Nomonde worked at the National Treasury's Tax Policy Directorate as an intern, focusing on intergovernmental tax relations.

Thesandree Padayachee holds a Master's in Evidence-based Health Care and Health Technology Assessment (UK) and an Honours degree in Speech and Language Pathology (UKZN). She is a Senior Researcher at the Health Systems Trust, specialising in health care research and is currently project managing four projects funded by the national DoH and National Treasury. Thesandree has extensive experience working with health officials at both district and sub-district level, and demonstrates good understanding of the complex managerial and health programme implementation challenges experienced by staff at these levels. She has worked on a number of projects in the SADC region, including the Elizabeth Glaser Paediatric Aids Foundation Economic Evaluation, STAR School Impact Assessment and the National Communication Survey (2008). She has five years' experience in research and data analysis, both locally and abroad, having spent three years in Japan as a volunteer researcher at the United Nations Centre for

Regional Development. Thesandree also has several years' clinical experience in both the public and private health sectors. Her training as a speech and language pathologist has given her a solid foundation in the social and cultural aspects of health care, having worked at Groote Schuur Hospital (2003) and Chris Hani Baragwanath Hospital (2004–2005). Thesandree is a recipient of the HIV/AIDS Young Researchers Award and the Deloitte/Unilever Nelson Mandela Scholarship.

Njabulo Mkhize is a Health Economist, with extensive expertise in public health. He is currently a Senior Lecturer at the School of Economic Sciences at the University of South Africa (UNISA). Previously, he worked for the national DoH as a Health Economist, ABSA Bank (as a Senior Economist) and SEIFSA (as a Chief Economist). He holds a Master's in Economics and is currently undertaking a PhD (Economics) through UNISA. Njabulo is a member of the Economic Society of South Africa (ESSA). He has undertaken projects in partnership with the Nelson Mandela School of Medicine, University of KwaZulu-Natal, Oasis Innovative Health Project Consultants, Gauteng Provincial DoH, UNDP Health Sector Support Programme and the Gerson Lehrman Group (GLG).

Real Effects of Public Debt on National Development¹

By: R. Mabugu, H. Maisonnave², M. Chitiga³, and B. Decaluwé⁴

1.1 Introduction

South Africa's National Development Plan (NDP) Vision for 2030 clearly articulates that fiscal policy would be expected to play a central role in influencing the pace at which the economy will grow and its capacity to deal with the key challenges that will arise over the next several decades (NPC, 2011). Domestic policy challenges include poor education and health outcomes, rapid urbanisation, environmental hazards, infrastructure capacity weaknesses, coupled with inadequate investment levels, and household and spatial inequalities. External challenges include immigration and an uncertain global economic environment. Fiscal policy will not only affect macroeconomic stability, but also whether the country can transition to a higher economic growth path, reduce its high poverty rate, and address its substantial income, asset, and regional inequalities.

It is now some five years since the global economic and financial crisis of 2008. The crisis led to prolonged and previously unforeseen fiscal deterioration that has left South Africa with serious challenges. The height of the crisis is now well past, but its aftermath remains pervasive, with South Africa still some way from restoring strong and sustainable economic growth rates per annum, as required by the NDP. These developments have directly affected the level and composition of public debt. The global crises and malaise have brought home that large government debt positions can be far more pernicious than a degree of crowding out. This was most dramatically illustrated by the sovereign debt default situations reached by several countries, most notably Greece, Ireland, Portugal, Spain and Cyprus. These countries have required massive bail-outs by international financial institutions, just to enable their economies to keep functioning. A more insidious effect is demonstrated by the case of Japan, which has the highest government debt-to-gross domestic product (GDP) ratio in the world, and has had great difficulty in achieving even modest economic growth, although a public debt crisis of bail-out proportions has been avoided. In the eurozone, the average public debt level is approximately 100% of GDP and significantly above 100% in countries such as Greece, Ireland, Portugal, Spain, Italy and Cyprus. Japan's ratio at 240% is by far the highest of any country. Countries such as Norway, Sweden and Australia have a public debt ratio of around 50%. In comparison, South Africa's public debt ratio is around 40%, which does not appear unduly high and is at a similar level to that of South Korea, which is progressing soundly in economic terms.

Nevertheless, in recent years South Africa's debt has increased considerably. Prior to the global economic crisis, policy succeeded: the public debt-to-GDP ratio fell from nearly 50% in 1994 (the result of excessive expenditure by the National Party to finance its homelands projects) to 45% in 1995. From 1996, government took measures that prevented further increases in the debt level and (only in 2000) started to reduce the debt level as a percentage of GDP. By 2008, government surpluses and low deficits had brought the debt level materially down to less than 24%. However, the international crisis in 2008 and the local economic consequences meant that the percentage to GDP inevitably increased, as deficits were incurred. The debt level exceeded 36% of GDP in 2012 and will continue to increase over the next few years as deficits continue, although the increase will be moderate. Some fiscal adjustment is therefore required in order to stabilise the debt dynamics.

The total balance of government debt in relation to the domestic bond market is high, and government bonds are a major determinant of the characteristics of the local bond market. The value of new government bonds being raised in the domestic market has increased significantly and is markedly higher today than during 1990–2000. The proportion of foreign debt (in particular foreign

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² Laval University, Canada

³ Human Sciences Research Council, South Africa

⁴ Laval University, Canada

bonds) has been far higher in recent years than during 1995–1998, when it was only around 5% of total government debt. Since then, it has expanded by a multiple of 8.6 times in rand value. These characteristics indicate a need to give careful consideration to the extent and manner of raising new public debt.

The interest payable on government debt is already a significant item in government annual expenditure and is estimated at R100-billion for 2014/2015, or close to 10% of government expenditure. This is in an environment of exceptionally low interest rates, as the South African Reserve Bank (SARB) has adopted a low-rates policy because of the slow economic growth and recovery from the financial crises in major economies. However, if circumstances changed, and the SARB felt compelled to increase interest rates significantly (which could easily occur in two to three years' time), the effect on government's ability to meet other desired expenditure could be compromised. For instance, if the interest rate reached 9%, the long bond rate could then move to 12%. As a result of this interest rate change alone, government's debt servicing costs would increase by 50%, to around R150-billion; in other words, a R50-billion annual constraint on other expenditure. In addition, raising new government debt would place pressure on the domestic bond market and could increase the spread of long bonds relative to short-term financing, thereby placing further strain on long-term debt financing. The situation could easily get worse if the government's actions and policies caused some doubt on its ability to repay its bonds, which would increase the risk portion of bond interest rates and make raising new bonds more difficult. Under such circumstances, meeting the financing requirements to translate the ambitious goals of the NDP into reality would be difficult, if not impossible. The country's recent financial pressures have brought to light the need for an analysis of debt sustainability, accompanied by appropriate debt management in the more difficult external and domestic environment.

Debt management decisions have begun to play a predominant role within government's fiscal strategies. As debt grows and its role as a major instrument for financing government needs is enhanced, debt management decisions become very important as part of a fiscal strategy. Considering that public debt management has fundamental effects on public finances, any attempt to determine the country's financing scheme in the medium term should involve adequate public debt management, as well as a medium-term debt strategy⁵. A debt policy design that takes into account a broader time horizon is fundamental, since this instrument must simultaneously accomplish different objectives: serving future financing needs, promoting fiscal stabilisation, meeting the restriction of being sustainable and minimising both the debt service costs and the vulnerabilities.

Debt policy contributes to ensuring and managing long-term debt sustainability. Debt sustainability defines the level of public debt that can be financed over a determined period of time without an unrealistically large future correction to the balance of income and expenditures. Debt management determines the composition and structure of the debt portfolio in order for its cost to be low and as less vulnerable as possible to market shocks. The main objective of this chapter is to analyse the appropriate management of South Africa's public debt, taking into account all the relevant financial, macroeconomic, short-term and long-term fiscal considerations, as well as debt paths that are sustainable over time and are consistent with the ideals of the NDP. Using South African data, models and variation across policy stance and over time, we examine the impact of the movement in debt and alternative policy responses on the economy, and compute thresholds beyond which debt can be considered to be detrimental to the economy. The results have immediate policy relevance. For example, threshold analysis of government debt may reveal higher levels of indebtedness, implying that government should aim to stabilise and reduce its debt to sufficiently low levels that do not retard growth. Prudence dictates that governments should also aim to keep their debt well below the estimated thresholds, so that even extraordinary events are unlikely to push their debt to levels that are damaging to growth. However, it could also imply that government may be unnecessarily overcautious, penalising much sought-after development espoused in the NDP. From a longer-term perspective, reducing debt to lower levels represents a severe test for the economy; the challenge is compounded by an unfavourable economic outlook (unemployment, inequality and poverty) and demographics.

>> ⁵ Government has only recently adopted a fiscal stance that is built on three principles of (a) counter-cyclicality, which means spending more relative to GDP during periods of economic weakness and less during periods of strong economic growth; (b) long-term debt sustainability, which means ensuring that spending levels do not continually increase debt and interest costs; and (c) intergenerational equity, which means that future generations should not be overburdened by the costs of current spending and that the upfront cost of capital infrastructure assets should be expensed over their useful lives. It is hoped that applying these principles consistently will improve economic conditions, as well as strengthen the fiscal position.

The chapter contains the following sections:

Section 2 gives an overview of South Africa's debt market. It covers the legal and regulatory framework, followed by a discussion of instruments and institutions of debt management.

Section 3 provides a concise summary of the main economic episodes, principal policy trends and performance of the South African economy over the past two decades, and the economic and fiscal factors that have shaped these. The section compiles relevant data, of the key economic magnitudes, to illustrate the points being made. The section also draws on South Africa's latest forecasts of economic growth, unemployment and government deficits and debts to provide a sketch of the economic background going forward.

Section 4 discusses public debt in South Africa, for each of the main categories of debt and trends over the past 19 years and the factors that have shaped them. It has an overall fiscal policy orientation analysing the current debt portfolio and projects debt costs in the medium and long term. Specific aspects covered are:

- Overview of debt policy, debt/GDP ratios and interest costs
- Denomination, indexation and maturities
- Composition of debt structure
- Liquidity indicators for the government bond market
- General government share of bond debt
- Breakdown of government debt securities between banks, asset managers and other institutions
- Variations over time in yield spreads between securities
- Policy implications for debt management.

Section 5 reviews the literature on public debt management. The main themes discussed are:

- Theoretical framework for optimal debt management: tax smoothing
- South African debt studies
- CGE models addressing debt implications on the economy
- An assessment and implications for the project.

Section 6 discusses the methodology and data used and provides suggestions for a public debt strategy. **Section 7** explains the policy simulations, while **Section 8** gives the results of the three scenarios. The concluding remarks, recommendations and discussion are contained in **Section 9**.

1.2 Debt Market Overview

The debt market has experienced substantial growth since the advent of democracy. This section discusses the legal and regulatory framework, followed by the evolution of debt management, institutions and instruments of public borrowing.

1.2.1 Legal and regulatory framework

The legal framework is underpinned by the Constitution and the Public Finance Management Act (PFMA) No. 29 of 1999, as explained in Table 1. The Minister of Finance authorises and approves all domestic and foreign borrowing by national government⁶.

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⁶ Large public entities e.g. South African National Roads Agency (SANRAL) and metropolitan municipalities float their own debt. These are included in consolidated general government, but excluded from the main budget.

Table 1: Legal framework

Constitution of the Republic of South Africa (Chapter 13)	Mandates the National Treasury to ensure: <ul style="list-style-type: none"> • transparency, • accountability, and • sound financial controls in the management of public finances.
Public Finance Management Act (PFMA) No. 29 of 1999	Section 66(2)(a) gives the Minister of Finance powers to commit the National Revenue Fund to future financial commitments by borrowing money, issuing a guarantee, indemnity or security, or entering into any other binding transaction. The Minister can borrow: <ul style="list-style-type: none"> • To finance a national budget deficit. • To refinance maturing debt or a loan paid before the redemption date. • To obtain foreign currency. • To maintain credit balances on the bank account of the National Revenue Fund. • To regulate internal monetary conditions should the necessity arise. Or any other purpose approved by the National Assembly by special resolution.

The regulatory framework is decentralised. The legal framework for regulation and supervision of banking groups is composed of the Banks Act (1990) and its associated regulations and directives. The major regulatory players and their functions are summarised in Table 2.

Table 2: Regulatory framework

Institution	Function
South African Reserve Bank (SARB)	South African Reserve Bank (SARB) The Financial Services Board exercises its regulatory, supervisory and enforcement duties to regulate the capital markets in terms of the Securities Service Act (2004). Its functions are: <ul style="list-style-type: none"> • To supervise compliance with laws regulating financial institutions and financial services. • To advise the Minister of Finance on matters concerning financial institutions and services. • To promote consumer education programmes and initiatives by financial institutions and bodies representing the financial services industry.
Financial Services Board	The Financial Services Board exercises its regulatory, supervisory and enforcement duties to regulate the capital markets in terms of the Securities Service Act (2004). ⁷ Its functions are: <ul style="list-style-type: none"> • To supervise compliance with laws regulating financial institutions and financial services. • To advise the Minister of Finance on matters concerning financial institutions and services. • To promote consumer education programmes and initiatives by financial institutions and bodies representing the financial services industry.

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⁷ This legislation has recently been reviewed and will be replaced by a Financial Market Bill, which has been tabled in Parliament. The bill updates the legislation, taking into account developments in international regulation and in South Africa's broader regulatory framework. The bill will promote a more robust regulatory framework for unlisted securities, enable central reporting for derivative transactions and strengthen efforts to combat market abuse, including insider trading.

Institution	Function
Johannesburg Stock Exchange (JSE)	<p>This is a self-regulatory organisation under the Securities Service Act (No. 36 of 2004). It provides listing requirements and trading platforms in a transparent, efficient and orderly marketplace. It also regulates applications for listings and the obligations of listed companies. Listings include equities, bonds, commodities and currency derivatives. New JSE debt-listing requirements came into effect in 2011. Highlights include the following:</p> <ul style="list-style-type: none"> • All issuers – including the National Treasury, which was previously exempt – are required to appoint a debt sponsor • Where unusual features exist regarding a listing, the JSE must be consulted to discuss such features at the earliest possible date. • The issuer shall publish on the real-time Stock Exchange News Service (SENS) details of any new issues or tap issues, and communication with investors. • Issuers are required to submit placing and other documents to list debt securities. • Debt securities to be listed on the JSE shall be cleared and settled through central securities depository participants (CSDPs) and share transactions totally electronic (STRATE).
Share Transactions Totally Electronic (STRATE)	<p>This is as a self-regulatory organisation under the Securities Service Act. STRATE, along with its CSDPs, is responsible for ensuring the safe custody and record-keeping of securities. A Central Securities Depository (CSD) must be licensed by the Financial Services Board on an annual basis.⁸ STRATE Ltd is currently the only licensed depository in South Africa. Under the Securities Service Act, it is responsible for:</p> <ul style="list-style-type: none"> • the custody and administration of securities, • the clearing of transactions in listed securities, and • the settlement of transactions in listed securities.

1.2.2 Debt management, institutions and instruments

Government debt management has evolved quite substantially since the 1970s when the need to develop the debt capital market was identified. Before 1990, the state issued debt only three or four times per annum. Bonds were issued at par, as and when needed, and issuance typically coincided with bonds' maturity dates. During this period there were no formal auctions, liquid benchmarks, active secondary market or prevailing market rate. Unlike most developing countries, because of sanctions, South Africa's debt was mainly domestic (and this trend continues today). By the end of apartheid, risk premiums were huge and Treasury Bonds traded at a massive discount. In 1993, the country was on the edge of a debt crisis and had a very bad credit rating.

From 1994, government started to use macroeconomic frameworks to guide debt management strategies. In 1996, a formal bond exchange⁹ was formed to promote the debt capital market and allow for self-regulation. The SARB was then appointed as an issuer of and settlement agent for government bonds. Commencing in 1998, auctions were conducted regularly at predetermined dates. Twelve primary dealers were appointed to ensure market efficiency, liquidity and transparency. Prior to 1999, the main objective of debt management was to develop the domestic market and promote a balanced maturity profile. After 1999, the focus shifted to reducing the cost of debt to within acceptable risk limits, ensuring government's access to domestic and international financial markets, and diversifying funding instruments. These objectives continue to anchor government's debt management strategy today.

Up until the 1990s, rising debt-to-GDP ratios made government more aware of the costs in managing public debt. At the same time, the shift away from financing budget deficits through banks towards

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⁸ A participant in a CSD is usually a bank that holds securities on behalf of clients and deposits them into the depository in terms of its rules. STRATE has accepted and supervises nine participants to hold equities and bond securities in the CSD and, during 2011/12, accepted three international participants.

⁹ The Bond Exchange of South Africa (BESA).

nonbank sources increased the risk of rolling over debt at higher interest rates, not least in the context of financial markets, which have become increasingly open internationally, especially after South Africa emerged from its apartheid pariah status. The result has been the development of more market-oriented and more sophisticated debt management procedures and techniques (see Table 3). By the late 1990s, longer-term, fixed-rate instruments accounted for a large part of government debt, reducing rollover and interest rate risk. Moreover, with the deepening of secondary markets, the impact on market interest rates from government issuance activity in primary markets appears to have been considerably reduced and with it the potential conflict between debt management and the operation of monetary policy. In fact, the link between monetary policy considerations and debt management issues is largely through the signalling effects of debt levels and maturity structures on policy makers' credibility. More recently, debt management concerns have abated somewhat, with the advent of low inflation and reduced public deficits. Looking forward, however, debt managers will face different challenges, as debt to-GDP ratios have begun to rise again. Thus, there needs to be an emphasis on improving the efficiency of debt management techniques, which has the potential to produce budgetary savings.¹⁰

Table 3: Institutional aspects of public borrowing

Institution authorised to borrow: debt management authority	Debt management agent	Main objective of debt management	Performance assessment	Monetary policy considerations
National Treasury	SARB	Provide government funding, minimise cost, diversify funding instruments, maintain balanced maturity structure.	Yes: National Treasury submits annual report on public debt management (since 2011/12).	Yes: coordination committee with representatives of SARB and National Treasury. Large public entities and metros float their own debt.

As shown in Table 4, South Africa has quite a diversified and liquid debt market with a sophisticated bond market at its apex. Domestic short-term borrowing consists of Treasury bills and cash borrowings from the broader public sector through the Corporation for Public Deposits (CPD). Although Treasury bill issuance is included in the financing of the borrowing requirement, occasionally the need arises for additional short-term financing. For purposes of cash management and financing, government can issue either very short-dated Treasury bills, or repo transactions, cash deposits with the SARB (sterilisation deposits, foreign currency swap transactions and the pool of broader public-sector cash), fixed-rate and inflation-linked bonds, and foreign currency bonds.

Table 4: Instruments and selling techniques of government debt

Standard instruments and maturities	Other instruments, derivatives	Currency	Selling techniques	Primary dealers
Treasury bills; repo transactions; cash deposits with the SARB (sterilisation deposits, foreign currency swap transactions and the pool of broader public-sector cash); fixed-rate and inflation-linked bonds; foreign currency bonds.	Index-linked bonds; separate trading of registered interest and principal of securities (strips); bond buy back.	Domestic and foreign.	Auctions; uniform-price auctions for long-term and multiple-price auctions for short-term instruments; automated auctions for short-, medium- and long-term instruments; tap system for National Treasury Retail Savings Bonds.	Yes.

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¹⁰ As the proportion of foreign debt rises, the country will increasingly have to consider the foreign exchange market and risk. The weak trade balance on the current account may place further pressure on debt management.

1.3 Macroeconomic Perspective and Fiscal Framework

1.3.1 Macroeconomic policy frameworks

The period considered here stretches from 1990 through to 2013. During the four years leading to the first democratic elections in 1994, the National Party was in power. The government supported four nominally independent homeland states and six self-governing areas, all of which had high and growing fiscal requirements. At the same time, severe international sanctions were limiting economic progress, political tensions were high, and violence and worker mass actions were widespread. From 1992, despite some degree of co-governance with the new political leaders, the incumbent National Party maintained responsibility for managing the country's economy.

Having been widely publicised prior to April 1994, the Reconstruction and Development Programme (RDP) became the official macroeconomic policy of the new African National Congress (ANC) government (ANC, 1994). The RDP contained ambitious socio-economic goals and envisaged massive changes to the economy's structure and governance. A minister was assigned to spearhead the programme, which was given a budget to supplement the line budgets of other government departments. However, despite its laudable goals, the RDP's implementation structure was found to be cumbersome. At the same time, concerns were raised about the sustainability of the national budget, given the demand on the fiscus and the already high public debt level.

Against this background, in June 1996, the government adopted the Growth, Employment and Redistribution (GEAR) programme, which sought to achieve high employment, and economic growth and redistribution, under fairly strict fiscal constraints. However, the government's alliance partners – the Congress of South African Trade Unions (Cosatu) and South African Communist Party (SACP) – did not support the programme, regarding it as excessively constrained and similar to structural adjustment programmes, typically prescribed by the Bretton Woods institutions of the International Monetary Fund (IMF) and World Bank. Nevertheless, the programme had a fiscal effect, and the country's budget deficit reduced steadily over the next several years.

In 2006, the Accelerated and Shared Growth Initiative for South Africa (Asgisa) framework was introduced, as an extension (and possible softening in approach) of the GEAR programme. It was not a departure from the fiscal stringency of the GEAR framework, but rather a reorientation, which was aimed at making government expenditure more effective in achieving social goals. Asgisa took note of the binding constraints that stood in the path of accelerated economic growth for South Africa, including the inadequate skills base, ability of the state to lead, and supply and value chain problems. The framework was not as contentious as the GEAR programme, but opposing parties, (such as Cosatu and the SACP), regarded the GEAR programme as still being in effect at macroeconomic policy level.

Following the national elections in 2009 and the change in presidency, the National Planning Commission (NPC) was set up and charged with producing a broad national plan (NPC, 2011) through wide consultation and the use of a non-government panel of leading experts.¹¹ In November 2011, the NDP was completed and, subsequently, widely discussed until its formal adoption as the economic policy direction at the ANC's conference in December 2012. The NDP has gained widespread acceptance across South African society, but is still vociferously criticised by some trade union groupings, in particular the National Union of Metalworkers of South Africa.

The NDP is a broad, wide-ranging document. Economic policy is just one aspect of the plan, which contains ambitious goals to be achieved by 2030.¹² Its economic expansion vision is an average annual economic growth rate of 5.4% and the creation of 11 million new jobs by 2030, with five million by 2020; this implies over 500 000 jobs per annum through to 2020. The intention is to reduce unemployment to around 14% by 2020 and 6% by 2030. The targeted investment-to-GDP ratio is 30% by 2030 (from around 20% at present), with the aim of increasing the growth trajectory of the economy. Public sector investment (including government enterprises and public corporations) will contribute significantly to the increased investment level, with the aim of increasing to 10% of GDP (from the present 7%). The expansion of public sector investment, by around 50% in relative terms to GDP, has major implications for fiscal policy and for public debt financing.

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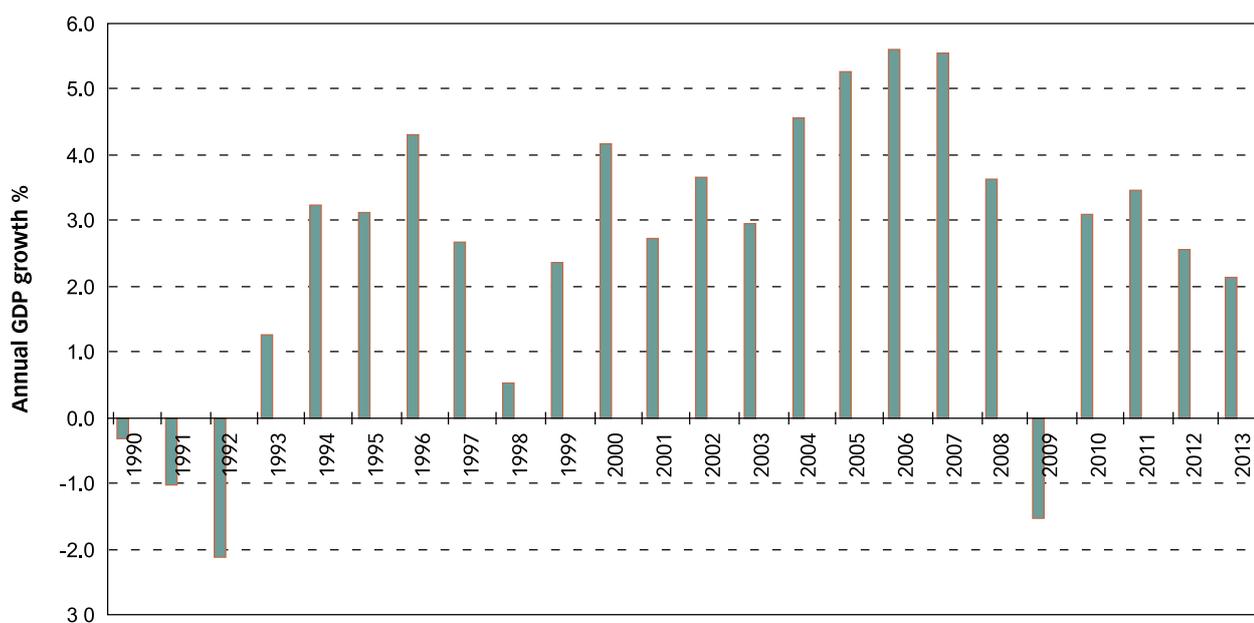
¹¹ In 2009, a New Growth Path (NGP) was also introduced that focused on the micro-economy and employment creation.

¹² For example, it sets out to eliminate poverty and reduce unemployment, improve the quality of school education, deconstruct the spatial patterns of the apartheid system, reduce the level of inequality, as measured by the Gini coefficient from 0.7 in 2007 to 0.6 in 2030, become a less resource-intensive economy, adopt sustainable development practices; etc.

1.3.2 Macroeconomic growth profile and growth prospects

From 1990 to 1992, the South African economy experienced negative growth, the combination of increased domestic protests and industrial action, international sanctions and slow export demand from major trading partners. As the country moved towards the negotiated and internationally accepted democratic election of 1994, the economy began to improve, growing by a modest 1.2% in 1993, followed by four years of 3-4% growth. In 1998, the economy grew by only 0.5% because of the international Asian crisis and high domestic interest rates that were instituted to combat exchange rate speculation. However, thereafter (until the international financial crisis in 2008), the economy achieved robust growth rates: from 2004 to 2007, growth rates were above 4.5%, reaching 5.6% in 2006 and 2007. Growth began falling in 2008, but the full effects of the international crisis on the domestic economy were felt in 2009, when growth was negative (-1.5%). Although South Africa's financial institutions remained stable and robust over the financial crisis period, the economy was severely affected by the fall-off in exports that resulted from the recessionary conditions in major developed economies supplied by South Africa (see Chitiga et al., 2010). In 2010 and 2011, the economy recovered slightly, growing at just above 3%, although export demand from developed countries remained slow. Since then, as poor growth continues in developed economies and somewhat slower growth in large developing economies, the South African economy has struggled to achieve growth rates much above 2%. The economy grew by 2.5% in 2012, but is expected to slow to 2.1% in 2013. Figure 1 shows the GDP growth rates since 1990.

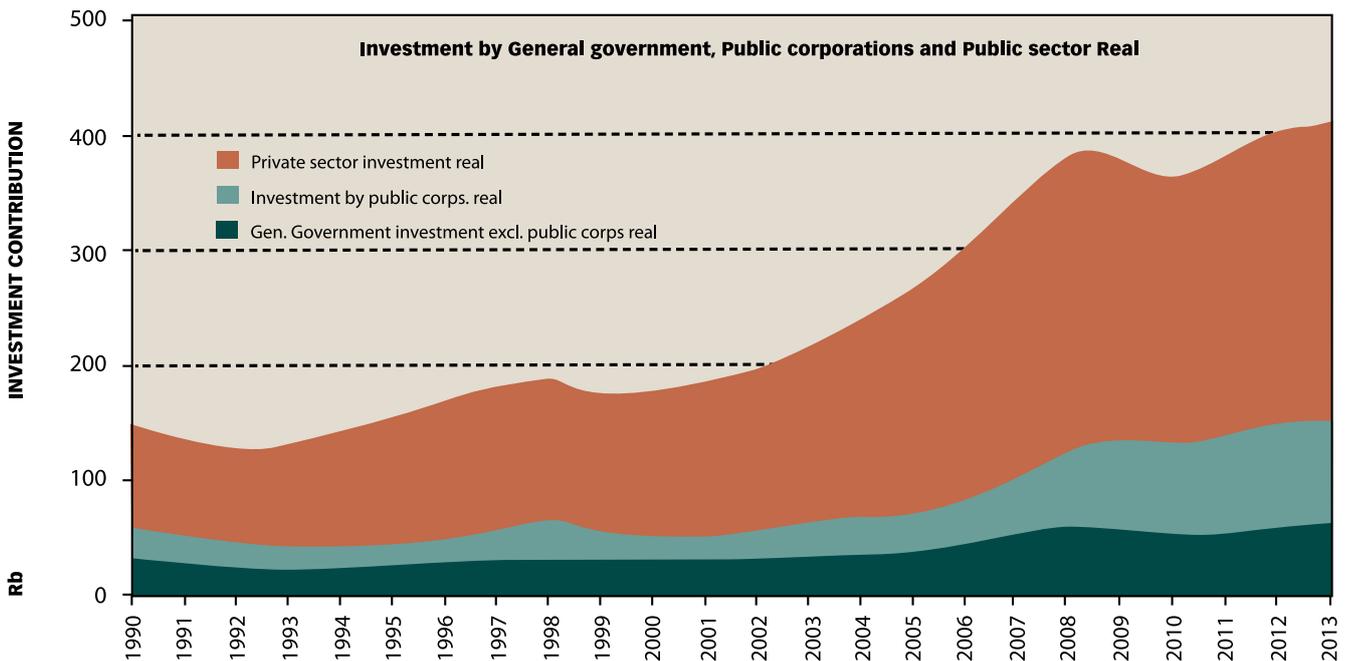
Figure 1: Government deficits as % of GDP (1990–2013)



Data source:
Computed using data
from SA Reserve Bank
(various issues)

During the period 2000–2012, the amount of gross fixed capital formation (GFCF) per year, which is a measure of investment, more than doubled in real terms (Figure 2). Although private enterprise GFCF has increased the most in terms of levels, the highest growth rates in GFCF have been by government, especially public corporations. This surge in GFCF was driven by investment by state-owned enterprises such as Eskom, for new power generation capacity, and Transnet, to upgrade and expand rail, port facilities and pipeline infrastructure. As a percentage of total investment, general government investment has remained at around 15% to 16%, whereas public corporations investments recovered from a low of 10% in 2001 to reach around 22% today.

Figure 2: Gross fixed capital formation by category (2005 prices year on year changes)



Source: SARB (various dates)

Domestic economic growth continues to be hampered by a combination of slow growth in major international economies and problematic local circumstances, including industrial action and an uncertain policy environment affecting key sectors.

- The IMF has issued forecasts that have seen an upward (instead of downward) revision of economic growth forecasts for the world for the first time in three years. Advanced economies are expected to accelerate growth to 2.2% and 2.3% in 2014 and 2015. But political and economic risks remain, for example the USA's fiscal risks and further slowdowns in several major emerging markets. In addition, the possibility that the USA Federal Reserve will slow the rate of monetary policy asset purchases has triggered significant movements in global capital flows.
- The IMF forecasts strengthening growth for the USA in 2014, despite the impact of the March 2013 sequester (automatic spending cuts). The USA fiscal and economic outlook in 2014 is dependent on the progress of further budget and fiscal negotiations scheduled for later in the year. The USA Federal Reserve has also signalled that it will begin to slow the pace of asset purchases in the coming months, but the exact timing depends on the underlying US economic outlook and fiscal negotiations. It should also be noted that the existing decline in quantitative easing, from US\$85-billion to US\$75-billion, has precipitated a depreciation of the exchange rate, thereby exacerbating the current account deficit, which is already of concern.
- The euro area is a key market for South African exporters. In the case of the eurozone, following negative growth in 2013, recent positive growth figures for several European countries augur well for the maintenance of positive (albeit modest) growth in 2014 and 2015, of 1% and 1.4% respectively. This followed an improvement in financial market conditions throughout 2013, as policy decisions (such as the ongoing effect of the European Central Bank's announcement of Outright Monetary Transactions), alongside a gradual process of macro-economic rebalancing in the key vulnerable countries, have lessened risks. However, despite this improving economic outlook, activity across the euro area remains subdued.
- There are concerns that a slowdown in the growth of the Chinese economy and the switch towards a more consumption- rather than investment-oriented dispensation in that economy will cause the demand for commodities from emerging markets to diminish. Many of these

markets have already seen their current account deficits expand, in part due to declining export performance. Currencies of such economies have been sold off heavily, especially in the case of the so-called “fragile five” (Brazil, India, Indonesia, Turkey and South Africa), whose current account deficits are widest, relative to their GDP. Nonetheless, many of these emerging markets are still growing at rates that are more than double those of advanced economies. Their public debt levels remain at about half or even less of those of advanced economies, while their demographic profiles remain far more conducive to more rapid economic growth in the longer term.

- Further to these international risks, oil prices in 2013 peaked in August at US\$117 per barrel in response to instability in the Middle East. However, prices have since fallen back, and at around US\$108 per barrel, the 2013 average has been slightly down, compared with recent years. The pressures created by rising prices between 2009 and 2011 have largely worked through the system. Nevertheless, risks remain, and a significant commodity price shock has the potential to destabilise the South African recovery.
- The impact of strikes and labour-related violence continues to cause damage to economic growth. Government should consider establishing levers that can serve to strengthen accountability of both employers and unions in the collective bargaining framework. Such an approach is particularly urgent, given that the mining sector, from where most of the strikes currently emanate, is also a key foreign exchange earner, which places further pressure on the current account.
- Growth prospects for the medium term will continue to be plagued by structural factors, such as inadequate education and skills base. High economic growth needs to be accompanied by improvements in skills and education. South Africa faces enormous pressure to upgrade human capital skills. The country suffers from competitive disadvantage in terms of its human capital quality, investment in research and development (R&D), and information and communication technology penetration. South Africa will need to increase investments and quality of spending in education and bolster spending on R&D. These supply-side factors constitute the most pressing key long-term challenges confronting South Africa and necessitate consideration of long-term fiscal risk. The Commission is aware that at the basic education level, government has initiated a process to enhance quality improvements, while at the post-school level, the Department of Higher Education has implemented a turnaround strategy in a bid to address the challenges described above. It is hoped that these interventions will be capable of yielding the required outcomes in terms of better and appropriately skilled and competitive human capital.
- Coupled with the perceived inability on the part of the state to deliver fully on implementing its own public investment programmes, the reluctance of the private sector to invest is contributing towards lower-than-anticipated capital investment and overall economic growth. This relative dearth of direct investment has been exacerbated by fears of electricity shortages in many businesses.
- Growth of household consumption expenditure has been slowing down markedly. The continuing fairly sharp depreciation in the value of the Rand over the last 2½ years has resulted in upward pressure on inflation, which has contributed to both depressing consumer confidence and eroding disposable income. The low rate of employment creation has also dampened consumer spending.
- Recent tightening of monetary policy in the wake of quantitative easing and foreign exchange depreciation is an important domestic risk.

Government's own most recent projections, presented in its Medium Term Budget Policy Statement (MTBPS) in October 2013, are as follows:

Table 5: Macroeconomic projections (2012–2016)

Calendar year	2012	2013	2014	2015	2016
	Actual	Estimate	Forecast		
Percentage change unless otherwise indicated					
Final household consumption	3,5	2,5	2,9	3,2	3,4
Gross fixed capital formation	5,7	4,1	5,0	5,5	6,3
Real GDP growth	2,5	2,1	3,0	3,2	3,5
GDP at current prices (R billion)	3 155,2	3 411,7	3 720,2	4 061,7	4 443,7
CPI inflation	5,7	5,9	5,6	5,4	5,4
Current account balance (% of GDP)	-6,3	-6,5	-6,4	-6,2	-6,1

GDP growth is projected to improve moderately from the current 1.9% in 2013 to reach 3.5% in 2016. Investment (fixed capital formation) is expected to play a significant part in the improved growth, as are more robust exports (Table 6).

Across all tables in the MTBS, the use of "0" refers to a value of small magnitude that is rounded up or down to zero. If a value is exactly zero, it will be denoted by "-". If data is not available it is denoted by "N/A"

Table 6: Macroeconomic performance and projections (2010–2016)

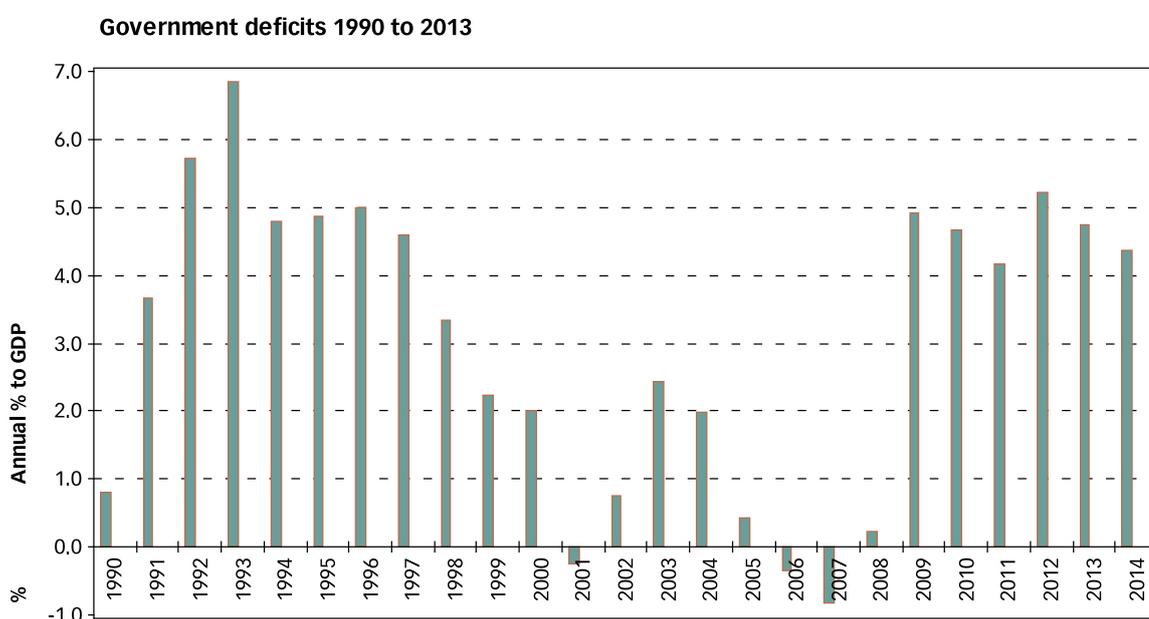
Calendar year	2010	2011	2012	2013	2014	2015	2016
	Actual		Estimate		Forecast		
Percentage change unless otherwise indicated							
Final household consumption	4,4	4,8	3,5	2,5	2,9	3,2	3,4
Final government consumption	5,0	4,6	4,2	3,4	3,4	3,0	3,3
Gross fixed capital formation	-2,0	4,5	5,7	4,1	5,0	5,5	6,3
Gross domestic expenditure	4,4	4,6	4,1	2,7	3,2	3,4	3,8
Exports	4,5	5,9	0,1	6,1	5,0	6,7	7,0
Imports	9,6	9,7	6,3	7,3	5,2	6,4	7,0
Real GDP growth	3,1	3,5	2,5	2,1	3,0	3,2	3,5
GDP inflation	7,2	6,0	5,5	5,9	5,9	5,7	5,7
GDP at current prices (R billion)	2 659,4	2 917,5	3 155,2	3 411,7	3 720,2	4 061,7	4 443,7
Headline CPI inflation (Dec 2012 = 100)	4,3	5,0	5,7	5,9	5,6	5,4	5,4
Current account balance (% of GDP)	-2,8	-3,4	-6,3	-6,5	-6,4	-6,2	-6,1

Source: Reserve Bank and National Treasury

1.3.3 Government deficits and debt levels

Figure 3 shows how government fiscal deficits were reigned in dramatically from 1998. Deficit levels in 1992 and 1993 were increasing and unsustainable, reaching almost 7% of GDP in 1993. After 1995, following the initial spending programmes of the newly elected government, deficit levels were close to 5%. However, from 1997 to 2000, the deficit level reduced steadily under the stringency of the GEAR framework and the fiscally disciplined approach of the finance minister. Up until 2008, deficits continued to be modest, with slight surpluses in 2001, 2006 and 2007, thanks to high economic growth rates and improved tax-collection efficiency. A marginal deficit was shown in 2008, as international growth worsened, and as the international economic crisis affected growth and employment rates, government shifted to significant deficits from 2009. Nevertheless, deficits have scarcely breached 5%, and for the 2013/14 fiscal year, projections are that a figure of 4.0% is achievable. Government's intention is to reduce this deficit level steadily over the next three years to reach close to 3%.

Figure 3: Government deficits as % of GDP (1990–2013)



Source: SARB (various dates)

Government debt levels have changed, as the accumulated result of changes in these fiscal deficit percentages. Government debt can be viewed at gross or net level, and for central government alone, or consolidated to include other tiers of government and public corporations. Here the net figure, i.e., after deducting cash balances, is used, on a consolidated government basis. As Figure 4 shows, after increases prior to 1994, net government debt rose above 45% from 1995. From 1996, government took measures that prevented further increases in the debt level and, in 2000, started to reduce the debt level as a percentage of GDP. Thereafter, government surpluses and low deficits helped bring the debt level down to less than 24% in 2008. With the international crisis of 2008, the percentage to GDP inevitably increased, as deficits were incurred. The debt level exceeded 36% of GDP in 2012 and will continue to increase moderately over the next few years as deficits continue.

Figure 4: Government debt (1990–2013)



Data source: Computed using data from SA Reserve Bank (various)

1.3.4 Government expenditure breakdown

When considering borrowing, two key aspects of government expenditure to view are investment spending and expenditures under the economic rubric, compared to those of a social support nature. Government investment (fixed capital formation) contributes to the building of physical infrastructure, which directly increases the productive capacity of the economy. It would be logical to argue that debt should always fund investment spending, as this spending has an economic return in terms of future additional production. Indeed, between 1910 and 1976, investment and current spending in South Africa were separated, with the goal of funding current spending from revenue raised and investment spending from borrowing (Siebrits and Calitz, 2004).

Table 7: Consolidated government fiscal framework (2012/13–2016/17)

R billion	2012/13	2013/14	2014/15	2015/16	2016/17
	Outcome	Estimate	Medium-term estimates		
Revenue	907,9	999,1	1 086,3	1 184,2	1 306,0
Percentage of GDP	28,3%	28,7%	28,6%	28,5%	28,7%
Expenditure	1 042,9	1 143,7	1 243,8	1 340,4	1 440,2
Percentage of GDP	32,5%	32,8%	32,7%	32,3%	31,7%
Budget balance	-135,0	-144,6	-157,5	-156,3	-134,2
Percentage of GDP	-4,2%	-4,2%	-4,1%	-3,8%	-3,0%

Source: National Treasury (2013b)

The breakdown of government expenditure in the current fiscal year and projections to 2016/17 are shown in Table 8.

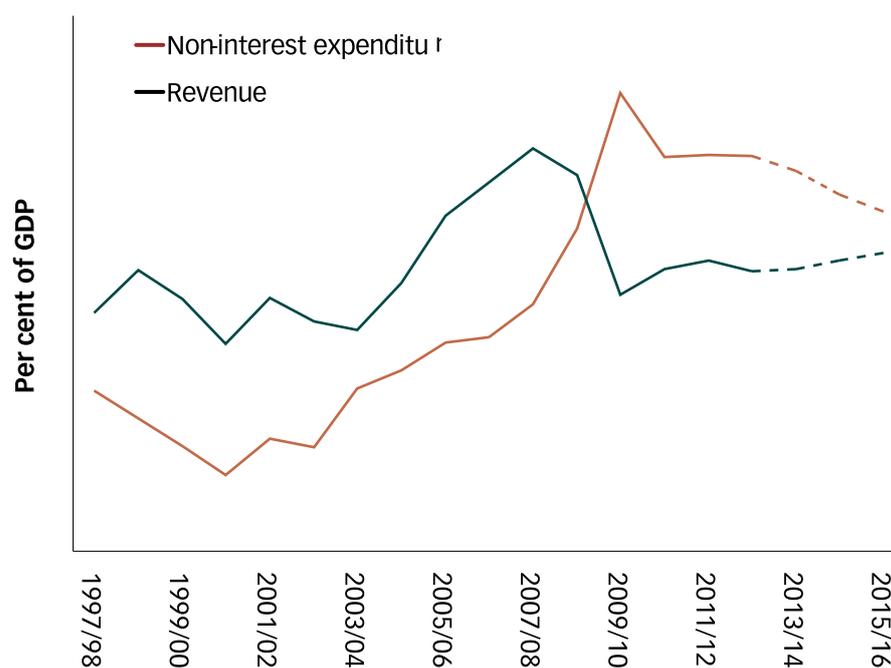
Table 8: Consolidated government expenditure (2013/14–2016/17)

R billion	2013/14	2014/15	2015/16	2016/17	Average
	Revised	Budget estimate			annual growth 2013/14 – 2016/17
Defence and state security	44,9	47,5	50,4	53,6	6,1%
Economic services	47,3	48,7	51,1	53,4	4,2%
Education and related functions	233,6	250,2	267,8	286,5	7,0%
Employment and social security	50,6	60,0	66,7	74,6	13,8%
General public services	62,1	65,3	69,4	71,0	4,6%
Health and social protection	266,0	289,2	308,6	328,4	7,3%
"Local government, housing and community amenities"	2016/17" 128,1	1 143,7 141,2	1 243,8 153,8	1 340,4 163,2	2016/17" 8,4%
Public order and safety	109,6	116,0	122,3	130,7	6,1%
Science and technology	16,8	18,1	19,5	19,5	5,2%
Transport, energy and communication	84,3	94,1	102,7	105,8	7,9%
Total expenditure by function	1 043,2	1 130,4	1 212,3	1 286,8	7,2%
State debt cost	100,5	110,4	122,2	135,4	10,4%
Contingency reserve	–	3,0	6,0	18,0	
Total expenditure	1 143,7	1 243,8	1 340,4	1 440,2	8,0%

Source: National Treasury (2013b)

The historical and projected relationship between national revenue and non-interest expenditure is shown in Figure 5.

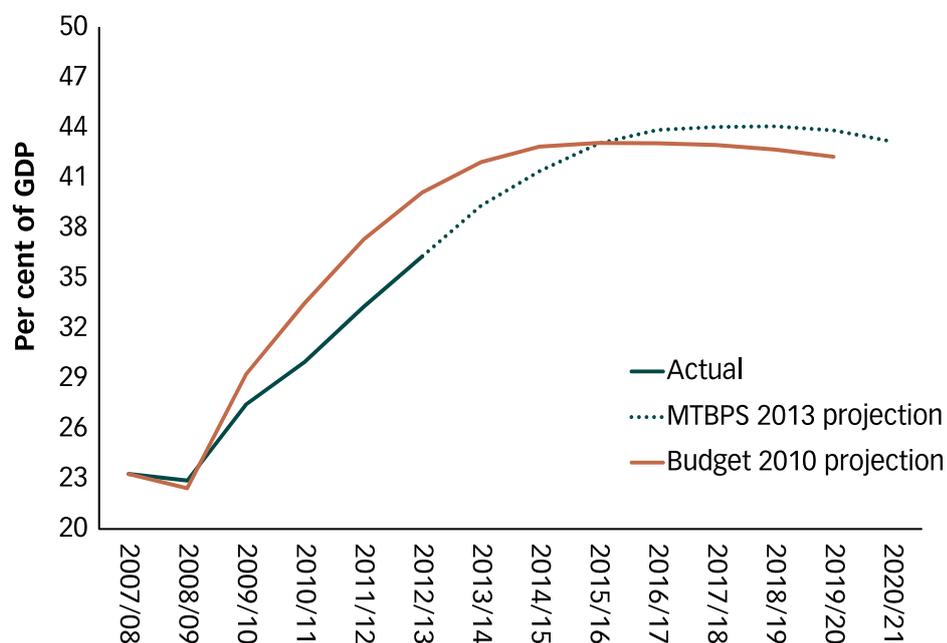
Figure 5: National revenue and non-interest expenditure (1996/97–2016/17)



Source: National Treasury (2013b)

Government's long-term projections of net debt to 2020/21 are given in Figure 6.

Figure 6: Long-term net debt projections (2007/8–2020/21)



Source: National Treasury (2013b)

Specific values and percentages are shown in Table 9.

As Table 9 shows, the net debt percentage to GDP is projected to increase steadily to approximately 44% of GDP in 2016/17. However, between 2011/12 and 2016/17, the proportion of foreign debt is projected to fall from nearly 10% to 6.4% in gross terms, or from 5% to 3.5% in net terms.

Table 9: Total national government debt (2010/11–2016/17)

As at 31 March	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
R billion	Outcome			Estimate	Medium-term estimates		
Total gross loan debt	990,6	1 187,8	1 365,6	1 562,3	1 748,8	1 966,5	2 170,5
Total net loan debt	820,4	989,7	1 181,5	1 370,4	1 573,7	1 788,2	1 994,0
<i>As percentage of GDP:</i>							
<i>Total gross loan debt</i>	36,2%	39,9%	42,5%	44,8%	46,0%	47,3%	47,7%
<i>Total net loan debt</i>	30,0%	33,3%	36,8%	39,3%	41,4%	43,1%	43,9%
<i>Foreign debt as percentage of:</i>							
<i>Gross loan debt</i>	9,9%	9,8%	9,1%	8,5%	7,5%	7,1%	6,4%
<i>Net loan debt</i>	4,8%	5,0%	3,7%	4,3%	3,7%	3,8%	3,5%

See National Treasury website for further details on net borrowing and financing

Consolidated fiscal figures expressed in the 2013 National Budget are shown in Table 10 and the latest projections from the MTBPS in Table 11.

Table 10: Consolidated fiscal framework (2009/10–2015/16)

R billion	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
	Outcome			Revised Estimate	Medium-term estimates		
Revenue	664.5	757.2	836.9	887.8	985.7	1 091.1	1 199.8
	27.1%	27.7%	28.1%	27.7%	28.0%	28.1%	28.1%
Expenditure	824.1	877.5	954.2	1 055.9	1 149.4	1 244.3	1 334.1
	33.6%	32.1%	32.1%	32.9%	32.6%	32.1%	31.2%
Non-interest expenditure	766.9	811.3	877.7	967.6	1 049.6	1 135.6	1 215.9
	31.3%	29.7%	29.5%	30.2%	29.8%	29.3%	28.5%
Debt-service cost	57.1	66.2	76.5	88.3	99.7	108.7	118.2
	2.3%	2.4%	2.6%	2.8%	2.8%	2.8%	2.8%
Budget balance	-159.6	-120.4	-117.3	-168.0	-163.7	-153.2	-134.4
	-6.5%	-4.4%	-3.9%	-5.2%	-4.6%	-3.9%	-3.1%
Primary balance	-4.2%	-2.0%	-1.4%	-2.5%	-1.8%	-1.1%	-0.4%

Source: National Treasury (2013b)

Table 11: Consolidated government fiscal framework (2010/11–2016/17)

R billion	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
	Outcome			Estimate	Medium-term estimates	
Operating account						
Revenue	764,7	843,5	907,6	998,9	1 086,1	1 184,0
Current payments	756,3	837,7	919,1	1 008,6	1 086,3	1 165,7
Compensation	309,9	345,5	375,4	409,0	437,2	466,9
Goods and services	137,2	153,7	165,1	178,6	188,2	198,1
Interest and rent on land	75,3	81,8	93,2	106,6	116,6	128,8
Transfers and subsidies	233,9	256,7	285,4	314,3	344,3	371,9
Current balance	8,4	5,9	-11,5	-9,6	-0,1	18,3
<i>Percentage of GDP</i>	0,3%	0,2%	-0,4%	-0,3%	0,0%	0,4%
Capital account						
Capital receipts	0,4	0,2	0,3	0,2	0,2	0,2
Capital payments	55,7	61,2	68,0	75,7	87,9	95,6
Capital transfers	45,4	49,7	52,5	55,8	63,3	70,1
Capital financing requirement¹	-100,8	-110,6	-120,1	-131,4	-151,1	-165,6
<i>Percentage of GDP</i>	-3,7%	-3,7%	-3,7%	-3,8%	-4,0%	-4,0%
Financial transactions ²	22,3	2,8	3,3	3,6	3,3	3,0
Contingency reserve	–	–	–	–	3,0	6,0
Budget balance	-114,7	-107,5	-135,0	-144,6	-157,5	-156,3
<i>Percentage of GDP</i>	-4,2%	-3,6%	-4,2%	-4,2%	-4,1%	-3,8%
Revenue	765,0	843,8	907,9	999,1	1 086,3	1 184,2
Expenditure	879,7	951,3	1 042,9	1 143,7	1 243,8	1 340,4
<i>Non-interest expenditure³</i>	804,4	869,5	949,6	1 037,0	1 127,2	1 211,7
<i>Interest payments</i>	75,3	81,8	93,2	106,6	116,6	128,8
Primary balance⁴	-39,4	-25,8	-41,7	-37,9	-40,9	-27,5
<i>Percentage of GDP</i>	-1,4%	-0,9%	-1,3%	-1,1%	-1,1%	-0,7%

¹ Includes payments for capital assets, receipts from the sale of capital assets and capital transfers

² Transactions in financial assets and liabilities

³ All spending except for consolidated interest payments

⁴ Revenue less non-interest expenditure

Source: National Treasury (2013b)

Government and Ratios

- Government is expected to continue to exert sufficient fiscal discipline on the economy, despite pressure from an expanding government wage bill. Higher interest payments, as a result of downgrades, and lower tax income because of weaker economic growth, will curb government expenditure. This will lead to government net debt reaching slightly above 40%, which is not alarming compared to many economies, especially those of the developed world.
- Government projects the deficit percentage to be -4.5% for 2013/14 (restated in the 2013 MTBPS as -4.2% with a reporting convention change), improving to -4.1%, -3.8% and -3.0% in 2014/15, 2015/16 and 2016/17. National Treasury's deficit projections and intentions are creditable in view of the financial difficulties of governments in many countries in present global economic times.
- Private consumption expenditure is expected to remain around 66% of GDP (66.1% in Q2 2013) and government consumption around 21% (21.5% in Q2 2013).
- The ratio of investment to GDP reached a high of 22% in 2009, mainly attributable to the GDP drop and to investment for the 2010 World Cup, and has retracted since. Over the next few years, the ratio is forecast to improve gradually, to reach around 22% in 2016, as investment plays a stronger role in the economy, particularly driven by government-backed investment spending. However, this remains much below the level needed for high economic growth and rapid employment generation.

1.3.5 Sources of new financing

Since the financial crisis of 2008, government's borrowing requirements have increased significantly, partly as a countercyclical response to support economic growth through infrastructure investment. To meet its requirements, government borrows in both the domestic and international debt markets, with domestic borrowing remaining the primary source, providing 70% of the annual requirement. Treasury bills are issued with maturities below one year and provide a portion of financing, but most financing is obtained through issuing bonds with maturities typically of several years, but which extend to 30 years and more at the long end. The South African bond market is one of the most liquid in the world. It also provides financing for state-owned companies, private sector corporates and banks.

Flow of funds statements prepared by the SARB show the extent to which funds have been drawn from overseas sources, compared to funds generated domestically, or moved to foreign users, if a surplus occurs domestically. The flow of funds indicates the relative saving and dissaving or investment, borrowing, lending and asset acquisition which occurs in different sectors of the economy, such as households, non-financial businesses, financial intermediaries and government.

The flow of funds account for 2012 indicates that the domestic economy drew in R197-billion of savings from the rest of the world (foreign sector). Much of this was in the form of trade credit and short-term loans (R106-billion) and flows into government bonds (R91-billion). Financial intermediaries in South Africa, primarily banks, showed a net lending outflow of R69-billion in the year, with most of this going to the non-financial business sector (R66-billion). However, banks increased their holdings of equities by R117-billion, drawing down on fund deposits to do so. Net flows into the banking sector were low.

The household sector recorded a net lending position of R11-billion for the year, mainly going toward increased deposits with general government. There were no net flows into the household sector for the year as a whole.

In 2012, the non-financial business sector generated savings of R306-billion, virtually all of which (R302-billion) was invested in new fixed capital formation. The parastatal sector invested R134-billion in fixed capital formation, of which only R48-billion was from its own savings.

1.4 Public Debt

1.4.1 Composition of government debt and debt maturities

Table 12 shows the breakdown of government debt. As at March 2013, Treasury bills accounted for 12.6% of government debt and bonds issued in the local bond market (fixed-rate and inflation-linked bonds) accounted for 76% of government debt. Foreign debt made up 9.1% of the total, most of which was in the form of foreign currency bonds.

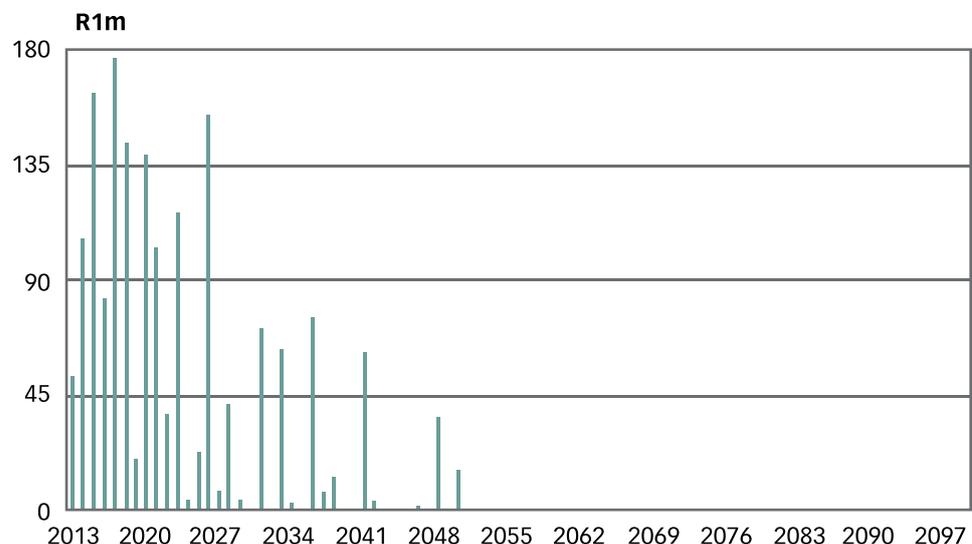
Table 12: Government debt breakdown (2012/13)

R million	Mar-12	% of total	Mar-13	% of total
Total domestic debt	1 070 940	90.2	1 241 123	90.9
Fixed-rate bonds	668 300	56.3	793 358	58.1
Inflation-linked bonds	220 973	18.6	244 496	17.9
T-bills	155 159	13.1	171 985	12.6
Corporation for Public Deposits	13 256	1.1	18 985	1.4
Retail savings bonds	12 222	1.0	11 269	0.8
Zero-coupon bonds	984	0.1	984	0.1
Other loans	46	-	46	-
Total foreign debt	116 851	9.8	124 555	9.1
Foreign currency bonds	98 151	8.3	106 588	7.8
Other foreign loans	18 700	1.6	17 967	1.3
Total government debt	1 187 791	100	1 365 678	100

Source: National Treasury

Figure 7 shows the value of all bonds listed on the domestic bond market across the debt maturity spectrum.

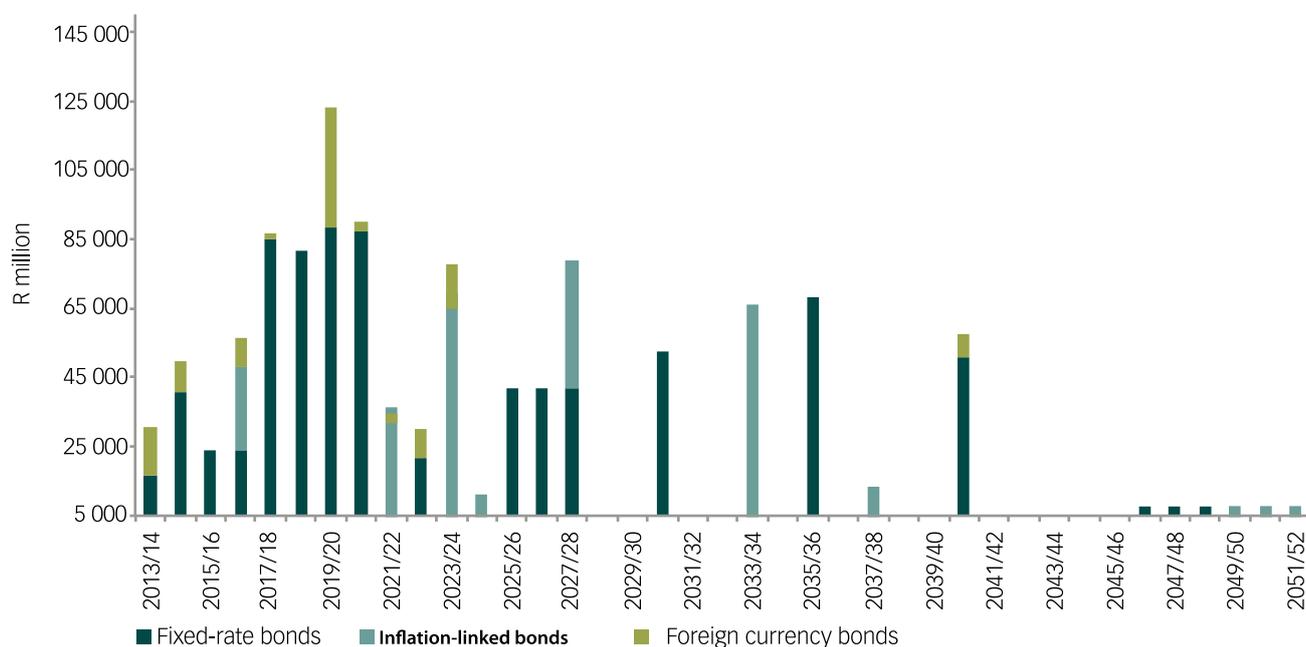
Figure 7: Value of bonds listed domestically across debt maturity spectrum (2013–2097)



Source: Standard Bank
Global Markets Research
<https://research.standard-bank.com>

Figure 8 gives the maturity profile of government bonds as at 31 March 2013 and shows the concentration of bonds in the five- and ten-year maturity ranges.

Figure 8: Debt maturity profile of government bonds at 31 March 2013



Source: National Treasury (2013a)

1.4.2 Total bond market, government share and liquidity of bond market

As at June 2013, the size of the total bond market in South Africa in terms of balance outstanding was R1,800-billion (SARB, 2013), while the total outstanding balance of marketable bonds issued by government was R1,089-billion. Government bonds make up 60.5% of the total outstanding in the South African bond market. With the inclusion of foreign bonds, the total government bonds balance outstanding was R1,428-billion at end-June 2013.

In 2012 (calendar year), the total value of bond trade transactions in the domestic secondary market was R25,274-billion, and the number of transactions 397 745, giving an average transaction size of R63.5-million. New issues of public sector bonds were R172.7-billion. In comparison, the total share capital raised on the JSE was R78.1-billion, which was lower than in 2011 when it was R87.60-billion. Nevertheless, new issues of public sector bonds were about double that of new share capital raised. In the first seven months of 2013, new government bond issues came to R96-billion, compared with private sector corporate bond issues of only R18.1-billion. As apparent in the flow of funds figures as well, the extent of public bond issues as a use of funds from the market is very substantial.

At the end of June 2013, national government's foreign debt outstanding was R117.6-billion, of which R99.7-billion was marketable debt. Taking the marketable debt to be by and large bonds, this gives a ratio of foreign to domestic bonds of approximately 9.2%. Table 13 shows national government financing in Q2 2013 and planned for the current fiscal year.

Table 13: National government financing (2013/14)

R million				
Item or Instrument	Originally budgeted 2013/14 ¹	Actual Apr-Jun 2013	Actual Apr-Jun 2012	
Deficit	179.2	63.5 ²	23.9 ²	
Plus: Extraordinary payments	0.9	0.0	1.4	
Cost/profit on revaluation of foreign debt at redemption	3.2	4.7	-2.9	
Less: Extraordinary receipts	0.3	3.8	0.1	
>> Net borrowing requirements	183.1	64.4	22.2	
Treasury bills	23.0	20.2	22.2	
Domestic government bonds	145.4	36.1	34.0	
Foreign bonds and loans	-1.1	-11.8	-12.1	
Change in available cash balances ⁴	15.8	19.9	-11.0	
Total net financing ⁵	183.1	64.4	22.2	

¹ Budget Review 2013

² Cashflow deficit

³ Cost + profit -

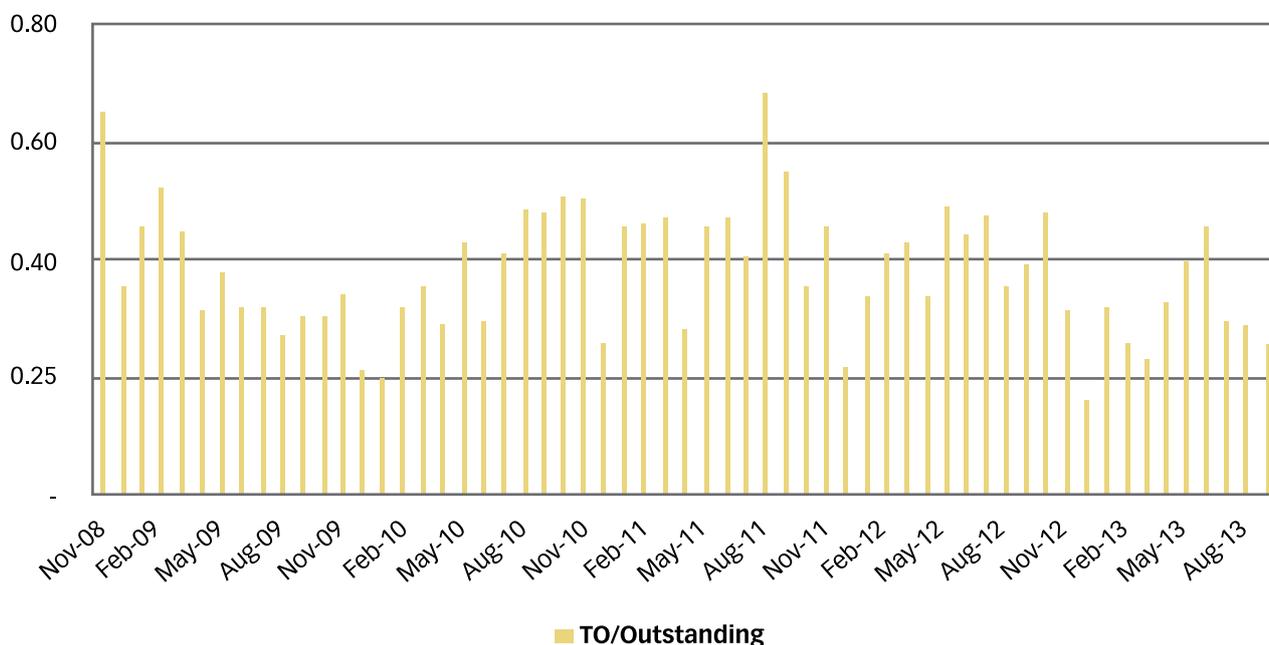
⁴ Increase- decrease+

⁵ Components may not add up to totals due to rounding

Source: SARB (2013)

A quantified indicator of bond market liquidity is bond turnover divided by the balance outstanding for bonds in the market. Using this calculation, the liquidity of the domestic bond market for calendar 2012 was 14. Figure 9, constructed using monthly data, shows a noticeable decline in liquidity in the domestic bond market over the course of 2013.

Figure 9: Bond market liquidity (turnover/outstanding bonds)

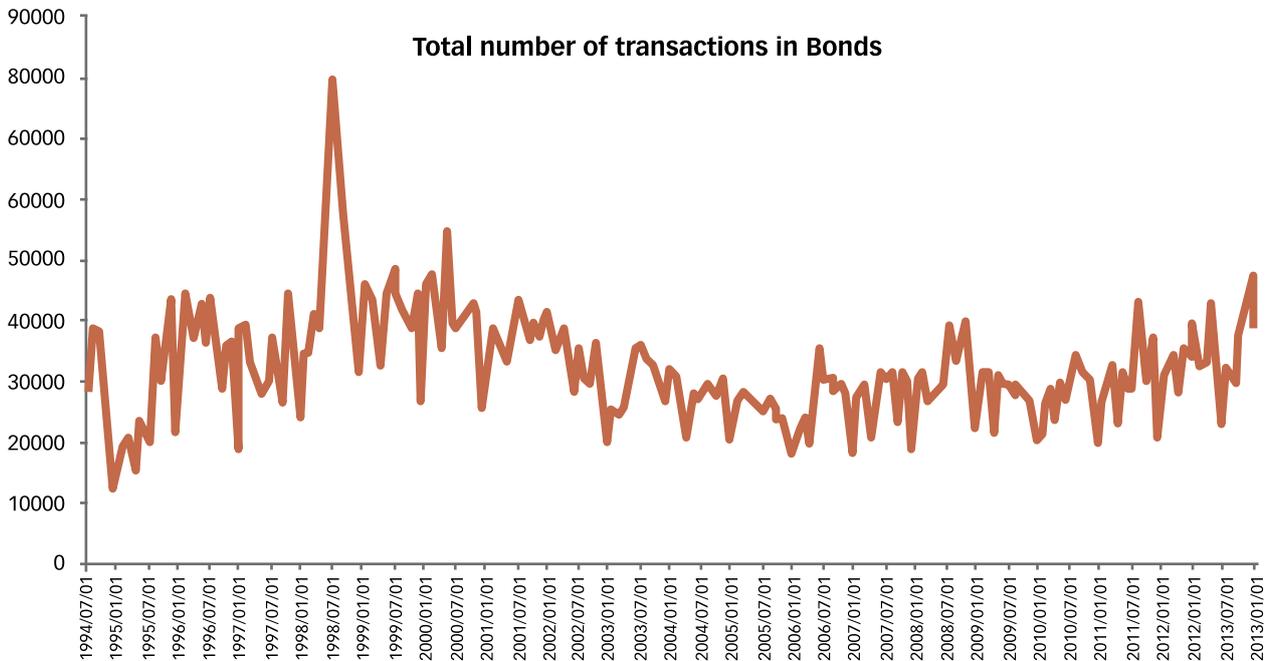


Source: Standard Bank Global Markets Research <https://research.standard-bank.com>

During the recession of late 2008 and 2009, bond market liquidity declined, but increased between early 2010 and late 2011. Since then, the decline in the liquidity of the domestic bond market could reflect two factors at play: an asset market rotation into equities, or an increase in global risk aversion amidst the sovereign debt crises in advanced economies.

A second measure of liquidity of the domestic bond market is the total number of transactions in bonds. This does not take into consideration the value of transactions, or the relativity to bonds outstanding, but does indicate the extent of trading activity. This measure shows a steady uptrend in transaction volumes in the bond market since July 2005 (Figure 10) and highlights the surge in bond trade during the Asian and domestic foreign exchange crisis of 1998. Monthly transactions surged to 80 195 in July 1998 during the most intense period of Rand currency speculation.

Figure 10: Bond market liquidity (total transactions in bonds)



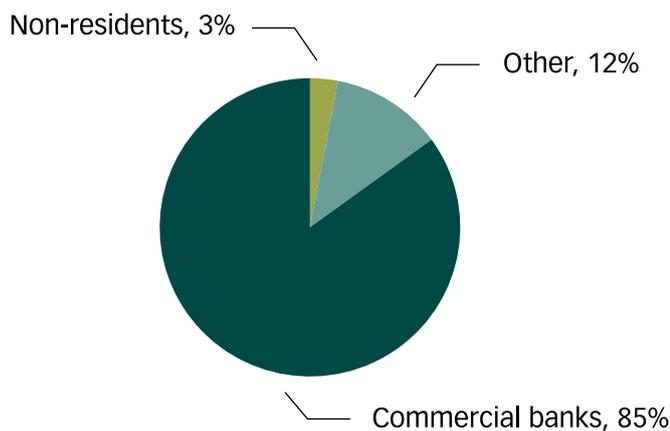
Source: SARB (various dates)

1.4.3 Holders of government debt

Holdings of Treasury bills

As at 31 March 2013, the amount outstanding on Treasury bills was R172-billion. Domestic commercial banks held 85% of the Treasury bills, with 3% held by non-residents. The remaining 12% was in the hands of various other financial institutions. Commercial banks are the dominant holders of domestic Treasury bills, which reflect the banks' liquidity and risk management strategies. Figure 11 shows the composition of holdings of Treasury bills.

Figure 11: Composition of Treasury bills holdings

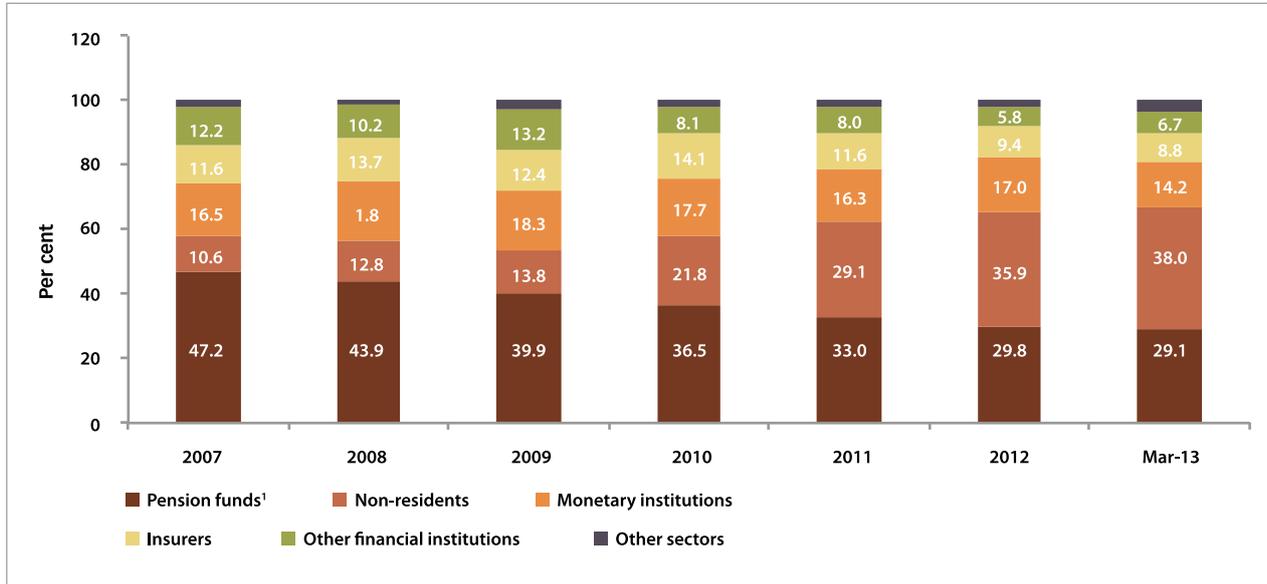


Source: National Treasury (2013a)

Holdings of domestic government bonds

Figure 12 shows the holders of domestic government bonds over the period 2007 to March 2013.

Figure 12: Holders of domestic bonds (2007 to March 2013)



>>

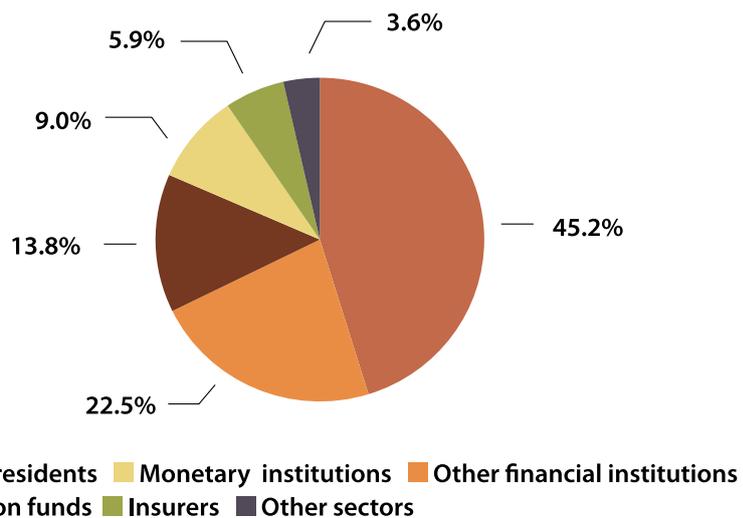
¹ Private self-administered funds and official pension funds

Source: Strate

Since 2007, holdings by pension funds in government bonds have declined, whereas holdings by monetary institutions have been fairly steady, and holdings by non-residents have increased markedly. Figure 13 shows the breakdown of holders for fixed rate bonds and inflation-linked bonds.

Figure 13: Holders of fixed rate and inflation-linked bonds 2013

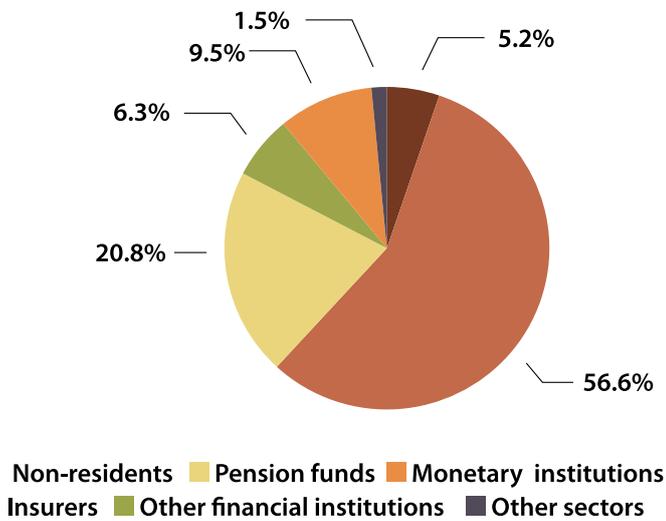
Fixed-rate bonds



Source: Strate

Figure 13: Holders of fixed rate and inflation-linked bonds 2013

Inflation-linked bonds



Source: Strate

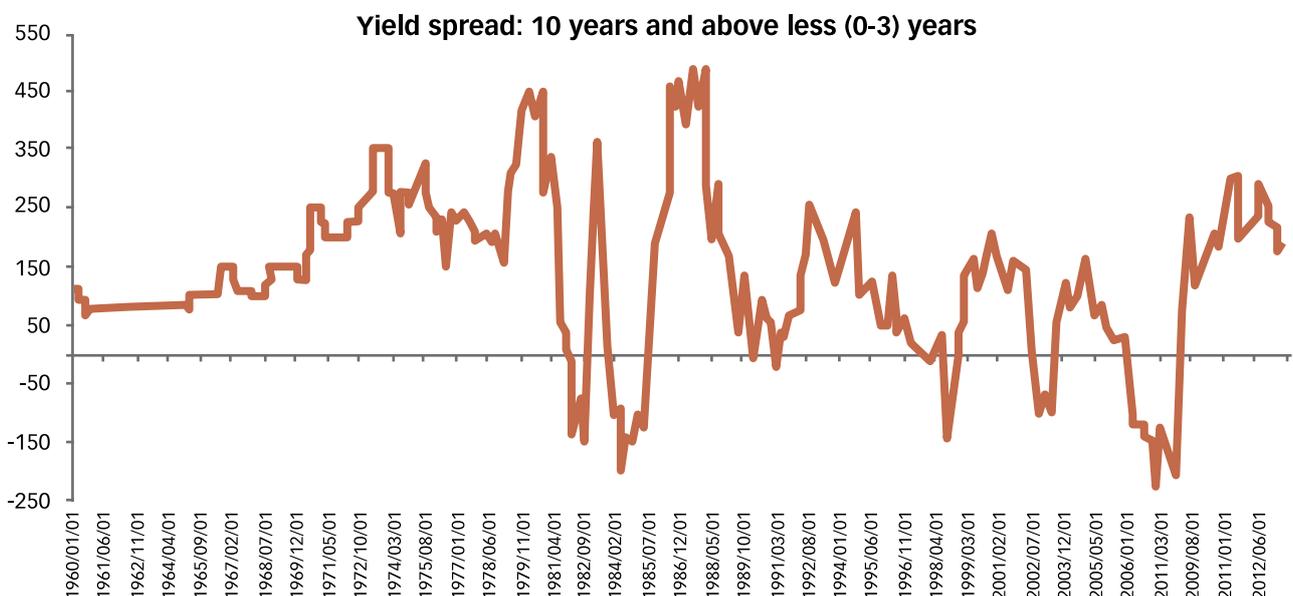
Non-residents have a far higher share in fixed rate than in inflation-linked bonds. Pension funds have very high holdings in fixed rate bonds, while insurers have a higher relative percentage in inflation-linked bonds.

1.4.4 Bond yields, spreads and new debt issues

Yields on bonds traded on the stock exchange

Since the recession of 2008/09, the yield spreads between bonds of 0–3 years’ maturities, and those with maturities greater than 10 years, have risen sharply. Although spreads have recently declined slightly, they remain high and are similar to those experienced in the late 1980s. This is an indicator of rising credit and liquidity risk in longer-dated sovereign debt instruments. Figures 14 and 15 depict the spreads from 1960 to 2012 and 1990 to 2013 respectively.

Figure 14: Yield spread (1960–2012)



Source: SARB (various dates)

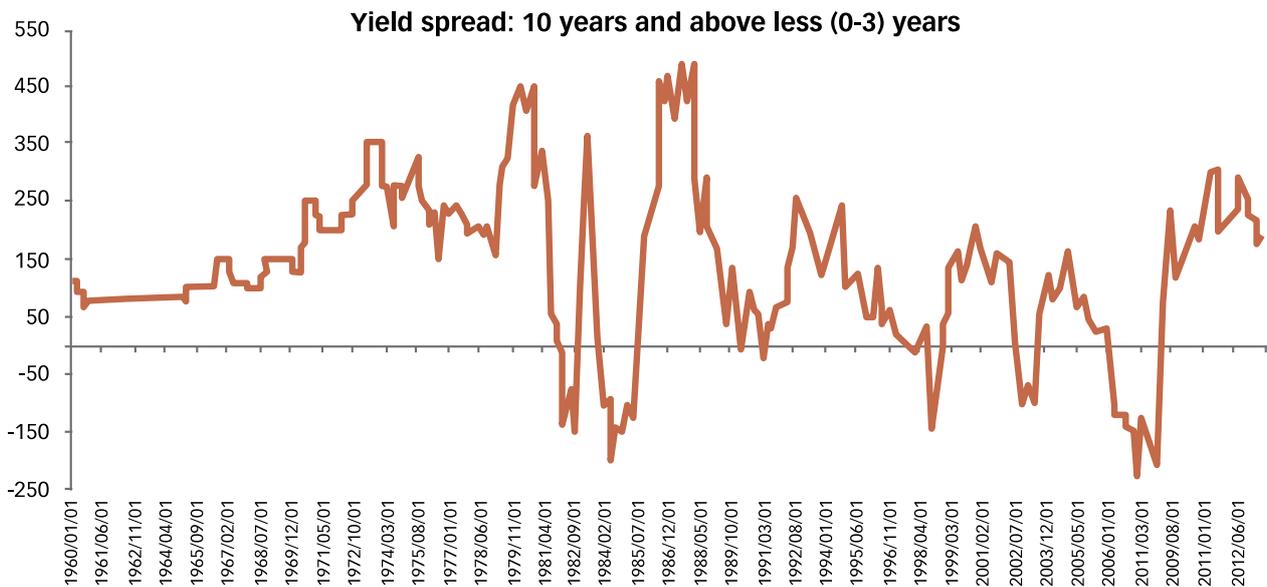
Figure 15: Yield spread (1990–2013)



Source: SARB (various dates)

Using Eskom debt securities to view yield spreads on parastatal bonds, there is a distinct increase in credit risk perception related to these debt securities. The spread between Eskom bonds and general government bonds of maturities between 0 and 3 years rose as high as 400 basis points recently. While still high, they have declined recently, showing some reduction in risk perception. The upward shift in the yield spread shown in Figure 16 indicates how these spreads can be affected by misgivings over the institution’s financial commitments.

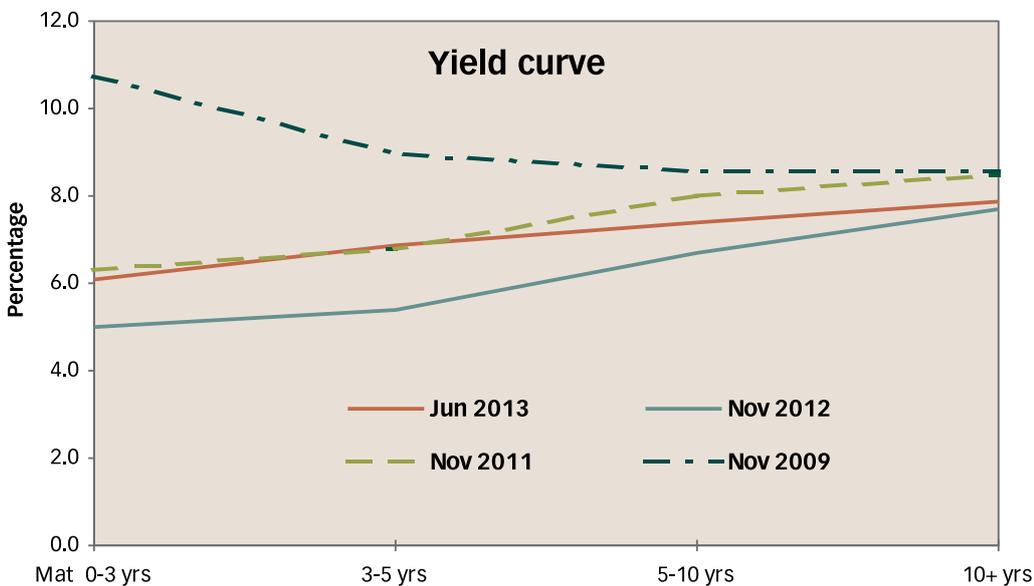
Figure 16: Eskom bond yield spread (1990–2013)



Source: SARB (various dates)

Overall, the yield curve remained strongly positive in Q1 and Q2 2013, although less steep than in late 2012. This is a reflection of the prevailing low interest rate policy and concerns that inflation may increase in the near future because of price pressures and, particularly, a weakening Rand exchange rate. There is growing acceptance in the market that a further reduction in the interest rate is unlikely. In mid-2013, yields on government bonds were 6.1% on short bonds, 6.85% on 3–5 year, 7.4% on 5–10 year and 7.9% on 10+ year bonds. This compares to figures in late 2012 of around 5%, 5.4%, 6.7% and 7.7%, and in December 2011 of 6.3%, 6.8%, 8% and 8.5%. Over the course of 2012, the yield curve shifted downwards by around 0.6%, but then shifted moderately upwards over the first half of 2013. The steepening of the curve towards late 2012 is apparent from the differential between short and long yields, which moved from 2.2% at end 2011 to 2.7% in late 2012. This then narrowed to 1.8% in mid-2013, as the curve flattened, mainly as a result of increasing rates at the shorter end of the spectrum. The positive yield curves are a major change from 2007 and 2008, when the yield curve was inverted, with yields at the long end being over 2.0 percentage points **below** short-term yields. The correction to a positive curve is likely to lead to a more balanced allocation of funds, both into financial assets and into real investment. The flatter yield curve in mid-2013 may reflect the market view that the consumer price index (CPI) inflation rate is likely to exceed 6% on average in Q3 2013, but is expected to moderate to below 6% thereafter.

Figure 17: Overall yield curve



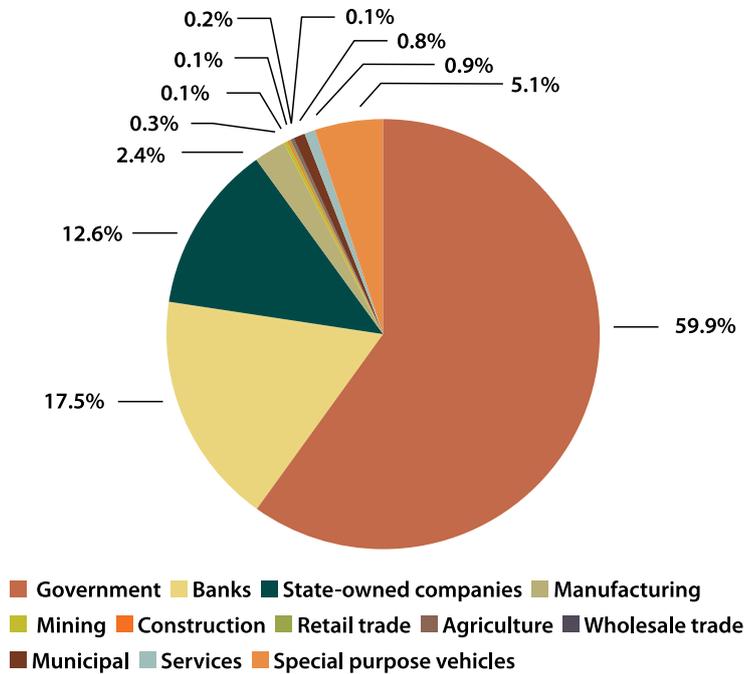
Source: Authors' calculations

New debt issues

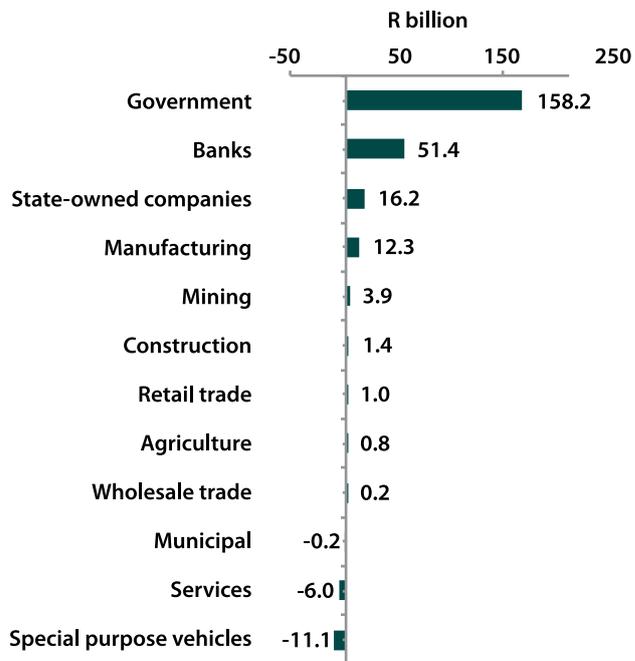
Figure 18 shows new debt issues for the fiscal year to end-March 2013, while Figure 19 compares the amounts raised in recent years to those raised in the 1990–2000 period.

Figure 18: New debt issues by sector

Nominal primary listing by sector

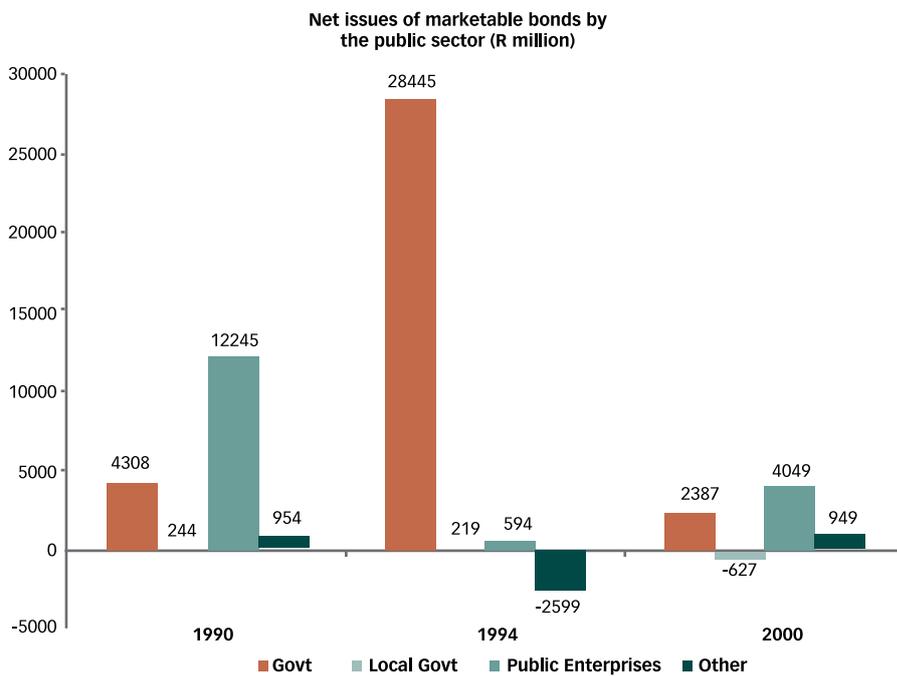
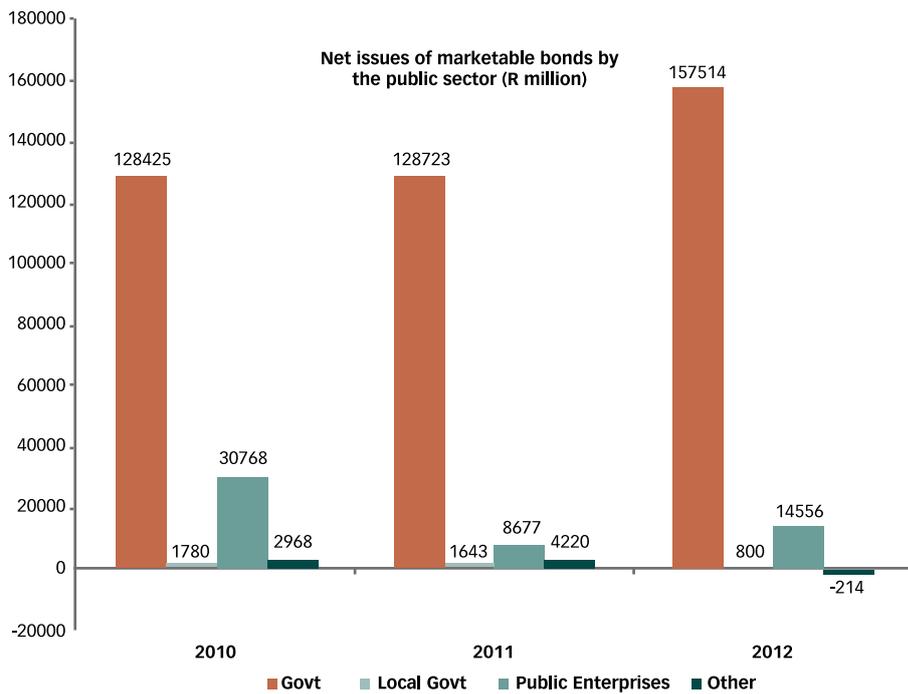


Net change in nominal listing value relative to March 2012



Source: Authors' calculations from JSE data

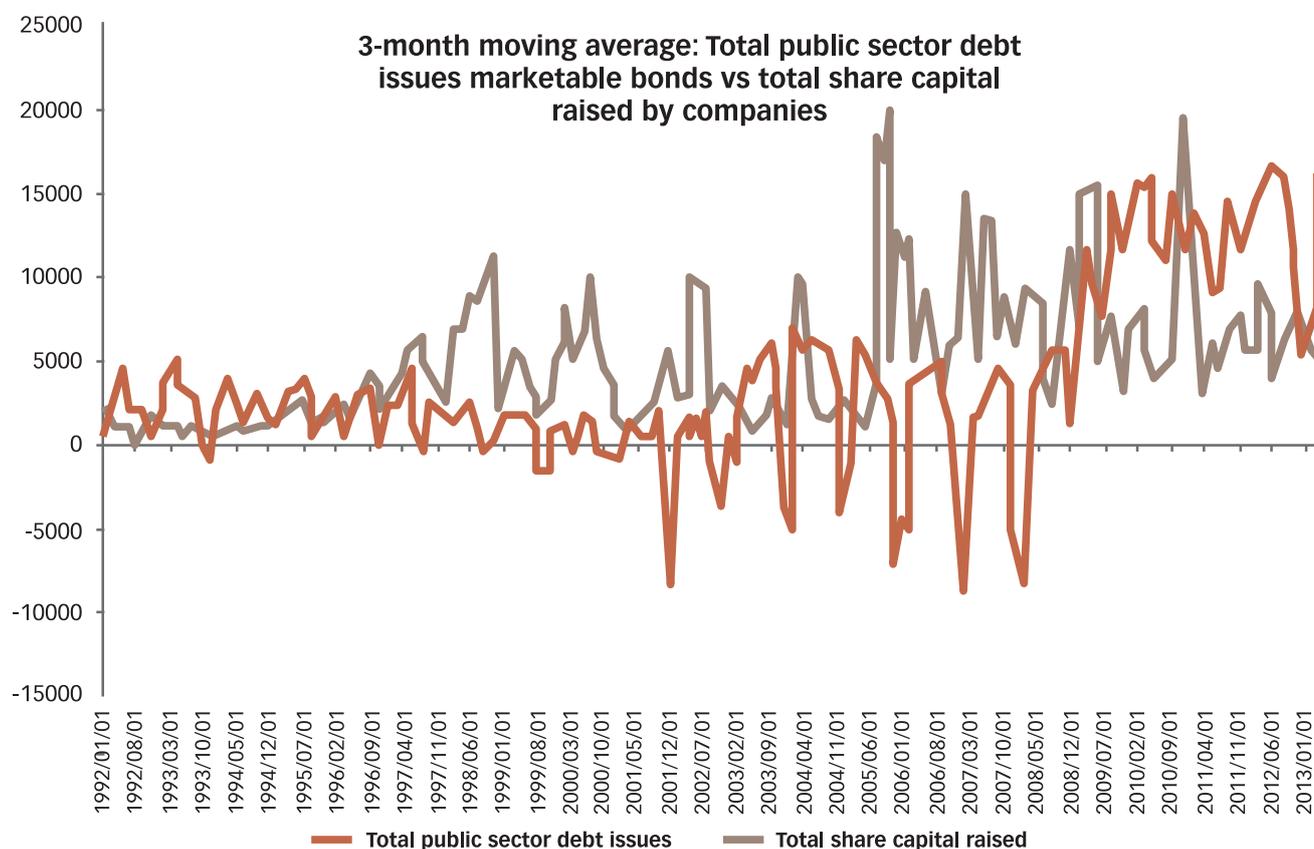
Figure 19: Net issues of marketable bonds by public sector (R millions)



Source: SARB (various dates)

Figure 20 shows the three-month moving average between total public sector debt issues, compared to share capital raised by private sector companies. This provides a comparison of the dynamics at play in the respective public and corporate finance markets. 1.4.5 Public private partnership financing

Figure 20: Total public sector debt issues (marketable bonds vs. total share capital raised by companies)



Source: SARB

Context

Only a limited category of public private partnerships (PPPs) is applicable in this context. In many cases, PPPs involve cooperation arrangements with government to deliver specified services, for which government pays from its revenues. An example of this would be a PPP in which a private sector firm provides full administration of a prison. This may occur without private sector capital investment to construct the prison. However, for government debt financing, the relevant forms of PPP are those in which the private sector makes a significant capital investment that the government would otherwise have had to make. An example is certain toll road projects, in which the investment in the road or major upgrade is funded from the balance sheet of the private sector participant. An example that might have occurred in the early 2000s was private sector firms constructing and operating electrical power stations. They were to fund and manage the power stations entirely themselves, with Eskom, or an independent power purchaser, drawing on the power generated at an agreed price. An applicable case would have been the possibility of a private sector investor taking up a 30% stake in the Kusile power station under construction by Eskom. These arrangements tend to be more applicable to state-owned public corporations, rather than directly to central government itself. Nevertheless, some cases may be applicable to central government, such as a PPP arrangement whereby a private sector firm funds and constructs a new office block to meet a government requirement, with government entering a long-term lease, under which it pays rentals for use of the offices.

An allied aspect to considering PPP contributions to financing is the degree to which government is willing to allow private sector firms to undertake activities that could be carried out by either state or private firms. Government pursued various initiatives in the 1990s, whereby business-oriented activities under the ownership of the state were transferred to private sector parties. An example was issuing shares in national telecommunications operator Telkom to private shareholders, and selling Iscor assets to the private firm that is now ArcelorMittal. These need to be noted because, from the early 2000s, national government made a deliberate shift to (by and large) refrain from transferring such activities to private sector parties, and to concentrate on building up state-owned public corporations to undertake these activities more effectively. The degree of funding alleviation, which could be possible from placing more activities in the private sector, is constrained by the government's policy stance regarding private sector engagement in spheres that are currently undertaken by public sector institutions, especially public corporations.

Possibility and limitations

Given the government's policy commitment to undertake most of these activities under state ownership, the instances for private sector financing are therefore limited. This appears likely to be the policy of the ANC government for a number of years to come. Nevertheless, the government may consider bringing in private sector firms in certain areas, without deviating too much from its policy stance. One such example would be road infrastructure, where forms of private sector investment may be achievable, despite recent resistance to the e-toll arrangement applicable to Gauteng freeways. Another example, which is clearly within government policy parameters, is the Independent Power Producer initiative being pursued by Eskom, in which private sector proposals are invited for certain forms of power generation. Under these, the private sector parties provide the entire financing and enter into a supply contract, whereby Eskom or a sister central network operator purchases the power at a contracted rate. In a similar vein, fuel pipeline projects can be undertaken by private sector parties; such a project was considered a few years ago.

Rail concessions, in which a private sector firm operates a certain rail line under contract to a state entity such as Transnet, have previously been contemplated and could once again be a possibility. In this case, the requirement to finance rolling stock for the concession rail route would shift to the private sector firm. At present, Transnet is undertaking a massive acquisition of rolling stock on its own balance sheet, which is material enough to affect the public debt situation of the country. Transnet is investing R60-billion in rolling stock, while Prasa is investing R123-billion. Eskom's investment in the Medupi and Kusile power stations is around R280-billion, and a nuclear programme would add massively to this. If a portion of these investments, say 30%, were to be met by private sector parties, the debt financing required by government and its public corporations could be reduced by R100-billion or more.

1.5 Literature Review

1.5.1 Theoretical framework on optimal debt management: tax smoothing

The effects of public debt on the economy of a country can be severe, as well as subtle. From a theoretical viewpoint, three principal views can be identified concerning the crowding-out effect of public debt. A neoclassical view holds that increased budget deficits lead to increased consumption expenditure in the economy, with a resultant decrease in savings. Taxes which would be needed to fund the deficit are shifted to future generations, increasing the propensity to spend. Interest rate increases become necessary to subdue inflation pressures from the increased demand. The increased interest rates have the effect of discouraging private sector investment. Through this channel, government deficits have a crowding-out effect on private sector investment. In contrast, a Keynesian view holds that government deficits are more likely to crowd in private sector investment, since the expansion in aggregate demand results in greater optimism of future potential in the economy, so that a higher level of investment is justified. A third view is that of Ricardo equivalence, in which budget deficits have very little effect on the economy, since actors in the economy are cognisant that reduced current taxation is simply a shift to increased future taxation of similar magnitude. Effects on interest rates and investment spending are thereby muted.

1.5.2 South African debt studies

In South Africa, few studies of public debt issues have been carried out; most of them are mainly descriptive, with few assessing debt management issues. Many of the empirical studies on public debt are linked to the sustainability of fiscal policy in the country. This is not surprising, since budget policy is constrained by the need to finance government deficits. Therefore, government's level of borrowing is dictated by the intertemporal (across time) budget constraint. Every country faces an intertemporal budget constraint, which requires that government's future expenditures, including the servicing of its outstanding official debt, be covered by the government's future receipts when measured in present value. No household can continually spend more than it makes. At some point, those who are financing the excess of the household's expenditures over its receipts will soon stop lending money. The same is true of governments. Eventually they need to change their spending or their revenues (or both) to satisfy their intertemporal budgets. The longer the delay in adjusting policy, the bigger and more painful the adjustment will be and the greater the burden on young and future generations, who are left behind to pay the bills. The requirement that, along its economic transition path, a country's taxes cover its expenditures when measured in present value (discounted as of today) is a feature of all neoclassical economic growth models. Indeed, every dynamic growth model constructed by economists incorporates this long-term budget constraint, either explicitly or implicitly.

To achieve a sustainable public debt level, prudent government finances need to be achieved first. A sustainable fiscal policy will directly translate into a sustainable debt pattern. In line with the established concept on debt and fiscal sustainability, many empirical studies have been carried out in this area on both developed and developing countries. Evidence from some of these studies suggests some important macroeconomic variables are the responsible factors dictating fiscal and debt sustainability, while other empirical studies suggest some thresholds of debt for countries and groups of countries, based on their level of income and/or quality of policy and institutions (Barro, 1997; Buiters, 1993, 1997; Feder and Just, 1977; Feder et al., 1981; Frank and Cline, 1971; Hamilton and Flavin, 1986; Kraay and Nehru, 2006; Turner, 2002; Wilcox, 1989). In addition, Collignon (2010) assessed fiscal policy rules and the sustainability of public debt in Europe. He interpreted sustainable public debt as the result of the interaction of fiscal policy with the economic environment and not as a statistical concept as mostly found in the literature. To prevent public debt from exploding over time, policy-makers need to respond to changing conditions in the tax system and to the cost of finance (Collignon, 2010). Therefore, it is critical to establish policy rules so that fiscal policy stances taken by governments are adjusted to changes in the environment and thus ensure long-term debt sustainability.

Lusinyan and Thornton (2009) use an alternative test (unit root and cointegration) to detect fiscal sustainability, rather than the traditional approach of intertemporal budget constraint. They found that the series are non-stationary (I (1)) and cointegrated. Therefore, the estimated long-run equilibrium supports the presence of a weak deficit sustainability condition (not totally unsustainable). This implies that the pattern of fiscal deficit, especially in the recent past, should be investigated. A similar investigation is reported in Burger et al. (2012) when estimating the South Africa fiscal reaction function, in order to detect how government has reacted to its debt position by adjusting its primary balance. Over the period of investigation, government's fiscal reaction to its debt position varied from period to period depending on the circumstances faced by the economy. Their overall conclusion is that government has run sustainable fiscal policy over the years by reducing the primary deficit in response to rising debt. Furthermore, when fiscal policy focuses on stabilising output, the potential for higher debt increases, but falls when the focus shifts to debt levels themselves. We can thus conclude that public debt has served the purpose of smoothing transitory fluctuations in GDP and public expenses. Naraidoo and Raputsoane (2013) have confirmed that fiscal consolidation in South Africa occurs at a much lower debt-to-GDP ratio, and the country has achieved relatively sound fiscal outcomes in the recent past. To achieve fiscal sustainability through consolidation, it is imperative to detect the component of the fiscals (tax and expenditure) that will ensure a faster outcome. However, as suggested in Akanbi (2013), for a structurally constrained economy such as South Africa, fiscal consolidation through tax changes will be more effective in achieving long-term fiscal and debt sustainability.

1.5.3 CGE models addressing debt impacts on the economy

Most empirical literature on debt issues have used time-series and cross-sectional data. There has been a dearth of empirical studies that employed the computable general equilibrium (CGE) technique to address the implications of public debt on the economy. Thissen (1999) describe the few that exist as financial macro CGE models. The reason behind this dearth of empirical studies may be linked to the old dichotomy between real and nominal analysis in economics. For instance, an economy-wide modeller, working to construct a theoretical structure for understanding the economy as a whole, may see debt as either trivial or intractable. Trivial, because (in a closed economy) it is net zero – the liabilities of all borrowers always exactly match the assets of all lenders. Intractable, because a full understanding of debt means grappling with a world in which the choice between debt and equity matters in some fundamental way. That means confronting, among other things, the intrinsic differences between borrowers and lenders; non-linearities, discontinuities, and constraints, in which bankruptcy and limits on borrowing are key; taxes, where interest paid to lenders is treated differently from dividends paid to shareholders; differences between types of borrowers, so household, corporate and government debt are treated separately; and externalities, since there are times when financial actors do not bear (or are able to avoid) the full costs of their actions.

As modern macroeconomics developed over the last half-century, most people either ignored or finessed the issue of debt. With few exceptions, the focus was on a real economic system in which nominal variables – prices or wages, and sometimes both – were costly to adjust. The result, brought together brilliantly by Woodford (2003), is a logical framework where economic welfare depends on the ability of a central bank to stabilise inflation, using its short-term nominal interest rate tool. Money, both in the form of the monetary base controlled by the central bank and as the liabilities of the banking system, is a passive by-product. With no active role for money, integrating credit in the mainstream framework has proven to be difficult. Yet, as the mainstream was building and embracing the New Keynesian orthodoxy, there was a nagging concern that something had been missing from the models. On the fringe were theoretical papers, in which debt plays a key role, and empirical papers, concluding that the quantity of debt makes a difference. The latest crisis has revealed the deficiencies of the mainstream approach and the value of joining those once seen as inhabiting the margin.

In response to the challenge, macroeconomists are now working hard to put financial stability policy on the same theoretical footing as conventional monetary policy. They are working, not only to understand the sources of systemic risk, but also on how to measure and mitigate it. That means writing down models in which debt truly matters and working through the implications. Empirical testing of public debt implications in CGE literature became visible from the mid-1980s onwards. Some of the few empirical studies carried out prior to this period focused on other simulations which could provide important macroeconomic implications. Table 14 outlines the major empirical models related to public debt in CGE models that are available in the literature and summarises the important differences in their methodologies and findings.

Table 14: Summary of empirical literature related to public debt in CGE models

	Title	Authors (Date)	Model and Research Question	Key Findings
1	Financial liberalisation and fiscal repression in Turkey: policy analysis in a CGE model with financial markets.	Yeldan (1997)	CGE model to conduct the effects of government mode of financing its fiscal deficits through debt instruments or monetisation.	Suggests a significant negative effect on the macro economy.
2	Macroeconomics of twin-targeting in Turkey: analytics of a financial CGE model.	Telli et al. (2008)	CGE model that provides an overview of the post-1998 Turkish economy in terms of real and financial sectoral adjustments.	Current Turkish monetary strategy is effective in bringing inflation down but at the expense of public sector interest burden.
3	Policy impact under credit rationing: a real and financial CGE of Rwanda	Decaluwé and Nsengi-yumva (1994)	CGE model to evaluate the effects of stabilisation policies (monetary instruments) in a financially repressed economy such as Rwanda.	Confirms the importance of linking the real and financial sectors in CGE modelling.
4	Macroeconomic adjustment and income distribution: a macro-micro simulation model.	Bourguignon et al. (1989)	CGE model to quantify the effects of stabilisation policies on the distribution of income and wealth.	External borrowing allows the economy to progressively reduce its current account deficit by half over a seven-year period, while maintaining a constant fiscal deficit.
5	Devaluation, capital flows and crowding-out : a CGE model with portfolio choice for Thailand.	Rosensweig and Taylor (1990)	CGE model to evaluate the response of fiscal and monetary policies on the macro economy.	Results confirm that CGE models can be extended successfully to deal with fiscal and monetary questions.
6	Un modèle de l'économie ivoirienne.	Collange (1993), explained in Lemelin and Decaluwé (2007)	Combines the Rosensweig-Taylor (1990) portfolio management model and Bourguignon et al. (1989) liability management model.	Similar to Bourguignon et al. (1989) and Rosensweig and Taylor (1990).
7	Libéralisation financière, structure du capital et investissement: un MCEG avec actifs financiers appliqué à la Tunisie.	Souissi (1994), explained in Lemelin and Decaluwé (2007)	Criticises the asset demand in the Rosensweig-Taylor (1990) model.	
8	Macroeconomics, financial variables, and CGE models.	Robinson (1991)	Surveys micro-macro CGE models that incorporate asset markets and product and factor markets.	Provides the first major move to dynamic financial CGE modelling in the literature.
9	Issues in recursive dynamic CGE modelling: investment by destination, savings, and public debt, a survey.	Lemelin and Decaluwé (2007)	Puts forward some ideas on how to represent the evolution of public debt in a recursive dynamic CGE.	Presents the basic requirements on how to represent public debt in the CGE. Surveys literature on issues of public debt in CGE.

	Title	Authors (Date)	Model and Research Question	Key Findings
10	La dette obligataire dans un MÉGC dynamique séquentiel.	Lemelin (2005)	Presents a minimalist version of a model of bond financing and debt, imbedded in a stepwise dynamic CGE model.	Proposes an approach to extend the CGE methodology to simulate the dynamics of debt.
11	Bond indebtedness in a recursive dynamic CGE.	Lemelin (2007)	Presents a minimalist version of a model of bond financing and debt, imbedded in a stepwise dynamic CGE model.	Demonstrates the practicability of extending the CGE methodology to simulate the dynamics of debt as proposed in Lemelin (2005).
12	Survey of dynamic CGE models for tax policy evaluation.	Pereira and Shoven (1988)	Carried out a survey of 11 CGE models that include some dynamics in their structure.	Treats issues of incorporating dynamics into the models and discusses different computational and implementation approaches. It includes a dynamic CGE model of corporate tax integration that indicates the importance of modelling dynamic choice.
13	Tax policy, asset prices, and growth: a general equilibrium analysis.	Goulder and Summers (1987)	Multisector CGE model that is capable of providing integrated assessments of the economy's short- and long- run responses to tax policy changes.	Simulation results reveal that the effects of tax policy differ significantly, depending on whether the policy is oriented toward new or old capital.
14	General equilibrium effects of investment incentives in Mexico.	Feltenstein and Shah (1995)	Using CGE model to examine the relative efficacy of tax instruments.	The results emphasise the importance of using an open economy model. Investment tax credit and tax rate reductions increase the demand for all capital, rather than new capital alone.

Yeldan (1997) investigated the interaction of the real and financial sectors of the Turkish economy in its different phases of financial liberalisation. The CGE simulations suggest that Turkey's fiscal policy of financing the public deficits through bond issuing and monetisation, has significant negative effects on the macro-economy, as pressure will be exerted on the interest rate, leading to shrinking of the financial markets and the private sector, which will eventually contract the real economy. A follow-up study (Telli et al., 2008) provided an overview of the post-1998 Turkish economy and focused on "twin targets" (primary surplus and inflation rate). The simulation results suggest that foreign capital inflow, along with high interest rates, will curb inflation, but at the expense of increased cost of interest burden to the public sector, which may strain fiscal credibility. The link between the real and financial sectors, especially in developing countries, remains very weak and largely depends on the structure of production and the functioning of the financial system. Therefore, models designed for a structurally constrained economy should take into account this important direct link. If these constraints continue to exist, then the distributive effect of government fiscal actions will remain subdued (Decaluwé and Nsengiyumva, 1994).

As highlighted in Lemelin and Decaluwé (2007), citing Thissen (1999), other important financial CGE models include Bourguignon et al. (1989), Collange (1993), Robinson (1991), Rosensweig and Taylor (1990) and Souissi (1994). These are macro-simulation models used to quantify the effects of stabilisation policies on income and wealth distribution in developing countries. They have similar characteristics in terms of representative agents in the economy. The household, businesses, commercial and central banks, government and the rest of the world are the representative agents, who hold debt or bonds at a particular point in time. In these models, government debt is treated as forms of bonds that are held by households, banks and the rest of the world. Government financial need, as described in the Rosensweig-Taylor model, is the difference between public investment expenditure (including acquisition of new shares issues by public enterprises) and government current savings. Collange's model further extends this to include exogenous transfers received by businesses. These needs are, however, met by central banks advances and foreign capital inflows.

The different approaches to debt issues in the literature mainly arise from the financial markets. Therefore, Lemelin and Decaluwé (2007) put forward some ideas on how to represent the evolution of "purely" public debt in a recursive dynamic CGE model. In this case, public debt is considered essentially to be in the form of bonds, which consist of three related features: interest payments, redemption of matured debt and the debt level itself. Given these features of public debt, Lemelin and Decaluwé (2007) recommend establishing in the CGE model a relationship between the level of indebtedness and the cost of borrowing. In order to represent the cost of borrowing and the borrowing capacity of government, the interest rate on new issue of bonds is set to depend on the existing stock of debt. In addition, government bonds compete with another asset, so that market valuation of bonds will respond negatively to rising stock of outstanding debt. This is a minimalist framework of bond financing adopted earlier in Lemelin (2005) where he proposed extending the CGE methodology to simulate the dynamics of public debt. The practicability of this modelling principle has been demonstrated in Lemelin (2007), using a small-scale recursive dynamic CGE model.

Other approaches related to CGE simulation on fiscal and debt issues relate to the effects of tax incentives on the macro economy. Most issues and shortcomings on tax policy evaluations have been dealt with in Pereira and Shoven (1988), and Goulder and Summers (1987). These include considering the intertemporal nature of the capital taxation by allowing an optimal evolution of capital stock in the economy and forward-looking optimal investment decisions. This is also coupled with an improved treatment of several tax provisions, such as investment tax credits and depreciation allowances. After incorporating dynamics into the CGE models surveyed, Pereira and Shoven (1988) also integrate corporate tax in order to assess the importance of modelling dynamic choices. The simulation results from Goulder and Summers (1987) reveal that a combined policy, which involves eliminating investment tax credit and reducing corporate taxes, generates windfalls to owners of capital and produces no favourable effect on capital accumulation. Based on this, Feltenstein and Shah (1995) investigated the general equilibrium effects of investment incentives through taxes for the Mexican economy. Their results confirm that reducing corporate tax has the most stimulative impact on investment, as it directly lowers the cost of capital and increases the rate of capital formation in the economy.

1.5.4 Assessment and implications

Given the above literature review, to the best of our knowledge, no studies exist for South Africa on the implication of public debt on the economy using CGE modelling. Such an investigation may augment the existing literature and provide further guidelines for policy-makers in assessing the sustainability of debt in the country. The CGE approach has many advantages over macro-oriented aggregated and partial equilibrium models, as it provides for differential impacts across sectors of production and consumer groups. CGE modelling allows for the analysis of distribution, which is a critical policy question that non-CGE studies cannot in general tackle.

1.6 Methodology

1.6.1 Model

The model is based on PEP 1-t from Decaluwé et al. (2013), but several assumptions have been changed in order to better represent the South African case and our study.

Introduction of interest and debt in the model

In the model, and according to the social accounting matrix (SAM), the different agents borrow from each other. More precisely, only firms and government borrow from the rest of the world, while each agent borrows domestically (from the firms or the households). Therefore, each agent will receive and pay interest income.

To take into account the interest revenues for households, the share of domestic interest they receive is added:

$$YH_{h,t} = YHL_{h,t} + YHK_{h,t} + YHTR_{h,t} + YHI_{h,t}$$

$$YHI_{h,t} = \lambda_h^I \sum_{ag} INT_{ag,t}^{DOM}$$

Household consumption budget also has to be adjusted. It becomes their disposable income less their savings, less the transfers to non-governmental agents, less the foreign and domestic interest paid:

$$CTH_{h,t} = YDH_{h,t} - SH_{h,t} - \sum_{agng} TR_{agng,h,t} - INT_{h,t}^{DOM} - INT_{h,t}^{ROW}$$

Households' investment is the sum of savings and what they borrow from other agents, less what they lend to the other agents:

$$I_PRI_{h,t} = SH_{h,t} + \sum_{ag} BOR_{h,ag} - \sum_{ag} BOR_{ag,h}$$

The same reasoning is applied to firms, government and the rest of the world. Note that for the government, this variable represents public investment, IT_PUB.

$$YF_{f,t} = YFK_{f,t} + YFTR_{f,t} + YFI_{f,t}$$

$$YFI_{f,t} = \lambda_f^I \sum_{ag} INT_{ag,t}^{DOM}$$

$$SF_t = YDF_t - \sum_{ag} TR_{ag,f,t} - INT_{f,t}^{DOM} - INT_{f,t}^{ROW}$$

$$I_PRI_{f,t} = SF_{f,t} + \sum_{ag} BOR_{f,ag} - \sum_{ag} BOR_{ag,f}$$

$$YG_t = YGK_t + TDHT_t + TDFT_t + TPROD_t + TPRCTS_t + YGTR_t + YGI_t$$

$$YGI_t = \lambda_{gvt}^I \sum_{ag} INT_{ag,t}^{DOM}$$

$$SG_t = YG_t - \sum_{agng} TR_{agng,gvt,t} - G_t - INT_DOM_{gvt,t} - INT_ROW_{gvt,t}$$

$$IT_PUB_t = SG_t + BOR_DOM_t + BOR_{gvt',row',t} - \sum_{agd} BOR_{ag',gvt',t}$$

$$YROW_t = e_t \sum_m PWM_{m,t} IM_{m,t} + \sum_k \lambda_{row,k}^{RK} \left(\sum_j R_{k,j,t} KD_{k,j,t} \right) \\ + \sum_{agd} TR_{row,agd,t} + \sum_{agd} INT_ROW_{agd,t} + \sum_l \lambda_{row,l}^{WL} \left(\sum_j W_{l,t} LD_{l,j,t} \right)$$

$$I_PRI_{row',t} = SROW_t + \sum_{agd} BOR_{row',agd',t} - \sum_{agd} BOR_{agd',row',t}$$

Government's borrowing from domestic agents is a share of total domestic borrowing. As a closure rule, it is assumed that government cannot increase its borrowing from the rest of the world:

$$BOR_{gvt,agd,t} = \lambda_{agd}^{BOR} BOR_DOM_t$$

Domestic and foreign interest are computed as the product of respective interest rate and debt:

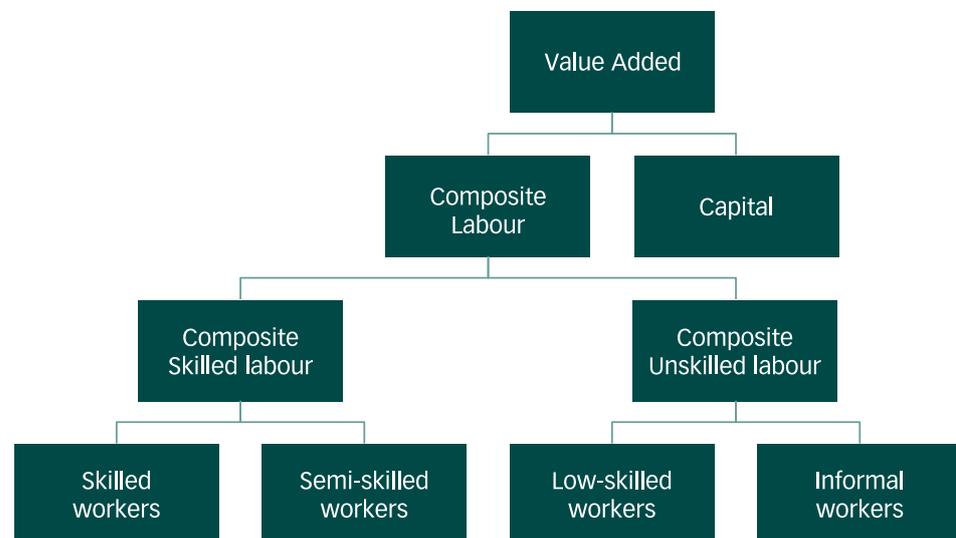
$$INT_{ag,t}^{DOM} = IR_{ag,t}^{DOM} DEBT_{ag,t}^{DOM}$$

$$INT_{agd,t}^{ROW} = IR_{agd,t}^{ROW} DEBT_{agd,t}^{ROW}$$

The labour market

In line with the SAM, the model has 53 activities and commodities. The production function technology is assumed to be of constant returns to scale and is presented in a four-level production process. At the first level, output is a Leontief input-output of value added and intermediate consumption. At the second level, a constant elasticity of substitution (CES) function is used to represent the substitution between a composite labour and capital. At the third level, composite labour demand is also a CES function between composite skilled and composite unskilled labour. Note that the composite skilled demand is a CES with a low elasticity between skilled and semi-skilled workers, capturing the fact that it is quite difficult for firms to substitute semi-skilled for skilled workers. On the other hand, a CES is also used to describe the composite unskilled labour demand between informal and unskilled workers. Here, the assumption is that it is relatively easy to substitute producers.

Figure 21: Structure of the value added for each activity



Source: Authors' construction

South Africa faces high unemployment problems, notably for semi-skilled and unskilled labour. Moreover, unions are very strong in the country. South Africa has the most disciplined and the largest trade union movement in Africa, which has influenced labour market policies and other related industrial policies. Unions negotiate salaries and wages, conditions of service, workforce restructuring and retrenchments on behalf of their members. As a result, wages and salaries are strongly rigid downwards. To take this rigidity into account in our modelling, a minimum wage is assumed. Thus, if production decreases, producers will not be able to decrease their employees' salary below the minimum wage. On the other hand, this rigidity will have an impact on unemployment: given that producers cannot decrease workers' wage rates, they will have to retrench some of them.

1.6.2 Data

The core data required to implement this model can be obtained from a SAM, a national accounting matrix and a flow of funds matrix. These data sources are available for South Africa. National accounts were used to update the SAM from 2012 with capital accounts. In addition, information on debt stocks for government and other agents was obtained from the SARB. Along with the SAM, some additional data such as elasticities were needed. For the income elasticities, we borrowed the values of Chitiga et al. (2012), whereas trade elasticities are taken from Gibson (2003).

Table 15: Structure of the demand

	Private Consumption	Total Intermediate Demand	Public Consumption	Consumption for Investment Purposes	Stock Variation	Margins
Agriculture, forestry and fishing	25.04%	74.55%	0.00%	0.00%	0.41%	0.00%
Coal mining	0.74%	99.19%	0.00%	0.00%	0.07%	0.00%
Gold and uranium ore mining	0.00%	101.78%	0.00%	0.00%	-1.78%	0.00%
Food	77.36%	21.49%	0.00%	0.00%	1.15%	0.00%
Beverages and tobacco	88.51%	10.54%	0.00%	0.00%	0.95%	0.00%
Textiles	41.16%	59.56%	0.00%	0.00%	-0.72%	0.00%
Wearing apparel	85.21%	14.36%	0.00%	0.00%	0.42%	0.00%
Leather and leather products	29.21%	68.16%	0.00%	0.00%	2.63%	0.00%
Footwear	89.18%	10.52%	0.00%	0.00%	0.29%	0.00%
Wood and wood products	0.31%	97.05%	0.00%	2.23%	0.41%	0.00%
Paper and paper products	8.69%	90.07%	0.00%	0.00%	1.24%	0.00%
Printing, publishing and recorded media	22.46%	76.16%	0.00%	0.00%	1.38%	0.00%
Coke and refined petroleum products	38.23%	58.94%	0.00%	0.00%	2.83%	0.00%
Basic chemicals	3.61%	98.18%	0.00%	0.00%	-1.79%	0.00%
Other chemicals and man-made fibres	37.34%	61.31%	0.00%	0.00%	1.35%	0.00%
Rubber products	37.58%	59.47%	0.00%	2.14%	0.81%	0.00%
Plastic products	1.61%	97.26%	0.00%	0.00%	1.13%	0.00%
Glass and glass products	2.79%	94.22%	0.00%	0.00%	2.99%	0.00%
Non-metallic minerals	1.16%	98.47%	0.00%	0.51%	-0.14%	0.00%
Basic iron and steel	0.02%	104.52%	0.00%	0.00%	-4.54%	0.00%
Basic non-ferrous metals	0.00%	100.35%	0.00%	0.00%	-0.35%	0.00%

	Private Consumption	Total Intermediate Demand	Public Consumption	Consumption for Investment Purposes	Stock Variation	Margins
Metal products excluding machinery	2.43%	72.06%	0.00%	24.40%	1.11%	0.00%
Machinery and equipment	2.92%	43.48%	0.00%	52.82%	0.77%	0.00%
Electrical machinery	11.90%	62.81%	0.00%	24.44%	0.84%	0.00%
Television, radio and communication equipment	23.86%	44.64%	0.00%	30.39%	1.12%	0.00%
Professional and scientific equipment	34.35%	65.26%	0.00%	0.00%	0.39%	0.00%
Motor vehicles, parts and accessories	30.47%	50.10%	0.00%	19.65%	-0.21%	0.00%
Other transport equipment	2.86%	89.26%	0.00%	6.18%	1.70%	0.00%
Furniture	41.61%	34.63%	0.00%	22.71%	1.05%	0.00%
Other industries	36.54%	44.35%	0.00%	21.19%	-2.08%	0.00%
Water, electricity, gas and steam	49.26%	48.93%	0.00%	0.00%	1.81%	0.00%
Building construction	0.00%	35.69%	0.00%	63.90%	0.40%	0.00%
Wholesale and retail trade	17.57%	18.37%	0.00%	3.12%	1.22%	59.72%
Catering and accommodation services	70.37%	28.79%	0.00%	0.00%	0.85%	0.00%
Transport and storage	33.27%	46.75%	0.00%	0.29%	0.09%	19.60%
Communication	36.36%	63.33%	0.00%	0.00%	0.30%	0.00%
Finance	18.14%	80.09%	0.00%	0.00%	1.78%	0.00%
Insurance	77.08%	21.90%	0.00%	0.00%	1.03%	0.00%
Business services	23.24%	70.18%	0.00%	5.95%	0.21%	0.41%
Non-government: health	84.40%	15.81%	0.00%	0.00%	-0.21%	0.00%
Other non-human health and social work activities	84.50%	15.71%	0.00%	0.00%	-0.20%	0.00%
Community, social and personal services	44.06%	55.63%	0.00%	0.00%	0.30%	0.00%
Non-government: water and sanitation	33.98%	64.59%	0.00%	0.00%	1.44%	0.00%
Non-government: education	93.68%	7.01%	0.00%	0.00%	-0.69%	0.00%
Government: infrastructure	0.00%	16.94%	82.69%	0.00%	0.37%	0.00%
Government: water and sanitation	33.92%	60.18%	4.38%	0.00%	1.52%	0.00%
Government: general administration	0.00%	15.76%	83.88%	0.00%	0.37%	0.00%
Government: defence	0.00%	19.07%	80.56%	0.00%	0.37%	0.00%
Government: law and order	0.00%	16.02%	83.62%	0.00%	0.36%	0.00%
Government: education	0.00%	12.43%	87.20%	0.00%	0.37%	0.00%
Government: health	0.00%	16.46%	83.17%	0.00%	0.37%	0.00%
Government: social	0.00%	21.06%	78.57%	0.00%	0.37%	0.00%
Government: economic	0.00%	17.42%	82.20%	0.00%	0.37%	0.00%

1.7 Policy Simulations

Three simulations are run and compared with the Business As Usual (BAU) scenario.

1.7.1 Baseline/Business as Usual scenarios

The baseline scenario looked at the possible outcome for public-debt to-GDP ratios over the next two decades in the absence of unexpectedly strong fiscal consolidation and/or major adverse economic shocks. The BAU scenario will reflect GDP projections of the National Treasury.

Table 16: Macroeconomic projections (2012–2016)

Calendar year	2012	2013	2014	2015	2016
	Actual	Estimate	Forecast		
Percentage change unless otherwise indicated					
Final household consumption	3,5	2,5	2,9	3,2	3,4
Gross fixed capital formation	5,7	4,1	5,0	5,5	6,3
Real GDP growth	2,5	2,1	3,0	3,2	3,5
GDP at current prices (R billion)	3 155,2	3 411,7	3 720,2	4 061,7	4 443,7
CPI inflation	5,7	5,9	5,6	5,4	5,4
Current account balance (% of GDP)	-6,3	-6,5	-6,4	-6,2	-6,1

1.7.2 Public debt scenarios

As renewed economic and/or financial turmoil may occur, public debt dynamics were assessed under four shock scenarios. The first three shock scenarios consider adverse single-variable shocks in the real GDP growth rate, the real interest rate, and the primary balance, i.e. the fiscal balance before net debt interest payments:

- *A real GDP growth shock.* This scenario can be understood as a low-growth scenario, in which economic activity is strongly restricted by a wide range of factors, including the impact of private sector deleveraging, sovereign over-borrowing, international trade disputes, high commodity prices, and/or untackled population social issues (mainly poor educational and health outcomes, HIV/AIDS etc.). To build this scenario, we took into account the slowdown in the European economies for some commodities for which Europe is the main market for South Africa.
- *A real interest rate shock.* This shock describes a world where investors become increasingly worried about surging public debt and the inflation outlook, and hence persistently demand higher real interest rates. Rising real interest rates would certainly put pressure on countries with already weak structural fiscal accounts. In particular, countries with an already large share of net debt interest payments to GDP (or revenue) would suffer the most from higher real interest rates. Therefore, we simulate an increase in the foreign interest rate.
- *A primary balance shock.* This scenario captures a longer-lasting deterioration in public finances, which could arise from further financial-sector support, slumping tax revenue and/or extraordinary expenses on social security. To build this scenario, we looked at a tiny decrease in households' direct tax rate.

Across all tables in the MTBS, the use of "0" refers to a value of small magnitude that is rounded up or down to zero. If a value is exactly zero, it will be denoted by "-". If data is not available it is denoted by "N/A"

Source: National Treasury (2013b)

1.8 Results

1.8.1 Scenario 1

The European Union (EU) is a major trade partner for South Africa. Table 17, computed from the SAM, shows the main commodities' share of exports to the EU.

Table 17: Main exports to Europe (% of total South African exports)

Agriculture, forestry and fishing	36
Food	28
Textiles	35
Leather and leather products	45
Glass and glass products	30
Machinery and equipment	34
Furniture	67

Impact on unemployment

The decrease in export demand for selected commodities will affect first the sectors producing these commodities. Given the decrease in their total export, these sectors will have to decrease their production and are likely to retrench workers. This decreased production will mean that these sectors will also reduce their intermediate consumption, which will have a negative impact on the other sectors. Therefore, throughout the period, unemployment rates are increasing for each worker category (Table 18).

Table 18: Impact on unemployment rates (in % to the BAU)

	LABHS	LABMS	LABLS
2014	1.22	0.21	0.46
2015	1.23	0.21	0.46
2016	1.25	0.20	0.47
2017	1.27	0.20	0.48
2018	1.30	0.20	0.49
2019	1.33	0.20	0.50
2020	1.36	0.20	0.51

The wage rate for informal workers (who do not face unemployment) decreases during the period, from 0.16% to 0.14%.

Investment in selected activities

Given the decrease in the production of most of the activities, the volume of new investment in the sectors also decreases.

Impact on households

Table 20 gives some figures on households. As expected, labour income (YHL) and income from transfers (YHTR) decrease over the period. As the two main sources of income are going down, total income (YH) also goes down for the entire period. This will have an impact on household savings (SH) and consumption (CTH_REAL).

Table 19: Impact on investment (in % to the BAU)

	2014	2015	2016	2017	2018	2019	2020
Agriculture, forestry and fishing	-0.87	-0.81	-0.77	-0.73	-0.70	-0.68	-0.66
Coal	0.01	-0.01	-0.02	-0.04	-0.05	-0.06	-0.08
Gold and mining	0.03	0.01	0.00	-0.02	-0.03	-0.04	-0.06
Food	-0.03	-0.06	-0.07	-0.09	-0.11	-0.12	-0.14
Textile	-0.38	-0.40	-0.41	-0.43	-0.44	-0.46	-0.47
Footwear	-0.07	-0.09	-0.11	-0.12	-0.14	-0.15	-0.16
Chemicals	0.00	-0.02	-0.03	-0.05	-0.06	-0.07	-0.09
Vehicles	-0.14	-0.14	-0.15	-0.16	-0.16	-0.17	-0.17
Insurance	0.01	-0.01	-0.02	-0.04	-0.05	-0.06	-0.08

Table 20: Impact on households (in % to the BAU)

	YHL	YHTR	YH	SH	CTH_REAL
2014	-0,097	-0,053	-0,079	-0,079	-0,047
2015	-0,097	-0,053	-0,079	-0,079	-0,051
2016	-0,097	-0,054	-0,080	-0,080	-0,055
2017	-0,097	-0,055	-0,080	-0,080	-0,060
2018	-0,098	-0,058	-0,082	-0,082	-0,065
2019	-0,098	-0,059	-0,082	-0,082	-0,069
2020	-0,097	-0,061	-0,082	-0,082	-0,072

Impact on government

Government sources of income are presented in Table 20. Given the reduction in activities, taxes on production (TIPT) decrease. Taxes on commodities – import (TIMT) and VAT taxes – both decrease because of decreased household consumption (as explained above) and decreased intermediate consumption by the different activities. Direct taxes on households (TDHT) and firms (TDFT) drop as well. Transfers received, mainly dividends from the firms, go down. Overall, government income (YG) decreases throughout the period. Government savings decrease (in this case, government deficit is increasing), and the government has to borrow more and, therefore, pay a greater amount of interest.

Table 21: Impact on government (in % to the BAU)

	TIPT	TIMT	TICT	TDHT	TDFT	YGTR	YG	INT_DOM	SG
2014	-0,08	-0,09	-0,09	-0,08	-0,08	-0,06	-0,08		-1,70
2015	-0,08	-0,09	-0,10	-0,08	-0,08	-0,06	-0,08	0,01	-1,69
2016	-0,09	-0,09	-0,10	-0,08	-0,09	-0,06	-0,08	0,01	-1,69
2017	-0,09	-0,10	-0,10	-0,08	-0,09	-0,06	-0,08	0,02	-1,68
2018	-0,09	-0,10	-0,10	-0,08	-0,09	-0,06	-0,09	0,03	-1,68
2019	-0,09	-0,10	-0,11	-0,08	-0,10	-0,07	-0,09	0,04	-1,68
2020	-0,09	-0,11	-0,11	-0,08	-0,10	-0,07	-0,09	0,05	-1,67

Impact on investment and debt

The decrease in government savings has an impact on its level of domestic debt, which increases, and on private investment, which reduces.

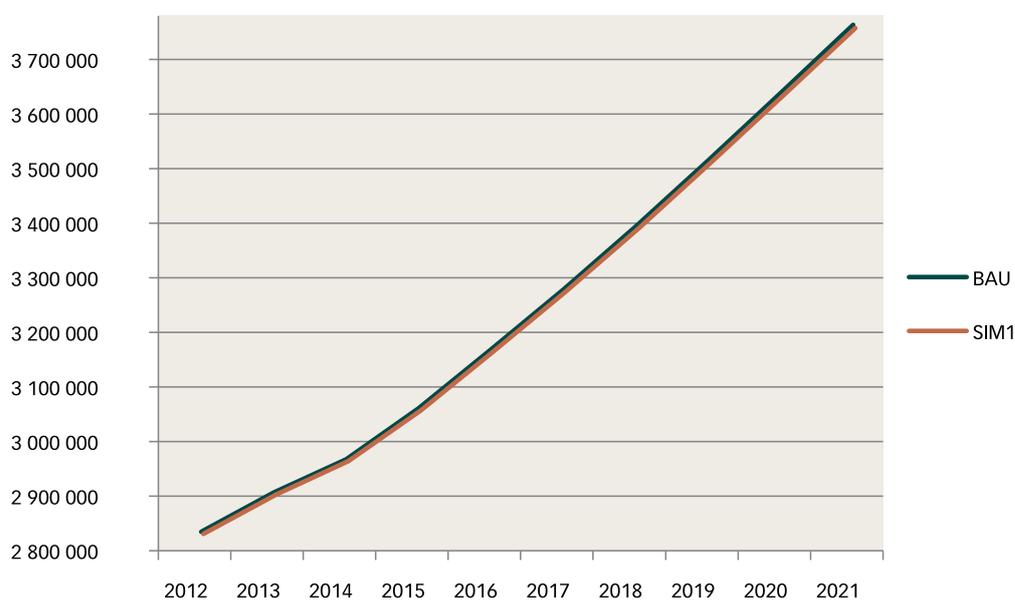
Table 22: Impact on domestic debt, public and private investment (in % to the BAU)

	DEBT_DOM	IT_PUB	IT_PRI
2014		-0,04	-0,22
2015	0,01	-0,03	-0,22
2016	0,01	-0,03	-0,22
2017	0,02	-0,03	-0,22
2018	0,03	-0,02	-0,21
2019	0,04	-0,02	-0,21
2020	0,05	-0,02	-0,21

Impact on real GDP

Given the magnitude of the shock, the impact on real GDP is very small. From the beginning of the simulation (2014) until 2021, real GDP is lower than for the BAU scenario.

Figure 22: Impact on real GDP



1.8.2 Scenario 2

The increase in the foreign interest rate will have different impacts on the economy, as the channels of transmission are different. Indeed, in this simulation, the shock will affect the agents, especially the ones who borrow from the rest of the world (firms and government), and so will have a sharp increase in the interest they have to pay back. We assumed that the interest rate would increase by 2% from 2014 to 2017, and then increase by 5% for the rest of the period.

Impact on agents

As expected, firms' income decreases, and their savings decrease even more, due to the increase of foreign interest they have to pay back. This decrease in firms' savings will have, ceteris paribus, a negative impact on private investment.

Table 23: Impact on firms (in % to the BAU)

	YF	YFK	YFTR	SF
2014	-0.03	-0.03	-0.02	-0.11
2015	-0.03	-0.04	-0.02	-0.11
2016	-0.03	-0.04	-0.01	-0.11
2017	-0.03	-0.04	-0.01	-0.11
2018	-0.06	-0.08	-0.03	-0.26
2019	-0.06	-0.08	-0.02	-0.26
2020	-0.06	-0.09	-0.01	-0.26

For households, their income also slightly decreases throughout the period, but the decrease is quite small for the entire period.

Table 24: Impact on households (in % to the BAU)

	YH	YHL	YHTR	SH
2014	-0.03	-0.04	-0.02	-0.03
2015	-0.03	-0.04	-0.02	-0.03
2016	-0.03	-0.03	-0.02	-0.03
2017	-0.03	-0.03	-0.02	-0.03
2018	-0.07	-0.08	-0.05	-0.07
2019	-0.06	-0.07	-0.05	-0.06
2020	-0.06	-0.07	-0.05	-0.06

Government sources of income also decrease because of the decrease in agents' income and in households' consumption.

Table 25: Impact on government (in % to the BAU)

	TDFT	TDHT	TICT	TIMT	TIPT	YG
2014	-0.03	-0.03	-0.05	-0.05	-0.05	-0.02
2015	-0.04	-0.03	-0.05	-0.05	-0.05	-0.02
2016	-0.04	-0.03	-0.05	-0.05	-0.04	-0.02
2017	-0.04	-0.03	-0.05	-0.05	-0.04	-0.02
2018	-0.08	-0.07	-0.11	-0.10	-0.10	-0.05
2019	-0.08	-0.06	-0.10	-0.11	-0.10	-0.06
2020	-0.09	-0.06	-0.10	-0.11	-0.10	-0.06

Impact on government savings and investment

The decrease in government income, combined with the increase in foreign interest the government has to pay back, has a strong impact on its savings. This has an impact on public investment (IT_PUB), and the domestic debt increases over the period. The impact on private investment is quite harsh: the crowding-out effect is combined with the decrease in private agent savings.

Table 26: Impact on public savings, public and private investment (in % to the BAU)

	SG	IT_PUB	IT_PRI	DEBT_DOM
2014	-0.425	-0.027	-0.212	
2015	-0.584	-0.022	-0.202	0.004
2016	-0.972	-0.016	-0.192	0.009
2017	-2.886	-0.011	-0.183	0.013
2018	-3.685	-0.036	-0.391	0.018
2019	-1.918	-0.025	-0.378	0.030
2020	-1.445	-0.016	-0.372	0.043

Impact on unemployment

The overall impact on unemployment is quite important. On one hand, the drop in total investment will have an impact on sectors that rely on investment goods (such as the construction sector). On the other hand, the decrease in household consumption will affect sectors that rely heavily on household consumption (for instance agriculture). Altogether, the impact on unemployment is quite harsh. Note that for highly skilled workers, the values are very small, which explains the big change in the percentage terms reflected.

Table 27: Impact on unemployment rates (in % to the BAU)

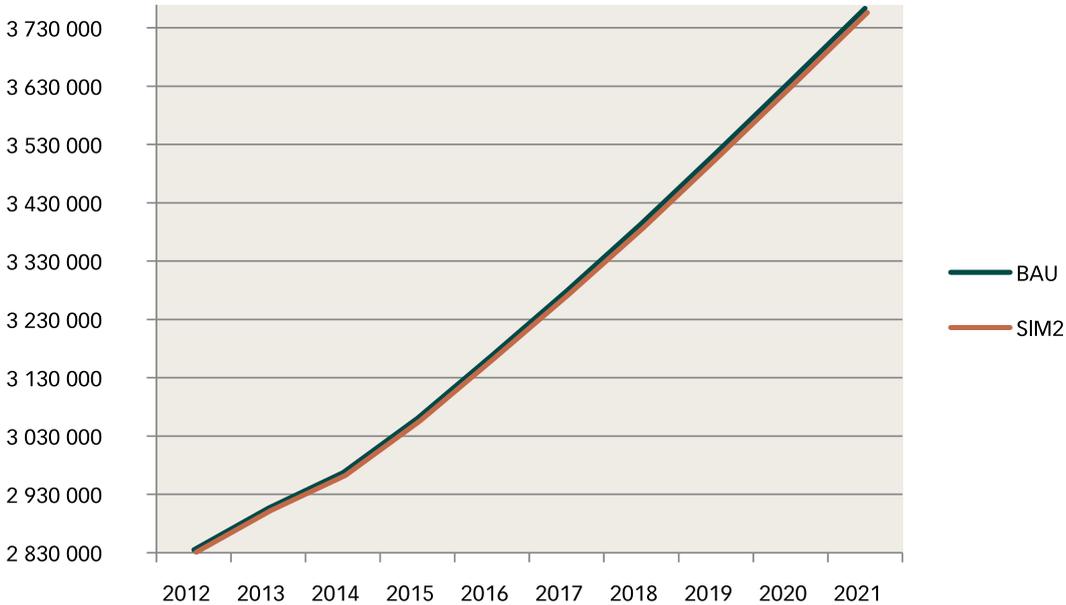
	LABHS	LABMS	LABLS
2014	0.58	0.09	0.18
2015	0.55	0.09	0.18
2016	0.53	0.08	0.18
2017	0.51	0.07	0.17
2018	1.43	0.20	0.46
2019	1.38	0.19	0.46
2020	1.34	0.17	0.46

Informal workers see their wage rate decreasing by 0.10% throughout the period.

Impact on GDP_BP_real

Finally, the impact on real GDP is slightly worse than in the BAU scenario.

Figure 23: Impact on real GDP



1.8.3 Scenario 3

The third scenario is designed to mimic a primary balance shock. We chose to decrease the direct tax rate on households by 1% over the period. By decreasing this tax, we are interested in seeing whether the loss the government makes on the one side can be covered by an increase in the indirect taxes because of the increase in the volume of consumption (switching).

Impact on households

Table 28 gives the percentage change in households' budget consumption (CTH), savings (SH), income (YH) and sources of income. Not surprisingly, households' budget consumption increases by 0.18% across the period.

Table 28: Impact on households (in % to the BAU)

	CTH	SH	YH	YHL	YHTR
2014	0.18	0.17	0.03	0.04	0.03
2015	0.18	0.17	0.04	0.04	0.03
2016	0.18	0.17	0.04	0.04	0.03
2017	0.18	0.17	0.04	0.04	0.02
2018	0.18	0.17	0.04	0.04	0.02
2019	0.18	0.17	0.04	0.04	0.01
2020	0.18	0.17	0.04	0.04	0.01

From the SAM, we know that households spend 14% of their expenses on food products, 13% on business activities and a bit more than 6% on beverages and tobacco. An increase in household budget consumption will therefore have a positive impact on these commodities. Moreover, the increase in spending by households will have a very positive impact on activities producing food or beverages and tobacco, as private consumption represents 77% and 88% respectively of total demand for these particular commodities.

The impacts on unemployment are quite encouraging, as unemployment decreases for each category of workers.

Table 29: Impact on unemployment (in % to the BAU)

	LABHS	LABMS	LABLS
2014	-0.60	-0.12	-0.04
2015	-0.64	-0.12	-0.05
2016	-0.68	-0.13	-0.06
2017	-0.72	-0.13	-0.07
2018	-0.77	-0.14	-0.07
2019	-0.81	-0.14	-0.08
2020	-0.85	-0.15	-0.08

Impact on government

As expected, total households' direct taxes are decreasing. The other components of government income go up, but in total, government spending goes down by around 0.24% across the period.

Table 30: Impact on government (in % to the BAU)

	YGTR	TPRCTS	TPRDN	TDFT	TDHT	YG
2014	0.03	0.06	0.05	0.04	-0.97	-0.23
2015	0.03	0.05	0.05	0.03	-0.96	-0.23
2016	0.02	0.05	0.05	0.02	-0.96	-0.23
2017	0.02	0.04	0.04	0.01	-0.97	-0.24
2018	0.01	0.03	0.04	0.00	-0.97	-0.24
2019	0.01	0.03	0.03	-0.02	-0.97	-0.25
2020	0.00	0.02	0.02	-0.03	-0.97	-0.25

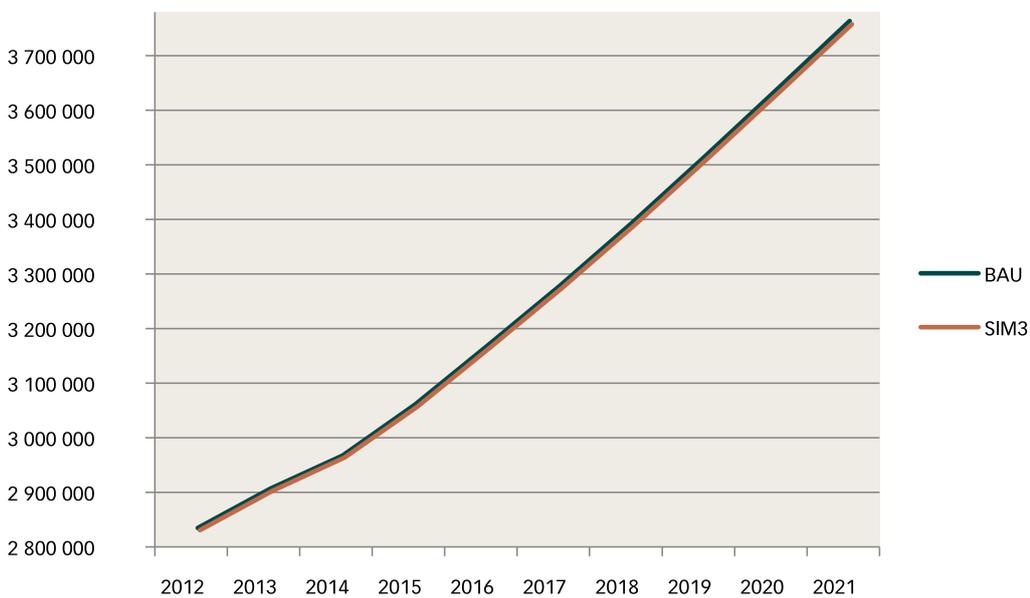
Government savings decrease and government borrowing increases throughout the period, which hampers private investment (crowding-out effect). Domestic debt increases by 0.13% at the end of the period, compared to the BAU scenario.

Table 31: Impact on government (in % to the BAU)

	SG	BOR_DOM	IT_PUB	IT_PRI	DEBT_DOM
2014	-1.21	1.07	-0.01	-0.35	
2015	-1.30	1.15	0.00	-0.36	0.02
2016	-1.40	1.24	0.00	-0.37	0.04
2017	-1.52	1.35	0.01	-0.38	0.06
2018	-1.66	1.48	0.02	-0.38	0.09
2019	-1.82	1.62	0.02	-0.39	0.11
2020	-2.01	1.79	0.03	-0.40	0.13

Finally, the impact on real GDP is hardly perceptible in this simulation

Figure 24: Impact on real GDP



1.9 Concluding Remarks and Recommendations

The main objective of this chapter was to study the evolution of public debt and its impact on the economy in order to make recommendations on how to mitigate the risks of public debt. In this chapter, the sustainability of public debt was interpreted as the result of the interaction of fiscal policy with the economic environment, and not as a statistical concept (as in most of the recent literature). If debt is not to explode over time, policy-makers have to respond to the changing conditions in their tax base (economic growth) and to the cost of finance (interest rates). Policy rules can help to ensure that at given moments the specific fiscal policy stances taken by governments are adjusted to changes in the environment, so that debt will not explode. This chapter has defined the conditions that will ensure compliance with the intertemporal budget constraint, while the empirical part of the paper has shown that public debt is sustainable in this respect. However, while compliance with the intertemporal budget constraint is a necessary condition for debt sustainability, it may not be sufficient. A government can be solvent, in the sense that it can raise sufficient revenue in the future to pay for the debt service, but may become illiquid if it cannot access financial markets at reasonable terms when old debt comes to maturity. A liquidity crisis can then turn into a solvency crisis, if high-risk premiums push interest rates up. This is also the issue with credit rating agencies.

The following recommendations are made:

1. To ensure continued high levels of public debt, do not create risks for economic and fiscal objectives, crowd out spending on public services, limit the ability to absorb the impact of future economic shocks and thereby destabilise underlying national, provincial and local fiscal frameworks, Government should consider improving existing debt management through a greater focus on:
 - a. Level of optimal public debt desired should be made explicit. Our analysis emphasises that not only the trend, but also the level of the debt-to-GDP ratio should be a key indicator in this framework. The Commission does not find a sound basis for integrating specific debt limits. However, our analysis suggests that a reference point for public debt of 60% of GDP be used flexibly to trigger the reference point for debt limit analysis.
 - b. Sub-national governments should be required to define long-term debt targets, functioning as an anchor for sub-national fiscal policy. Self-imposed, long-term debt targets best reflect a government's commitment to fiscal consolidation and sustainable public finances.
2. The Government should design and encourage the use of a more precise definition of productive public investment in municipal and provincial debt laws, to minimise subjectivity in borrowing to finance productive infrastructure by tying new borrowing to secured productive activities.
3. The Government should make coverage of fiscal balance and public debt as broad as possible, with particular attention to entities that present significant fiscal risks, including state-owned companies and enterprises, public-private partnerships, and pension and health care programmes.

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Appendix – Data and Description

1.A1 Economic and Financial Conditions

- The real effective exchange rate of the Rand decreased marginally in Q2 2013 to 97.3, from 97.8 in Q1. However, the higher domestic manufacturing PPI versus our leading trading partners' manufacturing PPI, which is used to deflate the index, will keep this index close to 100.
- The Reserve Bank has adjusted its GDP growth rate for SA downward, from 2.4% to 2.0% for 2013. Its forecast for 2014 has been reduced to 3.3%. Our own GDP forecast is 2.2% for 2013 and 3.2% for 2014. The forecast growth rate for 2013 has had to be reduced in view of the negative effects of recent strike action.
- Factors supporting the growth rate include the higher earnings from the export-linked sectors, fixed investment, the base effect, given the value lost as a result of the strikes in Q3 and Q4 2012 and that the low Q1 2013 was partly due to the pattern of public holidays this year, compared to last year.

Investment and Consumption

- Our forecasts are for a continuation of recovery in investment over 2013 and 2014, albeit not dramatic, given the negative growth during 2009 and 2010. Our forecasts are for investment growth of 4.2% in 2013 and 4.5% in 2014. Investment sentiment is affected by the strikes in the mining sector, an uncertain policy environment, rigid labour laws and unfavourable commodity prices. However, investments in energy, transport and transport equipment are expected to remain strong. Capital expenditure from state-owned enterprises is projected at R377.5-billion between 2013/14 to 2015/16, with Eskom and Transnet accounting for 87% of this amount.
- Residential investment went through a severely negative period from 2008 to 2011, but is slowly picking up. However, the investment of R24.7-billion in Q2 2013 is still 33.1% below the high of R36.8-billion in Q4 2006. A boost to investment is expected to come from the transport equipment sector, especially from the R123-billion rolling stock renewal of the Passenger Rail Agency of South Africa (Prasa).
- Our forecasts take investment as a share of GDP to 20.7% in 2013, from 20.2% in 2012. This is expected to increase to 21.4% in 2016, although this will depend on the ability of government to implement its capital expenditure plan and to create an environment conducive for investment. This investment ratio is low compared for example to China, where investment as a percentage of GDP was around 48% in 2012.

Inflation and Prices

- Inflation is still driven by cost-push rather than demand-pull factors, and recent increases are being spurred by a weakening exchange rate.
- Headline inflation is expected to reach a high of 6.3% year-on-year in Q3 of 2013, whereafter it is expected to return to around the 6% level.
- We expect the headline CPI to average 6.1% in 2013 and to be slightly better, at 5.9%, in 2014.
- The increased fuel price of 16%, as well as a depreciation in the rand/US\$ of 13.3% in 2012, have filtered through to other prices in the economy, but also provide a higher base price.
- Our forecast for PPI inflation is at an average of 6.4% for 2013, following an average of 6.2% for 2012. We expect the PPI to increase further in 2014, as domestically produced prices start to increase, given the depreciation in the exchange rate. Recent changes by Stats SA in the PPI definition may affect the PPI forecast.

Interest Rates

- The repo rate is expected to remain at 5% well into 2014. There will be pressure to reduce this rate, given low economic growth and weak levels of job creation, but the higher inflation will make it very difficult to do so. The prudent decision will be to keep rates at the 5% level for as long as possible, until the economy shows signs of a sustained recovery. Increases will most likely only follow international interest rate increases that imply a sustained recovery in leading international economies.

- The USA has indicated that it will keep interest rates at current levels until unemployment is below 6.5% and as long as CPI inflation does not breach 2.5%. This may imply that rates could remain at these low levels well into 2014.
- Money and bond rates remain fairly flat at low levels, anticipating the policy rate to remain flat for some time to come. Medium-term bonds, such as the R157, were around 5.4% for the second half of 2012, but medium- and long-term rates increased sharply on the USA Federal Reserve's announcement that they may start reducing quantitative easing in late 2013. Our forecast for a while has been that the recent low bond rates were at a relative low point, and that there will be a gradual shift upwards during the remainder of 2013 and 2014, as inflation starts to increase and uncertainty regarding monetary policy decisions increases.
- The forecast is of a yield curve that remains positive but fairly flat, although the long end has started to increase. The R157 rate is forecast to shift to around 7.6% by the end of 2015.
- Real prime, based on CPI, has been far below the long-term average, at around 2.5%; this is expected to shift towards normalisation, reaching 3.6% in 2015 and 4% in 2016.
- The Reserve Bank has also been reluctant to increase interest rates because economic growth has been relatively poor. The current underlying growth rate of around 2.5% is well below the potential growth rate of the economy calculated by the Reserve Bank, of around 3.5% in the longer term. Demand conditions are too weak to justify businesses increasing prices at an unduly rapid rate.
- The interest rates on forward rate agreements escalated markedly from the end of May 2013, with the combination of the weakened Rand and increased recognition of the unlikelihood of the Reserve Bank reducing the policy rate further. This reflects the worsening outlook for interest rate levels in the market, with stronger expectations of increased rates.
- To the extent that recent evidence points to lacklustre growth, both in the international economy and the domestic economy for an extended period of time, the likelihood is that long-term interest rates in South Africa will remain subdued for some time to come.

Money and credit

- Private credit extension continued to expand at a moderate pace through Q2 2013 (around 10% in nominal terms) and is expected to show growth of 9.4% in Q3 2013. Despite concerns over the rate of growth in unsecured lending, credit growth in overall terms shows no signs of accelerating at an unsustainable pace. Credit growth has spanned both households and the business sector, with household credit growth outpacing business credit. An increase in the pace of credit expansion is forecast to occur from late 2014. Credit growth is forecast to exceed 10% in nominal terms in 2014.

Structural issues

- It has become increasingly clear that the problems of high unemployment, poverty and inequality are not a function only of low economic growth, but have as much to do with a lack of education and skills development, an adversarial labour market environment, a low level of entrepreneurial flair and a weak small business development environment. Lower interest rates would be most beneficial to consumer spending, the sector of the economy that in any case has been growing fastest in recent years.
- There has been continual criticism of the structure of the economy, in that the low level of real interest rates prevailing in recent years has spurred consumer spending rather than fixed investment and exports. Yet it is the latter that would help generate jobs on a sustainable basis. Interest rates at low levels have helped to subdue savings and have encouraged consumption of imported goods, without providing a commensurate incentive for increased productivity. As a result, imports have been rising relative to exports, contributing to an expansion of the trade deficit, a contributory factor to the high current account deficit.
- The very fact that the current account deficit has been so endemic has meant that the Reserve Bank has felt obliged to refrain from further reducing interest rates in order not to dissuade capital inflows from continuing to be attracted into South African government bonds. These inflows have helped to finance, at least partially, the shortfall between imports and exports implicit in the large current account deficit. South Africa's real short-term interest rates are at the lower end of such rates on a comparative scale with other emerging markets.

- The possible inability of the country to finance the large magnitude of the current account deficit raises the Rand's vulnerability to depreciation and the potential for inflation to escalate, with negative implications for the bond market.
- The spectre of a slowdown in capital inflows in the event of a further downgrade in the country's credit rating exacerbates the potential for currency depreciation.
- The saving rate of households, relative to personal disposable income, moved from a positive figure, 2% in 1997, falling to 0.6% in 2002, and to a negative figure, -1.2%, in 2007 and 2008. From the second half of 2009, the growth in personal disposable income moved ahead of household debt growth. Nevertheless, household savings continued at slightly negative levels over 2011 and early 2012, but shifted to around zero from mid-2012 and is currently still close to zero in Q1 2013.
- The country is likely to continue to experience pressures on the current account, which will continue to place the Rand under pressure. The current account deficit recorded for 2012 was -6.1%, and is forecast at around -6.0% for 2013.
- The yield curve has remained strongly positive in Q1 and Q2 2013, though less steep than in late 2012. This is a reflection of the low interest rate policy prevailing, together with concerns that inflation may increase in the near future in view of price pressures.

Appendix – Data and Description

1.A2 Key Magnitudes

Total bond market outstanding balance in South Africa end-June 2013		R1,800-billion
Outstanding balance government marketable bonds end-June 2013		R1,089-billion
Proportion of government bonds to total domestic		60.5%
Domestic plus foreign bonds balance outstanding end-June 2013		R1,428-billion
Value of bond trade 2012 domestic market		R25,274-billion
Number of transactions		397 745
Average transaction size		R63.5-million
New issues public sector bonds 2012		R172.7-billion
Share capital raised on the JSE 2012		R78.1-billion
New government bond issues Jan-Jul 2013		R96.0-billion
Private sector corporate bond issues Jan-Jul 2013		R18.1-billion
Foreign debt outstanding end-June 2013		R117.6-billion
Marketable foreign debt		R99.7-billion
GDP 2012	Nominal R3,155-billion	Real R1,954-billion
Fixed investment	Nominal R604-billion	Real R394-billion

Real magnitudes are expressed in 2005 prices.

Some key magnitudes relating to the financial sector are:
As at end Q2 2013:

Total assets of banks	R3,782-billion
Total advances of banks	R2,868-billion
Total mortgage advances	R1,090-billion
Total overdrafts and loans	R853-billion
Total loans and advances of major banks end-2012:	
Absa	R587-billion
FirstRand	R575-billion
Nedbank	R538-billion
Standard	R832-billion
Total	R2,532-billion
Total consumer credit Q1 2013	R1,451-billion
Bank portion	R1,243-billion
Total new consumer credit granted Q1 2013	R102.3-billion
Bank portion	R83.3-billion

Before the financial crisis of 2008, new mortgages were around R53-billion per quarter, around half of the total new credit of R102-billion per quarter. In mid-2009, this fell to below R20-billion per quarter.

Assessing the General Equilibrium Effects of Social Grants in South Africa

By: R. Mabugu, M. Chitiga, I. Fofana, B. Abidoye and V. Mbanda.

2.1 Introduction

South Africa has one of the largest cash transfer systems in Africa. In 2012/13, about 16 million people, or 31% of the population, received a social grant (National Treasury, 2013), compared to 2.5 million beneficiaries in 1998. More than half of the country's households benefit from some form of social assistance, with 22% relying on it as a main source of income. Social grants are considered an important instrument in fighting poverty in South Africa.

Previous studies on the impact of social grants in South Africa made a strong assumption of the absence of a general equilibrium effect. The question still remains of the value/benefit to society at large, especially given the R158-billion invested in the programme in 2012 (representing 9% of the government's budget). As a result, it remains uncertain whether the government is making the best use of its money according to a well-defined set of goals. Assessing the effectiveness of the South African social grants system is especially important given the various assistance programmes and subsidies offered by the government in an economic situation where funding is becoming scarce and there is need to efficiently direct these scarce resources to alleviate poverty and aid economic growth.

The grant system is an important component of South African's overall social security architecture. The social protection system as defined within the fiscal framework has two separate but interrelated entities: social assistance (the grants system, through which the state provides basic minimum protection to relieve poverty) and social insurance (mandatory employee contribution schemes). Government is responsible for three primary social insurance mechanisms: the Unemployment Insurance Fund (UIF), the Compensation Fund and the Road Accident Fund (National Treasury, 2010).

The particular area of interest for the purposes of this study is the Comprehensive Social Security Programme, which incorporates both social assistance and social insurance. The specific purpose of this programme is to alleviate and reduce poverty, vulnerability, social exclusion and inequality. Social assistance helps prevent vulnerability and destitution, as a result of loss of income, and contributes to poverty alleviation. The Comprehensive Social Security Programme strategically facilitates effective and efficient implementation of social policies and procedures and ensures compliance through regular appraisals and reviews of implementation options. This is often achieved through the payment of cash transfers in line with the Social Assistance Act. Social assistance is provided in the form of social grants (for adults who are 18 years and older), children's grants (for those younger than 18 years) and a special award or the social relief of distress grant. Social grants for adults are: old age grant (OAG), disability grant (DG), war veterans' grant and grant-in aid (GIA). Social grants targeted to benefit children are: care-dependency grant (CDG), foster child grant (FCG) and child support grant (CSG).

The actual performance of the South African economy was compared to the results of a counterfactual scenario, i.e. what the state of the South African economy would be without beneficiaries of the social grant system, in order to gain insight into the biases introduced by social grants into the South African economy and to assess their overall impact. The main hypothesis of the study is that social grants have significant and important indirect effects through labour market participation and households' total consumption patterns, consumption budget shares and saving-investment behaviour.

A recursive micro-macro modelling is developed to quantify the impact of social grants on the South African economy. The framework is used to simulate a hypothetical South African economy without child support grantees. As sampling weights are readjusted across the survey, it is likely that the aggregate labour supply and consumption outcomes will change (Counterfactual Scenario Building). Therefore, the aggregate changes in labour supply and employment status, and total consumption expenditure and consumption by products are simulated at the macro level, along with alternative government revenue adjustment (Macro-Modelling). Then, the induced prices, unemployment, income and output affect households' consumption patterns. At this stage, a sample re-weighting technique (nonparametric) is used to assess the second order effects of the social grant shock (Micro-Modelling).¹³

The review of studies on South Africa and other countries in Section 2 provides evidence of the impact of various social grants. The methodological framework is detailed in Section 3. Results from the counterfactual scenario experiment are presented and discussed in Section 4. The document concludes by summarising the key findings, the limitations and the future extension of the analysis in Section 5.

2.2 Impact of Social Grants: A Literature Review

The literature assessing the impact of social grants in South Africa and around the world is extensive. These studies have covered issues such as labour participation, poverty, inequality, education, health and nutrition. The impact of cash transfers (CTs) on welfare depends on how the recipients use the cash. Since cash is fungible, there are concerns that the poor might be tempted to use the money on non-essential goods, including alcohol and drugs. This argument has sometimes been used to advocate 'in-kind' transfers rather than CTs. Another question is on the sustainability of CTs. There is a difference between 'livelihood protection' and 'livelihood promotion' impacts of interventions meant to reduce poverty (Devereux, 2002). Livelihood protection leads to the maintenance of minimum living standards and allows for smoothing of consumption, whereas livelihood promotion allows for a longer term and more sustainable improvement in living standards. In the past, CTs were seen as a livelihood protection measure, especially when people faced crises. However, recent studies have begun to show that CTs can also lead to livelihood promotion (Devereux, 2002). Hence, it has become important to understand, via various methods, the impacts of various social grants on economies. The sections below give brief reviews of international and South African evidence of the impact of social grants.

Many of the studies found a positive impact of social grants on various socio-economic outcomes. With respect to the empirical evidence, the UK's Department for International Development (DFID) (2011) notes that cash transfers are one of the more thoroughly researched forms of development intervention. Furthermore, over the past 15 years, a 'quiet revolution' has seen governments in the developing world invest in increasingly large-scale cash transfer programmes. Their findings indicate that while the evidence base for cash transfers is better than for many other policy areas, it is also uneven. Less is known about some instruments (public works) and outcomes in certain regions (sub-Saharan Africa). However, there is convincing evidence from a number of countries that cash transfers can reduce inequality and the depth or severity of poverty. Furthermore, cash transfers may support 'graduation' from poverty for those of working age.

Evidence is mixed for the effects of cash transfers on health and nutrition. Brazil's health and nutrition conditional cash transfer (CCT) programme, Bolsa Alimentação 2001, provided eligible households with a monthly cash transfer on condition that they complied with various compulsory programme activities. The programme was targeted at pregnant women, breastfeeding mothers with children below six months, and children from six months to seven years of age (Bassett, 2008). Morris et al. (2004) conducted a study which assessed the impact of Bolsa Alimentação on anthropometric status in four municipalities in north-east Brazil. The study used a random effects regression model to compare programme beneficiaries with matched individuals from households that were originally selected to receive the benefit, but were later excluded due to quasi-random administrative errors. A total of 472 beneficiary and 158 excluded children under three years of

¹³ One can use parametric micro-simulation modelling and estimate the income and prices elasticities, as well as the modelling of employment status and labour supply.

age were included in the analysis. The results showed that, for each additional month of exposure to the programme, the weight of beneficiary children was 31 grams lower than that observed in excluded children of the same age. These results were relatively startling and Morris et al. (2004) attributed the failure to respond to the programme to the possible perception that benefits would be discontinued if the child's health and nutrition status improved.

Agüero et al. (2007) observed that the child height-for-age data indicates that the CSG payments, which are assigned to women, boost early childhood development. The study uses the 1998 KwaZulu-Natal Income Dynamics Study (KIDS) data to measure the nutritional impact of the CSG received in the first three years of a child's life. A continuous treatment method was used to estimate how child nutrition, as measured by height-for-age, is affected by receipt of the CSG. The national Department of Social Development (DSD) et al. (2012) also observe that receiving the CSG in early life improves height-for-age scores for children whose mothers attained schooling beyond grade eight. Yamauchi (2005) used several rounds of the KIDS data to show that grant-financed nutritional improvements led to positive educational outcomes for children; for example reducing repetition in school and allowing for early schooling. Williams (2007) noticed that the probability that any child goes hungry falls by 8-14% for each CSG a household receives.

The majority of the studies in South Africa concur that CSG promotes school attendance among beneficiary children (Budlender and Woolard, 2006; Case et al. 2005; Leibbrandt et al., 2010). The exception is a study of children between seven and 13 years by the Community Agency for Social Enquiry (CASE) that found no major difference between children receiving the grant and children not receiving the grant (CASE, 2008). However, it is important to qualify these results by pointing out that South Africa already has high enrolment and attendance rates. Therefore, the evidence suggests that receiving grants is very important for reducing school non-attendance (Budlender and Woolard, 2006).

Mothers in their twenties who receive grants (on behalf of their children) show on average a 15% increase in employment probability and a 9% increase in labour force participation (Eyal and Woolard, 2011). Broad labour force participation increased by 7–14% for mothers who had a child receiving a CSG, with the most positive impact being among mothers and household heads who did not complete their matric and mothers who lived in informal residences (Williams, 2007). Although the study did not find that the CSG has a negative impact on labour supply, it suggested that further research is needed into the complex dynamics between social grants, poverty, and reproductive and remunerated labour (Williams, 2007).

Haarmann (2000) investigated the potential effects of social assistance (CSG and OAG) on poverty alleviation in South Africa using a micro-simulation model. Using Southern Africa Labour and Development Research Unit (SALDRU) data, updated to 1996 with 1996 census data, the study observed that the CSG has the potential to effectively alleviate extreme poverty, as it reaches some of the poorest households. However, Haarmann (2000: 190) commented that "the current support, both in terms of coverage and quality, is far from being able to break the poverty cycle effectively". On average, only 36.8% of the poverty gap in the first two quintiles will be closed by transfers if the system is to work with 100% efficiency (Haarmann, 2000). The possibility of introducing other forms of social assistance, (a Basic Income Grant, an Unemployment Benefit, and a Household Grant), in addition to the OAG and the CSG, was analysed. Haarmann (2000) found that a Basic Income Grant would effectively reduce poverty across the various household types.

A study commissioned by the DSD found that "South Africa's system of social security successfully reduces poverty, regardless of which methodology is used to quantify the impact measure or identify the poverty line" (Samon et al., 2004: 1). The study evaluated the OAG, CSG, DG, CDG, FCG and GIA, using micro-simulation modelling to assess the impact of social grants on poverty alleviation. The measurement of poverty and the evaluation of the impact of social grants was done at the household level. The analysis focused on the OAG, the CSG and the DG. The measures of poverty lines used in the analysis are the poverty headcount, the average poverty gap, the poverty gap ratio and the rand poverty gap. The results indicate that extending the eligibility age of CSG receipt has the greatest potential of reducing poverty. Samson et al. (2004) found that a combination of extending the CSG to age 14, with full uptake of the state old age pension (SOAP) and the DG, would

reduce the total rand poverty gap by 29%. However, the measurement of the quantitative impact was found to be greatly affected by the choice of the poverty line. The measured impact is consistently greatest when employing the total rand poverty gap and consistently smallest when using the poverty headcount measure as an indicator (Samson et al., 2004).

In order to highlight the role of social assistance in providing income support to the poorest households, Woolard et al. (2010) disaggregated household income sources by income quintile. They found that two-thirds of the income to the bottom quintile comes from social assistance grants, with most of this income coming from child grants (the CSG, the FCG and the CDG combined).

According to the Studies in Poverty and Inequality Institute (SPII), social grants are beneficial to society, but are often diverted into areas other than their intended purpose, given the conditions faced by the poor (SPII, 2012). Some of the benefits come from the CSG, which increases labour force participation rates among woman, and from the SOAP, which leads to about a half year's growth for children aged 0–6, and also leads to higher school enrolment rates of girls, because it is spent on education in poor households. SPII (2012) claims that a huge proportion of social grant income is often diverted to repayments of debts. Because of high rates of unemployment, the dependency ratio for grandparents who receive the SOAP is said to be high, especially in rural areas. The social grant income supports, not only the qualifying recipient (child or adult), but also the entire household, improving the welfare of recipients and the households in which they reside (SPII, 2012). Grants also support investment in productive capital, as the social grant money left over from food and fuel purchases is used for education expenditure (SPII, 2012).

Social grants do inject significant resources into poor households and can have both negative and positive impacts on working-age individuals' incentive to work (Williams, 2007). The UIF is the main instrument used to provide unemployment benefits in South Africa and is a contribution-based social insurance institution. Grants are thus only given to people with disabilities among the working-age population (subject to the means test). Despite this, the social assistance system still has some impact on labour-market participation, although the channels are different from those predicted by conventional theory (distortion of the relative prices of work and leisure) (Van der Berg and Siebrits, 2010). The Human Sciences Research Council's South African Social Attitudes Survey revealed that the poor prefer labour-market income to that from grants (Noble et al., 2008). The grant system influences labour supply through direct and induced effects on retirement decisions, household formation and job search activities (Van der Berg and Siebrits, 2010). Direct effects, covering incentives actually faced by recipients, are largely influenced by the means test, which discourages elderly people from working after reaching eligibility age (by imposing an effective marginal tax rate of 50% on non-pensionable incomes).

Disability grants are also subject to a means test and reveal similar discouraging effects. The situation is worsened by the high levels of unemployment and other labour-market disadvantages faced by elderly and disabled South Africans, while many members of these groups have limited skills and reside in rural areas, where job opportunities are scarce (Van der Berg and Siebrits, 2010). The small difference between the DG and available labour-market wages offers little incentive for persons with disability to seek or take up paid work, especially casual and temporary jobs (Johannmeier, 2007).

Receipt of an OAG lowers the labour-market participation of working-age adults (Bertrand et al., 2003), but only for household members, especially if the grant recipient is female (Posel et al., 2006). Using data from a panel designed to investigate the household impact of the epidemic, Booyen (2004) observed that the CSG, DG and FCG have the potential to mitigate the impact of HIV/AIDS, reducing morbidity or mortality for households affected by the pandemic.

In summary, previous studies generally indicated that social grants, and the CSG in particular, have positive impacts on recipients and households. In the short run, the CSG leads to improvements in beneficiary children's health and nutrition (DSD et al., 2012) and educational outcomes, through reducing repetition in school, allowing for early schooling and reducing the probability of school-age children not attending school (Case et al. 2005; Williams, 2007; Yamauchi, 2005). However the results for grants such as the OAG and DG are mixed, and research into the combined grants is insufficient. This is a contribution of this paper.

2.3 Analytical Framework

The analytical approach integrates the following three methods into a single framework: the Propensity Score Matching (PSM) Technique, Computable General Equilibrium (CGE) Modelling, and Micro-Simulation (MS) Modelling. The approach, developed in eight steps, is presented in Figure 25.

Step 1: A nationally representative sample of *beneficiary* (social grant recipients) and non-beneficiary (receive no grants) households were developed.

Step 2: The impact of the social programme was estimated by modelling the probability of being in the programme, given the observed characteristics of the household.

Step 3: Using the probability(or propensity) score from Step 2, the *simulation variables* for the households in the counterfactual scenario were identified. Building the simulation scenario in Step 5 requires a selection of the simulation variables in Step 3, using the available matching techniques and the building of a counterfactual sample in Step 4.

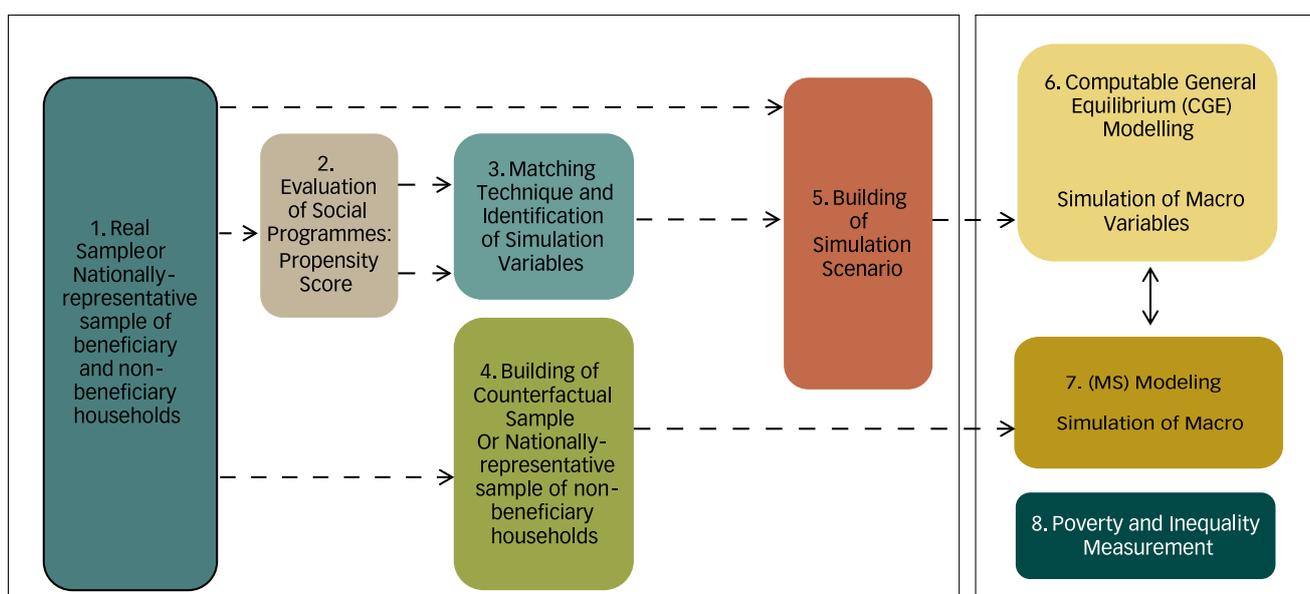
Step 4: The counterfactual sample – a nationally-representative sample of non-beneficiary households – was built from a nationally representative sample of beneficiary and non-beneficiary households (the ‘real sample’ in Step 1) and the results of the propensity score estimation in Step 2.

Step 5: The *simulation scenario* compares the outcomes of the simulation variables (identified in Step 3) from the real sample (Step 1) and the counterfactual sample (Step 4). It is used as input in the CGE model.

Steps 6 and 7: Various computer models are run, using a *macro-micro simulation* technique, integrated in a recursive fashion (top-down/bottom-up). The macro results generated by the CGE simulation in Step 6 are used in the MS model (Step 7) which, in turn, produces the micro results for the CGE model. The process is repeated until a convergence is reached.

Step 8: Poverty and inequality figures are computed.

Figure 25: Simplified presentation of the analytical framework



2.3.1 Building the simulation scenario

The analytical framework includes building a simulation scenario that compares the outcomes of the simulation variables from the real and the counterfactual samples. The changes in the values of the simulation variables are interpreted as the DIRECT impact of the grant programme, which then serves as simulation shocks in the CGE model. The analysis of the real and the counterfactual samples enables us to compare what actually happened and what would have happened to the population without the social grants. The counterfactual sample builds a representative households' sample, which does not show any beneficiaries of social grants. While the changes in government grant expenses are modelled at the macro-level, a suitable technique is required to build the counterfactual scenario at the household level.

First, a propensity score is estimated for the beneficiaries and the non-beneficiaries of social grants. Second, the matching techniques are used to estimate the direct impact of the programme on key variables of interest and to identify the simulation variables. Third, the matching method is used to find, for each beneficiary household, a matched non-beneficiary household; then the sample representativeness (weighted) of the beneficiaries and their matched non-beneficiaries are adjusted to reflect their new share in the counterfactual sample. Fourth, the changes in the values of the simulation variables are computed by comparing the real and the counterfactual samples; these changes are used as the CGE simulation shocks (bottom-up).

Data

The framework is applied to data from the National Income Dynamic Survey (NIDS) covering questions related to access of eligible individuals and their households to the social grant scheme (SALDRU, 2008). The NIDS is used to analysis the general equilibrium impact of social grants. The NIDS project is implemented by the SALDRU, based at the University of Cape Town's School of Economics. In 2008, the first NIDS survey included a nationally representative sample of over 28 000 individuals in 7300 households across the country. NIDS examines the livelihoods of individuals and households over time. It also provides information about how households cope with positive or negative shocks, such as an unemployed relative obtaining a job or a death in the family. Other themes include changes in poverty and wellbeing; household composition and structure; fertility and mortality; migration; labour-market participation and economic activity; human capital formation, health and education; and vulnerability and social capital. The survey captures the dimensions of the wellbeing of South Africans, which includes access to cash transfers and social services; wealth creation in terms of income and expenditure dynamics and asset endowments; dynamics in relation to household composition and migration; social heritage, which includes education and employment dynamics; social capital and intergenerational developments. The NIDS study included private households in all nine provinces of South Africa, as well as residents in worker hostels, convents and monasteries, but excluded collective living quarters, such as student hostels, old age homes, hospitals, prisons and military barracks.

The next sections discuss access of eligible children and their caregivers to the CSG and FCG, of senior members of the household to the OAG, and of disabled persons to the DG.

- ***The Child Support Grant (CSG) and Foster Child Grant (FCG)***

The main criteria of eligibility to the CSG are the age of the beneficiary, the income of the applicant or caregiver, of the spouse or partner, and of the beneficiary, and the citizenship or the residency status of the applicant. The programme was implemented 14 years ago, and the age threshold for CSG eligibility has been successively increased. Changes in the age threshold are actively communicated through letters, pamphlets and roadshows. The annual income threshold in 2012 was R32,700 for a single caregiver and R70,000 for a married caregiver and spouse. The employment status, in particular government employment, has been an important element of application because of misperception of the eligibility criteria. South African citizenship or permanent resident status of the applicant or caregiver is the third criterion. The status of the beneficiary does not determine the eligibility. Eligibility for an FCG requires the applicant and child to be resident in South Africa; a court order indicating foster care status; the foster

parent to be a South African citizen, permanent resident or refugee; and the child to remain in the care of the foster parent(s).

The main reasons cited by caregivers for not applying for the CSG (DSD et al., 2012) include: the lack of documents (parent identification document, child's birth certificate, child's clinic card, marriage certificate, proof of address), the lack of time, and income that is too high. One barrier to accessing the grant was found to be the 'refusals of fathers to support the mothers' applications for the grant on behalf of the child' (marital status). Other important barriers cited include misunderstanding the application process, such as the caregiver not being the child's mother (relationship between the child and the caregiver), process being too time-consuming or costly, and past experience with social grant applications (DSD et al., 2012). There is a high correlation between the CSG and other grants received as "households receiving the child support grant are more likely to receive another grant than households who receive no CSG" (DSD et al., 2012: 30). High transport costs reduce the likelihood of rural caregivers applying for the grant (urban and rural location, and access to roads).

African and female-headed households are more likely to receive social grants than other population groups and male-headed households (Geldenhuys, 2008). Households that receive grants tend to be larger than non-grant receiving households. Other indicators that were also found to be higher in grant recipient households than in non-grant recipient households include the mean total dependency ratio, child dependency ratios and aged dependency ratios, as well as unemployed and not-employed ratios. School attendance ratios (ages 5–24) were significantly higher in the grant recipient population than among households not receiving grants.

- ***The Old Age Grant (OAG)***

Age is the main eligibility criterion for an OAG. A beneficiary must be 60 years' old and above, a South African citizen or permanent resident living in South Africa, and must not receive any other social grant for themselves or be cared for in a state institution. In addition, there are asset and income thresholds. In 2013, a beneficiary was supposed to earn not more than R49,200 per year or own assets worth more than R831,600 if single; if married, beneficiaries could not earn more than a combined income of R99,840 per year or own assets worth more than R1,663,200.

Before 2007 most households depended on the income from an old age grant (OAG). This has since changed with the scaling up of the CSG over the years, resulting in decreased dependency on an OAG. Table 39 in appendices shows that households receiving an OAG decreased from 17.5% to 15.9%, while households receiving a CSG increased from 16.8% to 29.1% between 2003 and 2007. Households receiving both an OAG and a CSG increased the most, rising from 24.2% to 40.4%. Between 2003 and 2007, the relative contribution of an OAG towards household grant income decreased from 47% to 31%, while the mean contribution of a CSG towards household grant income increased from 37% to 52%, (Stats SA, 2009: 7). Several factors explain these changes: (i) the expansion of the social grant beneficiary definitions, especially for a CSG, between 2003 and 2007; (ii) more efficient identification and uptake of grant benefits by qualifying households; (iii) improved access to basic services over the same period may also have influenced observed differences.

- ***The Disability Grant (DG)***

A DG beneficiary must be aged between 18 and 59 years (if female) or 60 years (if male), and must not receive any other social grant for themselves or be cared for in a state institution. A beneficiary must also undergo a medical examination, during which a state-appointed doctor assesses the degree of disability, and must bring along any previous medical records and reports when making the application and when the assessment is done (medical assessment must not be older than three months at date of application). A beneficiary must be a South African citizen, or a permanent resident or refugee living in South Africa. In addition, there are income and asset thresholds: in 2013, a single beneficiary could not earn more than R49,200 per year or own assets worth more than R831,600; if married, beneficiaries could not earn not more than a combined income of R99,840 per year or own assets worth more than R1,663,200.

Propensity score estimation

Important tasks for economists, and of use to policy-makers, are evaluating the impacts of social programmes, predicting their effects in a different state of the world, and predicting the effects of policies never tried. One of the most popular methods is the treatment effect, which refers to the causal effect of a binary (0–1) variable on an outcome variable of scientific or policy interest. According to Heckman and Vytlacil (2005), current treatment effect literature focuses on the first task – evaluating the impact of a policy in place – in the special case where there is a ‘treatment group’ and a ‘comparison group’, i.e. a group of non-participants. For the purpose of this study, it will be the effects on certain economic outcomes, such as labour supply and consumption patterns of households, of participating (treated) or not participating in a social grant programme.

An estimation of the impact of these programmes (treatment effects) is complicated for economists because of selection bias, which arises from the fact that treated individuals differ from non-treated individuals for reasons other than treatment status per se. The previous section provided some reasons why people who are eligible do not apply for a CSG, an OAG or a DG, which highlight some of the differences between participants and non-participants that can bias the estimation of the impact. The most common methods of estimating these effects are typically social experiments, regression models, matching estimators, and instrumental variables. Although social experiments are gaining popularity, especially because of the low cost of carrying them out in developing countries, most economic research still uses secondary data, relying on a variety of statistical control strategies and/or natural experiments to reduce selection bias. The most commonly used statistical techniques in this context are regression, matching, and instrumental variables. All three methods are relatively linked in practice. For example, regression estimates can be understood as a type of weighted matching estimator. Matching estimator is similar to regression, in that it argues that the source of selection bias can be traced to a set of observed covariates of the representative agents.

In this study, we will focus primarily on the matching estimators because (i) treatment effects are constructed by matching individuals with the same covariates, instead of through a linear model for the effect of covariates, which fits in very well with our framework; (ii) given our vast understanding of the process determining the eligibility of the social grant programme, it makes the assumption of conditional independence valid and amenable to the use of the matching estimator.¹⁴

As it becomes computationally difficult to match the treated and the control when the covariates take on many values and dimensions, a propensity score was proposed that gives the conditional probability of treatment-given covariates. “Propensity score matching (PSM) constructs a statistical comparison group that is based on a model of the probability of participating in the treatment using observed characteristics.” (Khandker et al., 2009). The key conditions of applying a PSM method are the conditional independence and the sizable common support. Omitting key variables that determine participation leads to biased estimation of the propensity score. The selection of relevant variables is context-specific and driven by available data; limited guidance is provided by statistical tests (Khandker et al., 2009).

The propensity score estimation is based on a model of probability of being a beneficiary of a specific social grant (T) conditional on a household’s observed covariates (X).

$$P(X) = \Pr(T = 1 | X)$$

The model is specified over twenty-four (24) variables that respect the conditional independence and the sizable common support conditions (Table 37 in Appendix).

Before describing the simulation model and scenario, it is important to explain how treatment is defined in this study. The multiple treatments – CSG, FCG, OAG and DG. – are combined into one treatment. While recognising that there are other grants in South Africa, the largest and important grants are the OAG, CSG, and DG. FCG eligibility is similar to that of the CSG, so it is included as a treatment to ensure identification of the treated. The information on eligibility for other grants is useful and is included in predicting the probability of being treated as an indicator of experience with government grants and used as part of the propensity score estimation.

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¹⁴ Conditional independence implies the selection of key variables that are more likely to affect participation but not the outcomes.

Identification of simulation variables

Matching techniques are used to assess the direct impact of social grants and to select relevant variables to be considered in the simulation experiment. First, a set of outcomes is pre-selected from an exhaustive review of the literature. Only outcomes that are likely to be affected in the short run by the CSG programme are considered.

The available matching techniques¹⁵ – Nearest Neighbour, Stratification, Radius, and Kernel – are used to assess the direct impact of social grants on the identified outcomes of interest. We consider the impact of social grants on nine (9) categories of consumption by purpose: food, personal, transport, energy and water, household, clothes and footwear, health, education, and miscellaneous. The analysis of labour participation and time allocation includes six (6) types of work: agricultural wage, non-agricultural wage, self-employed, personal subsistence agriculture activities, casual, and business.

Previous studies have highlighted important labour market implications of access to social grants. The ratio of the number of employed household members to household size was substantially higher in households that do not receive any grant than in households that receive some form of social grants (Geldenhuys, 2008). Furthermore, the ratio of the number of those unemployed to household size was found to be lowest for households that do not receive any grant. Altman & Boyce (2008) pointed out significant increases in the number of households engaged in personal subsistence agriculture activities - such as keeping chickens, growing vegetables, raising livestock - among the grant recipients.

According to Altman and Boyce (2008), grant recipients spend most of their income (and over half of the grant) on food. Food items acquired both through market transactions and through own production increase with households' access to grants. Grant recipients' payments for municipal services account for the second-largest grant expenditure item. Grant recipients appear to have low levels of indebtedness, with the common creditors being schools (17%) and local authorities (13%), according to Altman and Boyce (2008). However, debt related to the purchase of essentials stood at 40%. In addition, Geldenhuys (2008) found that households that receive grants have lower welfare levels (based on spending and asset index scores).

Generating the simulation scenario

The analysis uses the common support blocks as clusters to generate the counterfactual sample.¹⁶ A binary variable (ω) is generated to highlight the grant recipients (modality 0) and the non-recipients (modality 1) over the common support. Also, households outside the common support zone are covered by the counterfactual sample (modality 1). Then, the sample weights are uniformly adjusted within each common support block through the following equation:

$$wgt^{adj} = \frac{\sum_{h=1}^n wgt_h^i}{\sum_{h=1}^n \alpha_h \cdot wgt_h^i}$$

with $\alpha \in \{0, 1\}$ and wgt^{adj} equal to one when outside the common support area. Within each block of the common support, counterfactual sample weights are calculated by the equation:

$$wgt_h^f = wgt_h^i \cdot wgt^{adj} \cdot \alpha_h$$

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¹⁵ Refer to Khandker et al. (2009) for further discussion on the matching techniques.

¹⁶ Alternatively, one can generate a cluster variable that couples the beneficiary and matched non-beneficiary households over the common support using the nearest-neighbourhood method without replacement and compute a single weight for a beneficiary and its matched non-beneficiary.

Outside the common support block, wgt^{adj} and α are both equal to one; then wgt^f is equal to wgt^i . In the counterfactual sample, beneficiary households are substituted with their matched non-beneficiary households within each block. Thus, recipients' weights are adjusted to zero, while non-recipients weights are (uniformly) adjusted upward to account for the replacement. The changes in the values of the simulation variables 'simvar' (labour supply and consumption spending) are computed using the real and counterfactual samples of households:

$$\Delta sim var_k = \frac{\sum_{h=1}^m wgt_h^f \cdot sim var_{h,k}}{\sum_{h=1}^m wgt_h^i \cdot sim var_k}$$

The above equation is used to compute the aggregate labour supply – total hours allocated – to the agricultural and the non-agricultural sectors, and the aggregate spending on consumption items is identified as the set of simulation variables $k(simvar)$. These simulation variables are used in the CGE model described in the next section.

2.3.2 The macro-micro model

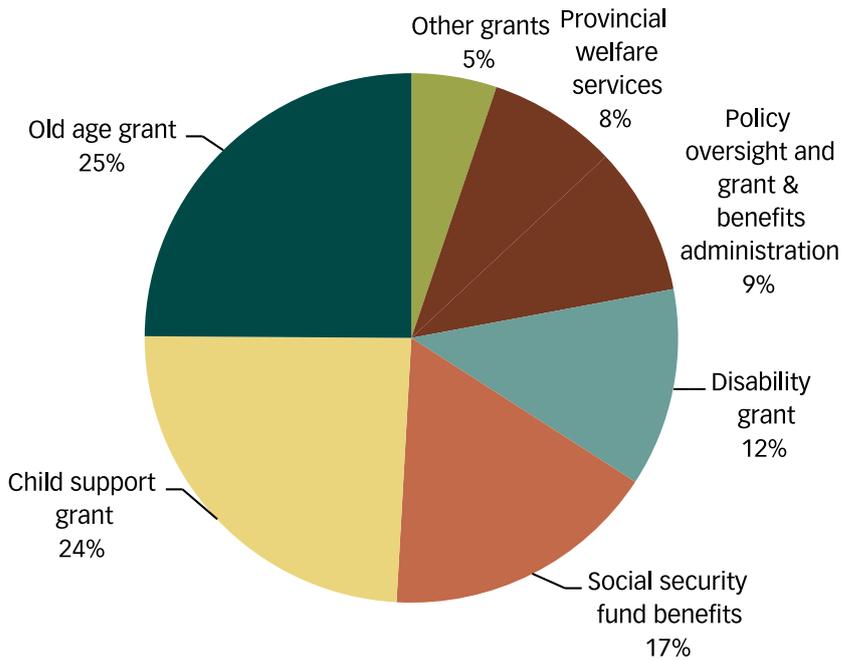
The scenario with an absence of social grant beneficiaries (counterfactual scenario) is simulated using a combined CGE model and a micro-simulation (MS) model linked in a recursive (top-down/bottom-up) fashion. The changes in income by sources – (i) agricultural employment income, (ii) non-agricultural employment income, (iii) capital income, (iv) the unemployment rate, and (v) the changes in real consumption expenses – are assessed by the CGE model and used as input in the MS model. Aggregate income and consumption results are distributed among surveyed households using the MS model. In turn, results on micro variables are used to compute the poverty and inequality indicators.

The CGE model

A static-comparative CGE model is built with exogenous labour supply and a linear expenditure system specifying households' consumption of goods and services. Household total consumption is initially equalised to its minimum consumption. The counterfactual scenario simulation is performed through exogenous shocks on the labour supply and the minimum consumption variables. The marginal income gain or loss (net of taxes, transfers, and saving) is allocated to consumption items given the income elasticities of consumption. A neutrality of government budget is assumed, and its income and expenses are balanced through a uniform compensatory tax on household gross income. The model is investment driven, i.e. households' aggregate saving is adjusted to an exogenous investment volume level. The direct impact of social grants is simulated by cancelling out the changes in labour supply to the agricultural and non-agricultural sectors, on the one hand, and the changes in expenses on consumption items, on the other hand. The above-mentioned changes in labour supply (to agricultural and non-agricultural sectors) and consumption expenses are imposed onto the CGE model. This shock is the direct impact of the social grants and is interpreted as what would have happened without the programme.

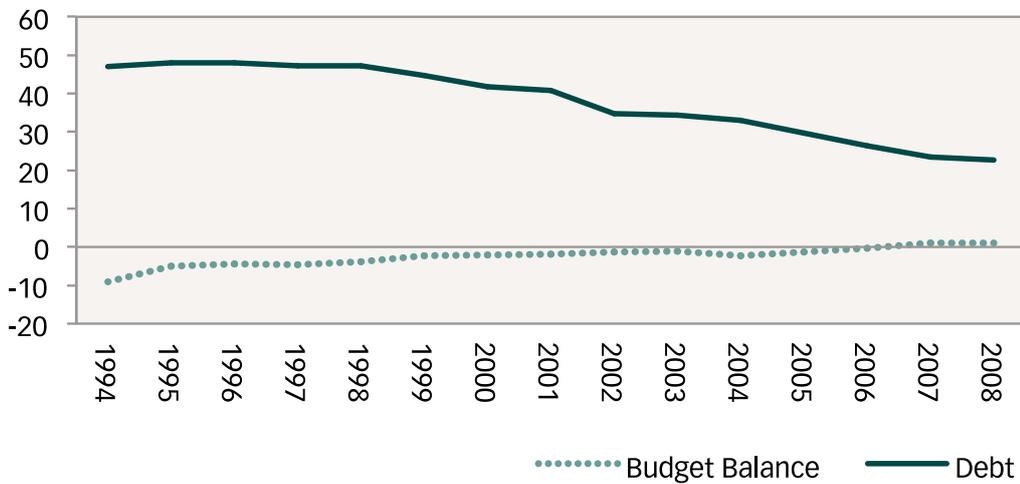
South Africa's economy without a social grant programme would result in less income transfers to households from the government, and more income to the government. The CSG programme covers 10.8 million children receiving R280 every month as of April 2012 (DSD, SASSA & UNICEF, 2012). In 2011, government spending on the OAG, the CSG, and the DG programmes was estimated at R36.6-billion, R35.6-billion and 17.8-billion respectively, representing in total 61.3% of social protection spending (Figure 26). We assume that the extra income of the government is used to reimburse its domestic debt (best spending opportunity). Figure 27 shows a positive relation between government deficit reduction and its debt reduction.

Figure 26: Share of CSG in the social protection spending for 2011



Source: National Treasury (2011)

Figure 27: Government budget balance and debt (% of GDP)



Source: The Presidency (2009)

The micro-simulation model

An MS model is developed to assess the distributional impact among households and individuals of the social grant shock. The adopted method builds upon the non-behavioural micro-simulation approach, which consists of adjusting the survey household's weights to create consistency between the macro and the micro outputs. Therefore, the method does not allow individuals and households to adjust their behaviour in response to the shock.

Under additional information provided by the macro model, household weights in the survey are re-adjusted using the cross-entropy estimation procedure (Golan et al., 1996). The approach minimises the Kullback-Leibler cross-entropy measure of the distance between the sets of initial (x) and final (y) surveyed household weights, transformed into probability measures:

$$\text{Min } \Omega = \sum_{h=1}^n y_h \ln \frac{y_h}{x_h}$$

subject to a consistency with the additional information:

$$A_j = \sum_{h=1}^n y_h \cdot a_{h,j}$$

In addition to the adding-up normalisation constraint, the constraint equations (j) include unemployment rate, agricultural labour earning, non-agricultural labour earning, capital earning, government transfer revenue, private transfer revenue, and total consumption spending (or macro variables). A_j are simulated macro data (averages) that are consistent with the set of final weights.¹⁷ The counterfactual sample of households is used in the MS model. This sample does not show any OAG, CSG, and DG beneficiaries and requires prior upward adjustments of the weights.

The cross-entropy method calculates new weights for the counterfactual sample of households which are consistent with the changes in the macro variables. The unemployment rate (30.5%)¹⁸ computed in the MS model is imposed onto the CGE model for consistency. The changes in values are used for the labour supply and the consumption variables and do not require a reconciliation procedure between the CGE and the MS models.

The changes in aggregate earnings and real consumption income, and the new employment rate are generated from the CGE model and constitute the new constraint for the MS model. The latter is run, and the new weights that satisfy the constraints on these aggregate outputs are collected for the poverty and inequality analysis. The paper by Chitiga et al. (2012) elaborates on the methodology in order to offer readers enough information to be able to use such a methodology in other studies. The reader is referred to that paper for details on methodology. That particular paper tests the methodology in the case of the CSG.

- **Poverty and Inequality Analysis**

The poverty impact is assessed using the Foster et al. (1984) measure of poverty or FGT, where: n is the number of individuals in the population, y_p is the per capita consumption expenditure of the person p , z is the per capita consumption threshold; α is the weight of the individuals with consumption expenditure below the threshold z :

$$FGT = \frac{1}{n} \cdot \sum_{p=1}^n \left(\frac{z - y_p}{z} \right)^\alpha$$

¹⁷ Robillard and Robinson (1999) discuss the cross-entropy method and its use to balanced macro and survey data.

¹⁸ This rate is higher than the official (narrow) rate of 23.5% but closer to the unofficial (broad) rate of 31.5% in March 2008 (The Presidency, 2009).

The measure of the inequality indicators uses the Theil index (Theil, 1967), with n and y_p keeping their above definitions, μ is the population average per capital consumption expenditure:

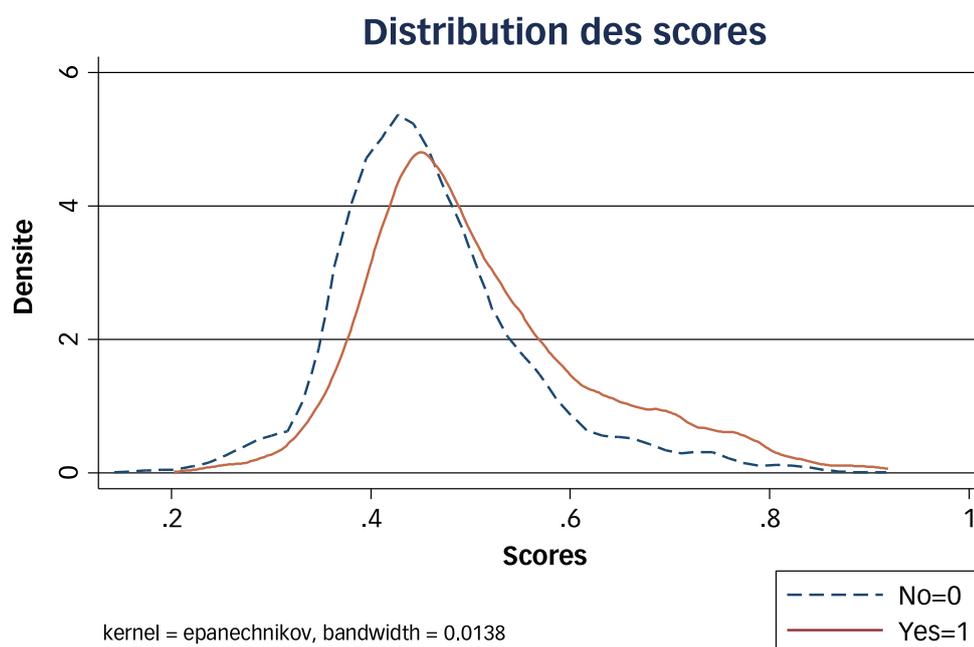
$$THEIL = \frac{1}{n} \cdot \sum_{p=1}^n \frac{y_p}{\mu} \cdot \log \frac{y_p}{\mu}$$

Three datasets are used for the poverty and inequality analysis: the 2008 NIDS survey (SALDRU, 2008), including 7301 households (real sample); a sample composed of the original 7301 households, less the 3761 beneficiaries of a social grant (OAG, CSG, DG), with adjusted weights (counterfactual sample); and a reweighted counterfactual sample (reweighted sample) consistent with the new macro outputs. FGT indexes (headcount, gap, and severity) are computed for each of the three samples given a poverty line of \$2/day or R260/month (Leibbrandt et al., 2010: 17). Theil inequality measures are also calculated using the average per capita consumption expenses in each sample.

2.4 Simulation Results and Discussion

To assess the general equilibrium effect of the social grants (CSG, OAG, and DG) programme in South Africa, the propensity score (PS) is first estimated over a series of observed variables. Figure 28 presents the kernel density distribution function of the social grant beneficiary and non-beneficiary groups resulting from the PS estimation. It identifies a large common support (0.202 to 0.919) and seven blocks that satisfy the balancing property. Table 32 shows for each block the inferior score and the number of beneficiary and non-beneficiary groups.

Figure 28: Kernel density function of the PSM



Source: Authors, from the estimation results

Note: No = not a recipient of a social grant; Yes= recipient of a social grant

Table 32: Common support block

Inferior Score	Non-beneficiary	Beneficiary	All
0.00	2	0	2
0.20	700	469	1169
0.40	976	747	1723
0.45	796	849	1645
0.50	702	961	1663
0.60	326	632	958
0.80	38	103	141
Total	3540	3761	7301

Source: Authors, from the estimation results

After the propensity scores have been estimated, the outcomes of the beneficiary group are compared with those of the matched non-beneficiary group for the pre-selected¹⁹ variables of interest (Tables 33 and 34). The matching methods aim at providing evidence that the social grants programme affects the variables of interest. However, only variables that show a statistically significant effect are selected as simulation variables.

The results from the available matching methods – nearest neighbourhood, stratification, radius, and kernel – show statistically significant differences in per capita spending on all consumption items except 'household', and 'education' (Table 33). The per capita spending on these two items showed no difference between beneficiary and non-beneficiary households..

Table 33: Effect on consumption spending

Consumption Item	Average monthly per capita consumption(in Rand)
Food products	-50.3***
Personal	-58.1***
Transport services	-67.0***
Energy and water	-20.2***
Household	-23.4
Clothes and footwear	-12.6**
Health services	-48.8***
Education	-2.8
Miscellaneous	-63.4***

Source: Authors, from the simulation results

Note: *** significant at 1%; ** significant at 5%

¹⁹ The variables are pre-selected according to the objective of the analysis. We have selected the labour supply and consumption variables as we are interested in the short-run impact of the CSG programme.

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Table 34 shows differences in the labour supply outcomes between the two groups. For non-agricultural activities, recipients of the social grants reduce their participation and their average number of hours worked, especially for the wage workers. On the other hand, agricultural wage work is observed to drop in favour of personal subsistence agriculture when households access the social grants programme. Social grant recipients have reduced labour force participation and average hours worked, but increased involvement in subsistence agriculture activities (although not necessarily the number of hours spent in these activities). This implies that social grant beneficiaries reduce their wage labour hours but tend to spend more time in subsistence agricultural activities. One explanation is that the extra income provided by the mainly subsistence agriculture activities does not disqualify the household for the grant.

Table 34: Effect on labour supply

Type	Participation	Time Allocation	
	Average number of individuals	Average annual hours per worker	Average annual hours, all workers
All non-agricultural work	-0.045**	-62.3***	-109.0***
Non-agricultural wage work	-0.038**	-26.0	-101.6***
Self-employment	0.015	-11.4*	3.6
Casual work	-0.012	-20.9	-9.3
Help in others' business	0.002	24.2	1.3
All agricultural work	0.016	-217.4***	-50.8**
Agricultural wage work	-0.022**	-96.5***	-58.1**
Personal subsistence agriculture	0.034**	17.2	7.3**

Source: Authors, from the simulation results

Note: *** significant at 1%; ** significant at 5%; * significant at 10%

The estimation of the participation effects on the social grant programme, using the matching methods in the previous step, identifies seven simulation variables for the consumption items and three simulation variables for the labour supply (Table 35). At the end, we consider the aggregated agricultural work and non-agricultural work variables for consistency with the macro model. Therefore, the simulation scenario is built around nine simulation variables and the changes in the outputs between the real and the counterfactual samples of households. The matching technique and the sample comparison show consistent results for all selected variables.²⁰

Table 35: Changes in simulation variables

Variable of interest	Change (in %)
Labour Supply	
1) Non-agricultural work	-1.5
2) Agricultural work	3.8
Consumption Spending	
3) Food	-3.2
4) Personal	-0.8
5) Transport	-10.3
6) Energy and Water	-4.8
7) Clothes and shoes	-4.6
8) Health	-27.3
9) Miscellaneous	-5.2

Source: Authors, from the simulation results

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²⁰ Tables 33 and 34 are expressed in average hour worked annually per household and per capita and consumption expenses, respectively. On the other hand, Table 35 is expressed in percentage change of the aggregation hour worked and per capita consumption spending. Thus, only the directions of the changes for the variables of interest are meaningful for analysis.

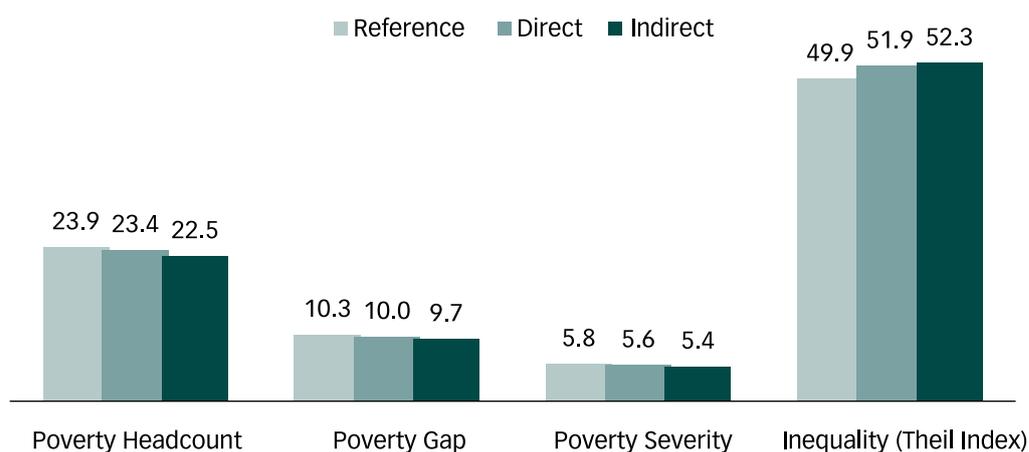
Figure 29 presents the FGT poverty indexes and the Theil inequality indexes for the reference and the simulations scenarios. The latter represent the elimination of the social grant programme in South Africa and is divided into the direct and the indirect impacts.

In the reference scenario, the values of the indexes are computed using the nationally representative sample of households (SALDRU, 2008), hereon the real sample. A per capita monthly consumption spending of R260 is used as the poverty line²¹ and to compute the FGT poverty indexes (headcount, gap, and severity).

The counterfactual sample of households replaces the grant beneficiaries with their matched non-beneficiaries, resulting in a hypothetical representative sample of households with no social grant beneficiaries. The counterfactual sample is used to estimate the direct impact of the programme. The results show small differences in poverty indexes between the real sample and the counterfactual sample. Poverty indexes are slightly lower in the counterfactual sample (only non-beneficiary households), compared to the real sample (beneficiary and non-beneficiary households). On the other hand, inequality is lower under the social grant programme. That is, inequality is lower in the real sample, compared to the counterfactual sample.

The simulated aggregate results are distributed among the categories of households using a re-weighted technique. Comparison of results from the re-weighted and the original counterfactual samples gives the indirect impact of the social grant programme. Poverty indexes are lower when we account for the indirect impact, compared to the direct impact. The Theil index of inequality is higher when the indirect effect of cancelling the programme, compared to the direct effect, is considered. In the short run, the results show little evidence that an alternative use of the resources invested in social grants in South Africa would lower the poverty head count, poverty gap and poverty severity. This implies that, while social grants in South Africa contribute to poverty reduction (as found in earlier studies), injecting these resources into the economy in other forms of capital can achieve a similar level of poverty alleviation. However, the programme does appear to be doing a better job of reducing inequality than other uses of the resources in the economy, even though the evidence in support of this is also weak.

Figure 29: Poverty and inequality indexes



Source: Authors, from the simulation results

Using other economic measures, the analysis shows that the grant programme contributes positively to economic performance, as measured by the level of gross domestic product (GDP). Indeed, South African GDP level is 0.9% lower under the counterfactual scenario, i.e. absence of the social grant programme, compared to the reference scenario (Table 36). This result is driven by households that are spending 5.6% more (private final consumption) and investing less (fixed capital formation -26.1%). Government earnings do not change significantly (0.2%), but government savings increase (17.7%) because of a cut in social grant transfers. Government extra revenue is assumed to cover its internal debt and contribute to reducing the decline in overall investment.

²¹ The value is equivalent to the international poverty line of US \$2 per day (Leibbrandt et al. 2010: 17).

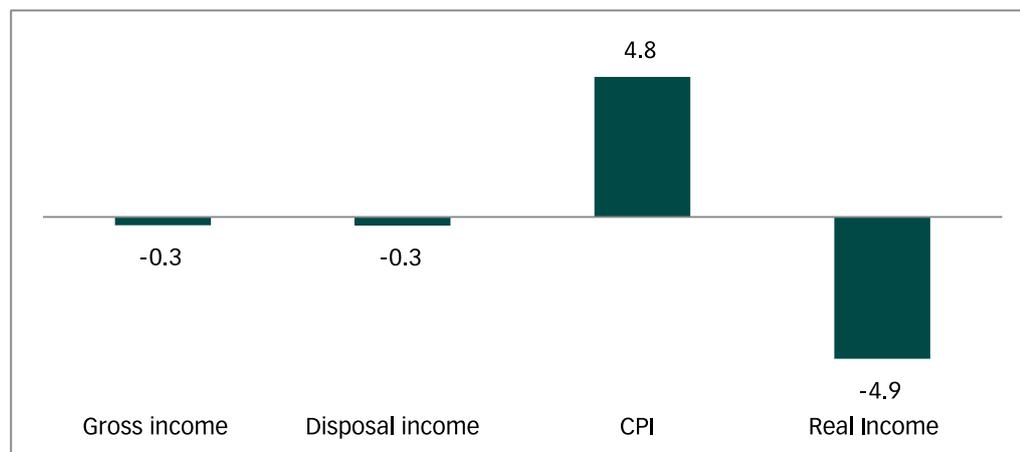
Table 36: Changes in macro variables (%)

	GDP	Public Final Consumption	Private Final Consumption	Fixed Capital Formation	Change in Inventories	Exports	Imports
Share	100.0	19.5	64.6	16.8	1.2	24.5	26.4
Change	-0.9	0.0	5.6	-26.1	0.0	-3.3	-3.4

Source: Authors, from the simulation results

Households' consumption price index increases by 4.8% and, consequently, their purchasing power, or real income, declines by 4.9% (Figure 30). Higher consumption prices contribute to reducing households' saving. Under the counterfactual scenario, household demand increases for most of the consumption products, putting an upward pressure on the consumption prices. The price increase is particularly important for health (Figure 32), contributing in a large part to the increase of household consumption prices. Health expenses contributed 5.4% of the household consumption spending in 2008 (Figure 31). The results show that social grant beneficiary households spend less on health services than their matched non-beneficiary households. Therefore, the demand for health services is higher in the counterfactual scenario (with no beneficiary households), compared to the reference scenario (with both beneficiary and non-beneficiary households). Agriculture and food prices also increase under the counterfactual scenario compared to the reference scenario. Agriculture and food products represent 18% of the household consumption budget (Figure 31); their prices increase as households spend less time on subsistence agriculture activities and, therefore, purchase more food from the market. Investment-oriented products – construction and non-metallic minerals, as well as basic metal, machinery and equipment – show the largest price declines (Figure 32).

Figure 30: Household income and consumption price effects (%)



Source: Authors, from the simulation results

Figure 31: Households' consumption budget share (%)

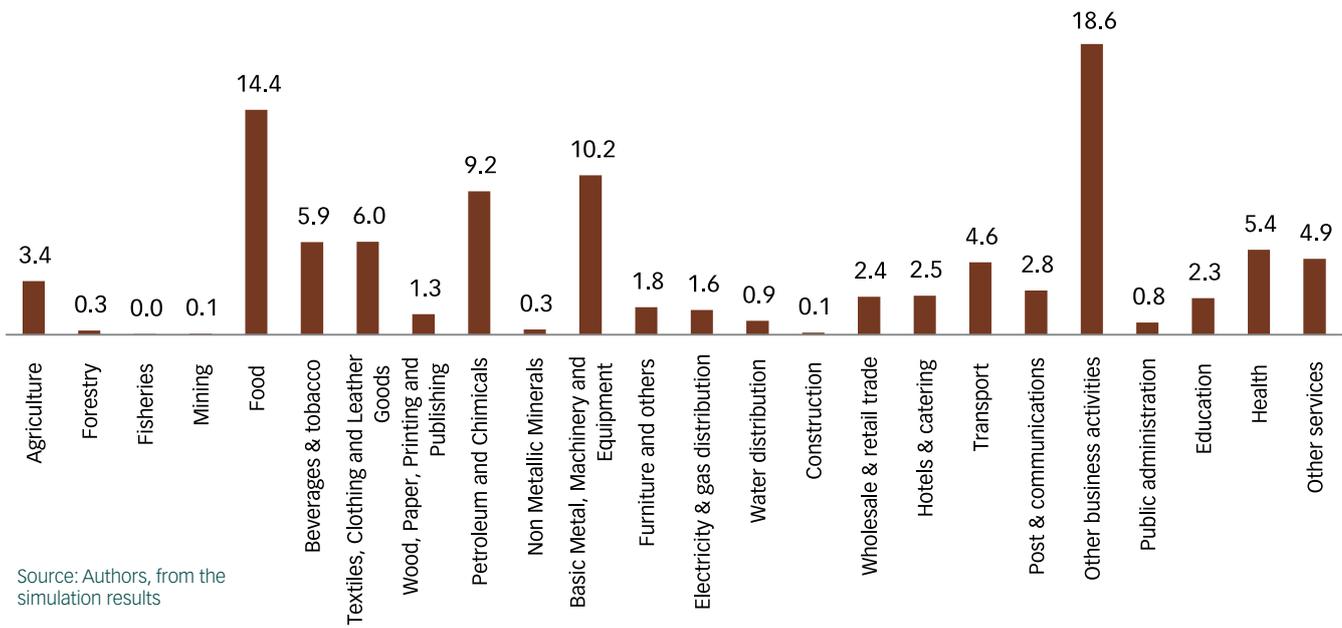
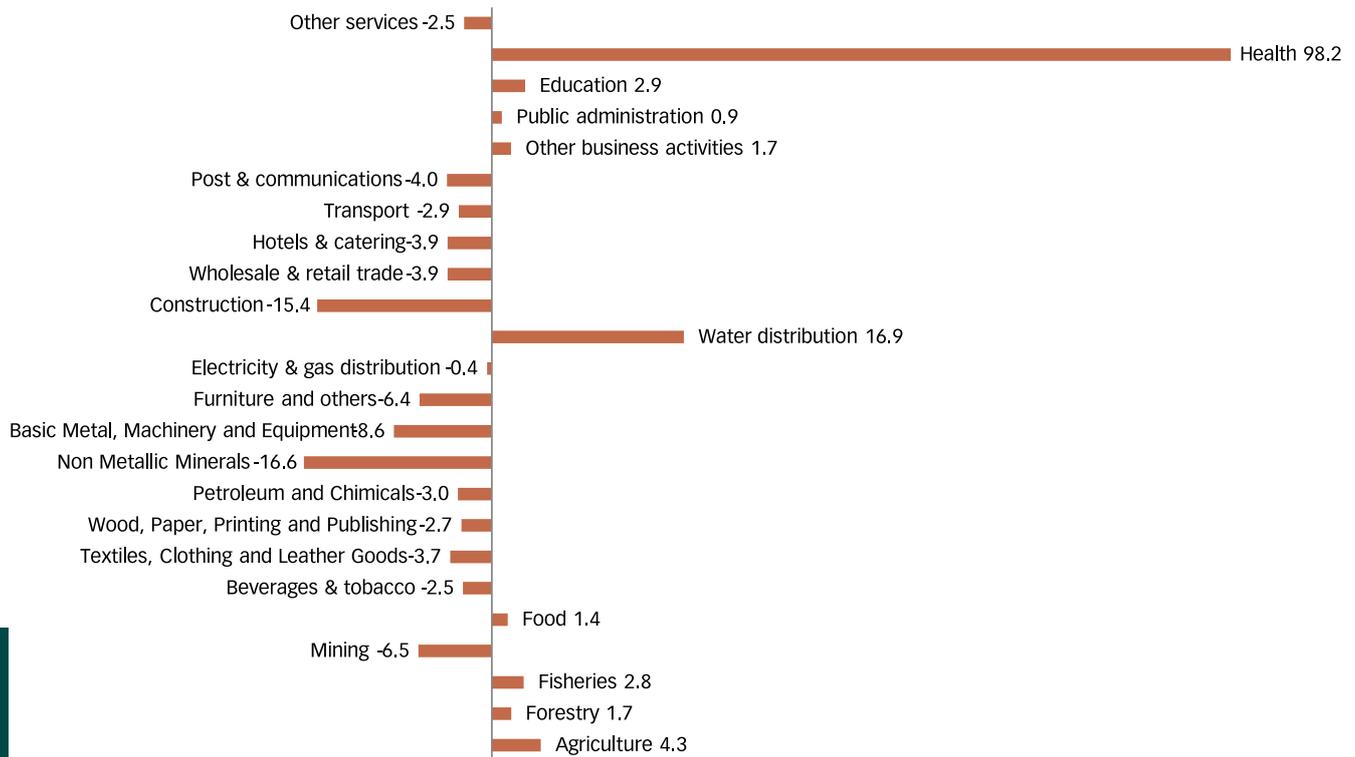


Figure 32: Effects on consumption prices (%)



2.5 Conclusion and Recommendations

South Africa introduced a comprehensive social security programme, which includes the OAG, CSG, FCG and DG, as safety nets for the poor. A number of studies have looked at the impact of the social grant programme on beneficiaries, but no research has been done on the impact of the programme on society at large, particularly on non-beneficiaries. This becomes important, as the size of the programme continues to increase in South Africa. In 2012, social grants grew by 9.1% to R157.9-billion, more than what was spent on basic education (R152.1-billion). Together, the OAG, CSG, FCG and DG represent about 62% of the total social protection budget (more than R90-billion).

This chapter is the first attempt to study the general equilibrium effect of a combination of social grants in South Africa by using an analytical framework that combines state-of-the-art techniques, including matching techniques, to evaluate social programmes. The framework builds a counterfactual scenario (no social grant system), which is fed into a combined macro and micro simulation model to calculate the impact of the programme on poverty and inequality in the country.

The results show direct differences between the beneficiaries and non-beneficiaries of the programme in terms of their observed outcomes. Households that receive social grants increase their labour supply for agricultural activities and reduce their labour supply for non-agricultural activities. There is also strong evidence that social grant beneficiaries spend less per capita than non-beneficiaries on all consumption products (e.g. food, transport and health) except for education and household products, which show no difference in level of spending.

Looking at the general equilibrium results, the social grant programme was found to make a positive contribution to economic performance in South Africa, as measured by the level of GDP. The absence of the programme, in a counterfactual setting, leads to a 0.9% decline in GDP. Inequality is also shown to decline as a result of the programme. However, the results show that poverty indexes are lower in the counterfactual scenario, i.e. the absence of the social grant programme.

A decline in household savings was also found, which is attributed to households' reduced purchasing power in the counterfactual scenario. Indeed, household consumption prices increase in the counterfactual scenario, triggered by increasing demands for health services and agriculture and food products. Thus, the analysis shows that the social grant programme contributes to lowering the cost of health services, as well as agriculture and food products. Social grant beneficiary households are more involved in subsistence agriculture and, therefore, purchase less food. They also spend less on health services and, consequently, extra income is spent on other consumption products or on investment products.

While fiscal prudence and consolidation are pursued in the medium term, the analysis shows that social security spending contributes to faster economic growth and to reducing inequality in South Africa.

The following recommendations are made:

1. A sustainable social security programme is pursued, as social security is the foundation of economic security for millions of South Africans and can assist in eliminating poverty, and reducing inequality. To ensure this, Government must
 - a. Pursue a pro-poor countercyclical strategy that preserves (if not increases) well-targeted social spending and investments.
 - b. Reduce poverty by providing an enhanced minimum benefit for low wage workers that provides full career workers with a benefit no less than 125% of the poverty line in 2017, indexed to wages thereafter as tax free benefit. This reform ensures that the programme can continue to meet its basic mission to prevent people from falling into poverty and ensures the minimum benefit would phase down proportionally for workers with higher wages.
 - c. Enhance benefits for the very old and the long-time disabled, by offering a new benefit enhancement equal to 5% of the average benefit phased in over five years (1% per year).
2. Develop and apply analytical macro-micro modeling tools to understand the ramifications of social policy transmission and how to respond most equitably and cost effectively through the division of revenue process.

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Appendix 1: Other Tables

Table 37: Variables used in the propensity score estimation

Variables		Observation	Modalities
1.	Recipient of CSG, OAG, and/or DG	7301	No (0) Yes (1)
2.	Recipient of other grants***	7301	No (0) Yes (1)
3.	Presence of children less than 16 years old	7301	No (0) Yes (1)
4.	Presence of children less than 7 years old	7301	No (0) Yes (1)
5.	Child has birthday certificate	7301	No (0) Yes (1)
6.	Clinic card	7301	No (0) Yes (1)
7.	Source of information for the child's date of birth	7301	Not applicable (0) Card (1) Recall (2)
8.	Child living with a parent	7301	No (0) Yes (1)
9.	Caregiver	7301	Not applicable (0) Mother, father (1) Great, grand Parent (2) Other (3)
10.	Mother completed higher education	7301	Not applicable (0) Yes (1) No (2)
11.	Mother is occupied economically	7301	Not applicable (0) Yet (1) No (2)
12.	Father completed higher education	7301	No (0) Yes (1)
13.	Presence of member more than 60 years old**	7301	No (0) Yes (1)
14.	Biological children currently living with the senior member*	7301	Not applicable (0) Yet (1) No (2)
15.	Biological children not living with the senior member**	7301	Not applicable (0) Yet (1) No (2)
16.	Marital status of the senior	7301	Not applicable (0) Married (1) Living with partner (2)

Variables		Observation	Modalities
			Widow/Widower (3) Divorced/Separated (4) Never Married (5)
17.	School grade completed by the senior	7301	Not applicable (0) Not educated (1) Lower than grade 5 (2) Between grade 5 and 9 (3) Grade 10 and more (4)
18.	Senior hold a driver's license	7301	Not applicable (0) Yes (1) No (2)
19.	Senior is computer literate*	7301	Not applicable (0) Yes highly literate (1) Yes basic use (2) No (3)
20.	Senior reading level in English	7301	Not applicable (0) Very well (1) Fair (2) Not well (3) Not at all (4)
21.	Senior writing level in English	7301	Not applicable (0) Very well (1) Fair (2) Not well (3) Not at all (4)
22.	Perception of health status	7301	Not applicable (0) Excellent (1) Very Good (2) Good (3) Fair (4) Poor (5)
23.	Health consultation	7301	Not applicable (0) In the last 30 days (1) One to five months ago (2) Six to twelve months ago (3) More than one and less than two years ago (4) Two or four years ago (5) Five to ten years ago (6) More than ten years ago (7)
24.	Location that the consultation took place in	7301	Not applicable (0) Public hospital (1)

Variables		Observation	Modalities
			Private hospital (2) Public health clinic (3) Private clinic (4) Private doctor (5) Nurse or chemist (6) Traditional healer (7)
25.	Smoke cigarette**	7301	No (0) Yes (1)
26.	Household size*	7301	1-26
27.	Number of children less than 14 years old	7301	0-14
28.	Average number of year of education	7301	0-25
29.	Average age of the household, number of year	7301	14-99
30.	Population group	7301	Others (0) African (1) Coloured (2) Asian (3) White (4)
31.	Gender of household head	7301	Female (0) Male (1)
32.	Household head's number of years of education	7301	0-25
33.	Age of household head, number of years	7301	14-99
34.	Marital status of household head**	7301	Never married (0) Married (1) Living with partner (2) Widow/widower (3) Divorced/separated (4)
35.	Type of dwelling	7301	1-10 (see questionnaire for details)
36.	Number of rooms	7301	1-35
37.	Distance of water source	7301	Not applicable/water on site (0) Less than 100m (1) 100m - less than 200m (2) 200m - less than 500m (3) 500m - less than 1km (4) 1km and more (5)
38.	Access to electricity*	7301	No (0) Yes (1)
39.	Time to reach the public transport services	7301	0-300
40.	Existence of street lighting near dwelling	7301	No (0) Yes (1)
41.	Household member owns the dwelling	7301	No (0) Yes (1)

Source: Authors, from the PSM estimation

Table 38: Products-to-consumption mapping (%)

Industry	Food	Personal	Transport	Energy & Water	Household	Cloths & Shoes	Health	Education	Miscellaneous
Agriculture	18								
Forestry	1								
Fisheries	0								
Mining									
Foods	74								
Beverages & tobacco		50							
Weaving & finishing of fabrics					10	86			
Wood products		1						29	
Petroleum products			62	37					
Glass products		1							1
Basic iron & steel					53				19
Furniture					9				3
Electricity & gas distribution				39					
Water distribution				22					
Construction					2				
Wholesale & retail trade					8	14			3
Hotels & catering	6	11							
Transport			38						
Post & communications		24							
Financial services									68
Public administration				2			1	16	
Education								56	
Health							99		
Other services		14			17		0		6
All industry	100	100	100	100	100	100	100	100	100

Source: Authors, from the simulation results

Table 39: The relative contribution of the CSG and OAG to household income from grants and earnings for grant recipient households

Characteristic	2003	2007
% of households receiving OAG	17.5 (16.9--18.0)	15.9 (14.4--16.5)
% of households receiving CSG	16.8 (16.9--17.4)	29.1 (28.3--29.8)
% of households receiving both OAG and CSG	4.2 (3.9--4.5)	6.4 (6.1--6.8)
% of OAG recipient households also receiving CSG	24.2 (22.6--25.8)	40.4 (38.7--42.2)
Mean % of total household grant derived from OAG (in rand and inflation-adjusted to 2007 values)	47 (46.1--48.0)	31 (30.6--31.9)
Mean of the % of total household grant money derived from CSG (in rand and inflation-adjusted to 2007 values)	37 (36.4--38.5)	52 (51.3--52.8)
Mean of the % of the combined household earning and grant money derived from OAG (in rand and inflation adjusted to 2007 values)	39 (37.8--39.6)	25 (24.5--25.8)
Mean of the % of the combined household earning and grant money derived from CSG (in rand and inflation adjusted to 2007 values)	22 (21.2--22.6)	29 (28.7--29.8)

Source: Stats SA (2009)

Equitable Resourcing of Schools for Better Outcomes

By: *Eddie Rakabe*

3.1 Introduction

Public ordinary schools are fundamental drivers of socio-economic development: if their funding and performance are inadequate or inequitable, the goals envisioned in the National Development Plan (NDP) cannot be realised. The NDP proposes to increase learner literacy and mathematics achievement levels, as well as to improve learner retention and completion rates to 80% by 2030 (NPC, 2011). Reaching the NDP targets will require far-reaching reforms and interventions, including increased parent involvement; teacher training and reskilling; improved curriculum; school management and accountability; and, most importantly, redirecting resources (human, infrastructure and funding) to areas with the greatest needs.

Not only are South African schools struggling with the reality of resource constraints and public pressure for improved performance, but the entire public basic education system is plagued by high levels of weakness and inequality and is criticised, in particular, for producing poor quality outcomes. South Africa inherited a dual public education system in which historically advantaged schools (or former Model Cs²²) co-exist with township, rural or poor schools. Former Model Cs are well resourced, have better facilities and better qualified teachers, can augment state funding with school fees, and produce better outcomes. Meanwhile, township schools are economically deprived, rely entirely on government for funding, face restrictions in charging school fees, largely accommodate poor learners, have little or no education facilities, and generally produce sub-optimal results.

The long history of systematic underinvestment in township schools has resulted in conditions that are not conducive to quality learning, teaching or satisfactory achievement levels. In 1996, the country was short of 29 000 primary school classrooms and 14 000 secondary school classrooms. The majority of schools did not have electricity, water or sanitation facilities. More importantly, teachers were inadequately trained and not always hired on the basis of prescribed qualifications. These factors, combined with poor governance, contributed to persistently low education achievement levels, not only by international but also the country's standards (Fiske and Ladd, 2004).

Recognition of these challenges prompted widespread education reforms to address resource disparities in schools and to meet the unqualified constitutional right to basic education. The most notable of these reforms were: (1) the South African Schools Act (SASA) No. 84 of 1996, which makes equitable funding of schools the state's responsibility; (2) the equalisation of learner-educator ratios; (3) the post-provisioning model for allocating teachers; and (4) the introduction of the National Norms and Standards for School Funding (NNSSF) that seeks to reduce the funding gap between rich and poor schools progressively (Ndhlovu, 2012).

The NNSSF remains the central instrument for redistributing resources towards needy learners and disadvantaged schools.

Since the introduction of the NNSSF, the aggregate state funding gap between rich and poor schools has narrowed significantly. Learners in poorer schools receive five times the state subsidy provided to richer schools. This has been made possible by successive fiscal reforms that make the allocation of funding relatively equitable. However, the resource allocation and performance of schools across and within provinces is significantly uneven. Despite legislative and policy imperatives to distribute

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²² Former state-financed all-white schools

resources equitably, poor schools in poor regions experience structural resource shortages. These disparities have resulted in: (1) unprecedented migration of learners to richer schools leaving poor schools with a less than optimal number of learners; (2) chronic infrastructure deficit, especially in the Eastern Cape and Limpopo provinces; and (3) continual sub-optimal attainment and achievement levels underpinned by unexplained variation across and within provinces.

The migration of learners deprives poorer schools of state funding and quality teaching staff because schools with small numbers of learners are allocated less funding and a smaller teaching staff. Similarly, school infrastructure deficiencies expose learners to safety risks and exacerbate unsupportive teaching conditions and learning environments, while poor performance dents public confidence in the public education system, particularly in poorer schools.

The funding framework, which is at an aggregate level for provinces and at a micro level for schools, disregards historical and geographical disparities, constraints affecting poor schools, and the growing competencies of the richer schools. More disturbingly, the national adequacy benchmark for learner subsidies (i.e. the minimum amount considered adequate to realise a learner's right to education) has no empirical basis and is adjusted annually by inflation rates only. Evidence from the Gauteng province suggests that the set minimum subsidy allocation for poor learners is insufficient to meet national policy aspirations such as the "one textbook per learner" policy.

In principle, provinces are allowed to increase the national learner subsidy allocations and redirect resources where the needs are greatest. However, their budgets have little room for manoeuvre as personnel costs (over 80% of total education allocation) and funds that are diverted from education create artificial differences between provinces. Furthermore, national policies often dictate how resources are distributed between schools. Nevertheless, this does not exonerate provinces from their failure to use existing resources to address inequities between schools and meet the objectives of the Constitution and the SASA.

The study seeks to evaluate how resources to schools are allocated and the effect of these resources on outcomes, given government's renewed emphasis on performance and quality. The study uses a two-pronged methodological approach involving: (1) detailed analysis of the budgeting processes and decisions at different levels, and (2) a panel data estimating performance effects of resources on outcomes.

An analysis of the budget process seeks to establish how expenditure decisions at aggregate and school levels are determined, given the constitutional requirements and policy imperative to achieve equity in both financing and outcomes.

3.1.1 The Commission's previous recommendations on education

The Financial and Fiscal Commission (the Commission) has made many recommendations regarding basic education. In 2003, it recommended that the Early Childhood Development (ECD) Conditional Grant be incorporated into the provincial equitable share (PES) and proposed that the full grant amount should form part of the education component. In 2008, the Commission recommended that the National School Nutrition Programme be extended to secondary schools and that learner support materials be restricted to stationery, textbooks, and learner and teacher aids. The Commission's recommendations in 2009 and 2012 focused on national norms and standards for transport, the impact of existing norms and standards, and input/output norms for intellectually disabled children. In 2013, its recommendations addressed the need for government to prioritise e-education funding.

The Commission's recommendations have focused on education policies and assumed existing equitable resourcing between schools. However, the evidence shows greater resource disparities between schools, accentuated by geographic and socio-economic status. Unless resources are distributed equally across schools, the Commission policy recommendations and government policy will not be achieved. Therefore, this study addresses an important gap in education finance policy reform: redirecting resources where the needs are greatest.

3.2 Research Methods

The research involves a literature review of fiscal transfers and a detailed analysis of budget allocations to schools. A panel data regression model is used to estimate the effects of school resources on the performance of schools, using data from 47 districts over three years. Variables of interest are the matriculation pass rate (used as a proxy for school performance) regressed against gross value added per capita and a poverty indicator.

The model is specified as follows:

$$PerV_{it} = \beta_0 + \beta_i X + \mu_i + \varepsilon_{it} \quad (1)$$

Where:

- $PerV_{it}$ represents matriculation pass rate for province i at time t ,
- β is the usual coefficient,
- X is a vector of explanatory variables
- μ_i represents unobserved district-specific (time invariant) fixed effects.

Panel data approaches allow these fixed effects to be removed, thus eliminating a source of bias in the model.

3.3 Equity in Education

Learners have the right to equitable education. Education equity has two dimensions. The first is equal treatment or fairness, meaning that personal and social circumstances (such as gender, socio-economic status or ethnic origin) should not be obstacles to achieving educational potential. The second concerns inclusion, equal opportunity or learner achievement aimed at ensuring a basic minimum standard of education for all, i.e. the requirement that learners should be literate and numerate. The two dimensions are mutually inclusive, meaning that tackling school failure helps to overcome the effects of social deprivation that often cause school failure (OECD, 2011). There is no consensus among policy makers on how to achieve equity, but three key policy areas stand out: the design of education systems, practices in and out of school, and how resources are allocated.

The key policy question in assessing resource allocation to education is how big a share of government spending is allocated to the poor. Studies are undecided whether or not government spending in South Africa is pro-poor. Some researchers argue that government has an anti-poor bias because: (1) the unit cost of service provision to the poor is lower and (2) the use of public services by poor households tends to be lower due to information problems and structural factors, such as high transport costs (Blecher, 2008; McIntyre, 2012). Other researchers demonstrate that government-wide spending, especially on schools, is increasingly well targeted or pro-poor (Burger, 2006; Van der Berg, 2006).

Despite disagreements on funding inequities, considerable progress has been made towards the equitable funding of learners. Using the per capita learner allocations as a single indicator of equity is insufficient because of the differences in need, demand, costs and deprivation across provinces. These factors dominate the discussion of whether the resources to schools should be need-oriented or demand-orientated. Each approach has advantages and disadvantages. The demand-based approach is strongly influenced by supply, i.e. demand-driven funding perpetuates inequities (for instance, despite having great needs, rural poor populations may underutilise public services). However, the needs-based allocation approach may not match the actual utilisation of services and associated workloads (Blecher, 2008).

Disregarding these peculiarities in the allocation formula leads to substantial variation in funding levels across provinces, which results in widely diverse service configurations and reinforces the perception of funding inequities.

Evidence suggests that needs, demands or properly costed inputs do not always inform school allocations. The imbalance in the mix of poor and rich schools makes achieving intra-provincial funding equity difficult. Provinces with a proportionally higher composition of poorer schools need

to spend relatively high amounts of funding on poor learners and less affluent provinces tend to spend relatively more on education personnel than other important learner inputs (Fiske and Ladd, 2004).

3.4 Essential Inputs Required to Produce Adequate Education

The availability and access to essential education inputs are key determinants of better learning outcomes. However, often there is no clarity regarding the minimum inputs required across schools of different types to produce adequate education or minimum acceptable outcomes. Ambiguity over the relative contribution of different inputs to the outcomes makes prescribing minimum education inputs often difficult, while other inputs are outside the control of policy-makers.

For instance, while it is generally agreed that basic inputs (such as textbooks and teaching aids) positively affect educational outcomes for inadequately resourced schools, it is far more difficult to demonstrate the effectiveness of additional inputs associated with more affluent schools (such as lower learner–educator ratios or computers). The lack of proper school management and other contextual community dynamics may also invariably subvert the effect of direct school inputs.

Nonetheless, the need to set explicit minimum education inputs is receiving increasing attention. The SASA specifically requires the Minister of Education to set norms and standards on key education inputs, including curriculum, funding, staffing, infrastructure and language policies. However, SASA is neither conclusive nor prescriptive about the full composition and minimum package of inputs required to produce a given level of education output.

Various enabling policy documents offer a breakdown of what may be considered education inputs (see Table 52 in the Appendix for details), but these inputs are not definitively expressed. For instance, norms and standards on school infrastructure stipulate that each school must have sufficient sanitation facilities, water supplies, libraries, funding, etc. but do not indicate the combination of facilities required to make a school fully functional. Furthermore, unlike the way funding and posts are distributed, infrastructure norms do not expressly provide for redress. More importantly, input norms are not directly linked to the production of outputs stipulated in the new Curriculum and Assessment Policy Statement (CAPS). CAPS provides details on the content that teachers should teach and assess on a grade-by-grade and subject-by-subject basis. CAPS assumes that all schools have the required adequate inputs to produce prescribed learning outcomes. This assumption ignores inherent resource disparities that exist between and within provinces, districts and schools.

3.5 International Lessons on Education Financing and Equity

Many countries derive school budgets using a formula that attempts to capture various characteristics of schools. The underlying principles are that budgeting should be equitable, adequate, efficient and transparent, and that schools must be more accountable for their actions (Fazekas, 2012).

In Australia, the funding process is not transparent and varies from state to state (Dowling, 2007), despite the government spending over AU\$30-billion on primary and secondary schooling each year. The system of public education does not have an agreed fiscal framework (Angus, 2007), and funds are allocated according to Average Government School Recurrent Costs, which take into account the total amount spent on schools and the total number of enrolments. Unlike South Africa, equity does not seem to be an aspect considered in funding public schools in Australia.

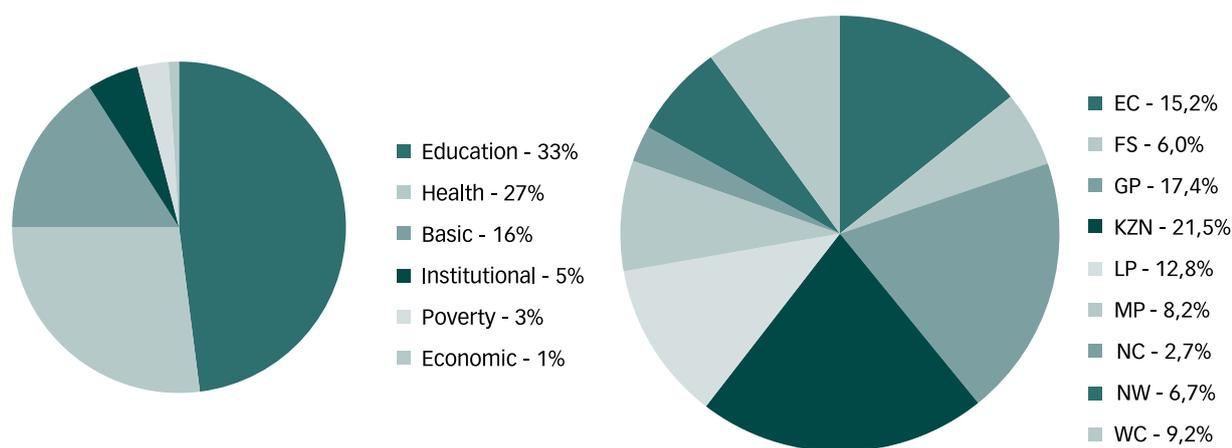
Education policy in Brazil changed following the election of Fernando Cardoso as president in 1994 (OECD, 2010). In 1996, the Law of Directives and the Bases of National Education was developed that clarified the roles of the municipal, state and federal education systems. Also created was the Fund for Primary Education Administration and Development and for the Enhancement of Teacher Status (FUNDEF), which provided a more equitable distribution of state funds. Before FUNDEF, resources were allocated based on population densities, so the majority of funds went to larger cities. FUNDEF corrected this situation by creating more equitable fund allocation and redirecting funds to teachers' salaries.

In the United States, public school budgeting differs from state to state. In the state of Virginia, for example, Burckbuchler's survey (2012) of various schools showed that the budgeting process can be attributed to history rather than logic. The implementation of the No Child Left Behind Policy appears to correlate with schools adopting a more performance-driven budgeting process (a movement away from line-item incremental budgeting). In the state of Washington, schools are allocated resources according to a formula (as set out in the Basic Education Act of 1977) based on whether or not a student is full time. Funds are then distributed per full-time learner (Snohomish County Schools Public Information Cooperative, n.d.). The state of New York follows a system called Fair Student Funding, which aims to: (1) improve equity in schools, (2) allocate funds to particular schools without taking away resources from other schools, and (3) create a more transparent public schooling system (Children First, 2007; Schwartz et al., 2007). In California, the state allocates funding using a complicated set of formulas dating from the 1970s. It includes many special-purpose programmes, which do not properly reflect the cost difference of educating different student populations. Equitable distribution of resources does not appear to be a driver of Californian school budgets because, interestingly, schools with more low-income students receive less funding.

3.6 Financing of Education: Provincial Budgetary Processes and Allocative Decisions

Funding for education in South Africa is determined at numerous levels. The first level of budgeting is at the horizontal (or aggregate) level, where provinces are allocated their discretionary equitable share. The PES is allocated to provinces through a formula that reflects constitutional functional assignments and captures the relative demand for services within provinces. Figure 33 gives the distribution of the formula components, as well as each province's share of the total equitable share for 2013. Education accounts for the largest share (48%) of the PES. KwaZulu-Natal (KZN) and Gauteng provinces received a third of the PES allocations, while the Northern Cape Province received the smallest share. The varying allocations are mainly explained by the distribution of the population across provinces, i.e. provinces with larger populations receive a greater share of the national revenue.

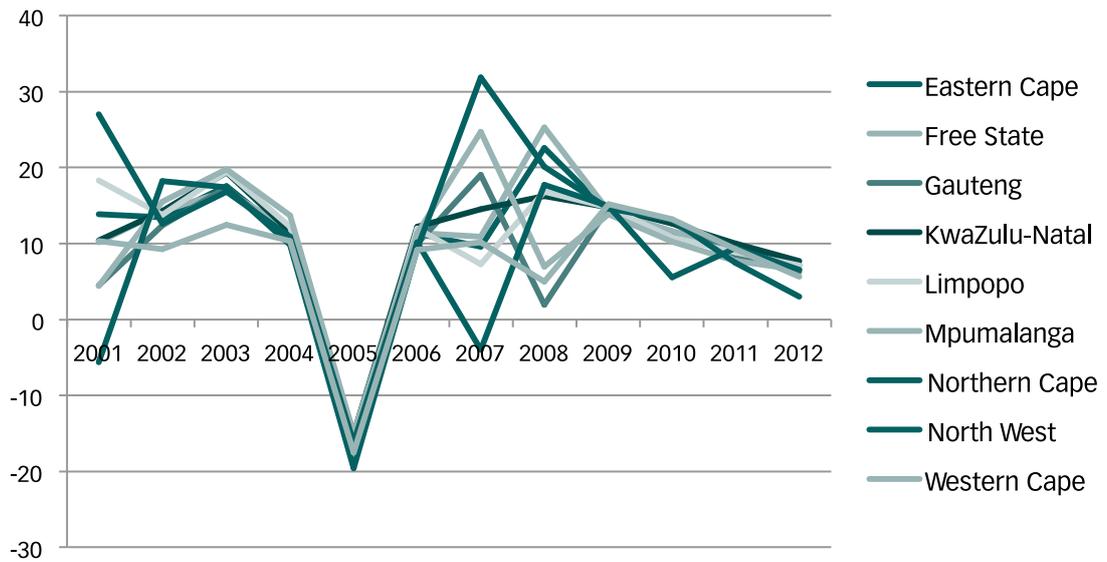
Figure 33: PES component weights and provincial distribution (2013)



3.6.1 PES redistributive powers

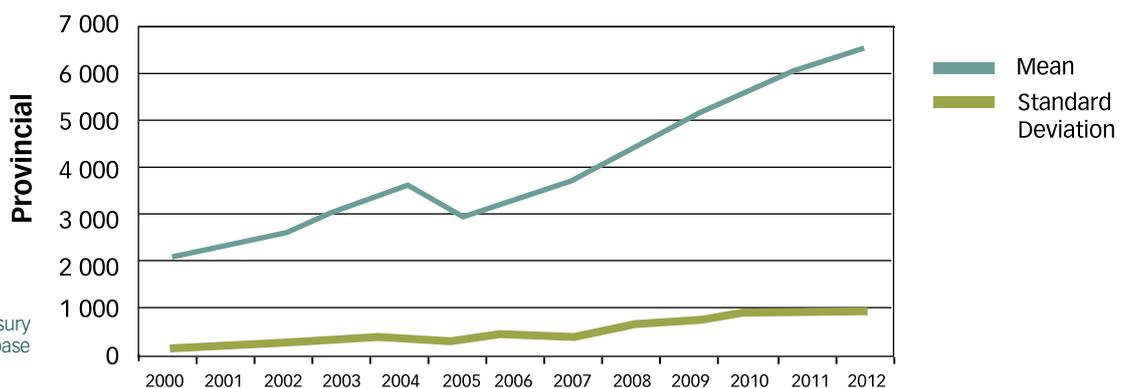
Between 1996 and 2013, the PES increased from R75-billion to over R300-billion, i.e. an average annual growth rate of 7%. Between 2006 and 2009, the PES growth rate was inconsistent across individual provinces but showed some convergence from 2010. This convergence suggests that provinces are treated equally as far as growth in allocations is concerned and that changes in the distribution of formula have an insignificant effect on the formula.

Figure 34: PES allocations growth rate (2001–2012)



Between 2000 and 2012 (see Figure 34), the per capita allocations increased from an average of R2200 to over R6300. Gauteng and the Western Cape had the lowest per capita allocation of just under R5000, while the Eastern Cape, Limpopo and the Northern Cape had the highest allocation of over R7000. The difference in per capita allocations between affluent and less affluent provinces suggests that the PES formula is increasingly progressive or redistributive. This is demonstrated by a visibly increasing and large standard deviation (see Figure 35). A larger standard deviation suggests values in the data set (provincial per capita allocations) are moving further apart from the mean, on average. Usually, provincial equitable shares are not expected to converge around the mean because of varying province-specific service needs and cost constraints. The equitable share formula uses generic or population-based needs indicators which are sometimes discredited for perpetuating convergence. Evidence from an Anova analysis rejects this convergence hypothesis at a 95% confidence level.

Figure 35: PES per capita allocation (2000–2012)



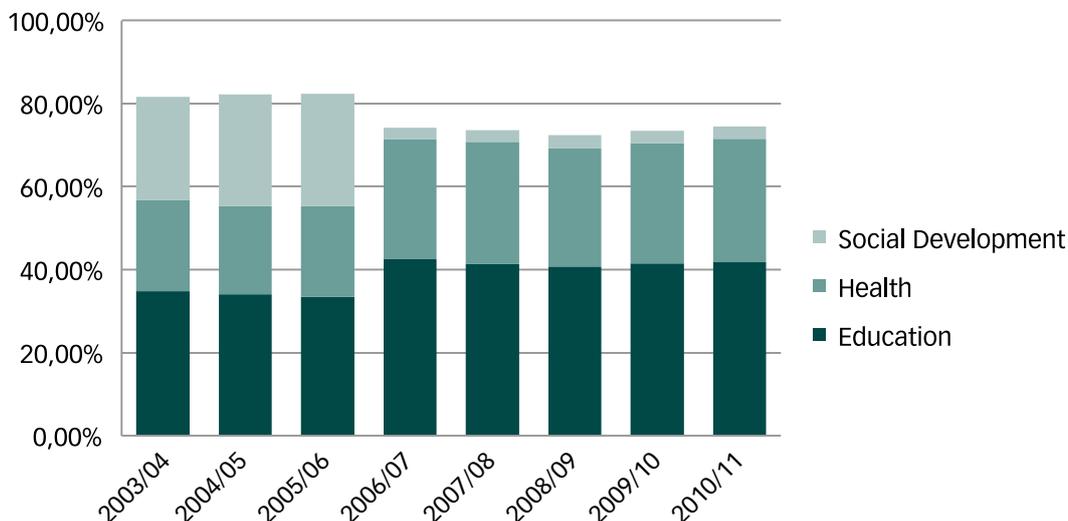
Source: National Treasury database

The analysis shows that, at an aggregate level, the PES formula is redistributive and resources are equitably allocated. Section 3.6.2 discusses provincial budgeting processes and factors that are taken into account when making allocations to schools. As a general rule, the hypothesis is that resources are equitably allocated at all levels of budgeting.

3.6.2 Provincial executive budgetary choices

The second level of budgeting for schools is at an executive level, where the provincial executive (legislature) determines the amount of funding allocated to education. However, this takes place under soft constraints from national policy, as national policies influence the share of provincial budgets allocated to certain provincial expenditure line items. For example, national government (through the National Bargaining Council) determines the amount of funding allocated to teachers' salaries. Therefore, a combination of provincial executive decisions and national policies ultimately decides provincial expenditure composition. As Figure 36 shows, education has accounted for over 40% of provincial expenditure since 2006/07.

Figure 36: Aggregate provincial expenditure composition (2003–2010)

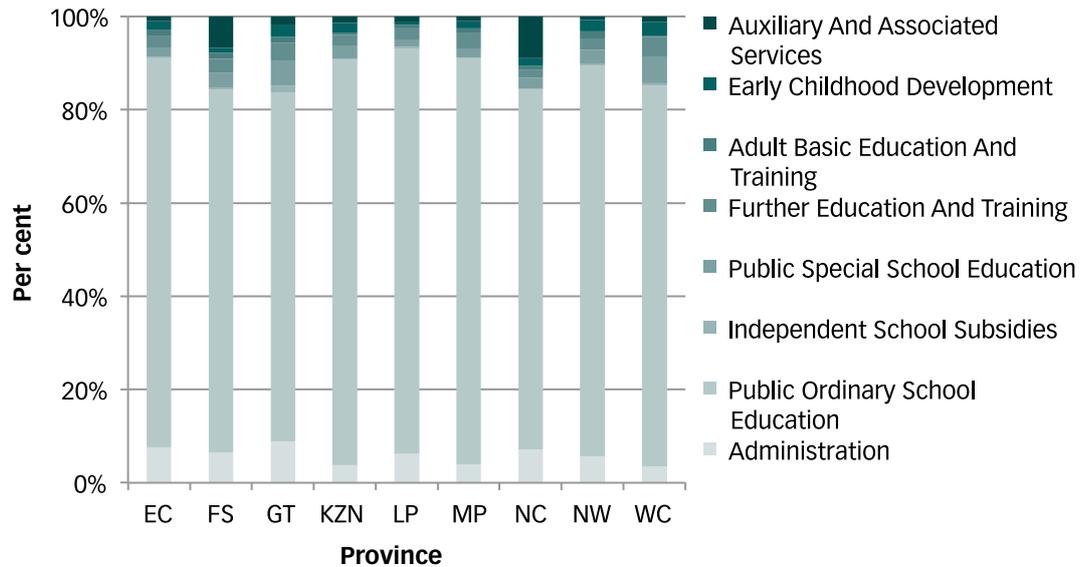


At this level, the different provincial-specific needs determine the composition of the budget. For instance, Gauteng and the Western Cape allocate 38% and 35%, respectively, of their total budget to education, whereas Limpopo and the Eastern Cape allocate 46% and 48%, respectively.

3.6.3 Functional disaggregation

At the third level of budgeting, the Member of the Executive Council (MEC) responsible for education further disaggregates the budget and allocates resources to schools, taking into account province-specific circumstances. Figure 37 shows that across the nine provinces, public ordinary schooling is the priority expenditure line item in the education budget, accounting on average for just over 80% of total education allocations. At this level of budgeting, allocations are based on whether resources are targeted at priority programmes rather than equity concerns.

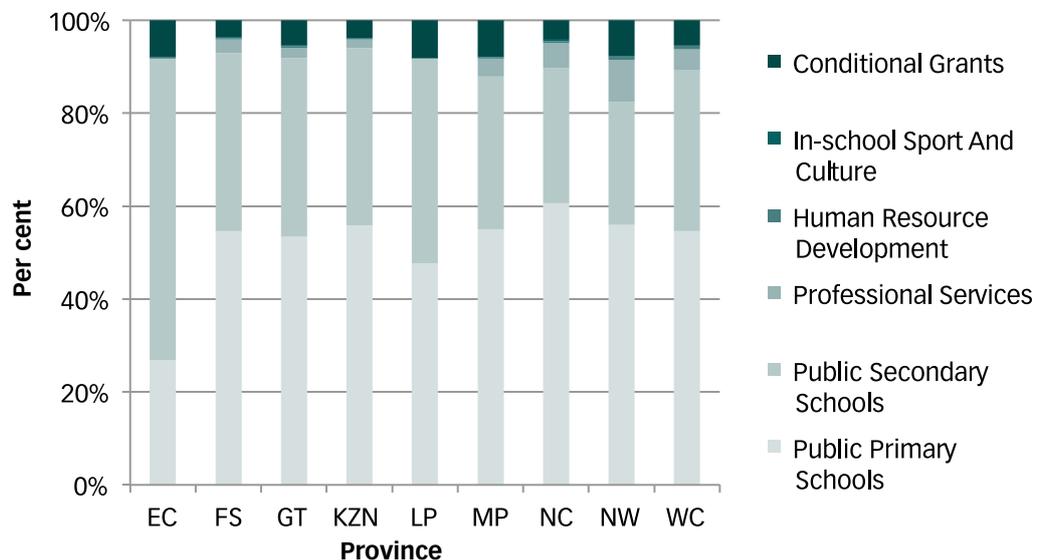
Figure 37: Composition of provincial education allocations (2012/13)



Source: National Treasury database (2013)

The final level of allocating funding to schools occurs at sub-programme level, where resources are allocated to various subcomponents of public ordinary schooling. For instance, in the Eastern Cape, the emphasis tends to be disproportionately on secondary schools, whereas other provinces allocate more than half of the public ordinary school budget to primary schools (see Figure 38). The budgeting patterns of the Eastern Cape are inconsistent with the research that shows a positive relationship between primary school participation and learning outcomes in subsequent grades (OECD, 2011). The relationship is strongest in schooling systems that offer primary education to a larger proportion of the student population over an extended period, have a small pupil-to-teacher ratio (14:1), and invest more per child.

Figure 38: Composition of public ordinary schools allocations (2012/13)



Source: National Treasury database (2013)

In spite of what appears to be an elaborate budgetary decision-making process, provinces have little or insignificant control over a considerable proportion of expenditure items. More than 90% of primary and secondary school allocations are earmarked for employees' salaries, leaving provinces with fewer resources for other essential non-personnel non-capital (NPNC) education inputs, such as learning and teaching support material (LTSM), school maintenance and other day-to-day operational costs.

To cater for these education inputs, the NNSF policy requires provinces to allocate certain amounts for different categories of learner in public ordinary schools. However, as Table 40 shows, after covering personnel costs, few provinces can adequately fund schools as per the national policy guidelines. On average, provinces use 8% of primary and secondary school allocations for NPNC inputs. Limpopo and the Northern Cape and North West provinces are unable to meet the learner-subsidy targets because of their large wage bills. The situation is especially serious in the North West Province, where the estimated per learner allocation is R175 compared to the average target of R814.

Table 40: Estimated variance between allocated and stipulated learner subsidies – 2012 (Rand)

	EC	FS	GT	KZN	LP	MP	NC	NW	WC
Primary schools allocation	5 889	4 461	11 299	17 300	9 099	6 885	1 979	5 109	6 368
Secondary schools allocation	14 187	3 131	8 161	11 810	8 376	4 121	954	2 407	4 051
Total allocation	20 076	7 592	19 460	29 110	17 475	11 006	2 933	7 516	10 419
Compensation of employees	18 101	7 000	16 804	25 382	16 202	10 202	2 755	7 383	9 389
COE as % total school allocation	90%	92%	86%	87%	93%	93%	94%	98%	90%
Residual / school subsidies	1 975	592	2 656	3 728	1 273	804	178	133	1 030
No of secondary school learners	614 454	244 813	677 137	1 538 012	680 471	387 617	91 930	259 678	335 343
No of primary school learners	1 130 356	367 909	1 052 827	1 057 454	850 275	575 576	165 862	447 931	584 754
Total number of learners	1 886 982	646 093	1 858 745	2 812 844	1 665 013	1 027 851	274 189	760 272	991 685
Estimated per-learner allocation	1 046	916	1 429	1 325	765	782	649	175	1 038
Average prescribed per-learner subsidy weighted by provincial poverty distribution	858	786	676	805	891	798	771	814	580
Variance	188	130	753	521	-127	-15	-123	-639	459

Source: Own Calculations

3.7 Determinants and Processes of Budget Allocations to Schools

The SASA and the NNSF inform individual school allocations. The NNSF was introduced in 1998 to address the historical resource gap between rich and poor schools and to ensure equitable distribution of non-personnel resources across different types of school. The motivation for introducing school funding norms was driven by the desire to achieve equity in public spending and distribute resources on the basis of need and poverty. The NNSF:

- sets out the financial responsibilities of the state and the general public in relation to public ordinary and independent schools;
- outlines average adequacy benchmarks;
- provides predetermined funding targets for learners of different socio-economic status; and
- regulates school-fee exemption requirements and the general governance of public ordinary schools.

The SASA and the NSSF require provinces to budget for NPNC expenditure, which is allocated to public schools through a predetermined funding framework. Schools are categorised into five quintiles representing the socio-economic status of the community within which they are based: quintile 1 represents the poorest schools and quintile 5 represents the more affluent schools. Each school is allocated funding according to the set minimum per-learner allocation applicable to each quintile. The poorest schools (quintiles 1, 2 and 3) are classified as fee-free and receive 80% of available NPNC funding.

Table 41 gives a summary of the national learner subsidy allocations. National government has decided that the minimum adequate allocation is R926 per learner per annum. However, the target funding level for learners in quintile 1, 2 and 3 is R1010, whereas learners in quintile 4 and 5 receive R505 and R174, respectively. The NSSF specifies that 30% of the NPNC budget must be allocated to quintile 1 schools (22.9%) and cover 100% of the learners. The NPNC must allocate 27.5% and 22.5% of its budget to schools in quintile 2 and 3, respectively, and also cover 100% of the learners. Schools in quintile 4 and 5 (35% of the total schools) receive 20% of the NPNC budget.

Table 41: National targets for school allocations (2013)

Quintile	Per Learner allocation	Proportion of funding allocated	% of schools / quintile	No Fee target (No of learners targeted)
Quintile 1	R1010	30%	22.9 %	100%
Quintile 2	R1010	27.5%	16.7 %	100%
Quintile 3	R1010	22.5%	24.9 %	100%
Quintile 4	R505	15%	18.8 %	67%
Quintile 5	R174	5%	16.7 %	22%
No Fee threshold/ minimum adequate	R926			

Source: Government Gazette, 2013

In the absence of actual allocations from all provinces, Table 42 translates the per-learner subsidy targets into estimated provincial allocations by school quintile.

Table 42: Estimated schools subsidy allocation by province by school quintile (2012/13)

R'000	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
Eastern Cape	661 331	411 664	400 229	110 539	35 789	1 619 551
Free State	200 987	97 231	131 163	61 340	17 313	508 033
Gauteng	197 120	214 016	514 389	255 317	76 328	1 257 170
Kwazulu-Natal	687 515	534 103	727 289	245 744	69 010	2 263 662
Limpopo	571 765	375 011	418 734	97 536	20 859	1 483 906
Mpumalanga	173 368	209 702	309 363	103 294	24 144	819 870
Northern Cape	72 833	49 017	59 817	20 493	9 351	211 510
North West	174 308	116 717	234 202	78 707	14 552	618 485
Western Cape	65 104	80 128	231 370	138 722	59 703	575 028
Total	2 804 330	2 087 588	3 026 556	1 111 693	327 048	9 357 216

Source: Author's calculations

The total estimated budget for learner subsidies, or NPNC allocations, is R9.3-billion, of which more than 70% is allocated to four provinces: the Eastern Cape, Gauteng, KZN and Limpopo. These provinces have to set aside proportionally large percentages of their public ordinary school allocations to NPNC inputs because of high levels of poverty. For example, 56% of learners in the Eastern Cape and Limpopo provinces attend quintile 1 and 2 schools compared to only 13% in the Western Cape.

In provinces with an over-concentration of poor learners, learner subsidies are below the national targets because the education component of the PES formula and the NPNC allocations to schools are calculated very differently. At provincial level, the education component of the formula bases allocation on only school enrolment and school-age population, whereas NPNC allocations are made on the basis of poor learners. Therefore, provinces with a high number of learners falling in quintile 1 and 2 are disproportionately overburdened.

For the Eastern Cape, Limpopo and Western Cape provinces, the estimated learner subsidy allocation is R1.6-billion, R1.5-billion and R575-million, respectively. The estimated allocations were checked against actual data from the Free State Province, and little variance was found: in 2012/13, the total subsidy appropriation to schools in the province was R493-million, compared to an estimate of R508-million (see Table 42).

The question that arises from the estimates in Table 42 is whether subsidy allocations are equitable or sufficient to provide adequate education levels to different groups, given the historical socio-economic disparities. The answer is beyond the scope of this study and lies at the heart of the Constitution, which requires the progressive realisation of basic needs. In other words, provinces must always try to provide universal good quality education within the limits of available resources. However, provinces are struggling to provide adequate education or full curriculum delivery because of budget constraints and insufficient school subsidies (Gauteng Department of Education, 2013; Ndlovu, 2012; Oliphant, 2008²³). For instance, the Free State Department of Education claims that it is only able to fund a third of learner subsidies in 2014/15. The current prescribed norms and standards for school funding also fall short of the amount required to provide textbooks (estimated at R1800 per learner).

In Gauteng, the provincial education department bails out schools unable to pay for municipal services, but it is unable to fulfil the requirements of the new CAPS and has a funding shortfall of R300-million for Grade 12 textbooks. The province attributes part of the shortfall to unfunded and uncosted national policies (i.e. CAPS) that require provinces to provide one textbook per learner per subject. Books are also purchased at different prices, which causes budgeting nightmares and unnecessary shortages, while ambiguous budgeting means that schools are often unsure about how to access funds to cover operational costs (Ndlovu, 2012). Free State municipalities cut off basic services to schools which are unable to pay, as the province is unable to bail them out.

3.7.1 Implementation, disbursement and management of school subsidies allocations

The final stage in the budgeting and fund allocation process is when the MEC places a notice in the provincial gazette detailing the per-learner allocations and the total amounts to be transferred to each school. The total transferred to each school depends on the quintile level and the total number of learners as per EMIS,²⁴ SNAP survey²⁵ and SA SAMS²⁶ data. However, what happens in practice differs slightly from policy directives, as Table 43 indicates.

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²³ Oliphant, L. 2008. 'Why no-fee schools are set to fail: educators say funds are insufficient'. City Press, 10 February 2008, p. 10.

²⁴ EMIS: Education Management Information System.

²⁵ The SNAP survey is completed by all ordinary schools (public and independent) and includes a complete count of learners, personnel, and details concerning the learners, resources and equipment of the school. The data collected from this survey forms part of the national EMIS database.

²⁶ SA-SAMS: South African School Administration and Management System.

Table 43: Actual provincial allocation per learner against national targets – 2012/13 (Rand)

Quintile	National Target	EC	FS	GT	KZN	LP	MP	NC	NW	WC
1	1 010	926	1 010	1 010	932	808	1 010	1 010	1 010	1 012
2	1010	926	1010	1010	932	740	1010	926	1010	1011
3	1010	926	1010	1010	932	740	1010	926	1010	1011
4	505	505	505	505	505	505	505	505	606	548
5	174	174	174	240	505	174	138	174	174	250

Source: National Treasury, 2013.

The Eastern Cape, KZN, and the Northern Cape fund quintile 1 to 3 learners at a level equal to, or slightly above, the no-fee threshold of R926, whereas Limpopo seriously underfunds quintile 2 and 3 learners (allocating 20% and 27%, respectively, below the no-fee threshold and national target). In contrast, Gauteng, KZN and the Western Cape fund quintile 5 learners at a level above the national target. Gauteng schools also receive a once-off top-up allocation of R35,000 for administration and other related costs. The variations in learner allocations suggest inequitable distribution of resources among provinces. They also reflect poor provincial fiscal choices and management, where certain expenditure priorities take precedence over education financing.

NNSSF regulates subsidy transfers to schools, outlining conditions under which allocations are transferred directly to schools and how they must be used. The SASA identifies two school types: Section 21 schools and non-Section 21 schools. Section 21 schools are self-managing and have a greater degree of authority and autonomy over the management of school funds and the general running of the schools. The learner subsidy allocations are paid directly into their school accounts, so they can buy their own consumables and pay for other budget items. In the case of non-Section 21 schools, their budgets are controlled centrally by the provincial education departments (PEDs) through a proxy budget that indicates how funds should be allocated (Ndhlovu, 2012). Table 44 shows how the NNSSF prescribes that non-Section 21 schools apportion their budget, although some provinces have adopted a different framework to suit their conditions. For instance, Mpumalanga requires schools to budget for only a part of their allocation because LTSM is centrally procured.

Table 44: Expenditure distribution of school allocations as per NNSSF

Items	% allocation
<ul style="list-style-type: none"> LTSM: textbooks, charts, posters, science equipment, musical instruments, sport equipment, televisions, etc. Non-LTSM equipment: furniture, paper, cleaning equipment, sport equipment, electrical accessories. Consumables: stationery for learners and office, paper, petrol, etc. 	50
<ul style="list-style-type: none"> Services relating to repairs and maintenance: equipment repairs and maintenance, small building repairs and maintenance, replacing of light bulbs. 	12
<ul style="list-style-type: none"> Municipal services: municipal service accounts, e.g. electricity, water, and sewerage and refuse removal, excluding payments for property tax. 	38

Source: National Treasury (2013)

The centralisation of school budgets has implications for the delivery of good education outcomes. Firstly, provinces and districts do not have sufficient capacity to process requisitions from schools quickly, which leads to late delivery of goods or supply of services. Secondly, and perhaps most importantly, the schools are unable to track actual expenditure on their budget despite being expected to reconcile spending with allocations (Giese et al., 2009).

The variation in per-learner allocations occurs at an aggregate level between provinces, and also within and across districts and different types of schools. However, the reasons for the variation are unrelated to provincial expenditure decisions and inequitable school funding norms. Instead, the variation in allocation to different schools within (and across) the districts is explained by the number of learners per school and the school quintile. In other words, schools that have a small number of learners are allocated fewer resources or a fixed amount, irrespective of the quintile level. The exception is Gauteng, which provides a top-up allocation of R35,000 to all schools. Table 45 shows the learner allocations in the five districts of the Free State.

Table 45: Comparison of learner allocation by district by type of school (2012/13)

Free State		Non Section 21	Section 21	Total
Fezile Dabi	Appropriation/Learner	R1 144	R818	R835
	Learner/Educator	21	28	27
	Number of learners	5 523	102 968	108 491
	Number of schools	114	133	247
	Number of learners/school	48	774	
Lejweleputswa	Appropriation/Learner	R1 030	R815	R822
	Learner/Educator	17	28	27
	Number of learners/school	49,2	733,73	
Motho	Appropriation/Learner	R770	R700	R706
	Learner/Educator	27	28	R28
	Number of learners/school	176	725	
Thabo Mufutsanyana	Appropriation/Learner	R1 033	R885	R891
	Learner/Educator	21	27	R27
	Number of learners/school	28	605	
Xhariep	Appropriation/Learner	R927	R882	R886
	Learner/Educator	24	26	R26
	Number of learners/school	126	493	

Fezile Dabi district has the highest per-learner appropriation in non-Section 21 schools, while Thabo Mofutsanyane has the highest per-learner appropriation in Section 21 schools. Lejweleputswa district has the lowest per-learner appropriation in both non-Section 21 and Section 21 schools. A disturbing picture that emerges from Table 45 is that Section 21 and non-Section 21 schools have a relatively equal number of schools, but with a skewed distribution of learners. Fezile Dabi district has 114 non-Section 21 schools with only 5500 learners (i.e. a learner-school ratio of 48) and 133 Section 21 schools with 103 000 learners (i.e. a learner-school ratio of 774). Thus, non-Section 21 schools have more resources to spend per child, even though learners are funded equally at an aggregate level. Poorer schools are better resourced given that most non-Section 21 schools fall in quintile 1, but these resources do not necessarily translate into better outcomes.

3.7.2 Monitoring and evaluation of school allocations

According to the SASA, school governing bodies (SGBs) are responsible for preparing budgets, keeping financial records and monitoring funds received and spent. This is done under the oversight of PEDs, which assumed monitoring responsibilities after a long history of weaknesses in SGBs and to meet the requirements of the Public Finance Management Act (PFMA). Section 8 of the National Education Policy Act also requires the provincial heads of education departments to check that national funding norms are complied with or that acceptable alternatives are implemented.

With regard to monitoring, National Treasury (2013) found that (1) no uniform method for monitoring allocations exists across the nine provinces; (2) the PEDs focus mainly on expenditure performance and verification of learner numbers; and (3) no proper controls are in place for reconciling the budget with expenditure, particularly in relation to municipal services. For example, KZN schools confirm how funds have been used in affidavits to district offices, while Western Cape, Eastern Cape and Northern Cape schools submit quarterly and monthly reports to district offices. In Mpumalanga, the head of department oversees a steering committee, which monitors adherence to targeted per-learner funding and spending by schools. Both Limpopo and the Western Cape transfer school allocations upon receipt of audited financial statements and satisfactory quarterly reports, and Limpopo schools are penalised 70% of their allocations if they fail to submit financial statements by mid-year (Ndlovo, 2012). The PEDs admit that they are unable to monitor all the schools that have identified capacity problems.

3.8 Distribution of Other Essential School Resources

According to SASA, the National Education Policy Act, NNSF, the National Policy for an Equitable Provision of an Enabling School Environment and the recently published norms and standards for school infrastructure, the Minister of Education must ensure an enabling learning and teaching environment by providing basic learning and teaching support infrastructure. These policies also oblige the Department of Basic Education to prioritise schools in the poorest quintiles.

3.8.1 Teachers

Teaching quality is an important element for improving learner achievements, even though no agreement on specific educator characteristics exists. Nevertheless, policy interventions prioritise an increase in the quantity and quality of teachers by rewarding educators with more qualifications and reducing class sizes. From the aggregate data, South Africa does not appear to have a significant shortage of teachers, but inequities in the allocation of teachers between poor and affluent schools are not revealed.

The annual allocation of posts to schools (“post provisioning”) occurs in terms of the Employment of Educators Act (No. 76 of 1998) and depends on collective agreements reached at the Education Labour Relations Council. The national minister determines the distribution model in consultation with provincial MECs, departments of education and provincial treasuries. MECs (provincial ministers of education) have the power to establish posts. This power is controversial because of the growing education wage bill and the subsequent crowding out of non-personnel expenditure.

Teaching posts are allocated to schools using the post-distribution model (post provisioning), which is based on the number of learners, grades, study fields or subjects and language(s) of instruction. This means that schools with large numbers of learners and subject offerings are allocated more posts. In 2002, the post-provisioning model was revised to take into account the poverty grading of a school, allowing provinces to retain a maximum of 5% of available posts that can be allocated to schools as “redress” posts (i.e. redressing historical inequalities). Over 80% of these posts are allocated to 60% of poorest schools.

This model suggests that a school with a wide spread of subjects or languages will be allocated more teachers than a school with fewer subjects or languages, even if the two schools have the same number of learners. Therefore, the model benefits more “affluent” schools because it does not take into account “historical competencies” that resulted in the different level and spread of subject offerings (Equal Education, 2009). These competencies include the ability of affluent schools to employ additional teachers using SGB funds and to attract experienced and qualified teachers. A combination of these factors, together with the unintended effects of reducing curriculum spread in rural schools, thus reinforce inequities.

3.8.2 Infrastructure

Infrastructure has been found to have a significant impact on learner achievement, wellbeing, enrolment and attendance (Branham, 2004; Cuyvers, 2011; Murillo, 2011). Access to water, electricity, communication and libraries all have a positive impact on education outcomes across the income distribution (Bhorat and Oosthuizen, 2008).

South Africa has backlogs in high school infrastructure. In 2011, nearly three-quarters (72.2%) of schools did not have libraries, about a quarter of schools (27.5%) had no toilets, and 9% did not have electricity. A further 85% and 77% had no laboratories and computer rooms, respectively. More disturbingly, only 7% of school libraries and 10% of school computer rooms were fully stocked (DBE, 2011).

Infrastructure backlogs are particularly serious in the Eastern Cape, KZN and Limpopo, as well as in poor quintile schools (see Table 46). More than 65% of schools in the Eastern Cape have a learner–classroom ratio of over 45, while 41% of schools in KZN do not have adequate toilets. Limpopo has the highest proportion of schools without libraries. Of the quintile 1 schools, over 22% have no electricity, 14% have no water, and more than 92% are without libraries.

Table 46: School infrastructure backlogs by province and school quintile (2006)

% of public ordinary schools					
Province	No electricity	No water	No toilet	No library	Learners/ classroom \geq 45
Eastern Cape	19.6	19.1	60.8	90.2	66.8
Free State	11.1	11.1	30.1	69.3	9.2
Gauteng	0.4	0.1	2.6	39.8	17.2
KwaZulu-Natal	25.8	10	41.4	79.7	26.6
Limpopo	5.4	6.3	39.5	92.5	18
Mpumalanga	10.5	6.1	26.2	82	26.8
Northern Cape	3.9	1.4	13.2	69.6	9.9
North West	4	1.5	33.3	80.2	16.6
Western Cape	0.1	0	0.8	46	6.7
School quintile					
Q1	22.1	14.8	53.3	92.1	35.2
Q2	16.9	12.2	47.8	88.6	32
Q3	8.2	5.4	30.6	77.4	31.2
Q4	1.8	0.5	6.7	55.2	26.4
Q5	0.6	0.2	2.2	29	14.9
National average	9.0	6.2	27.5	72.1	22.0

Source: Adopted from National EIMS (2006)

The NSSF states that PEDs must budget for school infrastructure from their overall education budget but, unlike for learner subsidy allocations, does not prescribe the amount of infrastructure funds to be allocated to each province or type of school. It simply states that funding must show preference for redress and equity. Historically, PEDs under-budgeted for school infrastructure, resulting in severe pressure on NPNC expenditure and deteriorating infrastructure. In recent years, funding for school infrastructure has become programme-based and diverted into conditional grants overseen by the national Department of Basic Education. The two main conditional grants are: the school infrastructure grant (allocated directly to provinces and implemented by the Department of Public Works on behalf of the PED), and the school infrastructure backlogs grant, which is an in-kind grant managed by the Development Bank of Southern Africa on behalf of the national education department.

Table 47: School infrastructure grant allocations by province

	2011/12		2012/13	
	Amount (R'000)	%	Amount (R'000)	%
Eastern Cape	968,435	18%	883,403	15%
Free State	418,776	8%	459,635	8%
Gauteng	461,011	8%	512,866	9%
KwaZulu-Natal	1,158,136	21%	1,247,477	21%
Limpopo	874,897	16%	942,091	16%
Mpumalanga	472,881	9%	530,711	9%
Northern Cape	289,158	5%	307,609	5%
North West	469,967	9%	507,200	9%
Western Cape	385,039	7%	431,397	7%
Total	5,498,300		5,822,389	

Source: National Treasury (2013)

Table 47 shows that over half (55% in 2011/12 and 52% in 2012/13) of the school infrastructure grant is allocated to the three provinces with the highest infrastructure backlogs: the Eastern Cape, KZN and Limpopo. Similarly, the school infrastructure backlogs grant is allocated mainly to the Eastern Cape (65% in 2012/13 and 90% in 2013/14) for the eradication of inappropriate school structures. The remainder is allocated to other provinces to reduce basic services backlogs (as part of the Accelerated School Infrastructure Delivery Initiative Programme). These two grants account for over R11-billion in education infrastructure expenditure. Other education infrastructure expenditure comes from smaller provincial-own allocations. The contribution of PEDs to capital spending from their own PES allocations has been declining over time, as conditional grant allocations increase. As Table 48 shows, the capital expenditure of most provinces (with the exception of KZN and Gauteng) is funded entirely from conditional grants. The Free State PED is unable to budget additional funds for infrastructure from its own revenue and only spent 1% of its education infrastructure grant on infrastructure maintenance. Schools with dilapidated infrastructure (many of which are rural) are placed on an infrastructure maintenance/refurbishment waiting list.

With the introduction of the new norms and standards for school infrastructure (DBE, 2013), financial arrangements will need to be realigned and increased drastically to meet the full implementation target date of 2030.

Table 48: Provincial own allocations to infrastructure (Rand) 2013

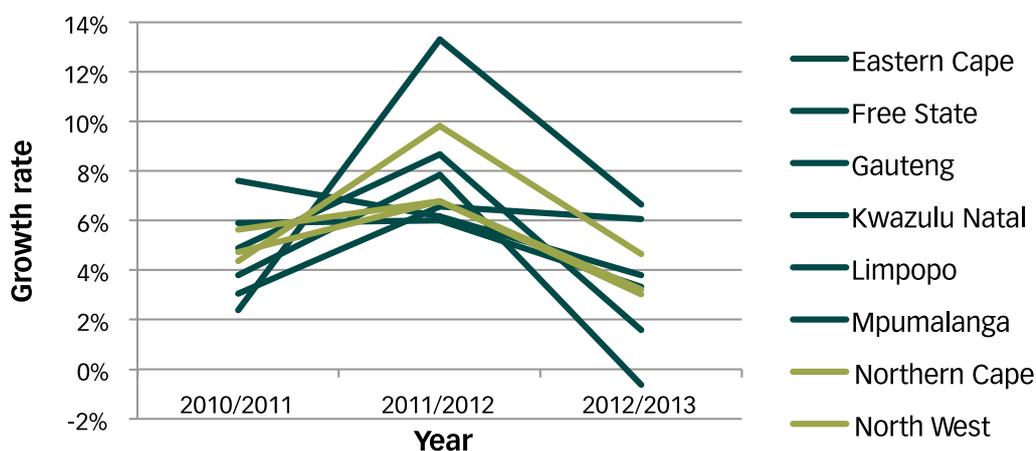
	Capital Spending	school Infrastructure Grant	Variance
Eastern Cape	972 857	883 403	89 454
Free State	496 137	459 635	36 502
Gauteng	1 466 152	512 866	953 286
Kwazulu Natal	2 696 135	1 247 477	1 448 658
Limpopo	893 620	942 091	-48 471
Mpumalanga	614 552	530 711	83 841
Northern Cape	310 153	307 609	2 544
North West	504 645	507 200	-2 555
Western Cape	585 006	431 397	153 609
Total	8 539 257	5 822 389	

Source: Adopted from National Treasury, 2013.

3.9 Translating Resources into Better Outcomes

The relationship between education funding and outcomes has been widely explored and found to be insignificant. South Africa spends approximately 6% of its total gross domestic product (GDP) on education but consistently fails to produce a commensurate improvement in education outcomes. Figure 39 suggests that the rate of growth in per-learner allocation is decreasing, perhaps indicating government’s acknowledgement that education outcomes do not respond to increasing resources. Despite this decline, funding norms appear to have contributed towards reducing inequity in funding to schools, but quality of education is proving to be a more enduring problem (Taylor, 2011). Given these findings, the question is whether allocations to schools have any effect on school performance.

Figure 39: Average provincial expenditure per learner (2010–2012)



Source: Calculated from National Treasury data

An analysis of the Free State province found a strong negative correlation between allocations to schools and education outcomes (matric results and Annual National Assessment (ANA) tests) in Grade 12 (matric), Grade 3 and Grade 9 (see Table 49). The correlation coefficient between Grade 6 results and school allocations is positive but weak. A weak correlation between allocations and outcomes is cause for serious concern, even though the nature of the analysis does not allow conclusive observations to be drawn. The results suggest diminishing returns, as after increasing up to Grade 6, the correlation coefficients start to decline.

Table 49: Correlation matrix – school allocations and education outcomes 2013

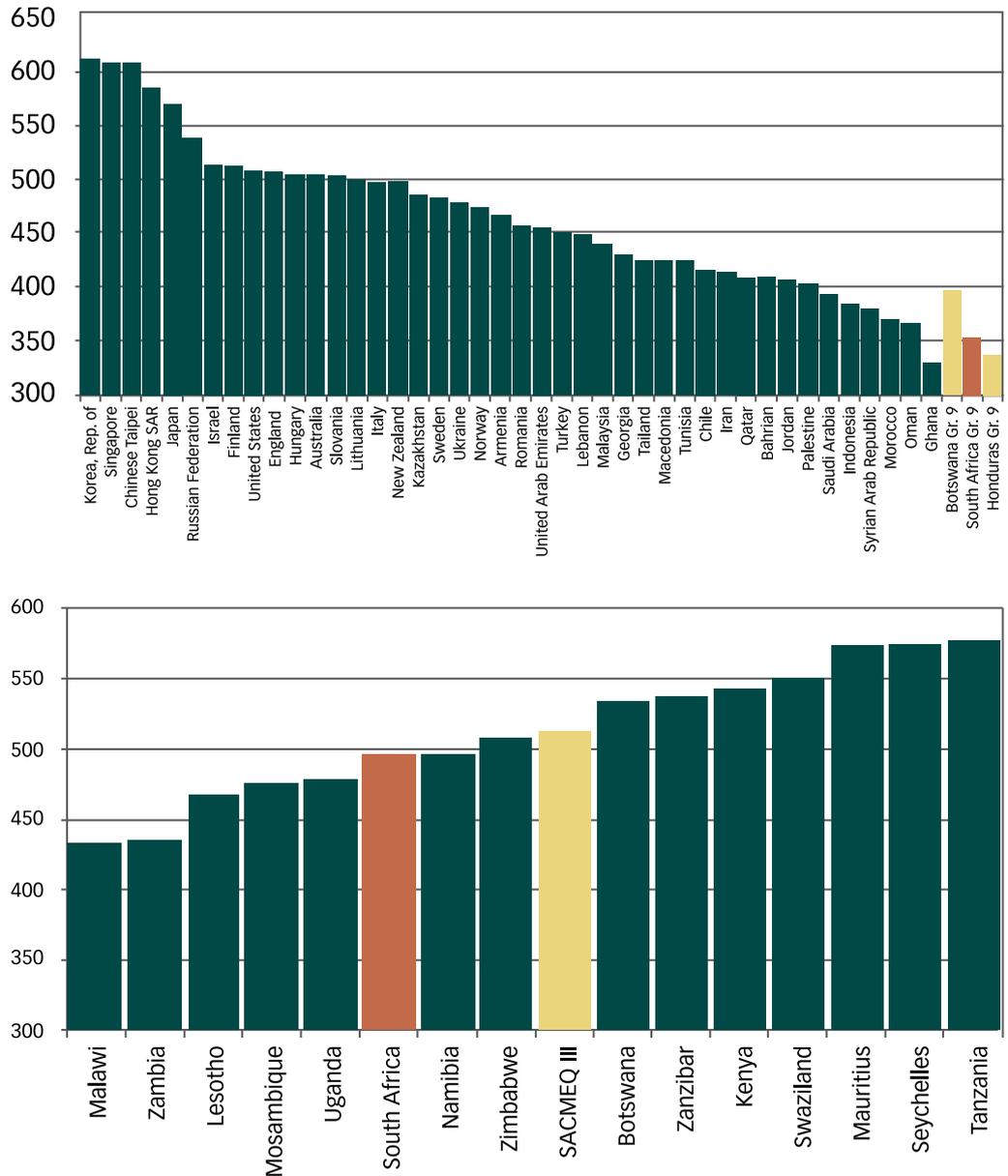
	Matric Pass	ANA 3	ANA 6	ANA 9	S A
Matric Pass Rate	1				
ANA 3 Index	-0,90	1			
ANA 6 Index	-0,48	0,63	1		
ANA 9 Index	-0,81	0,85	0,84	1	
School allocations (SA)	0,10	0,27	0,69	0,44	1

Source: Author's calculations

South Africa's educational quality lags far behind that of peer countries, as demonstrated by international tests, such as the Trends in International Maths and Science Surveys (TIMSS), Progress in International Reading Literacy Study and the Southern and East African Consortium for the Monitoring of Education Quality (SACMEQ). South Africa performed the worst in mathematics and just below average on reading (see Figure 40).

Figure 40: South Africa's performance on maths and reading tests

Source: Van der Berg (2006)



²⁷ Grade 3 ANA results are an index of maths and home language results weighted equally.

²⁸ Grade 9 ANA results are an index of maths and home language test results weighted equally.

²⁹ Grade 6 ANA results are an index of maths, home language and first language test results weighted equally.

As Figure 40 shows, South Africa ranks the lowest compared to other middle-income countries, and poor education attainment is concentrated in poorer communities. The TIMSS survey found inequities in education quality and an inverse relationship between funding and attainment levels, particularly within quintile 1 and 2 schools. Crouch and Mabogoane (1998) attribute the high variability in school performance to different efficiencies, managerial problems in many schools, and variation in learner backgrounds and teacher inputs. Yet the differences in reading and mathematics performance between poor and affluent schools far exceeded that of other SACMEQ countries, suggesting that the problem may very well be structural (Van der Berg, 2006).

Figure 41: TIMSS 2011 – science performance

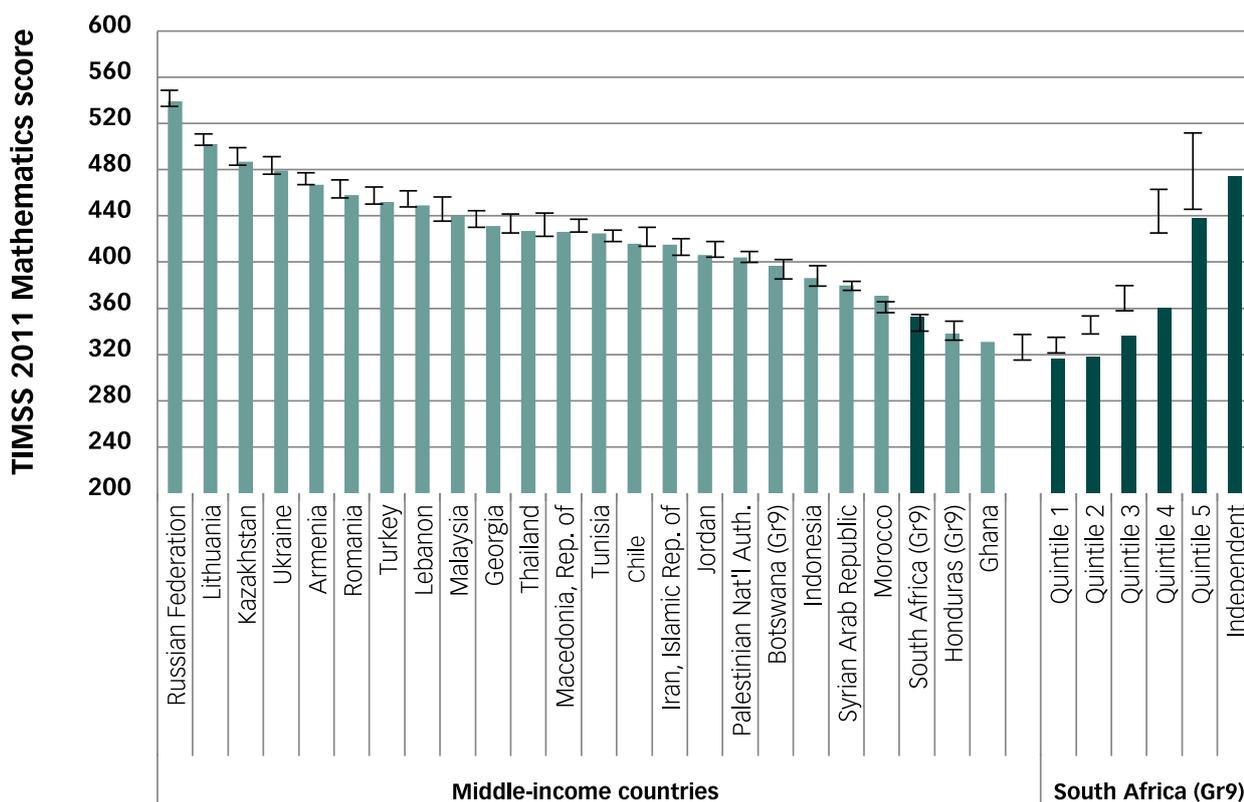


Table 50 and Table 51 show that poor performance is concentrated in the poor regions of South Africa – the Eastern Cape, Limpopo and KZN provinces – where most quintile 1 and 2 schools are concentrated and levels of social and economic deprivation are undesirably high. Common features that cut across districts with low education achievement levels are high levels of unemployment, poverty, education infrastructure backlogs and rurality.

Source: Van der Berg (2006)

Van der Berg (2005) found that parents' education levels explained 32% of the child's education achievement, whereas household income did not have a significant effect on learner achievement in low quintile schools. Pupil characteristics, such as age, gender, home language and household structure, are significant to academic performance, while other variables, such as attendance rate and access to textbooks and equipment, are also positive influences. Interestingly, learner outcomes were not related to teacher training, pupil-teacher ratios or rurality.

Schools in South Africa's centres of economic power consistently top education performance outcomes. In contrast, schools in the rural provinces and districts rank the lowest in both matriculation results and ANA tests. In particular, districts in the Eastern Cape and the Greater Sekhukhune District of Limpopo Province appear in the bottom five of most test results. The consistent poor performance of poor regions reinforces poverty and contributes to the continuous cycle of low education achievement.

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³⁰ When the threshold performance is increased to 50% below average.

Table 50: Index of education performance outcomes by province by district (2012)

Matric	District	ANA 3	District	ANA 6	District	ANA9	District	Total	District
Top 5	GP	Gauteng north	GP	Ekurhuleni south	GP	Ekurhuleni south	Tshwane south	GP	Ekurhuleni north
	GP	Tshwane north	GP	Ekurhuleni north	GP	Sedibeng east	Sedibeng east	GP	Ekurhuleni south
	GP	Ekurhuleni north	GP	Sedibeng east	WC	Metropole_Central	Ekurhuleni north	GP	Tshwane south
	WC	Westcoast	GP	Gauteng east	GP	Tshwane south	Ekurhuleni south	GP	Sedibeng east
	GP	Tshwane south	EC	East London	WC	Metropole_South	Gauteng west	WC	Metropole_Central
Bottom 5	EC	Butterworth	EC	Lady Frere	EC	Maluti	Ugu	NW	DR. R.S. Mompoti
	EC	Dutywa	NW	Ngaka M Molema	EC	Sterkspruit	Mopani	KZN	Obonjeni
	EC	Mt Frere	NC	John Taolo Gaetsewe	NW	DR. R.S. Mompoti	Obonjeni	LP	Mopani
	EC	Qumbu	LP	Greater Sekhukhune	KZN	Obonjeni	Greater Sekhukhune	LP	Waterberg
	EC	Fort Beaufort	NW	DR. R.S. Mompoti	LP	Greater Sekhukhune	Vhembe	LP	Greater Sekhukhune

Table 51: Index of education performance by province by district (2013)

Matric	District	ANA 3	District	ANA 6	District	ANA9	District	Total	District
Top 5		GP	Ekurhuleni south	GP	Ekurhuleni south	GP	Tshwane south		
		GP	Sedibeng west	WC	Metropole_South	FS	Motheo		
		GP	Ekurhuleni north	WC	Metropole_Central	FS	Thabo Mofutsanyana		
		GP	Tshwane south	GP	Sedibeng east	MP	Ehlanzeni		
		KZN	Umlazi	GP	Ekurhuleni north	FS	Fezile Dabi		
Bottom 5		LP	Waterberg	EC	Dutywa	LP	Vhembe		
		EC	Graaf-Reinette	EC	Fort Beaufort	KZN	Umkhanyakude		
		EC	Sterkspruit	EC	MT Fletcher	LP	Mopani		
		LP	Greater Sekhukhune	EC	Lady Frere	EC	Fort Beaufort		
		NC	John Taolo Gaetsewe	EC	Sterkspruit	LP	Greater Sekhukhune		

3.10 Conclusion and Recommendations

South Africa has an elaborate process of budgeting and allocating resources to schools. At an aggregate level, schools are funded through the education components of the PES, divided equitably across the nine provinces. Each province's share is then allocated to different functions and expenditure line items through a process involving the provincial executive and accounting officers. The allocations are mainly informed by national priorities, statutory costs and, in selected cases, province-specific priorities. Provincial budgets are essentially systematised to follow a particular allocation framework, which means that the budgetary decision-making process has very little room for discretion. Personnel costs account for more than 90% of the allocation, leaving only 10% for other important education inputs. The remainder is allocated directly to schools, as part of the school subsidy allocation or the NPNC budget. These subsidies are underpinned by the SASA and the NNSSF, which seek to improve equity in funding and delivery of quality education across schools of differing capacity.

The way in which the NPNC budget is allocated shows that South Africa has, at the very least, achieved equal treatment of learners. Allocations are made based on predetermined and pro-poor funding norms: a proportionally higher subsidy is allocated to learners in poor areas to account for their inability to pay and other costs constraints. However, the country has not necessarily achieved equitable education, given that the distribution of essential resources across different schools disregards historical disparities and other important constraints that affect disadvantaged schools in particular. Concerns also remain over the adequacy of the subsidy, particularly in schools that are entirely dependent on government allocations and in the light of increasing national policy priorities.

The provision of other essential education inputs is skewed and not aligned to the general policy framework of redressing funding and equity. The post-provisioning (teacher allocation) model is not informed by norms and standards, and does not take into account historical and geographic disabilities experienced by poor schools. Similarly, responsibilities for spending on infrastructure are not clearly distinguished between provinces and schools. For the most part, provinces rely on national conditional grants to fund new "big ticket" infrastructure, while the maintenance and refurbishment of old infrastructure is neglected. Although the NNSSF prescribes that a certain proportion of the learner subsidy allocation must be used for maintenance, in practice schools are unable to make such a provision because of the centralisation of their budgets or inadequacy of the subsidy.

Allocation of funding at the aggregate level is evenly distributed but becomes more unequal as the budget cascades down to schools. This inequality is in part because of poor provincial fiscal management and the distribution of poor learners across provinces and schools of different types. The variation in learner numbers, the number of no-fee schools across districts and the amount of funds spent on each learner create distortions, which show up as poor outcomes. More importantly, the subsidy allocation to schools is poorly managed and monitored. Recipient schools are unaware of how provincial education departments spend their allocations, and provinces have no means of ensuring and monitoring whether allocations are used in specified areas.

More disturbingly, growing evidence reveals a dissociation between resource provision and outcomes in schools, especially in poorer districts and provinces, such as the Eastern Cape and Limpopo. Part of the reason for the divergence is that input norms are not clearly linked to the production of output standards. Efforts to redirect additional financial resources to poor performing regions and schools need to be complemented by interventions that address the underlying causes of poor outcomes. Failure to address these concerns will inevitably create a perpetual cycle of inequality and deprivation.

The Commission makes the following recommendations:

1. The Department of Basic Education aligns learner subsidy allocations with national policy requirements and priorities. The current baselines do not cater for the significant increase in funding necessary to cover the CAPS requirements (including targets for learner textbooks and norms and standards for school infrastructure). The alignment must be carried out in conjunction with strengthening oversight of PEDs to ensure adherence to national policy priorities.
2. The allocation framework takes into account the full package of minimum education inputs when deriving the minimum adequate benchmark funding per learner in order to address the skewed distribution of resources between schools and districts. These inputs must be linked to both the process norms and output standards.
3. School funding norms and standards explicitly indicate the responsibilities of schools and PEDs for maintaining and upgrading school infrastructure, so that the division of expenditure is clear, in order to avoid prolonged neglect of infrastructure upgrades and to ensure consistent budget allocation for maintenance and its monitoring thereof.
4. The allocation framework for education infrastructure conditional grants sets out clear expenditure targets for quintile 1 to 3 schools and timelines for addressing priority infrastructure backlogs in each quintile. In addition, the school infrastructure backlogs grant make provision for transitional asset handover process to SGBs and PEDs on newly built schools. This would address alignment between funding for non-physical inputs and physical inputs, as well as curb decay of newly constructed infrastructure.
5. The Department of Basic Education and National Treasury monitor provincial learner subsidy allocations and intervene where national targets are not met or allocations are not transferred to schools on time. This can be done via a portal, similar to EMIS, through which individual no-fee schools can report: (1) payment delays and reductions in contravention of prescribed norms or (2) outright non-payment of learner subsidy allocations in contravention of payment schedules and gazetted allocations.
 - 5.1. PEDs, with the assistance of the national department, standardise monitoring of school-level expenditure and performance and, where necessary, provide shared services for preparing and auditing financial services. Information on performance must be consistently accompanied by inspectorate visits.
6. The Department of Basic Education integrates existing outcomes improvement programmes, such as the integrated national strategy to improve numeracy and literacy and mathematics intervention, and targets them to poor performing districts. Schools should be placed in the programme for a set period during which necessary infrastructure upgrades are carried out, skilled teachers are attracted and existing teachers trained, learner-specific interventions are carried out and, more importantly, SGBs are trained. This would ensure that interventions are holistic and targeted at the schools that experience multiple performance constraints and, more importantly, reduce inter-provincial variation in performance.
 - 6.1. PEDs must reprioritise their budgets for public ordinary schools away from personnel, to make adequate provision for learners, and redirect resources towards districts experiencing multiple performance obstacles.

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Appendix

Table 52: Education input and output norms

	Policy area	Input	Input norms		Output norms	
			Minimum	Maximum	Minimum	Maximum
Funding	LTSM, consumables and furniture	Learner subsidy allocation	50%	-	-	-
	Municipal services		38%	-	-	-
	Maintenance		12%	-	-	-
	Infrastructure	Infrastructure conditional grant	-	-	-	-
Educators	Teacher training (pre-service)	Quantity/quality of pre-service teacher training	Education diploma/ NQF 5	-	Set competency levels	Set competency levels
	Teacher training (in-service)	Quantity/quality of in-service teacher training	-	-	-	-
	Teacher supply distribution	Learner-educator ratio	-	30-40	-	-
Non Educators	Administration		-	-	-	-
	Security		1	-	-	-
Classrooms	Class supply	Number of classrooms	-	-	-	-
	Classroom size		1.2 m x 1.5 m	2 m x 2.6 m	-	-
Curriculum	Curriculum	Relevance/clarity of the curriculum		-	-	-
	Contact time	Contact time	7 hours	-	Set competency levels	Set competency levels
	Grade repetition	Level of learner repetition	-	2	-	-
	School admissions and streaming policy	Level of stratification	-	-	-	-
LTSMs	Materials provisioning	Quantity of LTSMs	1 textbook / learner	-	-	-
	ICT	Quantity of cutting edge LTSMs		-	-	-
Infrastructure	School construction, equipment and design	Quality of school buildings and equipment	Comply with policy	-	-	-
	Libraries and laboratories		1	-	-	-
	Sport and recreational facilities		1	-	-	-
	Electronic connectivity		Comply with policy	-	-	-
Management	Management training	Management capacity of school principal	-	-	-	-
	School principal conditions of service	School principal salary and fringe benefits	-	-	-	-
	Governance training	Level of community involvement	-	-	-	-
	Provincial/district support	Quantity/quality of district support	-	-	-	-
Access Issues	Scholar transport	Transport for remote learners	-	-	-	-
	School nutrition	Health of learners	Daily meal/ learner	-	-	-

	Policy area	Input	Input norms		Output norms	
			Minimum	Maximum	Minimum	Maximum
Basic services	Water		-	-	-	-
	Electricity		-	-	-	-
	Sanitation		-	-	-	-
Security	Perimeter fencing		1.8 m	-	-	-
	Burglar proofing		Comply with policy	-	-	-
	Alarm system		Comply with policy	-	-	-
	Fire protection		Comply with policy	-	-	-

Understanding Housing Demand in South Africa

By: *Sabelo Mtantato and Nanja Churr*

4.1 Introduction

If South Africa is to make meaningful progress towards its national development goals (NPC, 2011) and uphold the constitutional right to adequate housing, the structure of the housing subsidy and its delivery will have to be reformed. The Financial and Fiscal Commission (hereafter the Commission) held public hearings in 2011 and 2012 to discuss this issue (FFC, 2011; FFC, 2012).

The 2011 hearings sought to understand and clarify the problems facing the human settlements sector. These hearings brought to light a number of challenges, including the lack of a common understanding of what constitutes housing demand; administrative inefficiency in establishing, approving and transferring title deeds (and thus limited choices for subsidy beneficiaries); perverse incentives of the current housing subsidy; and the insignificance of South Africa's own self-build housing³¹ initiatives, compared with those of other developing countries.

Stakeholders indicated that the current housing demand is poorly understood and, in some instances, is interpreted as a housing backlog. Focusing only on backlogs carries the risk of excluding households that live in inadequate housing but do not qualify for housing subsidies. A uniform approach is needed, so that both the current and future demand can be estimated accurately, using data such as population growth, household formation and size, urbanisation, movement between rural and urban areas, movement between outlying areas and city centres, and life stage.

Concern was expressed about the decreasing rate of formal Deeds Registry registrations of newly built subsidised houses, which means that owners are being denied entry into the formal property market. An estimated 50% of government subsidy beneficiaries do not have title deeds to their houses, which prevents them from using their assets to reduce poverty. They are unable to trade their houses for one in another area, their mobility is restricted and they are therefore unable to participate fully in society.

Stakeholders agreed with the Commission that the current housing subsidy has created perverse incentives, as it continues to promote dependence on the state: an estimated 60% of households currently qualifying as beneficiaries are passively waiting for government to deliver. This raised the question of what role the state should play in providing housing.

The subsidy was also criticised for failing to encourage desirable levels of investment and participation by the private sector and households themselves. This weakness was linked to the slow progress of self-build housing initiatives and the length of time it takes for South African households to improve housing conditions compared to households in countries such as Brazil.³²

The fact that poor households choose to live in informal settlements and backyard shacks shows that they are prepared to accept poor quality housing in order to be close to economic opportunities and, if given a choice, would want their houses to be built closer to their jobs (FFC, 2012). The thinking behind the current funding for human settlements has contributed to the peripheral location of low-cost housing and does not promote densification or incentivise infill and brown-field developments, but is designed to provide a complete housing product at cheaper peripheral locations. It also fails to recognise that the biggest challenge is access to well-located land and the provision of subsidy amounts sufficient to build settlements with optimum densities that will eventually offset higher land costs (FFC, 2012).

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³¹ "Self-build housing" means houses constructed by the owners, using their own resources to cover materials and costs, and in some cases contracting a local builder. In both urban and rural areas, self-build housing is more common than subsidy housing.

³² In Brazil it takes five years or less for households themselves to improve their housing conditions from informal settlements to decent formal housing, while in South Africa informal settlements remain in the same state for many years until government intervenes or provides free RDP housing. See Chapter 5 of the Commission's Technical Report for Annual Submission on the Division of Revenue 2015/16.

Following the 2011 hearings, the Commission researched alternative funding and housing delivery options to address some of the challenges identified above. These alternatives were presented and discussed with stakeholders at the 2012 hearings. A complete report on funding and delivery alternatives, taking into account all the stakeholders' inputs, was finalised and tabled in Parliament in 2013 (FFC, 2013). Although the report addressed many of the challenges, further research is still needed on understanding housing demand, the cost of administrative inefficiency and challenges regarding title deeds, and self-build housing initiatives. This chapter addresses the issue of understanding housing demand.

South African cities, especially the metros, are experiencing increasing in-migration of rural people who have a variety of housing needs. Better understanding of what constitutes housing demand, where housing can best be situated and how households' tenure choices and locations change over time will make it easier to plan for future housing needs, improve delivery and provide relevant housing stock in relevant locations. Failure to understand housing demand has led in some cases to inappropriate government interventions and poorly planned settlements.

Against this background, this chapter evaluates housing demand in South Africa, with a view to understanding the housing demand (through the "housing ladder"³³), and recommends changes to the current funding and housing delivery process that could improve the response to housing demand. The chapter takes into account factors that must be included in any definition of housing demand: location, housing type and tenure status; and household circumstances and life cycle.

4.2 Research Methods

This chapter used both qualitative and quantitative methods. To understand housing demand, households in the Pretoria central business district (CBD) and surrounding areas were surveyed, and a housing demand model was developed using data from the City of Tshwane.

4.2.1 Household survey

Using a standardised questionnaire, a total of 544 households were surveyed to understand housing demand. Households were asked about housing type and tenure (what kind of house they are living in now and what kind of house they aspire to), and housing location (why they move from one area to another). A shortage of time and resources limited the survey to the City of Tshwane, specifically the Pretoria CBD and surrounding areas (see Table 53).

Table 53: Regions surveyed and number of interviews per region

Region	Suburbs	Number of interviews
Within 3km radius of Pretoria CBD	Arcadia, Muckleneuk, Pretoria Central, Sunnyside	45
Within 1km radius of major nodes	Highveld, Queenswood, Mamelodi FB3, West Park	37
Atteridgeville, Saulsville, Laudium	Atteridgeville Ext. 3 & 7, Jeffersville, Saulsville SP, Vergenoeg	56
Mamelodi, Eersterust, Nellmapius	Mamelodi Ext. 10 & 20, Nellmapius Ext 6	38
Pretoria, Akasia, Centurion	Montana Tuine, Elarduspark, Pretoriuspark, Lotus Gardens Ext. 2, Klerksoord, Theresapark, Erasmia, Spruit	140
Ga-Rankuwa, Mabopane, Soshanguve	Soshanguve South Ext. 1, 5 & 8	46
Hammanskraal, Temba, Mandela Village	Kanana, Kekana Gardens SP, Temba Unit 1	48
Olievenhoutbosch	Olievenhoutbosch Ext. 4, 19 & 24	42
Winterveld	Slovo, Winterveld Ext.1	48
Isolated towns	Ekgangala Section A, Rethabiseng, Zithobeni	44
Total interviews		544

³³ Housing ladder in this case refers to changes in a household's preferences (of housing typology, location and form of tenure) that are influenced by a number of variables, including income levels, ages and stages in life (for example marital status and size of household).

Figure 42: Modelling regions of the City of Tshwane

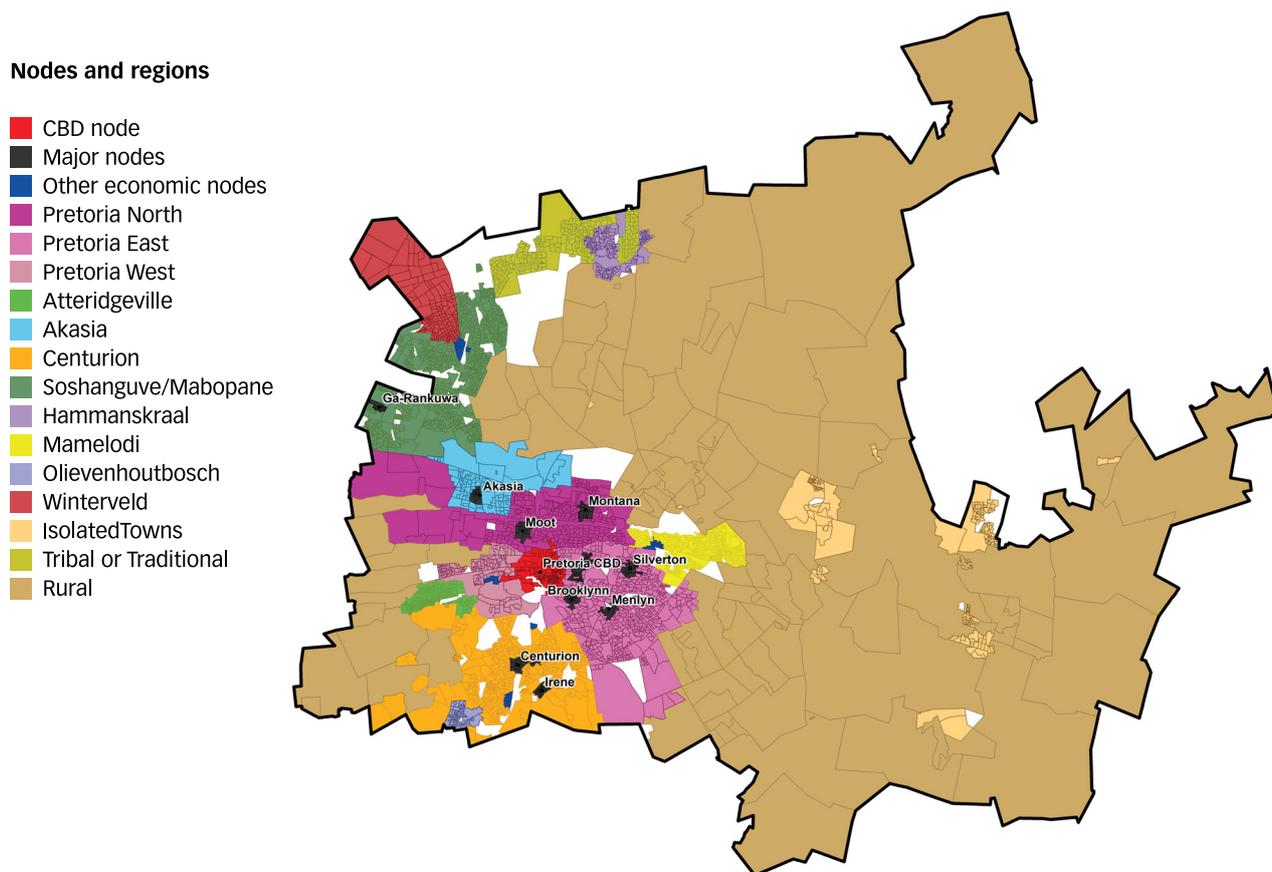


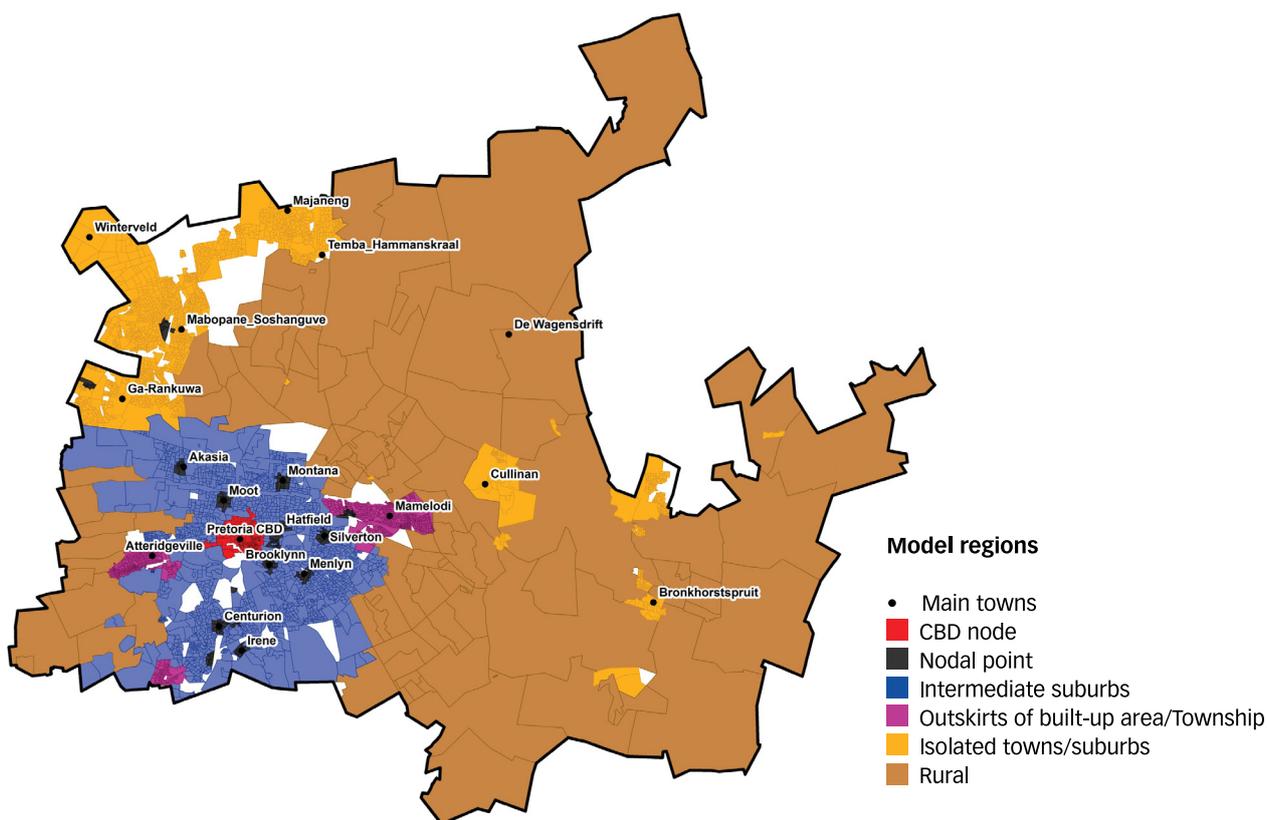
Figure 42 shows the modelling region of the City of Tshwane.

These areas are further grouped into the six location categories, as shown in Table 54 and Figure 43. With regards to sub-regions and major hierarchy groups, Census 2011 data from Statistics South Africa (Stats SA) is used as input data, in combination with the central place hierarchy data from the Council for Scientific and Industrial Research (CSIR), to group data at small areas level into various sub-regions.

Table 54: Regions surveyed and number of interviews per region

Location category	Areas included
CBD node	Within 3km radius of CBD node
Nodal points	Within 1km radius of key towns/nodes (key towns/nodes measured as towns/nodes with a GVA>R5,000 million)
Intermediate suburbs	Pretoria North, Pretoria East, Pretoria West, Akasia, Centurion
Outskirts of built-up areas/townships	Atteridgeville, Mamelodi, Olievenhoutbosch
Isolated towns/suburbs	Winterveld, Soshanguve/Mapobane, Hammanskraal
Rural/farms	Rural farms

Figure 43: Location categories in the City of Tshwane

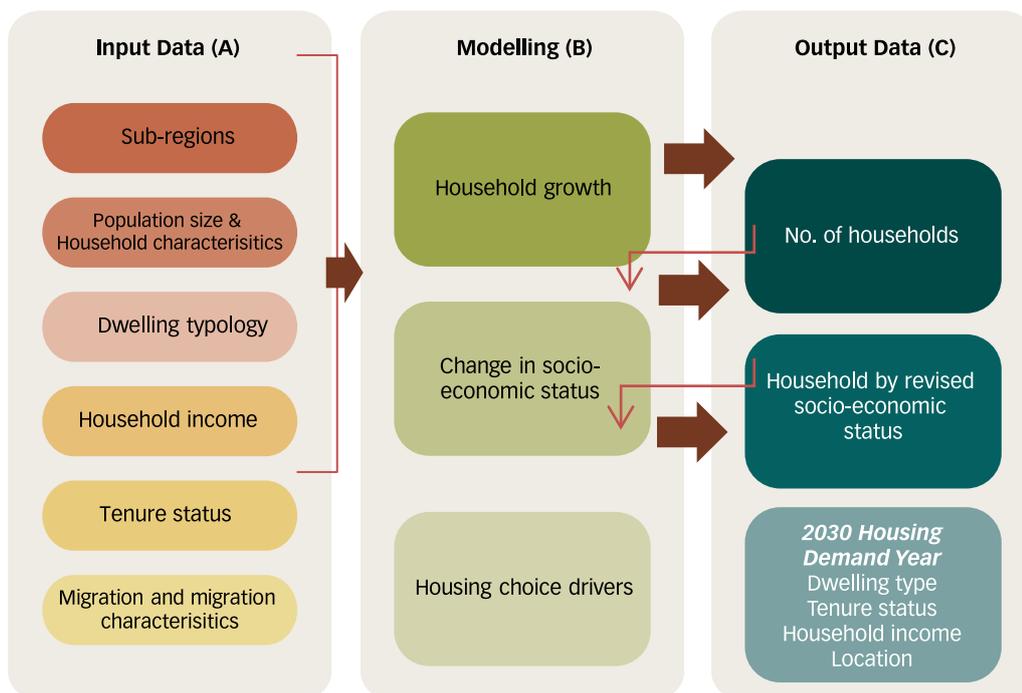


4.2.2. Housing demand model

A housing demand model was developed to estimate the current demand and to project growth to 2030. Housing demand (in terms of type, tenure and location of housing) is estimated based on (i) business as usual (BAU) or status quo according to the current trajectory or housing policy and (ii) future housing aspirations of households, given their current socio-economic status. The model takes into account the number of households per income group, the number of households per location, projected tenure choices and housing types. Households' aspirations are kept realistic by taking into account a number of socio-economic factors, including income. For example, it is not realistic for a household currently living in an informal settlement on the outskirts of a built-up area or township and earning about R2,500 a month to aspire to move to a higher income node such as Brooklyn, unless perhaps it is to a government-subsidised, high-rise rental flat.

The model makes it possible to assess the extent of current housing demand and possible future growth patterns. It accounts for realistic population growth up to 2030. It was developed to forecast future demand according to a housing typology of a selection of regions in the Tshwane metropolitan area. However, it is designed to be flexible enough to be used in any South African city, using that city's specific housing needs data. Future roll-out of the model envisages including growth variables such as the percentage split in urban and rural population per income level, the household sizes of the urban population, urban and rural growth per annum, economic performance and cost of housing. Figure 44 shows an overview of the model flow.

Figure 44: Model flow overview



4.2.3 Input data

The model uses the following input data:

- Sub-regions and location categories
- Population size and household characteristics
- Tenure status
- Household income
- Dwelling typology
- Migration and migration characteristics.

An important requirement was to use national input data at the lowest possible geographic level, so that the model will be usable for other regions throughout the country. Stats SA Census 2011 data is used, in combination with the CSIR’s central place hierarchy data, as shown in Table 55. The sub-regions listed in Table 56 may then be grouped into location categories as desired.

Table 55: Sub-regions

Sub-region	Description
CBD node	3km buffer zone around CBD node (CSIR central place hierarchy)
Major nodes	1km buffer key towns/nodes with GVA>R5,000 million (CSIR central place hierarchy)
Other economic nodes	Within 1km radius of other economic nodes or business/industrial areas with GVA R5,000 million (CSIR central place hierarchy)
Previous apartheid townships	Grouping of Stats SA Census 2011 small areas per individual previous apartheid township
Isolated towns	Grouping of Stats SA small areas in non-urban areas
Tribal areas	Grouping of Stats SA small areas in tribal geography type
Rural remainder	Grouping of Stats SA small areas in rural geography type
Other regions	Remaining regions are based on Stats SA main places and where needed (depending on the sizes of the main places and the similarity of their socio-economic profiles) the region(s) could be split into north, east, west using main arterials.

Sources: Stats SA (2012); CSIR (2007)

Data from Stats SA Census 2011 was used for population size and household characteristics (small-area data grouped into each of the sub-regions), for form of tenure (grouped per sub-region and categorised as “rented” (i.e. rental or rent-free property) or “owned” (i.e. fully paid-off or owned but not fully paid-off) and for monthly household incomes. The income categories do not match exactly. For instance, households eligible for housing subsidies earn up to R3,500 per month, but the model also needed to account for medium income households earning R3,500–R7,000 per month (by incorporating mechanisms to overcome the down-payment barrier) and for households in the gap market (earning R7,000–R15,000 per month). Income categories are grouped to make it possible to model the differences between medium and higher income households, whose housing types, demand and location needs differ according to affordability. The housing types as defined by Stats SA in Census 2011 are described in Table 54.

Table 56: Housing Types

Housing type	Description
House on stand	House or brick/concrete block structure on separate stand/yard/farm
Backyard room	House/flat/room in backyard or on property and larger dwelling/servants' quarters/granny flat
Flat	Flat or apartment in block of flats
Townhouse	Cluster house in a complex, townhouse (semi-detached house in a complex), or semi-detached house
Backyard informal	Informal dwelling (shack in backyard)
Informal dwelling	Informal dwelling (shack not in backyard, e.g. in informal/squatter settlement or on farm)
Traditional dwelling	Traditional dwelling/hut/structure made of traditional materials

Sources: Stats SA (2012); CSIR (2007)

Note: The Stats SA Census 2011 types “caravan/tent”, “other”, and “unspecified” have been re-distributed into the above categories proportionately.

The primary migration data was not readily available from Stats SA, who advised that they need to develop a means of extracting the data from the Census. In theory, they can provide a cross-tab (at small area level) of the newly migrated households’ characteristics in terms of housing type, tenure status, household income, age distribution and race group. Therefore, the model allows for regional differentiation between migrants’ income, housing type and tenure status, should the required data become available.

4.2.4 Data modelling

The data modelling includes household growth, changes in socio-economic circumstances (including income), changes in the supply of housing, and housing choice drivers. All the model input data entails readily available secondary data. However, the lack of secondary data for Tshwane or South Africa about household life cycle stages and characteristics of change mean that primary data collection is critical, and/or assumptions must be used in the model (see Section 4.2.6).

Household growth

The model includes realistic population growth up to 2030, taking into account:

- average annual growth in natural population (new household formation), applied evenly to all regions,
- average annual out-migration (population moving out) growth applied evenly to all regions, and
- average annual in-migration growth applied to total population and redistributed regionally, based on regions’ share of in-migrating population (from model input).

Changes in socio-economic circumstances

The model allows for changes in household size and household income. Changes in average household size also affects the number of households, so the model accounts for the average size of existing or new households or out-migrating households, the average size of in-migrating households and the minimum household size per region. For changes in income, the model allows for changes to the average percentage of households that move to the next income group for existing households, new household formation, out-migrating households and in-migrating households.³⁴

Changes in housing supply

The model allows for existing housing supply, which may be considered inadequate, to be removed (to represent, for example, the eradication of informal settlements).³⁵ The model assumes that formal houses on a separate stand or yard in a sub-region could be considered inadequate. For the purpose of the model, adequacy of location means proximity to jobs, shops, facilities and transport (DHS, 2009). A location is considered inadequate if it lacks features such as an efficient transport link and a well-established range of facilities. Formal houses on separate stands are often less well located than the informal settlements, which are usually in a good location and therefore why the residents chose to occupy that specific piece of vacant land.

Housing choice drivers

The model provides for one-off choices. Household choices per income group in terms of location, housing type and tenure status are provided for households moving from an existing inadequate supply, for new household formation and for in-migrating households. Reasons for households moving are location, housing type and tenure status. In practice, the lower the income group, the fewer choices will be available or affordable.

4.2.5 Output data

The model predicts the total number of households per annum up to the year 2030 and their location, housing type and income (in terms of the BAU, compared with aspirations).³⁶ Detailed results per region (including number of households per annum, average growth per annum, and percentage distribution per annum) are also provided by housing type, tenure status and income.

4.2.6 Model assumptions

The model makes the following assumptions:

- Income changes are not inflation linked.
- The average percentage increase in the number of households that move to the next income group per annum is applied equally to each region, based on the number of households per region.
- Households are not expected to move, and the specific housing type is assumed to be adequate if 0%.
- Households that move out of inadequate housing are removed from the existing supply because no other household will take up occupation of the inadequate housing.
- All inadequate housing types are assumed to be occupied by households with a monthly income of below R3,183.
- Potentially inadequate backyard informal and informal housing in formal areas are assumed in all cases to be rental accommodation.

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³⁴ Income changes are not inflation linked in the model and the changes to income are applied equally to each region on the basis of the number of households per region.

³⁵ The existing supply of housing may be considered inadequate because of the type or the location. Potentially inadequate housing types include backyard and other informal housing in informal areas, and backyard and other informal housing and traditional dwellings in formal areas. In the case of inadequate location, even a formal house may be inadequate if the location is unsuitable. This does not necessarily place a liability on the state (the household may not be eligible for a subsidy) but does lead to a search for alternative housing.

³⁶ "BAU" refers to supply-driven demand based on the 2011 typology, tenure and income distribution, but accounting for change in population growth, household size, etc. The BAU results do not account for realistic demand, as household choices are limited by the existing supply. "Aspirations" refers to the net effective demand, which correlates with the Breaking New Ground (BNG) policy in that it is demand-responsive housing demand (DHS, 2004). The aspiration results allow for greater differentiation between the tenure, typology and location choices (while considering existing household income). The intention is to provide maximum flexibility to those in need and to enhance the mobility of households.

- Potentially inadequately located formal houses and potentially inadequate traditional houses in formal areas are all assumed to be owned.
- The model assumes that the higher the income group, the more the household can afford to make adequate location choices. Only the lowest income group is assumed to be potentially inadequately located.
- The lower the income group, the fewer choices of housing type and tenure status will be available or affordable.

4.2.7 Limitations of the model

Like any model, the housing demand model has some limitations.

Limited number and spread of surveys

The small number of qualitative surveys and the limited area covered means that comprehensive movement patterns could not be identified for Tshwane as a whole – future roll-outs will require broader surveys if the model is to capture more than the tip of the iceberg. The survey focused on the lower income end of the market because it is assumed to be more distorted than the higher income end, as lower income households have limited housing choices (types, location etc.) available to them.

Lack of data

The housing model needs to account for migration patterns and the socio-economic characteristics of migrants. As mentioned in Section 4.2.3, Stats SA is currently developing the tools to extract the data from Census 2011 in the format required for the model. This data will make it possible to overcome the current limitation.

Snapshot of one year

The fact that the economy is always changing could limit the effectiveness of the results. As the model is based on a 2011 snapshot of the socio-economy, the accuracy of the forecasting is likely to decrease progressively from the base year. Nonetheless, the model is useful for understanding the likely size of demand rather than specific amounts.

A more general limitation is that household mobility patterns and responses are complex. In South Africa they are particularly volatile because of changing socio-economic conditions and demands for residential property to uplift previously disadvantaged communities. No model can give the complete picture, because no model can accurately predict all the changes determined by forces “outside” the model. However, the best available judgement about such outside factors is included in the forecasting. The purpose of the model is pragmatic. It aims to use the best available descriptions of housing types and household choice behaviour, combined with the best available outside information, to produce the most informative and accurate demand forecast.

4.3 Qualitative Findings

The limitations of the survey meant that housing demand patterns could not be identified for Tshwane as a whole, but the survey did reveal the complexity of lower income households’ mobility patterns and responses in a section of this metropolitan area.

This part summarises findings about the movement of households from various regions of residence mainly to the CBD node. As Table 57 shows, Tshwane will continue to experience high urban population growth, which will put pressure on the government’s ability to meet the housing needs of different households consistently. Across all income groups, the households likely to move to the CBD node are mainly from the intermediate suburbs and nodal points.

Table 57: Movement of households from various regions to the CBD

Income Group	Movement to the CBD from					
	CBD	Nodal point	Inter-mediate suburbs	Outskirts	Isolated towns	Rural/farms
R0–R3,183	20%	15%	25%	10%	5%	5%
R3,184–R6,367	30%	20%	10%	5%	10%	5%
R6,368–R12,817	35%	25%	20%	5%	10%	5%

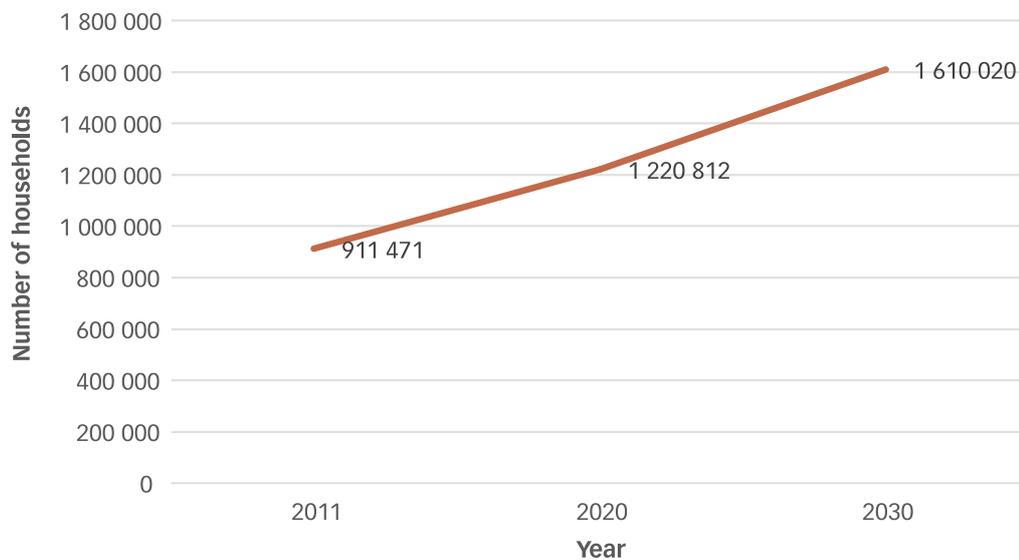
4.4 Quantitative Results

Quantitative results from the housing demand model are summarised in this section. In most cases a comparison is made between the BAU and aspirations scenarios.

4.4.1 Projected number of households by 2030

Based on the surveyed areas, the model predicts that the number of households in Tshwane will increase by more than a third every decade between 2011 and 2030. As Figure 45 shows, the number of households will increase by 34% (from 911 471 to 1 220 812) between 2011 and 2020 and by 31% (from 1 220 812 to 1 610 020) from 2021 to 2030.

Figure 45: Number of households, projected to 2030



4.4.2 Number of households per income group

The household income level (and its likelihood to change in the future) is key to understanding and projecting housing demand. Income levels of different income groups were compared between 2011 (the base year) and 2030 (projected using household aspirations). Table 58 shows a projected decrease of 1% in the percentage of households earning between R0 and R3,200 per month, from 48% to 47%, and a similar decrease for those earning between R6,401 and R12,800, from 12% to 11%.

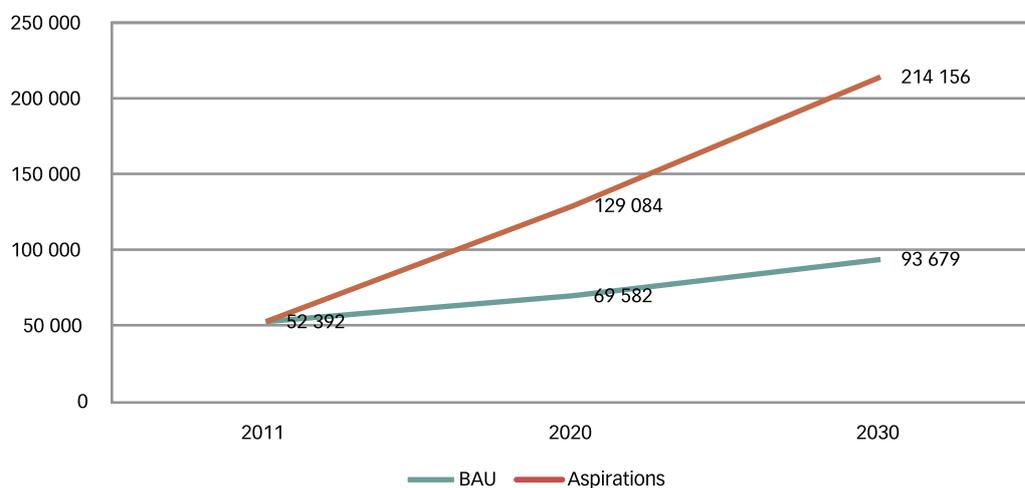
Table 58: Projected number of households per income group

Status Quo	HOUSEHOLD INCOME GROUP	BASELINE		PROJECTED	
		2011	Percentage	2030	Percentage
	R0-R3 200	437 506	48	763 293	48
	R3 201-R6 400	121 121	13	211 313	13
	R6 401-R12 800	107 404	12	187 382	12
	R12 801+	245 440	27	428 206	27
Total		911 471	100	1 590 195	100
Aspirations	R0-R3 200	437 506	48	593 845	47
	R3 201-R6 400	121 121	13	193 006	13
	R6 401-R12 800	107 404	12	165 845	11
	R12 801+	245 440	27	637 499	28
Total		911 471	100	1 590 195	100

4.4.3 Estimated housing demand by location

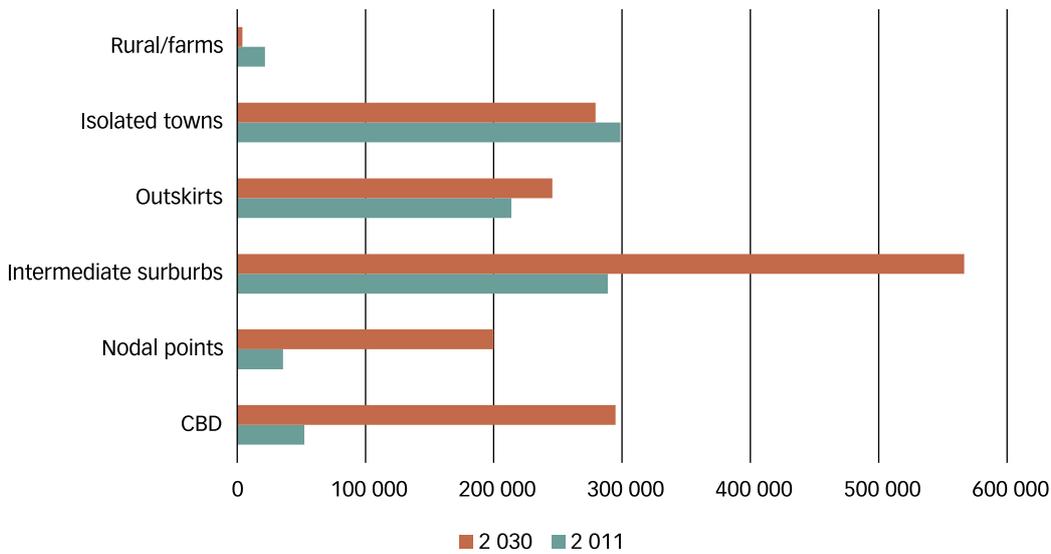
Under both scenarios, the number of households in the CBD will increase by 2030 (Figure 45). Under the BAU scenario, the number of households in the CBD will increase by 80% (from 52 392 in 2011 to 93 679 in 2030). However, when household aspirations are taken into account, the number of households in the CBD will increase to 214 156 in 2030, or by about 316% (Figure 46). All regions are expected to see an increase in the number of households, except for rural areas and farms, where a decrease is expected by the year 2030 (Figure 47). Regions that will experience significant growth by 2030 are the CBD node, nodal points and intermediate suburbs.

Figure 46: Number of households in the CBD



As Figure 47 shows, the distribution of households by location will move strongly in favour of urban locations.

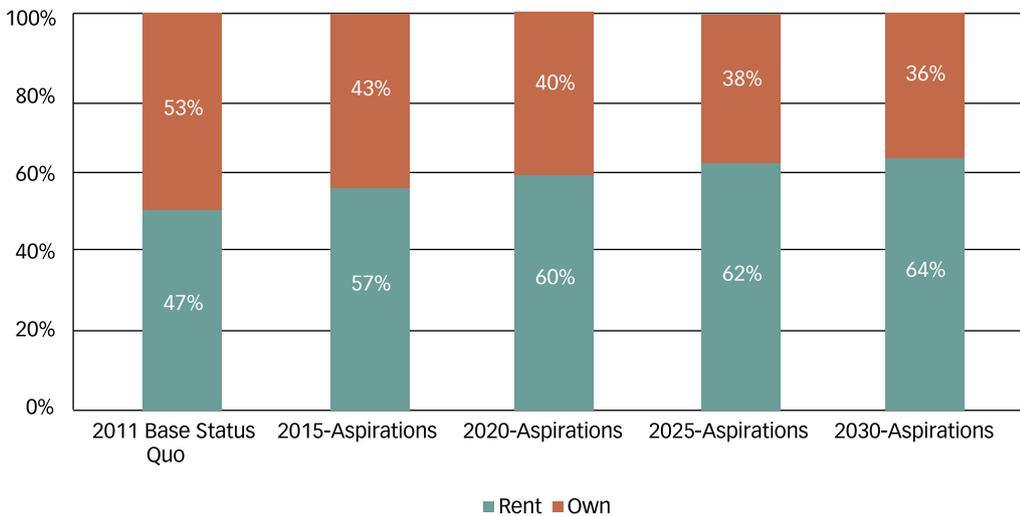
Figure 47: Number of households per location (2011 and 2030)



4.4.4 Projected tenure choices

As Figure 48 shows, there will be steady shift from ownership to rental as the preferred form of tenure. For example, rental as form of tenure is projected to increase by 17% (from 47% to 64%) between 2011 and 2030, while ownership is projected to decrease over the same period. Ownership will remain the preferred form of tenure in outskirts, isolated towns and farms, but households in these regions are few in numbers.

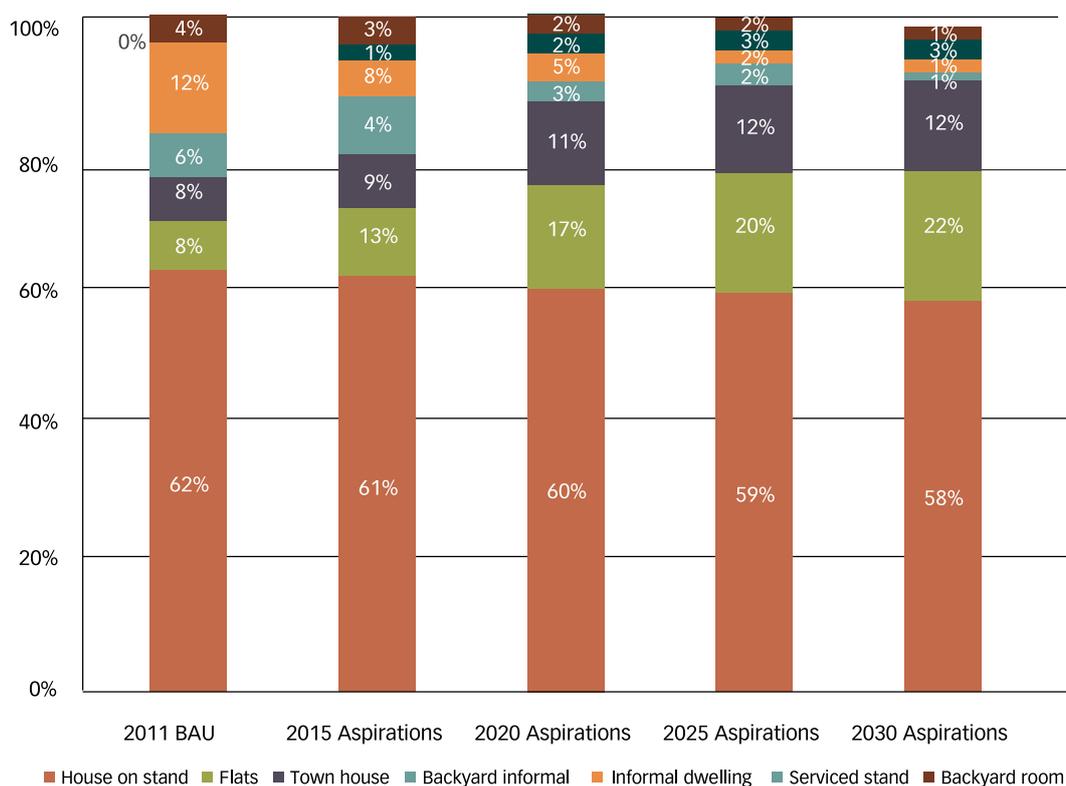
Figure 48: Changes on preferred form of tenure by 2030



4.4.5 Projected housing typology by 2030

Lastly, the model looked at the type of housing that would predominate by 2030 in the different location categories. As Figure 49 illustrates, houses on a separate stand are expected to decrease from 62% in 2011 to 58% in 2030. In contrast, over the same period, flats and townhouses will increase from 8% to 22% and from 8% to 12% respectively. This is in line with the shift towards rentals in the CBD and intermediate suburbs, as mentioned in the previous section.

Figure 49: Changes on preferred housing typology by 2030



4.5 Conclusions and Recommendations

Insufficient attention has been given to understanding housing demand, which is multi-dimensional and includes housing type, location and tenure. This understanding will enable government, especially metropolitan municipalities, to plan adequately and provide for future housing needs. Using a housing model developed and applied in the City of Tshwane, the research found that demand for housing will be the greatest in urban areas (CBD and nodal points), where rental flats will be the most desired form of housing.

The housing demand model developed for this study is intended to help ensure that housing demand choices are taken into account. A key requirement for the model is to have national data available at the lowest possible geographic level to enable future model roll-outs. However, no secondary data exists of household life cycle stages and characteristics of change in regions, either in Tshwane or the rest of the country. Primary data collection is therefore critical for this study and for future roll-outs. The model was developed for the City of Tshwane but can be used for other cities.

To address the challenge of housing demand effectively, it is recommended that:

1. Municipalities, especially metros, invest in forward-looking processes and systems that will enable them to understand and disaggregate housing demand accurately.
2. Metros focus on planning for rental flats and creating new (or transforming existing) neighbourhoods in intermediate suburbs, which have lower densities than the inner city.

4.6 References

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Self-build Housing Initiatives in South Africa

By: Sabelo Mtantato

5.1 Introduction

As explained in Chapter 4, the Financial and Fiscal Commission (hereafter the Commission) held public hearings in 2011 and 2012 to discuss housing delivery and finance in South Africa (FFC, 2011; FFC, 2012). One of the challenges brought to light by these hearings was the insignificance of South Africa's own self-build housing³⁷ initiatives, compared with those of other developing countries.

Stakeholders agreed with the Commission that the current housing subsidy has created perverse incentives as it continues to promote dependence on the state, with an estimated 60% of households currently qualifying as beneficiaries and passively waiting for government to deliver. The subsidy was also criticised for failing to encourage desirable levels of investment and participation by the private sector and households themselves. This weakness was linked to the slow progress of self-build housing initiatives and the length of time it takes for South African households to improve housing conditions compared to households in countries such as Brazil.³⁸ The government has called for an active response from needy households to improve their own housing circumstance. Outcome 8 specifically allows for self-build housing as well as subsidy housing as a delivery method in plans for upgrading informal settlements (The Presidency, 2010).

Statistics South Africa (Stats SA) defines an informal settlement as an unplanned settlement on land that has not been surveyed or proclaimed as residential and consists mainly of informal housing. Informal housing is split into two categories: a shack in a backyard or a shack not in a backyard. The category of shacks in the backyard has been extensively analysed, and funding and delivery options to promote this kind of housing are dealt with in the Commission's 2013 report (FFC, 2013). Shacks in the second category (not in the backyard) offer great potential for households to make their own improvements and are thus the main focus of this chapter. These shacks are mostly an urban phenomenon, but self-build initiatives in rural areas are also covered in this chapter.

To promote and support self-build housing initiatives, it is necessary first to determine the share of eligible poor households, i.e. those who have the money and the skills to contribute to improving their own houses. Therefore, this chapter:

- determines which groups of households can contribute to their own housing needs with some form of government assistance;
- defines and locates groups of households that need the most urgent assistance; and
- provides information on informal housing finance or shelter finance micro loans mechanisms that may help to support future delivery, in cases where fully subsidised housing is not financially feasible.

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³⁷ "Self-build housing" means houses constructed by the owners, using their own resources to cover materials and costs, and in some cases contracting a local builder. In both urban and rural areas, self-build housing is more common than subsidy housing.

³⁸ In Brazil it takes five years or less for households themselves to improve their housing conditions from informal settlements to decent formal housing, while in South Africa informal settlements remain in the same state for many years until government intervenes or provides free RDP housing.

5.2 Research Methods

Both qualitative and quantitative methods are used: an interview-based survey and an analysis using Geographical Information System (GIS) mapping followed by modelling and simulation.

5.2.1 Qualitative methods

The survey was of self-build housing initiatives at four sites (two in Gauteng and one each in Limpopo and Mpumalanga) and consisted of a total of 60 in-depth interviews (15 interviews per site) held in February and March 2013. The areas surveyed are described in Table 59.

Table 59: Regions surveyed and number of interviews per region

Area	Description
Swedenville, Mamelodi (Gauteng)	Metro shack community under threat of removal at Mamelodi, with entirely self-built housing, now expecting to be relocated to a services-capable area chosen by the community and officially forbidden to allocate or sell housing stands to new households arriving.
Block 18, Soshanguve (Gauteng)	Urban formalised and largely upgraded settlement, with Reconstruction and Development Programme (RDP) and self-built housing under a formal local government dispensation; some parts of the settlement still fear removal.
Jane Furse, Sesfikile (Limpopo)	Formal settlement, with informal self-built housing under rural institutions involving both the traditional tribal authority and the responsible local municipality.
Newhouse City, Bushbuckridge (Mpumalanga)	Rural township, with self-build and subsidy housing of very high quality under semi-rural institutions.

These study areas were selected based on prior research experience³⁹ that suggested their (urban or rural) locations were likely to be conducive to strong self-build housing activity. The sample in this study did not include households above the economic level of Newhouse City because higher-income settlements would include small proportions of households eligible for the current subsidy.

Household interviews were carried out with individual respondents, who were selected based on randomised quota sampling, avoiding clustering and spreading the selection as far as possible within the study areas. The questionnaire consisted of two sections. The first section covered type of housing, type of area and institutions, household structure and composition, income level and means of support, migration history, perceptions of the current situation and future plans for migration and housing. The second section asked open-ended questions on land prices, types of houses, housing preferences, resources for housing development and improvement, housing finance options and access to bank finance, saving preferences, rental activity and job search strategies. Interpretation of the data was entirely comparative and qualitative.

In addition, in each sample area, a focus discussion group was held at which concerns, options and priorities were discussed freely.

5.2.2 Quantitative methods

The data used was from the Human Sciences Research Council (HSRC), relating to the larger Spatial Temporal Evidence for Planning South Africa (StepSA), and from Stats SA's Census 2001 and Census 2011. In order to review the extent and distribution of self-building housing in South Africa, the study used data from the African-majority settlement areas. Lastly, to estimate the level of need for housing intervention, the quality of housing with an estimated value of less than R2,500 – mainly constructed from non-durable material – was used. While the chapter acknowledges that many

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³⁹ Spatial Temporal Evidence for Planning South Africa (stepSA) and World Bank research studies from 2006 to 2012.

different categories of poor households are in need of government support and assistance to improve their housing conditions, special attention is given to two of the most vulnerable groups of households:

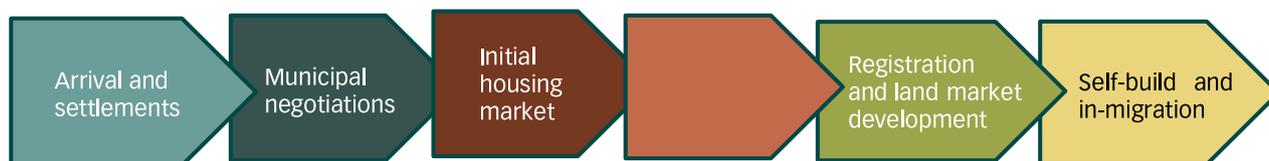
- a. Female-headed households with children under the age of 20 years; and
- b. Households whose members are over the age of 40 years, earning below R2,500 per month. In most cases these households are out of the labour market and unable to improve their own housing situation.

The study used these two categories of households to estimate the baseline subsidy needed to meet the housing needs of households that are entirely unable to contribute to their housing needs on their own.

5.3 Findings from Self-build Surveys – Qualitative Results

The findings from the interviews in the four study areas revealed a broad housing developmental sequence, illustrated in Figure 50.

Figure 50: Developmental sequence of the new informal to formal housing market



The sequence consists of six phases, as described below:

Arrival and settlement. Poor rural in-migrants (the majority of arrivals), or urban residents (such as township youth) unable to obtain housing of their own in their parent settlement, identify and occupy unused land. The first occupiers usually form part of the community committee that oversees public affairs, land allocation and outside contacts.

Municipal negotiations. These rural-origin communities, of which Swedenville is a typical example, commonly appear very poor at first. However, as long as the land is not contested, in a few years such communities can come to an agreement with the municipality to upgrade their settlement. If such an agreement is reached, houses are numbered and occupiers recorded, and further in-migration is supposed to cease. Without such an agreement, households are unwilling to upgrade their own shacks or build new decent quality houses for fear of losing their capital investment. Once the fear of eviction is eliminated, households with financial resources start to improve their housing conditions.

Initial housing market. Once an agreement is in place, a strong informal housing market starts to develop, with community members selling stands and shacks to each other, using the security of informal documentation supplied by the community committee. Land values for owned but unoccupied stands rise significantly, even for shack areas lacking infrastructure delivery or formal tenure security. As the community market develops, prices increase from an initial range of R50 to R300 to a range of R15,000 to R20,000. However, asset values in the shack settlement are not as high as in areas where individual ownership has been legally registered at municipal level, following delivery of formal housing and services by the municipality.

Upgrading and security. The next phase is the upgrading of the settlement, which is often accompanied by tenure security. Formal tenure security comes through municipal registration of stands and housing titles.

Registration and land market development. Once an area has been sufficiently formalised to register titles to housing and stands at the municipal office, the way is cleared for intensive self-build housing activity. This is accompanied by a rising housing market, with private rights secured against the municipal documentation. At this point, residents start to identify themselves as taxpayers, economic participants and full urban citizens, with a strong claim on their municipality for fast attention to servicing and maintenance. As their housing increases in value, they feel increasingly rooted in their community and locality.

Self-build and in-migration. Once infrastructure services and formal titles have been obtained, high-quality owner-building begins. Now well-established, these settlements no longer welcome shacks. The development of subsidised housing appears to be a catalyst for consolidating the market, with subsequent growth consisting almost entirely of self-build housing. These houses often have six to ten rooms with tile roofing and double garages and are valued by the owner in the range of R150,000 to R200,000 (within the market associated with “young, upwardly mobile, urban professionals”). This growth improves the economic status of the original poor occupier population. In addition, rentals from tenants living in the backyards of RDP units provide supplementary income that often allows formerly poor in-migrant households to move up into the middle class.

Three of the four communities (Block 18, Jane Furse and Newhouse City) have agreements with the municipality, thereby eliminating the fear of eviction. Following these agreements, households with financial resources have started to improve their housing conditions. An unexpected finding was that the metro-urban Block 18 community had moved up from extreme poverty in shack housing to middle-class standing within a single generation. It took only a few years for most of Block 18 to be upgraded and provided with full infrastructural services. This created a nucleus of formal occupation in subsidy housing that became a new extension of Soshanguve.

Similarly, in Jane Furse and Newhouse City, the delivery of RDP housing and formal infrastructure has densified the settlements, which are both in fairly good locations for access to employment and rural shopping plazas. Having become de facto upmarket areas, these settlements no longer welcome shacks. In addition, the aspirational self-build housing was of extremely high quality, even in these remote and formerly destitute remote rural areas.

Of the four communities surveyed, only Swedenville has not yet obtained legitimisation and upgrading, in spite of earnest and long-continued negotiations, and so has not begun to densify around investment-quality, self-build housing development. However, the community recently negotiated a new agreement with the municipality (five years after initial settlement), opening the way for subsidy housing to be delivered at a new location agreed to by both sides. The Swedenville shack residents surveyed insisted they had access to adequate finance and would start to build high-quality houses as soon as they were free from the fear of being removed from their sites (e.g. transferred to an outlying area such as Diepsloot). This fear is likely to be suppressing owner-builder activity in Swedenville, rather than access to funding. Formal mortgage finance and the institutional situation regarding housing, land sales and transfer security appear to be much less important than was previously thought.

The new semi-formal housing markets may now be moving so rapidly that informal communities are overturning previous procedural, financial and institutional barriers. The survey showed that the subsidy-eligible population is engaging intensely with the de facto private housing market and moving quite smoothly up the housing ladder, from a fully informal market in the shack settlements at the bottom level, through a semi-formal market at the lower middle level, to a mortgage-based formal market somewhere at or above the R200,000 level. The gap market⁴⁰ on the urban periphery and in the rural sector may be finding its own solutions, as part of a larger self-upgrading process that seems to be reducing the overall share of shack housing in South African poor communities.

Pending further research, it is not clear what fraction of the initial poverty-level population is able to stay in these areas of rising housing value and keep up with their new neighbours. However, the interviews showed that a significant fraction of the earlier in-migrant population has remained in place, although there is no easy way to estimate how many of them may since have sold out to more advantaged buyers, realised their market gains, and left the area.

⁴⁰ Households earning up to R15,000 that do not qualify for subsidised housing developments.

The surveys show that impressive self-build housing is being produced in South African poor communities. The findings about how the market works in these areas could influence both perceptions and policy, particularly how transactions are secured and financed, and what government and other institutions may need to do differently.

The survey found that the levers for self-build include availability and access to uncontested land, agreements for upgrading the settlement, allocation of housing numbers and recording of occupiers, provision or upgrading of infrastructure, and formal registration of land. Three recent developments that affect housing for poor communities are: formalisation and registration of transfer, access to land and financing informality.

5.3.1 Formalisation and registration of transfer

The system of title registry for these communities appears to have been rectified from the bottom up, at local government level. The key is municipal transfer registration, at least in principle connecting to the national Deeds Registry and providing owners and buyers with legally enforceable documentation. People transacting in the semi-formal local market can now secure sales officially, which opens the way to significant increased investment in housing as a household asset. Community residents on the urban periphery and in rural areas are building valuable housing stock that is bought and sold in the same market as subsidised units, at prices that indicate capital formation at household level. The informal transfer system has thus connected up to tenure security at municipal level.

5.3.2 Access to land

Land is being held as individual stands based on municipal ownership rather than allocated out to social contacts by either leaderships or landholding families. This de facto shift into an impersonal market framework will help to achieve equal and independent rights for all landholders, based on municipal registration that records and verifies all transfers. Most of the interviewees in the surveyed areas supported the right of women and single youth to obtain, hold and transact land.

5.3.3 Financing informality

The survey showed that once the semi-formal local market opens up, many buyers of informal housing do not need a mortgage from the mainstream banks in order to fund transactions of R200,000 or more. Instead, they obtain unsecured personal loans that are paid off as deductions from wages over four to ten years. This system enables them to by-pass numerous restrictions, conditions, valuations and insurance requirements. Even unemployed residents said they could raise and save R15,000–R40,000 out of their income from temporary work and informal small businesses. In a poor community where the housing market is starting to develop, R30,000 is enough to cover materials and labour to build a decent quality starter house that may later sell for between R100,000 and R120,000. In some cases, informal stokvel credit is a source of own funding for housing development, with some stokvels being able to extend loans in the R15,000 bracket and to offer repayment periods of five years or more.

5.4 Findings from Self-build Surveys – Quantitative Results

Certain groups of households living in inappropriate housing structures are likely to have more difficulty than others in mobilising the necessary resources to build new, decent quality housing. The survey identified two groups of households earning less than R2,500 per month that are likely to remain in inappropriate housing conditions until government provides fully subsidised housing: female-headed households with children under the age of 20 years and households containing adults above the age of 40 years who are likely to remain unemployed.⁴¹

5.4.1 Distribution of housing types

Table 60 shows the distribution of housing types by province for the African-majority settlement areas. (The total African-majority population consists of approximately 20 million people.)

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⁴¹ In most cases out of the labour market, are unable to improve their own housing situation.

Source:HSRC (2013)

⁴² Western Cape – WC, Eastern Cape – EC, Free State – FS, KwaZulu-Natal – KZN, Gauteng – GP, North-West – NW, Mpumalanga – MP and Limpopo – LM. Please also note that the Northern Cape Province did not form part of the study by the HSRC, so its data is not available hence is omitted on the Table.

Table 60: Type of housing unit by province

Province ⁴²	Formal house built by govt, municipality or big firm	RDP house or subsidy house not in backyard	People's Housing Process (PHP) formal-type house built by owner-builder with govt support	Formal house built by small community contractor	Bond house built for owner by contractor, bank, etc. – very high quality	Owner-built house, formal-type, good quality, 2-5 rooms	Owner-built house, formal-type, good quality, 6-10 rooms	Owner-built house, formal-type, good quality, more than 10 rooms	Unfinished owner-built housing, good quality	Low-quality owner-built house - better than shack	Formal backyard structure including RDP house in backyard	Informal backyard structure / backyard shack	Attached room in house or garage	Rented flat or space in flat or in cluster housing	Rented house	Rented room in shack	Shack rented by resident(s)	Shack owned/bought by resident(s)	Shack built and owned by resident(s)	TOTAL
WC	51 23.00%	60 27.00%	1 0.50%	5 2.30%	6 2.70%	- 0.00%	1 0.50%	- 0.00%	- 0.00%	1 0.50%	3 1.40%	10 4.50%	2 0.90%	4 1.80%	0 0.00%	0 0.00%	7 3.20%	12 5.40%	53 23.90%	222 100.00%
EC	187 15.10%	143 11.60%	8 0.60%	31 2.50%	27 2.20%	88 7.10%	32 2.60%	8 0.60%	5 0.40%	358 28.90%	2 0.20%	9 0.70%	100 8.10%	14 1.10%	2 0.20%	2 0.20%	3 0.20%	19 1.50%	34 2.70%	1238 100.00%
FS	125 28.00%	76 17.00%	1 0.20%	13 2.90%	26 5.80%	43 9.60%	32 7.20%	- 0.00%	2 0.40%	14 3.10%	1 0.20%	6 1.30%	15 3.40%	- 0.00%	5 1.10%	0 0.00%	27 6.10%	6 1.30%	15 3.40%	446 100.00%
KZN	105 9.70%	163 15.00%	1 0.10%	21 1.90%	24 2.20%	113 10.40%	46 4.20%	12 1.10%	5 0.50%	322 29.60%	14 1.30%	55 5.10%	11 1.00%	15 1.40%	11 1.00%	17 1.60%	9 0.80%	15 1.40%	65 6.00%	1088 100.00%
NW	60 13.60%	49 11.10%	1 0.20%	3 0.70%	40 9.10%	38 8.60%	35 8.00%	- 0.00%	2 0.50%	102 23.20%	- 0.00%	- 0.00%	7 1.60%	- 0.00%	11 2.50%	0 0.00%	3 0.70%	19 4.30%	26 5.90%	440 100.00%
GP	435 39.80%	140 12.80%	3 0.30%	- 0.00%	- 0.00%	71 6.50%	14 1.30%	3 0.30%	4 0.40%	5 0.50%	11 1.00%	99 9.10%	7 0.60%	1 0.10%	0 0.00%	9 0.80%	18 1.60%	258 23.60%	0 0.00%	1092 100.00%
MP	15 2.70%	20 3.70%	8 1.50%	- 0.00%	- 0.00%	234 42.80%	98 17.90%	6 1.10%	14 2.60%	73 13.30%	18 3.30%	2 0.40%	3 0.50%	2 0.40%	0 0.00%	1 0.20%	3 0.50%	24 4.40%	0 0.00%	547 100.00%
LM	45 5.50%	48 5.90%	6 0.70%	12 1.50%	21 2.60%	298 36.70%	161 19.80%	26 3.20%	11 1.40%	109 13.40%	3 0.40%	13 1.60%	34 4.20%	- 0.00%	0 0.00%	0 0.00%	0 0.00%	8 1.00%	1 0.10%	812 100.00%
NATIONAL	1023 17.40%	699 11.90%	29 0.50%	85 1.40%	144 2.40%	885 15.00%	419 7.10%	55 0.90%	43 0.70%	984 16.70%	52 0.90%	194 3.30%	179 3.00%	36 0.60%	29 0.50%	29 0.50%	70 1.20%	361 6.10%	194 3.30%	5885 100.00%

Table 60 shows that the percentage of formal housing delivery is relatively high in the Western Cape and Gauteng, at 51% and 39.8% respectively. The table shows relatively decent owner-built housing (two and more rooms) at about 24% of the national sample overall. Formal housing delivery is the highest in the strong economies of the main migration-destination provinces, while decent quality informal self-built housing is highest in Mpumalanga and Limpopo. These two provinces have the most decent owner-built units with two to five or six to ten rooms.

Backyard structures (consisting of both formal backyard and backyard shack structures) are a rapidly growing category that represents the main component of informal small-scale rentals. The highest proportions are in Gauteng (10.1%), the Western Cape (6.8%) and KwaZulu-Natal (7.4%), the provinces with the largest metro cities and the highest housing demand.

Table 58 shows that relatively decent owner-built housing accounts for about 23% of the national sample overall, with relatively decent owner-built housing of two to five rooms reflecting at 15% nationally (this increases to 23.70% with an inclusion of unfinished good quality owner-built housing). Formal housing delivery is the highest in the strong economies of the main migration-destination provinces (Gauteng and Western Cape), while decent quality informal self-built housing is highest in Mpumalanga and Limpopo. These two provinces have the most decent owner-built units with two to five or six to ten rooms, while Gauteng has comparatively little good quality owner-built housing stock (but relatively high levels of shacks and government-built brick housing).

5.4.2 Cost of different construction types

To assess future housing subsidy options, the study looked at the need to improve or replace housing at the low end of the ladder, in the urban shack areas and in rural districts where low quality housing of non-durable materials often serves as permanent family shelter. The standard used to distinguish housing of acceptable quality from unacceptable housing was based on construction from durable materials and on replacement value as estimated by the respondent. Table 61 shows various types of construction materials used for house walls and the probable cost of building a house using similar materials at the time of the survey, as estimated by interviewees in that survey. The table separates durable from non-durable materials and uses replacement cost estimates to indicate the relative quality of the materials, comparing the costs of durable materials (brick, cinderblock, etc.) with those of temporary or ad hoc housing materials (earth or mud, corrugated iron or zinc, wood).

Table 61: Construction material by cost to build similar house

Building material	NO COST	R1-R100	1 R101-R600	R601-R1,200	R1,201-R2,500	R2,501-R8,000	R8,001-R20,000	R20,001-R50,000	R50,001 +	Don't know	Total	Subtotal <R2500
Brick construction	1	1	15	29	51	240	685	670	865	280	2 837	97
	0.00%	0.00%	0.50%	1.00%	1.80%	8.50%	24.10%	23.60%	30.50%	9.90%	100%	3.40%
	0.50%	8.30%	12.80%	11.60%	12.30%	29.00%	55.70%	60.50%	71.10%	68.60%	49.20%	9.90%
Cinderblock, formal	14	1	1	3	13	14	49	70	78	11	254	32
	5.50%	0.40%	0.40%	1.20%	5.10%	5.50%	19.30%	27.60%	30.70%	4.30%	100%	12.60%
	7.40%	8.30%	0.90%	1.20%	3.10%	1.70%	4.00%	6.30%	6.40%	2.70%	4%	3.30%
Cement block, home-made	24	0	2	19	23	99	146	119	94	10	536	68
	4.50%	0.00%	0.40%	3.50%	4.30%	18.50%	27.20%	22.20%	17.50%	1.90%	100%	12.70%
	12.80%	0.00%	1.70%	7.60%	5.50%	12.00%	11.90%	10.70%	7.70%	2.50%	9%	6.90%
Cement built, ± plaster	24	0	1	5	5	25	52	59	47	3	221	35
	10.90%	0.00%	0.50%	2.30%	2.30%	11.30%	23.50%	26.70%	21.30%	1.40%	100%	15.80%
	12.80%	0.00%	0.90%	2.00%	1.20%	3.00%	4.20%	5.30%	3.90%	0.70%	4%	3.60%
Mud built, cement plaster	21	0	7	24	32	60	87	66	55	20	372	84
	6%	0%	1%	1%	2%	8%	24%	24%	30%	10%	100%	22.60%
	11.20%	0.00%	6.00%	9.60%	7.70%	7.30%	7.10%	6.00%	4.50%	4.90%	6.40%	8.60%
Mud built, no cement	10	3	7	19	40	64	73	33	16	29	294	79
	3.40%	1.00%	2.40%	6.50%	13.60%	21.80%	24.80%	11.20%	5.40%	9.90%	100%	26.90%
	5.30%	25.00%	6.00%	7.60%	9.60%	7.70%	5.90%	3.00%	1.30%	7.10%	5.10%	8.00%
Mud/cement mixture	16	0	17	20	34	54	48	44	19	24	276	87
	5.80%	0.00%	6.20%	7.20%	12.30%	19.60%	17.40%	15.90%	6.90%	8.70%	100%	31.50%
	8.50%	0.00%	14.50%	8.00%	8.20%	6.50%	3.90%	4.00%	1.60%	5.90%	4.80%	8.90%

Building material	NO COST	R1-R100	1 R101-R600	R601-R1,200	R1,201-R2,500	R2,501-R8,000	R8,001-R20,000	R20,001-R50,000	R50,001 +	Don't know	Total	Subtotal <R2500
Corrugated iron/zinc	62	7	47	107	174	213	62	35	21	20	748	397
	8.30%	0.9%	6.3%	14.3%	23.3%	28.5%	8.3%	4.7%	2.8%	2.7%	100%	53.10%
	33.00%	58.30%	40.20%	42.80%	41.90%	25.80%	5.00%	3.20%	1.70%	4.90%	13.00%	40.40%
Wood	8	0	17	16	27	31	8	4	6	4	121	68
	6.60%	0.00%	14.00%	13.20%	22.30%	25.60%	6.60%	3.30%	5.00%	3.30%	100%	56.20%
	4.30%	0.00%	14.50%	6.40%	6.50%	3.70%	0.70%	0.40%	0.50%	1.00%	2.10%	6.90%
Other	8	0	3	8	16	27	19	8	15	7	111	35
	7.20%	0.00%	2.70%	7.20%	14.40%	24.30%	17.10%	7.20%	13.50%	6.30%	100%	31.50%
	4.30%	0.00%	2.60%	3.20%	3.90%	3.30%	1.50%	0.70%	1.20%	1.70%	1.90%	3.60%
Total	188	12	117	250	415	827	1 229	1 108	1 216	408	5 770	982
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source: HSRC (2013)

Note: The three rows per type of housing building material used show (1) The actual number of households surveyed within a particular income range that have used that type of building material to construct their houses. (2) The percentage of households surveyed that used the building material to construct their houses within each income group. (3) The percentage of households within each income group that used the different types of housing material. For example, of the total 2 837 households surveyed, only 15 (or 0.5% of) households were earning between R101 and R600 per month and were in brick-constructed houses. However, going down the column, for households earning between R101 and R600 per month, 15 (12.80%) of the 117 households in this income group used bricks as construction material.

Durable materials denote housing with walls built from brick, cement block/ashblock/ cinderblock, solid cement or other material capable of withstanding weather and ordinary use for extended periods with only minor routine maintenance; not necessarily formal construction, often including good-quality, owner-built units. Brick is the single most important construction material, accounting for about 49% of the survey sample, but represents less than 10% of housing valued at under R2,500 (Table 59). However, it is important to note that not all housing units constructed from durable materials can necessarily be classed as decent quality. For example, about 3.40% and 12.60% respectively of houses built from blocks and cinderblocks are assigned a replacement value of less than R2,500 because they are old and dilapidated, very poorly built and unsound.

Non-durable materials denote housing with walls built from mud, mud plastered with cement, tin, plastic, cardboard, low-quality wood or other material not capable of withstanding weather and ordinary use for extended periods with only minor routine maintenance. Houses built of these materials are normally below the level of good-quality owner-built units and tend to require replacement, rebuilding or extensive maintenance on a cycle of one to five years. Mud and corrugated iron are the main materials below the line for durability and therefore out of the potentially acceptable category for housing quality. The corrugated iron shack structures, which serve only as low-cost and temporary, ad hoc housing options, received the lowest valuations. About 13% of the housing structures covered in the survey sample that were all mud, corrugated iron, wood and other were valued at less than R2,500 to replace.⁴³ Not all housing structures in mud, corrugated iron and wood will be replaced if a replacement value of R2,500 is applied, as some houses constructed out of these materials are valued at more than R2,500 as shown in Table 59. The category showing between R2,500 and R8,000 replacement cost accounted for a further 3% (calculated as the number of households in all mud housing structures earning between R2,501 and R8,000 – three blocks in yellow – of the total housing sample which was 5770).

5.4.3 Identification of vulnerable households

As indicated in the methodology, the chapter has identified that certain groups of households living in inappropriate housing structures are likely to have more difficulty than others in mobilising the necessary resources to build new, decent quality housing. Therefore, it is important to distinguish between:

- Poor households that need their current low-quality housing replaced but are likely to be able to use the assisted self-build option, as they are actively mobile and are using lower-quality housing options as a stepping stone.
- Poor households that will continue to need subsidy housing provided free of charge because of poverty and structural handicaps.

The survey identified two groups of households earning less than R2,500 per month as the most vulnerable: (i) female-headed households and (ii) households containing adults over the age of 40 years who are likely to remain unemployed (in view of their ages, they are not likely to be able to find full-time work again). Of the surveyed households, 48% fall into category one and 8% fall into category two.

As Table 62 shows, over half (48%) of the surveyed households are headed by females, while over 70% (73.1) of children aged 20 years or under live in female-headed households.

⁴³ This is calculated as 750 (sum of numbers in red in Table 3) of 5 770 (total number surveyed) households.

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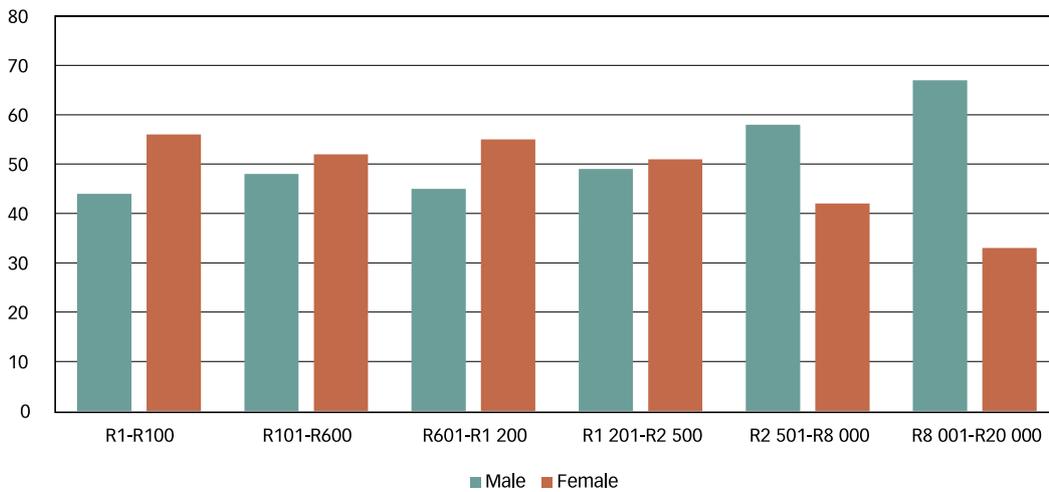
Table 62: Distribution of households

	Male head		Female head		Total
Male/female headed households	2 935	52.41%	2 665	47.59%	5 600
Children under the age of 20 years old	835	26.9%	2668	73.1%	3 103

Data source: HSRC (2013)

Figure 51 shows the split between female- and male-headed households per income group. Female-headed households represent the majority of the lowest income groups (i.e. below R2,500 per month), with 56% of the women surveyed earning between R1 and R100 per month.

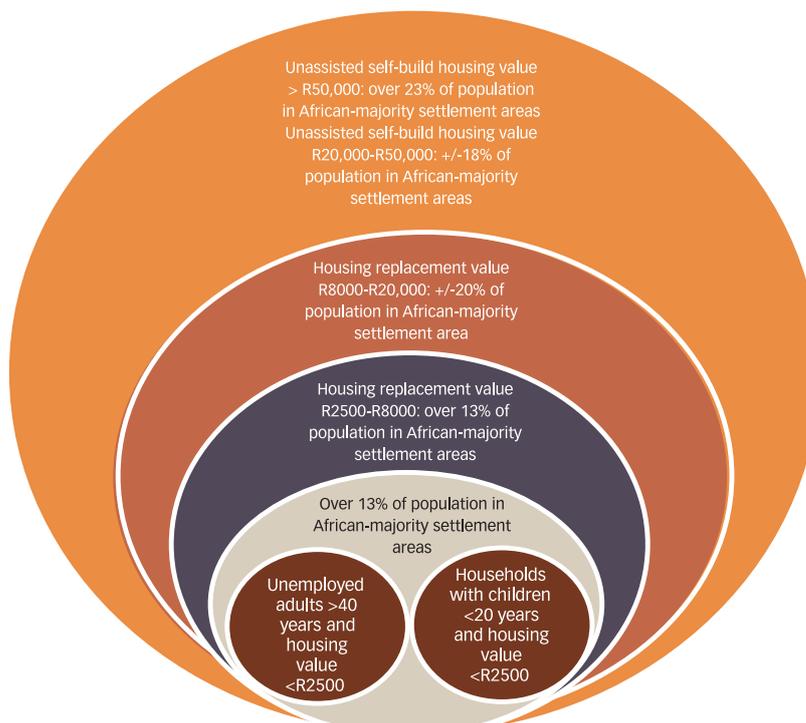
Figure 51: Female- and male-headed income groups (%)



Source: StepSA (2008)

Figure 52 divides the population into categories based on housing replacement value.⁴⁴

Figure 52: Estimates of replacement housing value and appropriate public support level



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⁴⁴ Survey respondents were asked how much it would cost to build a similar house to theirs. These answers were used to calculate the housing replacement values used.

In Figure 52, the light grey circle with two red circles contains households with a housing replacement value of less than R2,500. These households are the two most vulnerable groups, as identified above: households with children under the age of 20 years, mostly female-headed, and households whose members are all adults over the age of 40, who have been passed over by the labour market and are not normally eligible for social grants. They represent just over 13% of the population in African-majority settlement areas – the total African-majority population consists of approximately 20 million people. At a minimum, providing subsidy housing to these two groups would cost R120-billion, based on about 650 000 households and a cost of R180,000 per housing unit. These two groups are unlikely to be able to contribute towards attaining adequate housing needs, so they are entirely dependent on government's full housing provision.

The subsidy-eligible households most likely to succeed with self-build construction are those with housing replacement values of R2,500–R8,000 and R8,000–R20,000. If households with a housing replacement value of up to R8,000 were included in the subsidy net, this would mean a total of about 1.3 million households (or 27% of the population in African-majority settlement areas), which would increase costs to approximately R230-billion. The group in the replacement value category of R8,000–R20,000 (representing over 20% of the population in African-majority settlement areas) live in relatively poor-quality housing but would, based on the experience of Swedenville and Block 18, be likely to have the resources and competences needed to build good-quality houses for themselves. Providing this group with a serviced site, in line with Outcome 8, would cost about R19-billion. This amount is based on an estimated cost of R33,000 per household, which includes R18,000 on average per site for acquiring the land on which these settlements are to be upgraded in situ, R10,000 for bulk services and R5,000 for electricity supply.

By encouraging and supporting self-build housing initiatives, the government could achieve remarkable progress in housing delivery. Government could assist households that can contribute towards meeting their housing needs by prioritising land registration and the provision of services and amenities. More resources could then be allocated to the two most vulnerable groups of households that cannot contribute at all towards their housing needs.

5.5 Conclusion

South African government policy does acknowledge and emphasise the importance of active citizenry by encouraging households to be central to the development of their own lives, including their housing needs. Self-build housing initiatives can help ensure progressive realisation of the right to adequate housing and reduce housing backlogs. Yet, compared to other developing countries, South Africa's self-build housing initiatives are insignificant. Understanding which groups can contribute to their own housing will enable the government to direct its fiscal and policy interventions more towards those who, if not assisted at all, could remain in inadequate housing conditions indefinitely.

A study of self-build initiatives in Gauteng, Limpopo and Mpumalanga found that the key levers for self-build structures are land registration and the provision of basic infrastructure services. The population living in African-majority settlement areas were divided into categories based on the housing replacement value. The subsidy-eligible households most likely to succeed with self-build construction are those with housing replacement values ranging between R2,500 and R8,000, and between R8,000 and R20,000.

Self-build housing initiatives should be encouraged and supported for those households able to contribute to meeting their housing needs. This would leave more resources available for the two most vulnerable groups of households, which would require government-subsidised housing. These are poor female-headed households with children under the age of 20 years and unemployed households whose members are over the age of 40 years. These groups are unlikely to contribute towards fulfilling their own housing needs, even if the government provides serviced land. They are, therefore entirely dependent on the government's full housing subsidy scheme.

The study revealed a great demand for the self-build initiative from lower-income earning households in and around the cities. By voluntarily taking themselves off the government housing programme, competent owner-builders with sufficient own finance can contribute to upgrading their housing, thus enabling the government to channel resources to the most needy. Government could achieve remarkable progress in housing delivery if households were encouraged to participate in self-build initiatives and government resources were targeted at the most vulnerable.

5.6 Recommendations

The Commission recommends that:

- In the future, Government's housing subsidy prioritises the most vulnerable groups, which include poor, female-headed households with children under the age of 20 years and households containing adults who are permanently out of the labour market.
- Targets and indicators are put in place and closely monitored annually.
- The national Department of Human Settlements reports on households benefitting from government housing programmes, based on gender and by age group, on a yearly basis.
- Municipalities prioritise land ownership registration processes, where informal settlements are located in the developable areas.
- Government prioritises the provision of infrastructure in areas with the potential for self-build housing.

5.7 References

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The Impact of Fiscal Expenditure and Intergovernmental Coordination on Food Security in South Africa

By: *Ghalieb Dawood*

6.1 Contextual Background

This paper investigates the impact of public spending on household food security in South Africa⁴⁵. A critical shortcoming in the existing policy framework on food security is the lack of understanding of how different government interventions targeting food-insecure households have affected food security levels in South Africa. Such an understanding will enable government to make informed decisions when allocating budgets for food-security programmes. The government's policy response to the steep increases in food prices that followed the global economic recession reflects a preference for a supply-side approach that favours improving the livelihoods of poor families through small-scale agricultural support programmes.⁴⁶ This particular response suggests a narrow focus in addressing the problem of food security, which in modern economies depends heavily on the family's income and access to resources. Therefore, a thorough investigation into the impact of different fiscal programmes on household food security is necessary, to assess whether government's current approach is most effective in improving food entitlement of vulnerable households.

A second strand to the investigation is to assess the effectiveness of the intergovernmental functional arrangement in implementing the existing policy framework. The disjointed implementation of food security interventions is a major challenge, as currently, different line ministries at different levels of government implement food security programmes. No single department is responsible for all the food security and nutrition programmes, which is largely because of the multi-faceted nature of food security and the need for a multidimensional approach. The danger is that departments only take responsibility for their programmes and fail to plan and implement programmes holistically, resulting in overlapping activities and inefficient implementation.

The specific objectives of the study are:

- i.) To describe the functional assignment of the food security policy framework and to analyse the effectiveness of the institutional arrangement, especially in terms of implementation.
- ii.) To investigate the extent of household food security in South Africa and to assess whether any decline is evident since the implementation of the Integrated Food Security Strategy (IFSS) in 2002.
- iii.) To determine the contribution of different fiscal programmes to household food security in South Africa, and the extent of those contributions.
- iv.) To examine whether public investment through special-purpose conditional grants or the unconditional equitable share has any differential influence on household food security.
- v.) To make recommendations on the intergovernmental arrangements and food security programmes that will yield improved food entitlements for households.

The paper focuses specifically on public spending in the agricultural sector, without ignoring other spending programmes.

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⁴⁵ Refer to section 1.2 for definition of food security.

⁴⁶ A supply-side approach denotes a country's ability to produce enough food either through domestic agricultural production or food imports.

6.1.1 Problem statement

Although South Africa is a food-secure country, hunger and under-nutrition among citizens remain a serious challenge.⁴⁷ Sen's capability theory (1981, in Sen and Druze, 1991) states that a person may go hungry even if the ratio of food to the population goes up rather than down. This is because aggregate food supply does not get distributed equally through a formula but rather each family has to establish command over its own food. Therefore, households go hungry if they fail to establish entitlement over enough food. Sen explains that "entitlement failure" happens either because of a loss of endowments (e.g. alienation of land, loss of labour power due to ill health) or because of a shift in exchange entitlement (e.g. loss of employment, fall in wages, rise in food prices, decline in self-employment production, etc.).

The disconnect between national food security and household food insecurity suggests strongly that the entitlement system in South Africa fails to give households adequate means of securing enough food. In fact, legal and economic factors, including those governing ownership, production and exchange, play a crucial role over command of food by different sections of the population (Sen and Druze, 1991). Apartheid policies have contributed to many vulnerable households experiencing entitlement failure, which is caused by factors, such as insecure tenure, lack of adequate basic services, poor quality of education, restricted work opportunities and conditions of exchange.

The Constitution of South Africa sets out the socio-economic rights of citizens, including the right to have access to sufficient food and water (RSA, 1996). In the landmark Grootboom case,⁴⁸ the Court highlighted government's duty to implement policies to realise socio-economic rights but also indicated that this should be consistent with available resources. The Court further emphasised that government socio-economic policies should be coherent, coordinated, flexible enough to respond to both short-term and longer-term needs, and should be implemented effectively (Brand, 2002).

Food security is diverse in nature and often depends on the realisation of other socio-economic rights. The converse is also true. Research by the Financial and Fiscal Commission (the Commission) found interactive responses exist among the millennium development goals (MDGs) (FFC, 2012). Addressing hunger and under-nutrition can help achieve important MDGs, such as universal basic education (MDG 2), reducing child mortality (MDG 4) and improving maternal health (MDG 5) (World Bank, 2006), while the lack of food security detracts from other health outcomes (e.g. HIV, TB, etc.). Improving household food security and nutrition can improve long-term economic growth by enhancing human capital, and reducing poverty. The economic costs of malnutrition are considerable: it is estimated that malnutrition results in individuals losing 10% of lifetime earnings, and countries losing 2%–3% GDP (World Bank, 2006). In the Copenhagen Consensus report, leading development economists found that nutrition-related interventions gave the highest returns for 17 development interventions (ibid.).

Food insecurity is increasingly acknowledged as both an urban and rural phenomenon, although on aggregate rural food insecurity is more severe. The expanded coverage of the child support grant (CSG), which targets poor households in rural and urban areas, increased from 2.3 million in 2003 to 12 million in 2007. In consultation with the Commission, in 2005 government also introduced the Comprehensive Agricultural Support Programme (CASAP) to build livelihoods among poor farmers. However, despite the increased spending on these and other food security-related programmes, the extent of the grant's impact on reducing household vulnerability and insecurity remains unclear.

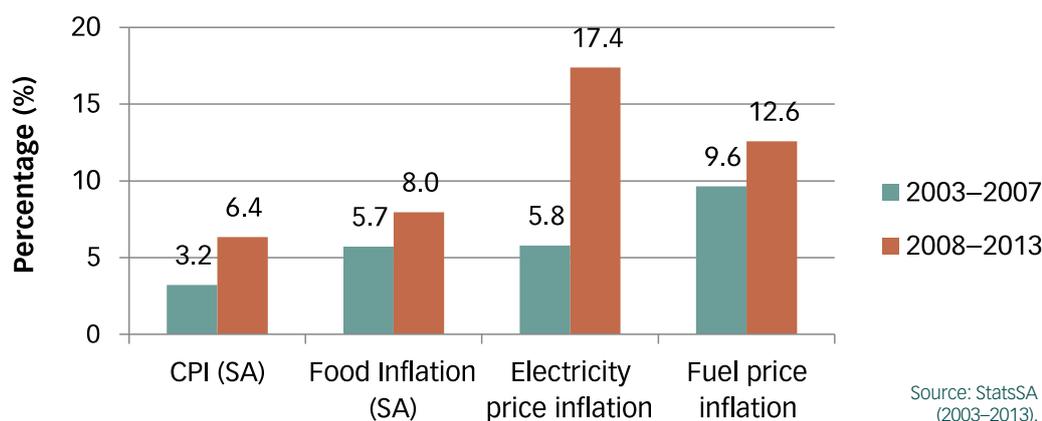
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The economic crisis in 2007/08 has brought food security to the forefront of policy discussions. Policy-makers are concerned about the effect on households of the sudden increase in commodity prices. At the same time, as Figure 53 shows, food inflation has risen faster than the consumer price index (CPI). This affects poor households the most because they spend a larger share of their household incomes on food compared to other incomes groups.

⁴⁷ National food security implies the country is able to produce enough food and import where necessary to feed its population adequately.

⁴⁸ *Government of the Republic of South Africa and Others v Grootboom and Others* (CCT11/00) [2000] ZACC 19; 2001 (1) SA 46; 2000 (11) BCLR 1169 (4 October 2000).

Figure 53: Average increase in commodity prices (South Africa)



The government's policy response has been to take a supply-side approach through stimulating small-scale agriculture development and agro-processing. The National Policy on Food and Nutrition (2013) and associated strategies, the Household Food and Nutrition Security Strategy (2013) and the Fetsa Tlala Food Production Strategy (2013), are policy reforms aimed at strengthening the implementation of the IFSS. These reforms suggest that government wants to encourage self-reliance as a means of enhancing the livelihoods of poor families. With the need for fiscal consolidation, the government will have to make potential budgetary trade-offs in the future. One potential trade-off is between spending on social grants versus spending on other strategic priorities, such as education, infrastructure and job-creation initiatives. In an uncertain macro-environment, government's response to household vulnerability and long-term food sustainability issues will be crucial to ensure the constitutional right to access food is protected. Therefore, a careful examination is needed to assess the impact (if any) of these spending programmes on household food insecurity.

Even though government implements a range of food security interventions, the concern is that some of these interventions may not be effectively implemented, largely as a result of poor coordination among implementing agents and inefficiencies within service delivery departments. Therefore, potential coordination challenges need to be assessed more systematically and their impact on service delivery examined.

6.1.2 Food security in South Africa

Food security is when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2009). This means (i) having access to food that is safe and nutritious and (ii) having the ability to acquire food in a socially acceptable way. Conversely, food insecurity is when food is not easily available and households have difficulty securing adequate food. Food insecurity at a household level can be transitory or chronic. Transitory food insecurity is temporary in nature and caused by climatic or economic shocks resulting in a decrease in household purchasing power. Chronic food insecurity is more long term in nature and linked to the chronic lack of livelihood strategies and assets. Food insecurity can also be at a national, regional or community level. Food security at a household level is largely influenced by livelihood strategies of individuals rather than by total agro-food output (Altman et al., 2009). In this paper we are interested in exploring household-level food insecurity without ignoring the importance of national food security.

Food insecurity includes dimensions of hunger and under-nutrition, which both result from a lack of food. Hunger is associated with "not eating enough food", whereas under-nutrition is from a lack of micro and macronutrients required to develop and function optimally (Altman et al., 2009). Household nutrition also includes dimensions of health, sanitation and knowledge of food use. A household can be food secure but still be undernourished because of poor eating habits (e.g. eating takeaways) or lacking in proper sanitation facilities, which leads to infection and ill health.

Measuring household food insecurity

Different surveys of household food insecurity produce varying results. According to the General Household Survey (GHS), food insecurity fell significantly, from 23.8% in 2002 to 10.5% in 2007 (Stats SA, 2011). However, the onset of the global economic recession in 2007 pushed back some of the gains achieved.⁴⁹ Households that reported children going hungry “always” and “often” fell from around 25% in 2003 to around 12% in 2007, but then increased by 1–2% in 2008 (FFC and UNICEF, 2010). In contrast, the South African Social Attitudes Survey (SASAS) found that half of all households either experienced hunger (25%) or were at risk of hunger (25%). The National Food Consumption Survey (NFCS) estimated higher levels of food insecurity, with 52% of households being food insecure. The NFCS also found that food insecurity did not decline between 1999 and 2005, and households at risk of hunger increased from 23% in 1999 to 33% in 2005 (Labadarios et al., 2009). A study by Jacobs (2009) found the highest level of food insecurity. Using expenditure information to estimate a minimum basket of nutrient intake, Jacobs derived an average dietary energy cost of R262 per month per person and a below average dietary energy cost of R189 per month per person.⁵⁰ Drawing on data from the 2005/06 Income and Expenditure Survey (IES), Jacobs found that food expenditure for 82% of households fell below the average dietary energy cost line, while 73% fell below the “below-average dietary energy cost line”.

These results may vary because of the different methodologies used and the sample size (many of the surveys have small sample sizes and in some cases, e.g. the NFCS, a non-random sampling frame). Furthermore, the Jacobs (2009) study, which reflects the highest level of food insecurity, was not tested for robustness and did not take into account economies of scale when arriving at a minimum dietary food cost line for households.

Table 63 summarises the main survey instruments used by researchers to measure household food security and nutrition.

Table 63: Household food insecurity based on other studies

Survey instrument	FI measure	Food-insecure households
National Food Consumption Survey – NFCS (1999) N = 2735 (Labadarios et al., 2009)	Food Hunger Index	52% of HH experience hunger 23% of HH at risk of hunger
NFCS (2005) N = 2413 (Labadarios et al, 2009)	Food Hunger Index	52% of HH experience hunger 33% of HH at risk of hunger
South African Social Attitudes Survey – SASAS (2008) N = 1150 (Labadarios et al, 2009)	HH Food Insecurity Access Scale	25.9% of HH experience hunger 25% of HH at risk of hunger
Income and Expenditure Survey – IES (1995) N = 20 000 <i>approx</i> (Rose and Charlton, 2002 in Jacobs 2009)	Food prices MRC energy index	38.7% of HH below minimum cost of food basket threshold
IES (2005/6) N = 20 000 <i>approx</i> (Jacobs, 2009)	Minimum dietary energy food line	82% of HH below ‘average dietary energy food cost line’ 73% of HH below ‘below-average dietary energy cost line’
South African National Health and Nutrition Examination Survey – SANAHES (2013) N = 10 000 <i>approx</i> (HSRC, 2013)	Community Childhood Hunger Index	26% of HH experience hunger 28.3% of HH at risk of hunger

⁴⁹ Findings by Stats SA (2011) and Pienaar and Von Fintel (2013) confirm general downward trend of household hunger. A similar downward trend in the indicators of poverty are also evident (Finn et al., 2013).

⁵⁰ Two dietary cost lines were estimated, based on the assumption that four members make up a household and then scaling up the cost lines in order for them to be comparable.

The change over time is probably more important than the different food security survey results. As the only national tool that collects food insecurity data on a regular basis, the GHS reflects a steady decline in food insecurity in South Africa. However, since the economic recession, the slight upward trend suggests that many households may have moved from food-secure to food-insecure or from vulnerable to food-insecure. The level of food insecurity measured by the GHS requires further validation and should therefore be looked at as only one contribution to understanding the extent of food insecurity in South Africa. If done annually, the SANAHES survey (which samples 10 000 households) could be a useful validating instrument for the GHS. Using the Community Childhood Hunger Index, the SANAHES survey reported that 26% of households experienced hunger (HSRC, 2013).

6.1.3 Functional assignment and policy context of food security

The Constitution clearly states that everyone has the right to have access to adequate food and water (RSA, 1996),⁵¹ with special protection provided to those who cannot access food through their own means, for example children and prisoners. Therefore, government must ensure food security. Government functions that relate to food security include agriculture, health services, environmental services, welfare services, urban land reform and rural development. Schedule 4A of the Constitution classifies these functions as concurrent competencies between national and provincial spheres; in other words, national and provincial governments share responsibility for these functions. National or provincial government can also assign these functions to municipalities, provided the function can be implemented more effectively at local level. Local-level functions that contribute to food security and nutrition (as listed in Schedule 4B of the Constitution) are municipal planning, water and sanitation, and health services. Municipal planning is a crucial function, especially in light of increasing urban populations and pressure to use agricultural land for other purposes.⁵² Municipalities can support food security initiatives by setting aside land in urban or peri-urban areas to encourage small-scale agricultural production.

In 2002, the IFSS was introduced to address the challenge of food insecurity in South Africa (Department of Agriculture, 2002). Government recently passed the National Policy on Food and Nutrition Security (DAFF, 2013b), which includes the Household Food and Nutrition Security Strategy and the Fetsa Tlala Food Production Strategy (DAFF, 2013a), as a means of reinforcing the implementation of the IFSS. The major weakness of the IFSS was that it was implemented in a disjointed and fragmented way by government departments. The National Policy on Food and Nutrition Security and Fetsa Tlala have an implementation structure that is similar to that of the IFSS, but the political responsibility for coordinating the implementation of overall food security initiatives is escalated to the Office of the Deputy President and to provincial premiers' offices, with technical support (on programme planning, monitoring and evaluation) from coordinating units at national and provincial level.

Another weakness was that the IFF views food security largely through a rural lens, as poverty and inadequate livelihoods tend to be concentrated in rural areas.⁵³ This means that cities do not have a clear mandate to address food insecurity, which could lead to policies and by-laws that undermine urban food security (Battersby-Lennard and Haysom, 2012). For instance, informal traders play an important role in the food value chain of food-insecure households, but municipal by-laws (and health and safety regulations) may inadvertently discourage the growth of informal traders (Battersby-Lennard and Peyton, 2014). The National Policy on Food and Nutrition Security and the Fetsa Tlala attempt to address urban food insecurity but the interventions proposed assume homogeneity, whereas food security in rural and urban areas have different characteristics. Encouragingly, the National Policy on Food and Nutrition Security asserts the importance of women having greater access to food production.⁵⁴ (In rural areas, women often work on the land but are rarely custodians of the land.) It calls for gender equity in land reform policy and that women should own 10% of land in terms of the land reform programme by 2015 and 15% by 2030. Going forward, monitoring the achievement of these targets and reviewing possibly increasing the targets will be important, especially for 2030.

Selected policies or legislation that affect food security are described in Table 64.

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⁵¹ Sections 27(1)(b), 28(1)(c) and 35(2)(e) are all provisions in the Constitution that deal with the right to food.

⁵² Refer to landmark case study by Battersby-Lennard and Haysom (2012) on the Philippi Horticultural Area.

⁵³ Two targeted surveys administered in 2000 and 2008 revealed that in low income areas, urban food insecurity is as much a problem as rural food insecurity (Battersby-Lennard and Haysom, 2012).

⁵⁴ Results from the GHS (Stats SA, 2011) indicate that rural households headed by women are often characterised by high dependency rates, unemployment and reliance on social grants. Evidence suggests that women are becoming increasingly involved in subsistence agriculture as an additional livelihood strategy.

Table 64: Selected legislation related to food security

Policies or Legislation	Purpose	Departmental Custodian	Implementing Agencies
The Marketing of Agricultural Products Act (1996)	Aims to reduce state interference in agricultural marketing and product prices.	Agriculture	Department of Agriculture, Forestry and Fisheries (DAFF), provinces and national Agricultural Marketing Council.
White Paper on Land (1997)	Promotes equity of land ownership.	Rural Development and Land Affairs	Department of Rural Development and Land Affairs (DRDLA), provinces, municipalities, NGOs and private sector.
The Competition Act (1998)	Promotes and maintains competition, and ensures customers have access to competitive prices.	Trade and Industry	Department of Trade and Industry (the dti), Competition Commission, Competition Tribunal, Courts and private sector.
The Foodstuffs, Cosmetics and Disinfectant Act (1974)	Controls the sale, manufacture and importation of food stuffs.	Health	National Department of Health, provinces and municipalities.
The Meat Safety Act (2000)	Provides for measures to promote meat safety and safety of animal products.	Agriculture	DAFF, the dti and national Department of Health, provinces and municipalities.
Social Assistance Act (2004)	Allows social relief of distress to be provided as financial or non-financial assistance in the form of cash, vouchers or food parcels.	Social Development	SASSA, provincial departments and external service providers.
National Climate Change White Paper (2012)	Aims to manage unavoidable climate change impacts and to carefully balance potential trade-offs.	Public Enterprise	Departments of public enterprises, water affairs and environment, State-Owned Enterprises (SOEs) and provinces.
National Biofuels Industrial Strategy (2007)	Sets out to stimulate the production of 'suitable' crops in used agricultural areas of the country for the production of biofuels.	Minerals and Energy	DAFF, DRDLA, Department of Water Affairs, Central Energy Fund, Industrial Development Corporation, SOEs and provinces.

6.1.4 Existing international and local food security research

Implementation strategies

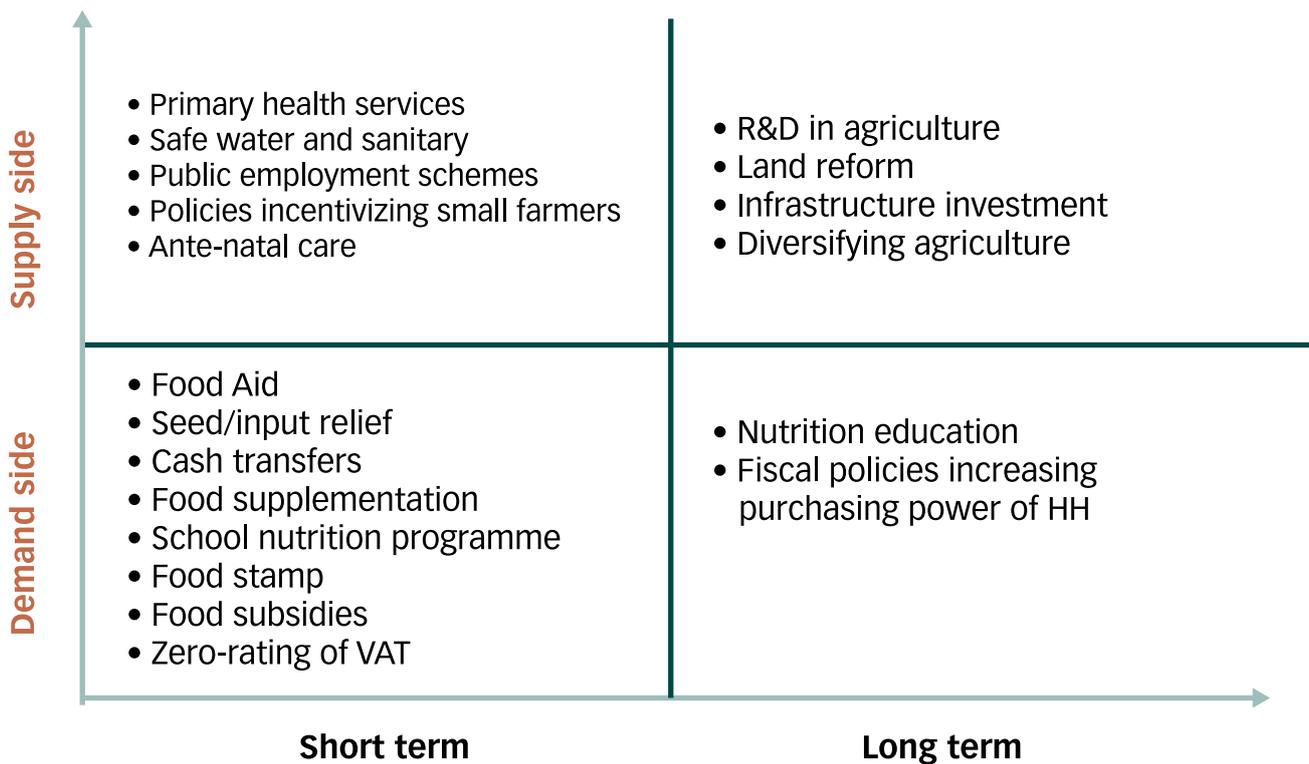
Public investment in food security and nutrition typically involves long-term and short-term interventions that address the supply side and the demand side. Supply-side incentives aim to boost productivity at household or national level, whereas demand-side interventions take the form of direct financial or non-financial support. Addressing hunger and under-nutrition is not merely about increasing the purchasing power of households but also about having access to clean sanitation, health care and education, which all contribute to improving the nutrition and food of household members (Sen and Druze, 1991). Figure 54 summarises food security interventions, which range from direct support (cash transfers, food parcels, etc.) to indirect support (job-creation schemes, adequate health care provision, etc.).

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⁴⁹ Findings by Stats SA (2011) and Pienaar and Von Fintel (2013) confirm general downward trend of household hunger. A similar downward trend in the indicators of poverty are also evident (Finn et al., 2013).

⁵⁰ Two dietary cost lines were estimated, based on the assumption that four members make up a household and then scaling up the cost lines in order for them to be comparable.

Figure 54: Food security implementation modalities



Source: Author (2014)

Impact assessment

The literature contains many suggested approaches for measuring the impact of government policy on household food security. Studies have used various models, including probit, computable general equilibrium (CGE) and data envelopment analysis (DEA) to understand the impact of economic policies on the different dimensions of household food security. Probit models are used to estimate determinants of household food security and household-level parameter estimates, which can be used as part of the inputs for the CGE models. CGE models are then used to assess the economy-wide effects of various policies and programmes, while the DEA uses CGE output and expenditure estimates to evaluate efficiency and effectiveness of the programmes.

Probit models have been used extensively to determine the impact of various policies and factors of household food security. For example, Ratcliffe et al. (2011), Gao et al. (2012), and Shaefer and Gutierrez (2012) used probit models to evaluate the National School Lunch Program (NSLP) and the Supplementary Nutrition Assistance Program (SNAP) in the United States (US). Bartfeld et al. (2009) evaluated the impact of the School Breakfast Program (SBP) in the US on household food insecurity by focusing on the difference between participants and non-participants. The paper used two measures of food insecurity: (i) the official food security measure, based on an 18-item scale that classifies households as food secure or insecure, based on the number of affirmative responses to various questions; and (ii) a less restrictive variant of the 18-item scale. This paper found that access to SBP enhanced food security among vulnerable families and helped balance food-related concerns among at-risk families. However, access to SBP did not necessarily alleviate food insecurity among families already classified as being food insecure.

Probit models only assess the impact of programmes in a partial equilibrium context, and so CGE models are used to assess economy-wide impacts. Many studies have applied the CGE model in an effort to determine the impacts of food security programmes on household food security status. For instance, the study by Caria et al. (2011) evaluated the impact of various economic policies on food security in Ethiopia, using a static International Food Policy Research Institute (IFPRI) standard

CGE model calibrated for Ethiopia. Food security was assessed at the national level, using domestic food production and household food consumption as food security indicators. The paper concluded that the fertiliser subsidy policy increased fertiliser demand and agricultural productivity. This led to a drop in crop prices, thereby stimulating consumption of the local staple. The study also found that the food transfer policy stimulated food consumption more effectively than the fertiliser subsidy policy (Caria et al., 2011). Another CGE-based study, by Mariano and Giesecke (2014), evaluated the impact of price and subsidy policies in the Philippine rice market. The study found that removing the price ceiling increased food insecurity, as indicated by the food cover index, but marginally reduced food insecurity if specified by the self-sufficiency index. Results further revealed that removing the price floor or the seed subsidies increased food insecurity. Finally, a study by Mitik et al. (2013) found that increased government public expenditure on irrigation and training improved household food security in Ethiopia.

In South Africa, very few studies have evaluated the economy-wide impact of government policies on food security, although a study by Mabugu et al. (2013) found that the CSG contributes to an increase in education and nutrition. Surprisingly, very few studies have addressed the dimensions of efficiency and effectiveness of government food security programmes. Lemba (2009) used the DEA technique to estimate the technical efficiency of different interventions. Determining the sources of efficiency or inefficiency for each policy is crucial, especially in the South African context, as household food security remains widespread, despite significant investment in food policy programmes.

6.2 Research Methods

The research employs a combination of qualitative and quantitative techniques.

The data for various food security programmes were sourced from the National Treasury database, while data for the agriculture conditional grants were collected from the Division of Revenue Acts. As agriculture is not a stand-alone department in most provinces, to ensure comparability across provinces, functions unrelated to agriculture were stripped out and the administrative programme was adjusted on a pro-rata basis. Spending figures for agriculture were deflated using the CPI deflator from Stats SA. To complement the data analysis, semi-structured interviews were held with senior officials from various sector departments to find out about the food security interventions and to understand some of the implementation challenges, especially in relation to fiscal impacts and coordination weaknesses.

The Comprehensive Agricultural Support Programme (CASP) was used as a case study to explore systematic intergovernmental coordination challenges, through a value-chain analysis.

6.2.1 Conceptual framework

A structured conceptual framework was developed to analyse the impact of selected government policies on food security and how food security programmes affect different households. The framework comprised a probit model, a CGE model and a DEA model, which are explained below.

To estimate the probability of various households experiencing food insecurity, the following probit model is used:

$$FS_i = \alpha_0 + \beta_1 P_i + \beta_3 X_i + \varepsilon$$

Where

- FS_i is the food insecurity status of household defined as being food insecure (1) or not (0).
- P_i is the food security programme (government spending) in which household participates.

- X_i represents other socio-economic factors that affect food security status, for example income, education, age, household size, gender and race of household head; whether a household receives a government grant; type of grant; and household geographical location and province.
- ε is the error term.

The estimation of the probit model is based on the 2010 IES. The model used the ratio of food expenditure to total household expenditure as an indicator of household food security (Smith and Subandoro, 2007). This measure is firmly established and widely accepted in the literature, as an important proxy for the food “accessibility” dimension of food insecurity, especially in the African context, where the majority of people live in poverty (Maxwell et al., 2013; Smith and Subandoro, 2007). This measure has also been validated and used extensively in a number of sub-Saharan countries (Smith and Subandoro, 2007). To maintain consistency with international literature, the World Bank’s definition of household aggregate consumption as a measure of household total expenditure was used. Empirical estimates from Jacobs (2009) confirmed that poor households in South Africa spend 38% or more of total household expenditure on food.⁵⁵ A household is specifically classified as food insecure if it spends 38% or more of total household expenditure on food (Jacobs, 2009). Using this benchmark, 27% of households from the IES were found to be food insecure in 2010. This was used to explore the impact of various social grants in improving household food security.

The probit model emphasises the relationship between the various social grants, household characteristics and household food security. However, due to the high likelihood of endogeneity arising from self-selection for grant recipients, the study employed an instrumental variables bivariate probit regression model. Given that the IES is primarily an expenditure survey; the plausible instrumental variables were limited. Nevertheless, household cellular phone ownership and house type (wall and roof materials) were chosen to ensure instrument validity and were in line with related international literature (Ratcliffe et al., 2011). For example, whether a household owns a cellular phone or whether its walls are made of concrete or mud is unlikely to directly affect food insecurity, but is likely to be correlated with grant receipt. Indeed the F test (> 10) confirmed that the instrument are valid (Stock and Yogo, 2004). Weather and climate change conditions were not controlled because of the cross-sectional nature of the data. Essentially, these are long-term phenomena that cannot be observed in isolation throughout one year.

Other important programmes that influence food insecurity, such as the CASP, Expanded Public Works Programme (EPWP), National School Nutrition Programme (NSNP) and Community Works Programme (CWP), were not included in the model because the IES did not contain these variables. As a result, the link of probit results to CGE was limited in this study. Therefore, the probit results were provided to help form the general perspective of the impact of social grants on food security, rather than to be used in CGE computations. To the most complete extent possible, some of these shortcomings have been mitigated and controlled in the CGE model – this paper’s main model of analysis.

The study utilised the energy extension of the South African Computable General Equilibrium Model (E-SAGE), a recursive dynamic CGE model based on the generic International Food Policy Institute (IFPRI) CGE model. The CGE model uses the 2005 Social Accounting Matrix (SAM) as the core database. The SAM comprises 53 industries, mainly agricultural including food, fish, beverage and non-agricultural commodities.

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⁵⁵ In a paper on the status of household food security in South Africa, Jacobs (2009) reported that the poorest households in South Africa spend at least 38% or more of their income on food. Another paper by Aliber (2009), using the 2005/6 IES, reported that the poorest decile spends an average of 37% of their income on food expenditure compared to 7% of the richest decile.

Many assumptions were made relating to the factors of production used. The mobility of factors of production is a central feature of any general equilibrium. A factor is mobile when it has the capacity to be relocated across industries in response to changes in rate of return. Accordingly, the greater the mobility factor in the model, the greater the economy's simulated capacity to respond to changes in the economic environment. Four types of labour are identified: '*flab-p*; *flab-m*; *flab-s* and *flab-t*'

- (i) *flab-p* represents primary-educated labour i.e. between Grade 1 and Grade 7
- (ii) *flab-m* represents middle-educated labour i.e. between Grade 8 and Grade 10
- (iii) *flab-s* represents secondary-educated labour i.e. between Grade 11 and Grade 12
- (iv) *flab-t* represents tertiary-educated labour.

In the South African labour market, *flab-t* are mobile and fully employed, while *flab-p*, *flab-m* and *flab-s* are mobile and not fully employed.

Two types of capital are identified. *Fcap* represents a capital use in non-energy industry and is mobile and fully employed, while *Fegy* represents the capital allocated for energy industries. One type of land is identified: *Flnd* represents land allocated mainly for agricultural activities and is also mobile and fully employed.

The model identifies four main agents: the government, private enterprises, households and the rest of the world. Households are divided into nine income groups, split into low-income, middle-income and high-income households:

- *hhd-0*, *hhd-1*, *hhd-2*, *hhd-3* and *hhd-4* belong to the low-income household category and represent households with 0–10%, 11–20%, 21–30%, 31–40% and 41–50% respectively of the total national income;
- *hhd-5* and *hhd-6* are considered middle-income households, representing households with 51–60% and 61–70% of the total national income;
- *hhd-7*, *hhd-8*, *hhd-91*, *hhd-92*, *hhd-93*, *hhd-94* and *hhd-95* are classified as high-income households, representing households with 71–80%, 81–90%; 91–100%; 92–100%; 93–100%; 94–100% and 95–100% of total national income respectively.

To capture household commodities' consumption behaviour, substitution between production inputs and trade characteristics in the model, as well as different parameter assumptions were used. On the demand side, household food, fish and beverage income elasticity values are 0.76, 0.66 and 0.67 respectively. These elasticities were obtained from the probit results from existing studies by Case (1998), TIPS (2002) and Mabugu et al. (2013).⁵⁶ However, on the supply side, the production function used in the model is a CES function at the top nest. The CES elasticity of substitution used in the model was based on a study completed by Thurlow (2002). The value is relatively higher and equal to 1.2. On trade assumption, elasticity of transformation was presumed to be 4.2, 0.89, 2.80 respectively for fish, food and beverages (DBSA, 2005).

The simulation is conducted with saving-investment, government and the rest of the world and factor markets' closures which are implemented exogenously. The model assumes that saving drives investment, while the exchange rate is fixed for flexible saving. In addition, government savings are fixed. The combined effect of these closures is that the full effect of changes in policy are channelled to changes in sectorial growth, in food commodities' prices, household total expenditure, household expenditure on food and household food consumption and household total consumption, as part of variables on which the household food security mitigation level is based.

Regarding production factors' markets, higher skilled labour in South Africa are fully employed and mobile, while low skilled labour are not fully employed and mobile. In addition, capital and land are fully employed and mobile across various sectors of production.

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⁵⁶ As explained above, the probit elasticity estimates in this study are not used in CGE due to the limitation of failing to disaggregate government intervention to CWP, EWP and other programmes..

Once the various impacts of the different food security policies have been estimated, the DEA model can then be used to evaluate and rank the efficiency of each policy. The DEA method defines the efficiency frontier by seeking the maximum possible proportional reduction in input usage (or the maximum proportional increase in output production), with output levels held constant (or input levels held fixed) for each spending programme. Spending programmes that are not on the efficiency frontier are identified as candidates for improvement. DEA was used to evaluate four programmes: EPWP, NSNP, Consolidated Agriculture Programme (CAP)⁵⁷ and social grants. The selection of these programmes was largely driven by data availability, obtained from annual reports of the specific programmes. The main inputs selected were total expenditure and the number of beneficiaries for each programme, while the three outputs used were food expenditure, consumption expenditure and income. The analysis therefore involves two inputs and three outputs.⁵⁸

The DEA window analysis derivation is presented in Appendix 6.5. The efficiency scores were computed using the PIM DEA software. The following formula was applied to determine the number of data points and the number of windows:

$$w = k - p + 1$$

Where

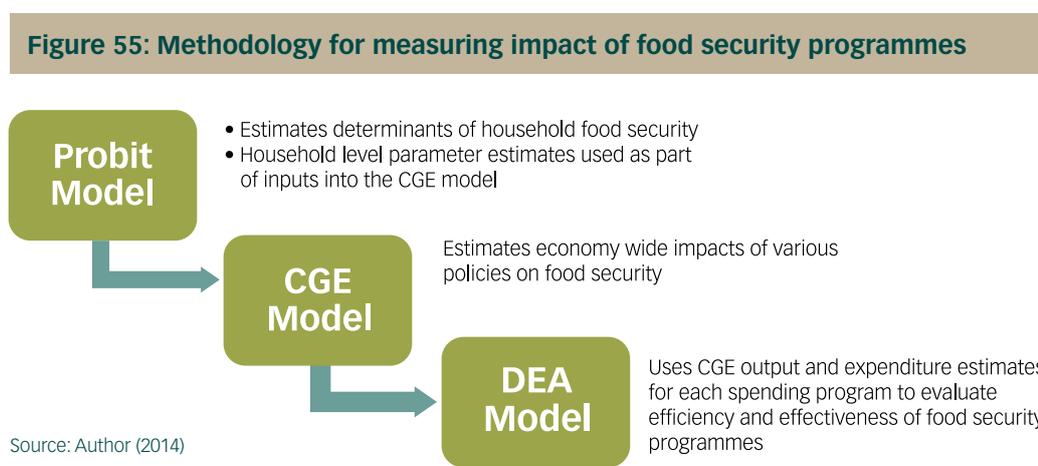
- w is the number of windows
- k represents the number of periods
- p is the length of each window.⁵⁹

From the formula, the number of windows . The number of different programmes is

$$n \times p \times w = 4 \times 4 \times 4 = 64$$

The resulting window analysis results provided “row views”, which were used to examine performance trends that occurred over time in each window. Conversely, the “column views” were used to examine stability properties, as they allowed the programmes to be compared across different reference sets and hence provided insights on the stability of these scores as reference sets changed. To test whether the variables are isotonic (i.e. increasing inputs does not reduce output), the Spearman correlation coefficient was calculated.

Figure 55 summarises the different models used and how they assist in addressing the research questions.⁶⁰



This evaluation framework will help various policy-makers recognise the operational mechanisms, relative contribution, impact and efficiency of each food security programme.

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⁵⁷ This is made up of the agricultural conditional grants and the equitable share.

⁵⁸ Compensation of employees, number of workers employed under each programme and the amount spent on goods and services are all important key inputs, which if included could alter the respective efficiencies of the programmes.

⁵⁹ The length of each window is chosen such that it is as small as possible to minimise unfair comparison over time but large enough to generate a reasonable sample size.

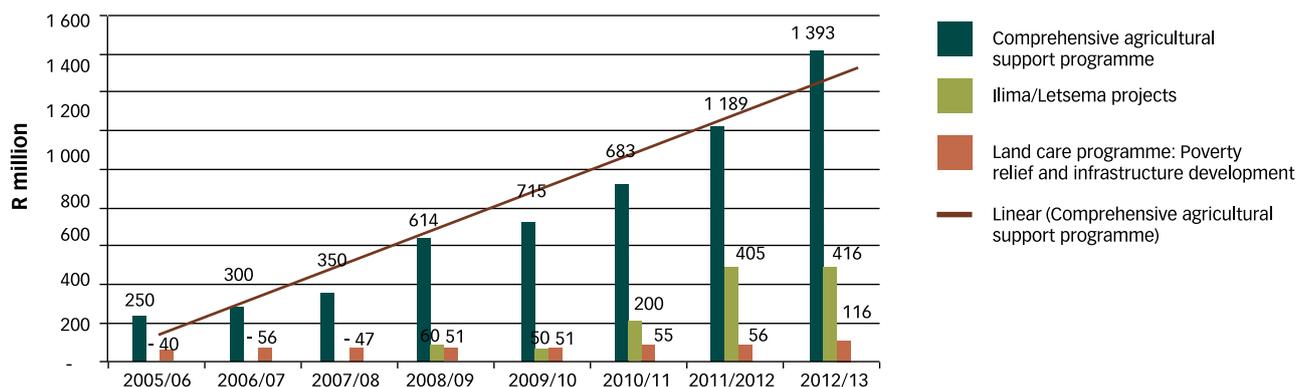
⁶⁰ However the probit estimates obtained in this study are not directly used in the CGE model as explained above.

6.3 Findings

6.3.1 Funding of food security in South Africa

The national Department of Agriculture, Forestry and Fisheries (DAFF) is the transferring agent for the three agriculture conditional grants, while provincial departments are responsible for implementing and reporting to DAFF on the spending of these grants. Figure 56 shows expenditure for the three agriculture conditional grants for the period 2005/06 to 2012/13.

Figure 56: Expenditure on agriculture conditional grants (2005/06 – 2012/13)



Source: National Treasury Database.

Over the seven-year period, spending on the CASP grant increased five-fold, reflecting government's move to promote job creation in rural areas and to redress past discrimination by supporting emerging farmers. The Ilima/Letsema grant also increased noticeably (by over R200-million between 2010/11 and 2011/12), as government redirected funds to boost food production by investing in irrigation schemes and supporting beneficiaries with starter packs and production inputs. Provinces spent R116-million on the land care programme grant, which funds capacity-building programmes, as well as the rehabilitation and protection of natural resources. For the period 2009/10–2012/13, government spent close to 100% of the land care programme grant and 95% of the Ilima /Letsema grant, which was generally good, whereas only 90% on average of the CASP grant was spent.

The three agriculture conditional grants could be better coordinated and integrated, as (for example) CASP and Ilima/Letsema grants both have similar objectives, but are implemented in silos. The grant design also focuses narrowly on certain activities in the agricultural sector, ignoring complementary sectors (such as agri-tourism and food processing), which could generate more employment opportunities. In addition, the reporting requirements do not allow for the outcomes to be assessed properly in relation to rural development and food security. For instance, indicators measure outputs, such as number of jobs created and number of tonnes of grain produced, but do not measure the number of communities becoming food secure, which is of relevance to policy.

As Table 65 shows, over the past decade provincial agricultural expenditure has more than tripled, increasing from R2.84-billion in 2001/02 to R9.2-billion in 2011/12; per capita spending increased from R591 to R1975. Per capita spending is highest in provinces with a large rural population such as Limpopo (R275) and North West (R222), compared to Gauteng (R42) and the Western Cape (R90), where a strong urban core is present. The variation in per capita spending reflects each province's priorities and agricultural sector strategy according to its Provincial Growth Plan, which is used for long-term resource allocation.

Table 65: Shifts in provincial agriculture expenditure (2001/02–2011/12)

	Agric. Spending 2001/2 (R m)	Agric. Spending 2011/12 (R m)	Per Capita Spending 2001/2	Per Capita Spending 2011/12	Per Capita Increase
Eastern Cape	563 298	1 486 047	86.84	224.86	138.02
Free State	1195 99	491 925	43.38	177.65	134.27
Gauteng	110 684	516 645	12.18	42.82	30.64
KwaZulu-Natal	655 185	2 481 989	68.75	241.76	173.01
Limpopo	581 395	1 498 867	113.80	275.73	161.94
Mpumalanga	336 256	959 177	93.73	237.09	143.36
Northern Cape	56 446	511 890	55.27	462.30	407.04
North West	305 561	778 609	93.07	222.67	129.61
Western Cape	114 357	516 712	24.91	90.36	65.45
Total	2 842 781	9 241 861	591.93	1 975.25	1 383.32

Source: Own Calculations, National Treasury Database.

Table 66: Food security-related programme expenditure

Programme	Sphere	2012/13 (R'000)	2012/14 (R'000)	2012/15 (R'000)	2012/16 (R'000)
School Nutrition Programme	Provincial	4 950 557	5 1730 81	5 461 915	5 703 715
Free State	Provincial	510 160	615 000	607 000	625 000
Gauteng	Local	662 130	611 000	632 000	661 000
KwaZulu-Natal	National	1 448 900	1 731 330	2 257 840	2 505 410
Limpopo	National	63 426 900	66 248 200	71 178 800	75 355 000
Mpumalanga	National	22 216	23 062	21 768	22 852
Northern Cape	Provincial	269 158	247 558	276 459	293 344
Total		71 290 021	74 649 231	80 435 782	85 166 321

Source: Own Calculations, National Treasury Database.

Expenditure on agriculture is just one aspect of food security. Currently, all three government spheres fund and implement non-agricultural programmes that contribute to food security (Table 66).

Semi-structured interviews were held with senior officials in various sector departments to find out about the food security interventions and to understand some of the implementation challenges, especially in relation to fiscal impacts and coordination weaknesses. The results from the interviews are summarised in Table 67.

Table 67: Food security programmes and implementation challenges

Sector	Food Security Interventions	Implementation Challenges	Implementation Strategy
Health	Nutrition security is this sector's focus area. Key interventions include breastfeeding support and promotion, supplementation, nutrition therapeutic programmes, management of acute malnutrition, clinical dietetic services and nutrition education and food safety. The sector also plays an advisory role to other sector departments.	<ul style="list-style-type: none"> Inadequate funding to expand community-based initiatives, especially to pregnant mothers and children under the age of two years. Upskilling of health care personnel on key nutritional interventions. 	District, provincial, national and NGOs.
Social Development	The main food security intervention is feeding programmes offered through social welfare programmes in centre-based facilities, such as community kitchens, early childhood development centres, aftercare facilities, etc.	<ul style="list-style-type: none"> Successfully exiting people from the support programmes. Funding constraints have led to financial cuts to NGOs implementing food security programmes. 	Local, provincial, NGOs.
SASSA	Cash transfers to beneficiaries. Food parcels and food vouchers provided to beneficiaries of social relief grant.	<ul style="list-style-type: none"> Interventions do not address long-term socio-economic challenges. Amount allocated to social relief grant is small compared to other grants and only applies for three months. 	National agency, provincial and service provider.
COGTA	Through the community works programme (CWP), work opportunities are created and income earned for the unemployed. Projects such as food gardens, cleaning, maintenance, home-based care etc. are identified as work sites.	<ul style="list-style-type: none"> CWP is not yet a permanent structure in the department. Reporting lines are not streamlined, with COGTA having to report to the Department of Public Works and National Treasury. Food gardens cannot grow in some areas because of water scarcity. 	National, NGOs.
Public Works	The Expanded Public Works Programme (EPWP) provides poverty and income relief by offering temporary job opportunities to unemployed. Activities include food gardens, infrastructure projects, community-based care, and rehabilitation of wetlands among others.	<ul style="list-style-type: none"> Spending is low in some EPWP programmes because of poor planning. Coordination can be improved across various sectors and spheres of government. 	National, provincial, local, NGOs.
Education	The National School Nutrition Programme provides meals on a daily basis to learners at schools. Nutrition education and food gardens are also provided.	<ul style="list-style-type: none"> Centralised model leads to implementation inefficiencies, especially delayed procurement processes. The budget allocated does not match the poverty profile. Lack of capacity at district level, which compromises the monitoring of the programme. 	National, provincial and NGOs

Sector	Food Security Interventions	Implementation Challenges	Implementation Strategy
Rural Development and Land Reform	The recently started recapitalisation and development programme is intended to increase food production and job creation by supporting small commercial farmers. The department also processes land claims and settles people on land for productive activity. The department is meant to work closely with DAFF in supporting new land claimants to turn land into a productive asset through small-scale farming.	<ul style="list-style-type: none"> • Inadequate post-settlement support hampers efforts to turn land into a productive asset. • The land reform process is costly and behind target. • The focus on smallholder farming and food production in the recapitalisation and development programme may be duplicating similar interventions by DAFF. 	National, provincial and NGOs
Agriculture, Forestry and Fisheries	Responsible for supporting farmers through a full package of services, such as financial support, infrastructure development, veterinary services and capacity building among others.	<ul style="list-style-type: none"> • Inadequate supply of water, mining activities and climate change limit existing agricultural land. • Poor planning and delays in procurement. • Lack of youth participation and farmer training. • Inadequate monitoring and evaluation. • Poor leveraging with other stakeholders. 	National, provincial and private providers
Municipalities	Municipalities provide zoning rights for economic development (including productive agriculture), implement food safety standards, provide nutrition services at local clinics and implement poverty alleviation initiatives such as provision of food parcels and food gardens.	<ul style="list-style-type: none"> • Municipalities do not have a clear mandate on food security. • The function is split across many departments, creating a fragmented approach to food security delivery in municipalities. • No integrated strategy on food security, which means accountability and responsibility for food security are not clearly defined. 	Metros, districts and local municipalities

Source: Author (2014)

While each sector focuses on its own dimension of food security, programme interventions appear to take place in isolation, as overlaps are apparent in a number of cases. For example, many sector departments have identified food gardens as an important intervention to combat household food insecurity, yet no national strategy is in place to coordinate, upscale and synthesise efforts across sectors and spheres. This confirms feedback received from interviews that the existing Integrated Food Security task team, which is meant to coordinate food security delivery in South Africa, has not been effective. Evidence suggests DAFF and the Department of Rural Development and Land Reform (DRDLR) could further strengthen coordination, especially to smallholder farmers, and provide adequate post-settlement support to land reform beneficiaries.

Even though food security-related programmes implemented by sector departments do not involve municipalities, many municipalities include food security interventions as part of their poverty alleviation, food safety and economic development initiatives. The food security function is spread across various directorates within a municipality (e.g. social development, economic development and health), with no unit taking direct responsibility for it. Municipalities view food security function as an unfunded mandate, and so the internal and external resources are limited, despite the critical need on the ground. Expenditure figures for food security interventions in municipalities are also very hard to estimate because the existing budget structure does not currently recognise food security as a municipal function.

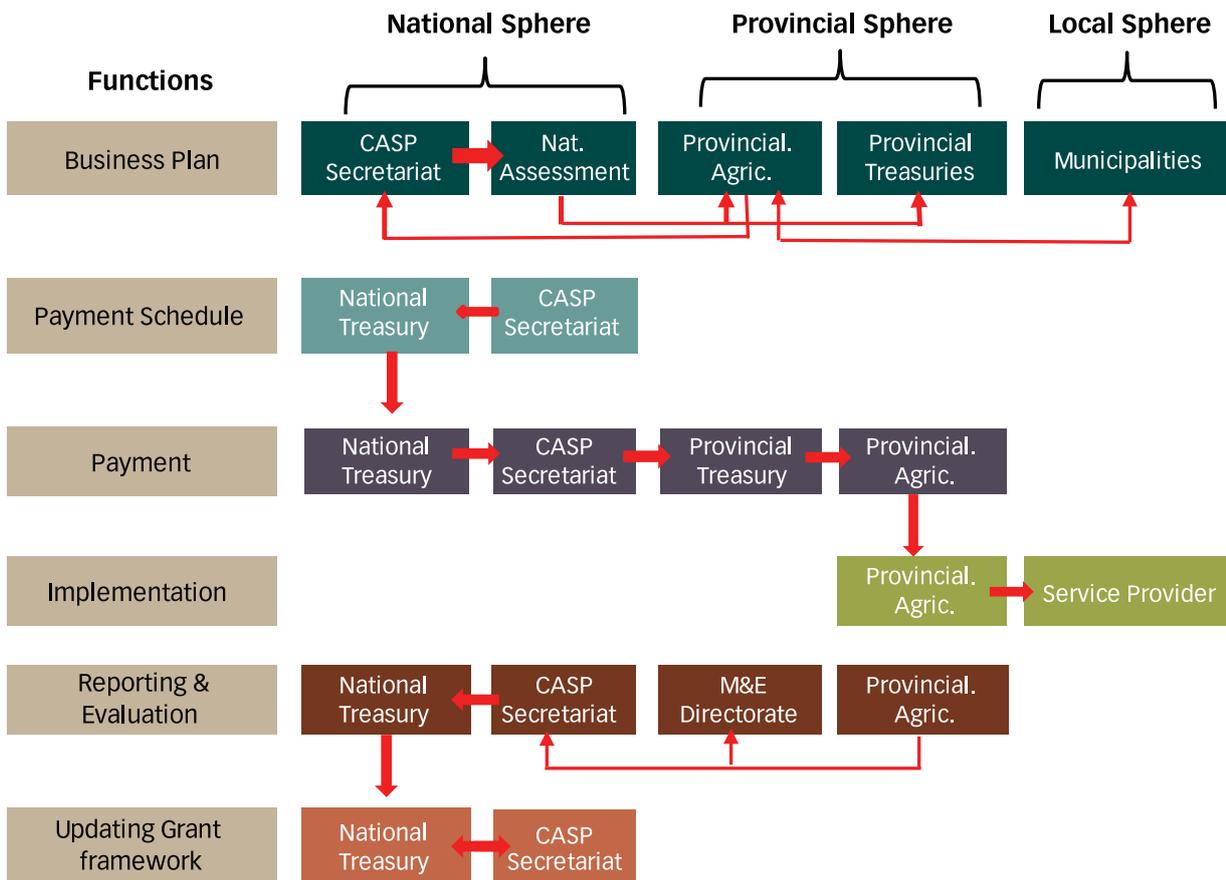
6.3.2 Value-chain analysis of CASP grant

The CASP grant provides a case study that highlights some of the intergovernmental coordination challenges affecting effective implementation of food security interventions. The CASP value chain contains six main functions or components (Figure 57). Blockages in any of these components will negatively affect the grant's performance.

- *Business Plan:* If the business plan submitted by a provincial department is late or does not comply with the grant framework, it is returned by the assessment committee. As a result, some projects may start late or be dropped completely. To reduce the risk of late or incomplete submission, the transferring department should develop easy-to-complete business plan templates and provide capacity-building and ongoing technical support.
- *Payment Schedule:* If the province's cash-flow and disbursements to service providers are not synchronised, the province could end up paying service providers late and incurring penalties or building up surpluses that could have been invested to earn additional income. To reduce this risk, DAFF must make sure the payment schedule issued to National Treasury is consistent with the service delivery schedules of provincial departments, while provincial departments must ensure proper cash-flow planning and management.
- *Payment:* If the transfer of funds to the province is delayed, projects cannot proceed because funding is not available. This may result in some projects being incomplete at the end of the financial year. Therefore, provinces should comply with all the necessary requirements for disbursements and, especially, make sure all the relevant signatories sign off on their business plans.
- *Implementation:* If procurement processes are delayed, or the selected service providers do not meet the minimum requirements, the project could be completed late or not completed. To reduce this risk, provinces should plan properly and ensure procurement staff have the relevant skills and capabilities. In addition, contract-management capacity should be built and disincentives created to avoid voluntary default by contractors.
- *Reporting and Evaluation:* If provinces do not submit reports accurately and on time to DAFF (where the information is collated and reported to National Treasury every quarter), planning and management decision-making will be adversely affected. For instance, issues may emerge late in the financial year, when corrective action could have been taken much earlier to resolve any blockages. To reduce the reporting burden on provinces, sector departments requiring the same information should agree on a standardised reporting format.

- *Updating Grant Framework:* Every year the DAFF reviews and submits the proposed grant framework to National Treasury. All provincial departments must adhere to the framework conditions when accessing funding from the CASP grant. If the grant conditions are unnecessarily complex, administering the grant could be cumbersome for provinces and may result in a lower uptake of the grant. As part of the annual update process, provinces should be given the opportunity to provide inputs into the grant framework, something which is currently not happening.

Figure 57: Value chain of the CASP grant



Source: Author (2014)

6.3.3 Impact assessment

The probit and marginal effects estimates

The marginal effect estimates of the biprobit model are presented in full in Appendix 6.1. The models estimated were model 1 (the ordinary biprobit model), model 2 (similar to 1 but used instrumental variables) and model 3 (a biprobit model with instrumental variables but used a dummy variable for grant). The Wald test of exogeneity confirmed the possible endogeneity in the biprobit model without instrumental variables (model 1). Results in the main model (model 2) show that, among all social grants, only the grant for the elderly is associated with reductions in food insecurity. Being a recipient of the old-age grant reduces the probability of experiencing food insecurity by one percentage point. However, households that received both the child and disability grants do not seem to experience reductions in their food insecurity status. This outcome may simply be a result of the amounts received being either insufficient or not used for food in the household budget.

Other results demonstrate that household size, location, and the head of household's gender and education level matter. Larger-size households are more likely than one-member households to experience food insecurity. Male-headed households are more likely than female-headed households to experience food insecurity, a finding that is supported by Duflo (2003) who found that female-headed households have higher food and nutrition budgets in South Africa. Furthermore, even after controlling for income effect, households with better educated heads experience lower food insecurity. Finally, location matters: households in urban areas are less likely to experience food insecurity than those in rural areas.

CGE results

Various government expenditure programmes on food security were evaluated to assess their impact on food security. The CGE model evaluated the impact of different programmes on improving the country's economy, market commodities' prices, household income or purchasing power, and the effect on food consumption and expenditure. The results are presented in Appendices 2 and 3.

An assessment of the impact of the NSNP on food prices, household income, food consumption and total expenditure between 2005 and 2012 shows an average decrease of 0.03%, 0.027% and 0.037% in fish, food and beverage prices respectively (Appendix 2, Table 69). In addition, for the total period, prices of food commodities decreased by 0.23%, 1.19% and 0.25% for fish, food and beverage respectively (see Appendix 3, Table 74). The results show that a reduction in food prices is followed by a reduction in household food expenditure and total consumption expenditure. The NSNP had a positive effect on household income levels, especially on low income households, by providing food, which reduced household food expenses.

The results found that the EPWP contributed to a decrease of 2.66%, 0.64% and 0.13% in fish, food and beverage average prices respectively (see Appendix 2, Table 69). Average total household consumption also decreased, by 3.51% and 2.33% for low and middle income households respectively, but increased by 4.28% for higher income households (see Appendix 2, Table 71). Furthermore, average income reduced by 3.73% for low income households and increased by 1.8% and 4.04% for middle and higher income households respectively (see Appendix 2, Table 72). During the same period, total food prices decreased by 18.68%, 4.54% and 0.93% for fishery, food and beverage commodities respectively (see Appendix 3, Table 74).

The EPWP helped to reduce household food insecurity by increasing households' ability to purchase more. Expenditure on food and beverages decreased for all household income levels, while expenditure on fish increased for middle and higher income households but decreased for low income households. In addition, household income improved most for middle and higher income households. As a supply-side food insecurity mitigation policy, the EPWP has created jobs and generated income to improve middle and higher income purchasing power. The policy has also managed to improve low income households' food expenditure, mainly on fish, food and beverage commodities. It can be concluded that the programme has helped to significantly reduce the vulnerability of low income households to food security.

In addition to the first two programmes, the impact of the Community Works Programme (CWP) was to decrease fish, food and beverage commodities average prices by 4.55%, 1.10% and 0.22% respectively (see Appendix 2, Table 69). The average expenditure decreased by 5.95% for low income households and by 3.98% and 7.29% for middle and high income households (see Appendix 2, Table 71). In addition, average income decreased by 6.34% for low income households and increased by 3.13% and 6.88% for middle and high income households respectively (see Table 72). In a related development, total food prices decreased by 31.85%, 7.73% and 1.57% for fish, food and beverage commodities respectively (see Appendix 3, Table 74). However, total household expenditure increased by 273.13%, 165.24% and 349.19% for low, middle and higher income households respectively (see Appendix 3, Table 76), while total income decreased by 310.87% for low income households but increased by 49.90% and 240.93% for middle and higher income households (see Appendix 3, Table 77). The CWP should be supported, as it provides households with job opportunities and therefore boosts household income. In a competitive labour market, improving skills is very important for improving household welfare and income generation.

The social grant programme was associated with a decrease in average prices, 0.001%, 0.002% and 0.0009% for fish, food and beverage respectively (see Appendix 2, Table 69). Total household consumption decreased by 0.23% for low income households and increased by 0.072% and 0.09% for middle and higher income households respectively (see Appendix 2, Table 71). In addition, average household income decreased by 0.3%, 0.14% and 0.13% for low, middle and higher income households respectively (see Appendix 2, Table 72). Total food prices decreased by 0.007%, 0.01% and 0.006% for fish, food and beverage commodities respectively (see Appendix 3, Table 74). However, total household consumption decreased by 6.30% for low income households and increased by 2.35% and 3.07% for middle and higher income households respectively (see Appendix 3, Table 76). Total income decreased by 15.93%, 2.06% and 4.8% for low, middle and higher income households respectively (see Appendix 3, Table 77). The Social Grant Programme's impact was to reduce expenditure on food, fish and beverages for low income households and to reduce income for all households. Social grants provide direct cash transfers to households, which improves the household purchasing power and reduces expenses when food prices are low. However, this is not the same as improving household income generation through employment.

The National Nutritional Programme was found to contribute to a decrease in fish prices of 0.025% and an increase in the average food and beverage commodities prices of 2.11%, and 0.025% respectively (see Appendix 2, Table 69). Average total household consumption decreased by 0.13%, 0.20% and 0.29% for low, middle and higher income households respectively (see Table A2d). In addition, average household income decreased by 0.06%, 0.09% and 0.16% for low, middle and higher income households respectively (see Appendix 2, Table 72). Notwithstanding, total food prices during this period decreased by 0.17% for fish and increased by 14% and 0.18% for food and beverages respectively (see Appendix 3, Table 74). Total household consumption decreased by 34.29%, 7.23% and 13.84% for low, middle and higher income households respectively (see Appendix 3, Table 76), while total income decreased by 3.36%, 1.38% and 5.67% for low, middle and higher income households (see Appendix 3, Table 77). Thus, the NNP did not lead to increased household income or reduced household food expenditure. However, in the short term, the NNP had a relatively positive and significant impact on the overall health and wellbeing of households.

The CAP was found to decrease average fish prices by 0.9% and increase average food and beverage prices by 5.47% and 1.43% respectively (see Appendix 2, Table 69). Total average household consumption decreased by 1.60%, 0.93% and 0.56% for low, middle and higher income households respectively (see Appendix 2, Table 71). In addition, average household income decreased by 1.68%, 1.06% and 0.62% for low, middle and higher income households respectively (see Appendix 2, Table 72). Furthermore, fish prices decreased by 6.62%, while food and beverage prices increased by 38.32% and 10.05% respectively (see Appendix 3, Table 74). However, total household consumption decreased by 157.16%, 20.08% and 19.31% for low, middle and higher income households respectively (see Appendix 3, Table 76), while total household income decreased by 82.47%, 14.84%, and 21.97% for low, middle and higher income households respectively (see Appendix 3, Table 77). The CAP failed to improve the availability of household food commodities or to reduce food prices. It also did not contribute to improved household income and perhaps households' ability to access food. However, supporting various agricultural programmes is indispensable to improve food availability and accessibility.

The CAP is fundamental to food security, as improving food production and agricultural productivity contributes to minimising the cost of producing food. However, the impact assessment of the programme found that both food prices and household food expenditure have increased, while the CAP does not contribute to improved household purchasing power. Nonetheless, implementing a policy efficiently can potentially improve its impact. Therefore, the modelling exercise explores the efficiency of the various spending programmes using the output from the CGE framework.

Data envelope analysis

Table 68 displays the descriptive statistics of the variables used in the DEA estimation.

Table 68: Food security-related programme expenditure

Statistics item	Maximum	Minimum	Mean	Std. Dev.
Total Expenditure	65,600,000,000	1,060,000,000	20,500,000,000	19,700,000,000
Total Beneficiaries	15,600,000	165,447	5,436,084	5,530,545
Food Expenditure	151,000,000	142,000,000	149,000,000	2,705,999
Consumption Expenditure	1,040,000,000	969,000,000	988,000,000	16,600,000
Income	1,230,000,000	1,160,000,000	1,180,000,000	18,000,000

Author's calculations (2014)

Using the Spearman correlation coefficient, Table 69 shows that the variables selected are all positively correlated.

Table 69: Food security-related programme expenditure

Spearman correlation		Outputs	
Inputs	Food Expenditure	Consumption Expenditure	Income
Total Expenditure	0.1773	0.5205	0.2075
P-value	0.3666	0.0045	0.2894
Total Beneficiaries	0.3963	0.4866	0.2770
P-value	0.0368	0.0086	0.1535

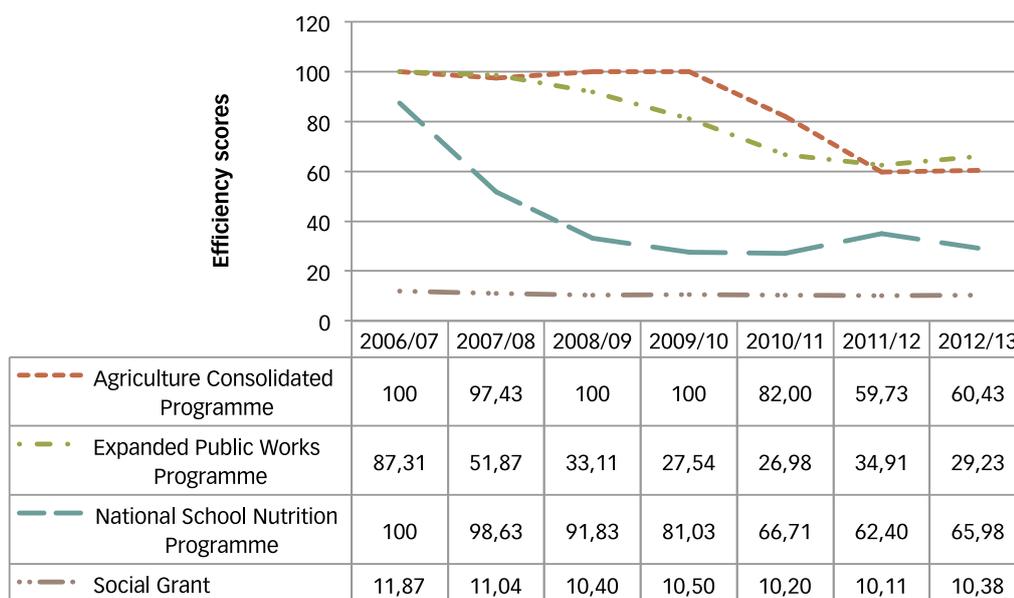
Author's calculations (2014)

There are 64 data points to which the DEA model is applied in order to obtain the efficiency scores given in Appendix 6.6. For illustration, the CAP deteriorates in performance from 2009/10 to 2012/13 in the third and fourth windows, although overall the programme is more efficient than the other interventions. The social grants programme performs the worst but was relatively stable over the period. The scores in the rows are very high for the CAP and the NSNP, suggesting that their efficiency has been relatively stable over time.⁶¹ The results in the column rows also demonstrate stable performances. Therefore, the averages shown on the right and at the bottom of each table can be taken as representative of these performances. The grand averages shown in the four lower corners can therefore be used to show that the CAP (grand average = 88.80%) was the best performer in terms of technical efficiency over the period followed by the NSNP, EPWP and the social grants programme (grand average = 80.49%, 36.28% and 10.52% respectively). In addition to examining each programme's trend and stability, Figure 58 shows the yearly efficiency trends among the four programmes.

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⁶¹ The foregoing analysis is conducted by first analysing the performance of a programme over a four-year period or window. The window is then shifted one period by replacing an earlier year with a new year and the analysis is performed again on these 16 DMUs. The process continues shifting the window forward by one period each time and concluding with the final analysis of the 16 DMUs for the last four-year period (2009/10–2012/13). In general, one examines p-w+1 separate analysis, where each analysis examines (4x4) DMUs

Figure 58: Yearly technical efficiency (2006/07–2012/13)



Source: Author (2014)

6.4 Discussion

There is strong empirical evidence that food insecurity has declined since 2002, although the global recession has reduced some of the earlier gains. Access to sufficient food is an important socio-economic right under the Constitution, but assessing whether government is meeting this statutory obligation is very difficult because the food-security function is fragmented across different spheres and sectors. As a result, setting norms and standards that can be costed is a challenge.

The recently approved National Policy on Food Security and associated strategies do encourage the strengthening of small-scale agriculture, but the policy is not adequately resourced because DAFF has not submitted a detailed, properly costed implementation plan and addressed existing implementation challenges. An assessment of provincial conditional grants suggests that the inability of provinces to absorb existing funds, especially the CASP grant, is symptomatic of institutional weaknesses and blockages in the conditional grants value chain. Blockages identified are poor planning, lack of staff support, inadequate marketing, delays in procurement, weak monitoring and evaluation, lack of farmer training and also poor leveraging with other stakeholders.

Furthermore, CASP and Illima/Letsema grants essentially have the same objectives yet are implemented separately, while the Illima/Letsema grant overlaps with the DRDLR's recapitalisation and development programme, which creates competition and reduces the impact on the ground. A further challenge is that the DAFF is unable to ascertain the true service delivery performance of provincial agriculture departments, largely because of the lack of a comprehensive evaluation of provincial service delivery. Holding provinces accountable is difficult, as no norms and standards are in place to measure provincial performance. Municipalities currently have no clear legislative mandate, resulting in a lack of accountability and responsibility for food security. The food security function is considered an unfunded mandate, which means municipalities are restricted in applying for additional resources, despite the critical need on the ground.

Over the period under consideration, despite being relatively efficient, the CAP has not significantly improved household food security. This result is interesting in that a programme can be efficiently implemented, while failing to address the underlying challenge of reducing household food insecurity. The increases in food prices and the absence of improved household income show that the CAP has failed to address the country's household food insecurity. To achieve the programme's goal, what is needed urgently is effective land reform (the land reform policy is among various programmes that support the CAP), interventions to boost productivity (measures to reduce transport

cost, fuel prices and soil improvements) and improve infrastructure to increase market accessibility. Climate change has had negative impacts on the country's food production during recent periods, and so addressing the impact of climate change might reduce the sector's vulnerability and thereby improve household food availability at a lower cost.

The most promising programmes for improving household food security were found to be those that improve a household's ability to access food to meet their dietary demand and at a lower cost. Improving household income increases households' purchasing power. In addition, increasing food availability at lower cost could improve households' food accessibility and thereby reduce food insecurity. However, since households largely acquire food through purchase, improving their income can also be effective in reducing food insecurity. In this regard, both the EPWP and CWP increase household income. Creating more jobs and improving skills to supply the labour market and contribute towards industries' growth are vital for improving household welfare and income generation. Improving the efficiency of the EPWP would also go a long way in negating negative temporary shocks that affect households.

The efficiency of the social grants programme has been flat over the period, which suggests that huge gains could be realised by improving efficiency. Government should consider expanding the scale and scope of grant support to vulnerable households who qualify and are not currently covered. The impact assessment shows that the social grants programme is unlikely to protect households against price shocks, since grants generally increase at below food inflation levels. However, the policy has contributed to reducing food insecurity, mainly in low income households.

Lastly, an important development goal for the South African government is providing healthy food and improving household diets. The NSNP and the NNP have contributed towards a reduction in total household consumption and increased food expenditure. The impact on household income has, however, been limited. Improving the ability of households to acquire and access food could increase the effectiveness of the various nutritional programmes in reducing food insecurity. However, while providing free food to school children helps households save money for other spending possibilities, job creation remain the long-term first best solution.

6.5 Recommendations

1. DAFF strengthens its ability to enforce the conditions in the grant framework to ensure better oversight of provinces, so that spending and performance of the agricultural conditional grants can be improved. The Commission suggests that norms and standards be developed to assess the performance of provinces and that five-year evaluations of conditional grants be institutionalised.
2. Special focus is put on improving the operations of different food security programmes, especially Agriculture, EPWP and the School Nutrition Programme, which accelerate reduction in household food security without necessarily increasing programme expenditure. Areas that can yield improved results include better joint planning (such as creating a value chain between smallholders receiving grant support and the NSNP) and streamlining procurement processes with the assistance of the Chief Procurement Office. The ability to use available resources optimally for the food security programmes has declined over time.
3. Government clarifies the legislative mandate and responsibility of municipalities in relation to food security. In this regard, DAFF should develop a policy on urban food security with concrete proposals on how such a mandate will be funded. Currently, food security is not seen as a competence of municipalities and therefore cannot be funded.
4. The terms of reference for the committee to review the agricultural conditional grants are finalised without unnecessary delays. The review should be comprehensive in scope and should include assessing the value chain of conditional grants and unlocking operational constraints, especially in relation to planning, procurement, comprehensive smallholder support, cash-flow and monitoring and evaluation. Stakeholders such as the DRDLR should be invited to be part of the committee, and ways to streamline the funding overlap between the Illima / Letsema grant and the recapitalisation and development programme should be examined.

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Appendix 6.1: Probit Results

	Model 1: biprobit model						Model 2: IV biprobit model						Model 3: IV biprobit model					
	biprobit coefficients			marginal effects			biprobit coefficients			marginal effects			biprobit coefficients			marginal effects		
	Coef.	s.e	P>z	dy/dx	s.e	P>z	Coef.	s.e	P>z	dy/dx	s.e	P>z	Coef.	s.e	P>z	dy/dx	s.e	P>z
Old-age pension	-0.137	0.031	0.000	0.035	0.008	0.000	-0.129	0.030	0.000	-0.008	0.002	0.000	-	-	-	-	-	-
Child grant	0.160	0.030	0.000	-0.040	0.008	0.000	0.802	0.097	0.000	0.048	0.004	0.000	-	-	-	-	-	-
Disability grant	0.015	0.037	0.681	-0.004	0.009	0.681	0.013	0.036	0.719	0.001	0.002	0.719	-	-	-	-	-	-
Care depend-ency grant	0.248	0.174	0.154	-0.062	0.044	0.154	0.231	0.167	0.168	0.014	0.010	0.169	-	-	-	-	-	-
Income(log)	-0.265	0.011	0.000	0.067	0.003	0.000	-0.253	0.011	0.000	-0.015	0.001	0.000	-0.236	0.011	0.000	-0.022	0.001	0.000
Grant	-	-	-	-	-	-	-	-	-	-	-	-	0.962	0.083	0.000	0.088	0.007	0.000
Household Size																		
2	0.104	0.033	0.002	-0.026	0.008	0.002	0.097	0.032	0.002	0.006	0.002	0.003	0.122	0.030	0.000	0.011	0.003	0.000
3	0.028	0.038	0.470	-0.007	0.009	0.470	0.021	0.037	0.577	0.001	0.002	0.577	0.063	0.034	0.060	0.006	0.003	0.060
4	0.081	0.045	0.070	-0.020	0.011	0.072	0.073	0.043	0.093	0.004	0.003	0.098	0.128	0.038	0.001	0.012	0.004	0.001
Gender (male)	-0.003	0.024	0.909	0.001	0.006	0.909	-0.001	0.024	0.980	0.000	0.001	0.980	-0.008	0.022	0.709	-0.001	0.002	0.709
Race																		
Coloured	0.008	0.048	0.863	-0.002	0.013	0.863	0.028	0.046	0.544	0.002	0.003	0.547	0.000	0.044	0.992	0.000	0.004	0.992
Indian/Asian	-1.282	0.205	0.000	0.213	0.016	0.000	-1.139	0.165	0.000	-0.044	0.004	0.000	-1.111	0.158	0.000	-0.069	0.005	0.000
White	-0.768	0.100	0.000	0.157	0.015	0.000	-0.744	0.097	0.000	-0.034	0.004	0.000	-0.739	0.092	0.000	-0.054	0.005	0.000
Education Level																		
Primary	-0.066	0.036	0.068	0.019	0.011	0.070	-0.067	0.035	0.055	-0.005	0.002	0.059	-0.015	0.033	0.644	-0.001	0.003	0.645
Secondary	-0.207	0.039	0.000	0.058	0.011	0.000	-0.197	0.038	0.000	-0.013	0.003	0.000	-0.103	0.035	0.003	-0.010	0.003	0.004
Tertiary	-0.521	0.048	0.000	0.133	0.013	0.000	-0.494	0.046	0.000	-0.029	0.003	0.000	-0.378	0.044	0.000	-0.034	0.004	0.000
University	-1.057	0.124	0.000	0.224	0.018	0.000	-1.009	0.120	0.000	-0.048	0.005	0.000	-0.885	0.115	0.000	-0.065	0.006	0.000
1.formal_ emp	0.029	0.029	0.322	-0.007	0.007	0.321	0.028	0.028	0.315	0.002	0.002	0.316	0.068	0.026	0.007	0.006	0.002	0.007
Province																		
E. Cape	-0.211	0.057	0.000	0.056	0.015	0.000	-0.237	0.055	0.000	-0.015	0.004	0.000	-0.249	0.052	0.000	-0.024	0.005	0.000
N. Cape	0.135	0.056	0.016	-0.038	0.016	0.016	0.142	0.054	0.008	0.010	0.004	0.009	0.125	0.051	0.014	0.013	0.005	0.014
Free State	-0.512	0.064	0.000	0.127	0.016	0.000	-0.470	0.062	0.000	-0.028	0.004	0.000	-0.433	0.059	0.000	-0.040	0.006	0.000
KZ-Natal	-0.126	0.058	0.030	0.034	0.016	0.030	-0.136	0.056	0.015	-0.009	0.004	0.016	-0.140	0.053	0.008	-0.014	0.005	0.009
North West	-0.302	0.064	0.000	0.079	0.017	0.000	-0.266	0.062	0.000	-0.017	0.004	0.000	-0.244	0.059	0.000	-0.023	0.006	0.000
Gauteng	-0.364	0.057	0.000	0.094	0.015	0.000	-0.335	0.056	0.000	-0.021	0.004	0.000	-0.311	0.053	0.000	-0.029	0.005	0.000
Mpumala- langa	-0.222	0.061	0.000	0.059	0.016	0.000	-0.191	0.059	0.001	-0.012	0.004	0.002	-0.165	0.056	0.003	-0.016	0.006	0.004
Limpopo	-0.230	0.060	0.000	0.061	0.016	0.000	-0.182	0.058	0.002	-0.012	0.004	0.002	-0.155	0.056	0.006	-0.015	0.006	0.006
Urban	-0.287	0.030	0.000	0.072	0.008	0.000	-0.246	0.030	0.000	-0.015	0.002	0.000	-0.224	0.029	0.000	-0.021	0.003	0.000

Appendix 6.2: Average Changes in CGE Results

Table 70: Food security-related programme expenditure

Sectors	Pro-gramme	Average Real GDP	Sectors	Pro-gramme	Average Real GDP
Agriculture	NSNP	30,2319122	Water	NSNP	6,97269944
	EPWP	30,8265732		EPWP	7,04460443
	CWP	31,29823835		CWP	7,09161912
	SG	30,12825965		SG	6,97801541
	NNP	30,10474265		NNP	6,97030732
	CAP	22,97049392		CAP	6,98462798
Fishery	NSNP	1,226870342	Construction	NSNP	28,8216159
	EPWP	1,296042117		EPWP	28,9731257
	CWP	1,345592278		CWP	29,077838
	SG	1,218736965		SG	28,8235907
	NNP	1,22178013		NNP	28,8219661
	CAP	1,21866081		CAP	28,8901917
Food	NSNP	27,33916719	Trade	NSNP	136,045206
	EPWP	27,09772461		EPWP	138,086845
	CWP	27,09503441		CWP	139,560881
	SG	27,08416993		SG	135,977649
	NNP	27,16293263		NNP	135,977982
	CAP	26,21619995		CAP	136,053643
Beverage	NSNP	16,85505387	Transport	NSNP	183,331869
	EPWP	17,07605858		EPWP	186,831595
	CWP	17,22434256		CWP	188,262021
	SG	16,86392546		SG	183,183915
	NNP	16,83605484		NNP	183,31059
	CAP	16,579161		CAP	185,767187
Petroleum	NSNP	22,0927626	Gov Services	NSNP	248,241446
	EPWP	22,31510062		EPWP	250,717375
	CWP	22,47198758		CWP	252,216654
	SG	22,09266734		SG	248,602178
	NNP	22,09563522		NNP	248,425539
	CAP	22,33484649		CAP	248,438936
Electricity	NSNP	26,15571758	Other Services	NSNP	121,435361
	EPWP	26,15992002		EPWP	123,678691
	CWP	26,16304303		CWP	125,248511
	SG	26,15549467		SG	121,432237
	NNP	26,15538891		NNP	121,370805
	CAP	26,15491167		CAP	121,518943

Source: Author's calculation from ESAGE model results

Table 71: Average changes in food commodity prices (% changes from baseline of 2005)

	NSNP	EPWP	CWP	SG	NNP	CAP
Fish	-0,03304645	-2,66980939	-4,55042662	-0,00109292	-0,02547866	-0,94669395
Food	-0,02790483	-0,64986029	-1,10560852	-0,00217533	2,11444187	5,47571056
Beverage	-0,0370636	-0,13423736	-0,22517314	-0,00090151	0,02596071	1,43579939

Source: Author's calculation from ESAGE model results

Table 72: Average annual changes induced by household food security programmes on household food consumption (% changes from baseline of 2005)

	NSNP			EPWP		
	Fish	Food	Beverage	Fish	Food	Beverage
Low income	-0,01291849	4,16960906	0,6937349	-0,62873418	1,77774761	-1,49118712
Middle income	-0,05082518	5,88035709	2,13389764	3,12385719	7,6070428	3,67097446
High income	-0,11397965	1,52046521	0,93417875	3,70086081	4,04996779	3,4925145
	CWP			SG		
	Fish	Food	Beverage	Fish	Food	Beverage
Low income	-0,74837565	1,20475157	-1,92887706	-0,03444887	4,14812328	0,68183181
Middle income	3,72477908	8,05385255	3,9980972	0,02758335	5,97517273	5,97517273
High income	4,4132161	4,56536769	3,99596162	0,02154848	1,66624885	1,08877579
	NNP			CAP		
	Fish	Food	Beverage	Fish	Food	Beverage
Low income	-0,19895176	2,22628123	0,4780381	-0,56358967	0,30920251	-0,98492595
Middle income	-0,19357221	4,5028436	1,94688784	-0,12484544	3,3735256	3,3735256
High income	-0,20422831	0,33553241	0,7978958	0,11553303	-0,25429694	0,25406849

Source: Author calculation from ESAGE model results

Table 73: Average changes induced by household food security programme on household total consumption (% changes from baseline in 2005)

	NSNP	EPWP	CWP	SG	NNP	CAP
Low income	-0,08681729	-3,51286437	-5,95120229	-0,23360894	-0,1365134	-1,60745945
Middle income	-0,19473957	2,33385982	3,98258409	0,07273074	-0,20667531	-0,938692
High income	-0,32712267	4,28431689	7,29005125	0,09148138	-0,2936818	-0,56368964

Source: Author's calculation from ESAGE model results

Table 74: Average changes induced by household food security programme on household income (% changes from baseline in 2005)

	NSNP	EPWP	CWP	SG	NNP	CAP
Low income	-0,05813198	-3,73963528	-6,34444414	-0,32515588	-0,06875671	-1,68320132
Middle income	-0,1381264	1,83845781	3,13574874	-0,14729957	-0,09915472	-1,06017641
High income	-0,29258469	4,04590977	6,88372969	-0,13786803	-0,16213278	-0,62796737

Source: Author's calculation from ESAGE model results

Appendix 6.3: Total Real Changes in CGE Results

Table 75: Total real GDP at factor cost by activity

Sectors	Pro-gramme	Average Real GDP	Sectors	Pro-gramme	Average Real GDP
Agriculture	NSNP	241,855298	Water	NSNP	55,7815955
	EPWP	246,612586		EPWP	56,3568354
	CWP	250,385907		CWP	56,7329529
	SG	241,026077		SG	55,8241233
	NNP	240,837941		NNP	55,7624586
	CAP	183,763951		CAP	55,8770238
Fishery	NSNP	9,81496273	Construction	NSNP	230,572928
	EPWP	10,3683369		EPWP	231,785006
	CWP	10,7647382		CWP	232,622704
	SG	9,74989572		SG	230,588726
	NNP	9,77424104		NNP	230,575728
	CAP	9,74928648		CAP	231,121534
Food	NSNP	218,713338	Trade	NSNP	1088,36165
	EPWP	216,781797		EPWP	1104,69476
	CWP	216,760275		CWP	1116,48705
	SG	216,673359		SG	1087,8212
	NNP	217,303461		NNP	1087,82386
	CAP	209,7296		CAP	1088,42915
Beverage	NSNP	134,840431	Transport	NSNP	1099,99122
	EPWP	136,608469		EPWP	1120,98957
	CWP	137,79474		CWP	1129,57213
	SG	134,911404		SG	1099,10349
	NNP	134,688439		NNP	1099,86354
	CAP	132,633288		CAP	1114,60312
Petroleum	NSNP	176,742101	Gov Services	NSNP	1985,93157
	EPWP	178,520805		EPWP	2005,739
	CWP	179,775901		CWP	2017,73323
	SG	176,741339		SG	1988,81742
	NNP	176,765082		NNP	1987,40431
	CAP	178,678772		CAP	1987,51149
Electricity	NSNP	209,245741	Other Services	NSNP	971,48289
	EPWP	209,27936		EPWP	989,429524
	CWP	209,304344		CWP	1001,98809
	SG	209,243957		SG	971,457893
	NNP	209,243111		NNP	970,966439
	CAP	209,239293		CAP	972,151546

Source: Author's calculation from ESAGE model results

Table 76: Total changes in food commodity prices (% changes from baseline of 2005)

	NSNP	EPWP	CWP	SG	NNP	CAP
Fish	-0,23132516	-18,6886657	-31,8529864	-0,00765041	-0,17835065	-6,62685768
Food	-0,19533384	-4,54902201	-7,73925963	-0,01522734	14,8010931	38,3299739
Beverage	-0,25944517	-0,93966149	-1,57621195	-0,00631054	0,18172496	10,0505957

Source: Author's calculation from ESAGE model results

Table 77: Total changes induced by household food security programme on household food commodities consumptions (% changes from baseline of 2005)

	NSNP			EPWP		
	Fish	Food	Beverage	Fish	Food	Beverage
Low income	-0,63300621	-30,8079747	-36,6704067	-1,68799459	-9,74863628	-27,6158938
Middle income	-0,71155256	43,7340007	52,1469071	0,38616688	-2,71001101	-1,74783615
High income	-3,98928765	129,530128	154,462563	0,75419695	-7,14799079	4,04365618
	CWP			SG		
	Fish	Food	Beverage	Fish	Food	Beverage
Low income	-1,15199008	24,0377052	28,7272461	-1,07574572	-10,2605358	-23,5673699
Middle income	-0,08147537	22,2711384	49,9258284	27,5231579	-0,9203413	-0,99872082
High income	-3,48517496	106,915571	127,491168	0,59292321	-5,9574039	3,81206604
	NNP			CAP		
	Fish	Food	Beverage	Fish	Food	Beverage
Low income	-0,78879149	46,0692074	78,3522773	26,7632768	-8,8382872	-19,9303928
Middle income	-1,06239329	24,145185	52,0141096	27,1126969	-1,22669292	-0,65149117
High income	-2,78072455	82,2662736	98,0916152	0,45162204	-4,56943724	3,27297032

Source: Author calculation from ESAGE model results

Table 78: Total changes induced by household food security programme on household total consumption (% changes from baseline in 2005)

	NSNP	EPWP	CWP	SG	NNP	CAP
Low income	-33,5006512	159,466606	273,138132	-6,30177157	-34,2929099	-157,161935
Middle income	-7,654283	97,0380827	165,246845	2,35365443	-7,23520423	-20,0854383
High income	-15,8620332	205,300601	349,197173	3,07316633	-13,8435879	-19,3149734

Source: Author's calculation from ESAGE model results

Table 79: Total changes induced by household food security programme on household income (% changes from baseline in 2005)

	NSNP	EPWP	CWP	SG	NNP	CAP
Low income	-2,84846708	-183,242128	-310,877763	-15,932638	-3,36907889	-82,4768646
Middle income	-1,93376957	25,7384093	43,9004824	-2,06219393	-1,38816603	-14,8424698
High income	-10,2404643	141,606842	240,930539	-4,8253809	-5,67464715	-21,9788579

Source: Author's calculation from ESAGE model results

Appendix 6.4: Inter-linkage Equation Used in the ESAGE CGE Model.

The following equations explain the linkage between the model production, household consumption and government expenditure:

$$QVA_a = iva_a * QA_a \quad (1)$$

$$QINTA_a = int a_a * QA_a \quad (2)$$

Where

$a \in ALEO(C, A) = a$ set of activities with a Leontief function at the top of technology nest.

iva_a quantity of value-added per activity unit,

$int a_a$ is the quantity of aggregated intermediate inputs.

$$QINT_{ca} = ica_{ca} * QINTA_a \quad (3)$$

Where

$QINT_{ca}$ is disaggregated intermediate production input.

Our commodities production and allocation is there defined as:

$$QXAC_{ac} + \sum_{h \in H} QHA_{ach} = \theta_{ac} * QA_a$$

Where

$a \in A$

$c \in CX$

$QXAC_{ac}$ is marketed output quantity of commodity c from activity a

QHA_{ach} quantity of household home consumption of commodity c from activity a for household h.

$$PA_a = \sum_{c \in C} PXAC_{ac} * \theta_{ac}$$

Where $a \in A$ a set of activities

PA_a is activities prices or gross revenue per activities

$PXAC_{ac}$ producer price of commodity c for activity a, and

θ_{ac} yield of output c per unit of activity a.

Aggregate intermediate input prices is defined as

$$PINTA_a = \sum_{c \in C} PQ_c * ica_{ca}$$

Where

$PINTA_a$ aggregate intermediate input price for activity a, and

ica_{ca} quantity of c per unit of aggregate intermediate input

$$EH_h = (1 - \sum_{i \in INSDNG} shi_{ih}) * (1 - MPS_h) * (1 - TINS_h) * YI_h$$

Where

EH_h is household consumption expenditure income expenditure

shi_{ih} share of net income of I'

MPS_h marginal propensity to save for domestic nongovernment institution (exogenous variable)

$TINS_h$ direct tax rate for institution i

YI_h income of institution i

INSDNG where INSDNG is domestic non-government institution

INSDNG' where INSDNG' is other non-government institution

$$EG = \sum_{c \in C} PQ_c * QG_c + \sum_{i \in INSDNG} trnfr_{igov} * CPI$$

where EG is government expenditure and $trnfr_{igov}$ to non-government institution

Appendix 6.5: DEA Window Analysis

DEA window analysis generalises the idea of the moving average pattern of analysis to detect efficiency trends of Decision Making Units (DMUs) over time. A DMU in each window is regarded as a different one. The performance of a DMU can then be compared with its performance in other periods in addition to comparing it with other DMUs in the same period. Consider N DMUs ($n = 1, \dots, N$) that use r inputs to produce s outputs and are observed in T ($t = 1, \dots, T$) periods. Let DMU_n^t represent an observation n in period t with

$$X_n^t = \begin{bmatrix} x_n^{1t} \\ \vdots \\ x_n^{rt} \end{bmatrix} \text{ and output vector. } Y_n^t = \begin{bmatrix} y_n^{1t} \\ \vdots \\ y_n^{st} \end{bmatrix}.$$

input vector and output vector. If the window starts at time k

($1 \leq k \leq T$) with w ($1 \leq w \leq T - k$), then the matrices of inputs and outputs are denoted as:

$$X_{kw} = \begin{bmatrix} x_1^k & x_2^k & \cdots & x_N^k \\ x_1^{k+1} & x_2^{k+1} & \cdots & x_N^{k+1} \\ \vdots & \vdots & \ddots & \vdots \\ x_1^{k+w} & x_2^{k+w} & \cdots & x_N^{k+w} \end{bmatrix} \quad Y_{kw} = \begin{bmatrix} y_1^k & y_2^k & \cdots & y_N^k \\ x_1^{k+1} & x_2^{k+1} & \cdots & y_N^{k+1} \\ \vdots & \vdots & \ddots & \vdots \\ y_1^{k+w} & y_2^{k+w} & \cdots & y_N^{k+w} \end{bmatrix}$$

Substituting inputs and outputs DMU_n^t of into the following model proposed by Charnes et al. (1978) will produce the DEA window analysis:

The optimal θ ,

denoted by θ^* ,

satisfies $0 < \theta^* \leq 1$.

$$\begin{aligned} \min \quad & \theta \\ \text{s.t.} \quad & \theta x_{ik} - \sum_{j=1}^n \lambda_j x_{ij} \geq 0, \quad i = 1, \dots, m, \\ & \sum_{j=1}^n \lambda_j y_{ij} \geq y_{rk}, \quad r = 1, \dots, s, \\ & \lambda_j \geq 0, \quad j = 1, \dots, n, \quad \theta \text{ unrestricted in sign} \end{aligned}$$

If $\lambda_j \geq 0$, $j = 1, \dots, n$, θ unrestricted in sign equals unity (or 100%), the DMU under measurement is said to be technically efficient and lies on the efficiency frontier that consists of the set of efficient units. The observed data of the inefficient units is therefore said to be enveloped by the frontier.

Appendix 6.6: DEA Window Analysis for Technical Efficiency (2005/06–2012/13)

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Av*
Agriculture Consolidated Programme								
2006/07–2009/10	100	94.86	100	100				98.72
2007/08–2010/11		100	100	100	78.95			94.74
2008/09–2011/12			100	100	78.95	52.34		82.82
2009/10–2012/13				100	88.09	67.12	60.43	78.91
Av*	100	97.43	100	100	82.00	59.73	60.43	88.80
Expanded Public Works Programme								
2006/07–2009/10	87.31	51.8	33.1	27.54				49.94
2007/08–2010/11		51.94	33.12	27.54	26.98			34.90
2008/09–2011/12			33.12	27.54	26.98	31.86		29.88
2009/10–2012/13				27.55	26.98	37.96	29.23	30.43
Av*	87.31	51.87	33.11	27.54	26.98	34.91	29.23	36.28
National School Nutrition Programme								
2006/07–2009/10	100	97.26	86.43	70.21				88.48
2007/08–2010/11		100	89.06	72.53	57.05			79.66
2008/09–2011/12			100	81.39	63.98	55.66		75.26
2009/10–2012/13				100	79.10	69.13	65.98	78.55
Av*	100	98.63	91.83	81.03	66.71	62.40	65.98	80.49
Social Grant								
2006/07–2009/10	11.87	10.74	9.65	8.81				10.27
2007/08–2010/11		11.33	10.19	9.31	8.58			9.85
2008/09–2011/12			11.37	10.38	9.57	8.78		10.03
2009/10–2012/13				13.51	12.46	11.44	10.38	11.95
Av*	11.87	11.04	10.40	10.50	10.20	10.11	10.38	10.52

Towards a More Optimal Passenger Transport System for South Africa: Design of Public Transport Operating Subsidies

By: *Ghalieb Dawood and Mathetha Mokonyama*⁶²

7.1 Institutional/Contextual Background

South Africa's transport policy provides for the state allocation of a public transport subsidy, as a "socially necessary" service, in a manner that ensures transparency. However, the long-term aim, stated in the 1996 White Paper on National Transport Policy (DoT, 1996), is to reduce the state's subsidisation costs, dependent on a more effective and efficient public transport system being developed. The policy also states that where public transport subsidies are granted based on welfare considerations, or to promote public transport, they should be applied through mechanisms that provide incentives for increased efficiency.

Despite the above policy provisions, very little has changed in the public transport domain since 1996. Expenditure on public transport subsidies continues to increase without any proportionate benefits to the public. The minibus taxi industry keeps making a case for transport subsidies to be extended to cover taxis, without any clear response from government. Further complicating the fragmented subsidy framework is the addition of public transport modes such as Gautrain and Bus Rapid Transit (BRT) to the network, each with their own subsidy requirements.

The departure point for the investigation is the critical gap between the requirements of a national transport policy and the current public transport subsidy framework, as well as its implementation. The principal aim of the investigation is to design and recommend an appropriate public transport subsidy framework for South Africa, which aligns the actual transport operations with transport policy provisions. The investigation also identifies the fiscal implications of adopting the recommendations.

The administration of transport subsidies spans across all three spheres of government – national, provincial and local – with most of the funds being channelled from the national fiscus. Any recommendations emanating from the research are therefore subject to South Africa's intergovernmental relations framework, thus warranting the involvement of the Financial and Fiscal Commission (the Commission).

The investigation is limited to public transport services, particularly relating to operational subsidies. While public transport subsidies tend to be institutionally ring-fenced, the investigation reviews the pool of subsidies in its entirety.

7.1.1 Findings from previous research

Previous research by the Commission acknowledged the progressiveness of the South African transport policy but highlighted the lack of policy implementation (attributing this to vested interests across many stakeholders to maintain the status quo, the complexity of the required interventions and the disabling institutional setups) and questioned whether existing studies are optimally used (FFC, 2010).

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⁶² Council for Scientific and Industrial Research (CSIR)

Public transport subsidies in South Africa are closely related to the political history of the country and were historically provided for two reasons: to cushion the cost of transport resulting from relatively long travel distances to and from work, as a result of spatial apartheid policies; and to make transport in the urban areas, particularly metropolitan areas, more affordable (DoT, 2006). Parallel to the development of the subsidised public transport services, in the late 1970s, the less-formal minibus taxi services emerged to serve the growing travel demand that could not be adequately served by the limited spatial coverage of subsidised bus and train services (McCaul, 1990). Owing to their extensive spatial coverage, minibus taxis have since captured the largest proportion of the travel demand, and tend to compete directly with the subsidised passenger transport modes. Nonetheless, minibus taxis do not receive any operational subsidies from government, although they do receive indirect subsidy in the form of capital investment in ranking facilities and the road network.

DoT (1994) concluded that a sustainable subsidy framework must:

- incentivise operator productivity;
- target low-income users;
- be structured to reduce the need for subsidy in the future;
- be affordable at a macroeconomic level; and
- contain losses resulting from administrative inefficiencies, fraud and corruption.

Furthermore, in the case of subsidies channelled through operators, monitoring of operations is necessary, to ensure that operators comply with contract conditions and that their claims are correct.

User-side subsidies were seen as expensive to administer and should be introduced only after a comprehensive welfare information system has been implemented.

The White Paper on National Transport Policy questions the effectiveness of the subsidy framework and calls for its reform (DoT, 1996). It also supports the provision of public transport subsidies in order to address critical social needs for a more equitable society, especially where operations cannot be provided on full commercial principles. However, as stated previously, it makes provision to seek a longer-term solution that would result in the reduction of public transport subsidies. Studies by the Department of Transport (DoT) have also found that current subsidies are not sustainable because of rising costs and declining passenger numbers, and that the subsidy framework is inequitable, ineffective and entrenches past apartheid planning policies (DoT, 1998; 2006).

Before the adoption of the White Paper on National Transport Policy, operators had perpetual lifelong operating rights. The competition was mainly between minibus taxis and bus services. The White Paper then introduced regulated competition with tendering as the main mechanism for providing public transport services. Since the adoption of the White Paper, the DoT commissioned a number of studies to review the public transport subsidy policy framework, with the intent of improving the framework and its implementation (DoT, 1998; DoT, 2003b; DoT, 2004; DoT, 2006). Some of the key recommendations made in these studies that are relevant to the current investigation were that:

- Subsidies should move gradually towards the unemployed poor, pensioners, learners in rural areas and isolated communities across the country, including the usage of taxis specifically in rural areas.
- Subsidised buses must be accessible to passengers with special needs, such as those with disabilities.
- Subsidised public transport services operating in parallel to each other should be identified and addressed.
- Historic commitment to support rail deficits and subsidised bus services to ex-homelands and “Group Areas Act townships” should no longer be the main rationale for subsidy policy.
- Full responsibility for municipal public transport should be devolved to the metropolitan and specified urban municipalities, together with the appropriate grants for infrastructure to initiate the new municipal public transport networks.

- Public transport funding streams should be consolidated.
- Entry as an operator should be on the basis of tendered contracts. Subsidies required for welfare considerations, or to promote public transport, should be through mechanisms that provide incentives for efficiency within the framework of transport plans.
- Support should only be provided for services, whether existing or planned, that are included in approved transport plans and form part of an integrated network of services.
- Subsidies allocated under the “relief of distance burden” rationale should be continued but gradually reduced and, eventually, limited to commuting trips of 40km or less.
- A phased, intergovernmental programme for rationalising and coordinating the subsidisation of urban transport and housing should be formulated and implemented.
- In the medium to longer term, provincial and/or local funding should directly supplement transport subsidy levels through appropriate means, to partially replace national funding.
- In the long term, operators should compete for the provision of subsidised rail and road-based public transport services, through competitive tendering processes. Tendering processes should make provision for the participation of historically disadvantaged enterprises and individuals. Passenger rail services, as part of the recommended public transport system at local level, should be subsidised through concessioning.
- Conditions specified in rationalisation plans prepared as part of integrated transport plans should be used as the subsidy qualification criteria.
- An indirect subsidy should prioritise the provision and maintenance of road infrastructure along roads used for public transport.
- Only scheduled formalised public transport services or services that adhere to minimum service levels should attract subsidies.
- Minibus taxis could be subsidised, if such services are provided in terms of contracts or similar agreements with government or agents thereof, and where a minimum frequency or level of service is specified.

The above recommendations have largely remained unimplemented, confirming the conclusions from past Commission research on the lack of transport policy implementation.

The National Development Plan (NDP), which is South Africa’s 2030 strategic vision and action plan, acknowledges the above historical problems with the country’s passenger transport system (NPC, 2011). It recognises the relatively long public transport commuting distances and even suggests an explicit link between poverty and access to transport. The NDP cautions against adopting transport solutions that are not aligned with the country’s priorities, which include the promotion of spatial and social inclusiveness, and the reduction of the distance burden. The NDP supports providing subsidies to low income commuters and creating movement corridors that connect settlements occupied by rural migrants and urban service centres. Given that the transport sector contributes significantly to anthropogenic greenhouse gas (GHG) emissions, and that the NDP has set bold targets for GHG emission reduction, transport subsidies should also incentivise GHG emission reduction.

7.1.2 Why public transport subsidies are necessary

Globally, public transport subsidies have historically been provided for two main reasons:

- (i) To make the services more affordable for the poor, and
- (ii) To incentivise a modal shift to public transport, particularly because competing private transport users do not pay for their full cost of transport (Serebrisky et al., 2009) and modal shift can help reduce GHG.

Public transport subsidies have also been justified in terms of the Mohring effect, which states that optimal frequencies increase as demand for public transport increases, thus diminishing waiting times or schedule-delay costs for all users (Gomez-Lobo, 2011). In terms of the Mohring effect, additional demand for public transport introduces marginal costs that, without subsidies, will result in increased fares for the original passengers.

There is no general agreement on how to measure the affordability of public transport. Some approaches, as in South Africa, set a limit on the proportion of income that should be used for public transport, above which public transport is deemed unaffordable. In some cases, affordability is defined in terms of the ability of a household to pay for a predefined number of necessary trips to survive and also run a household (Serebrisky et al., 2009).

Supply-side subsidies, which are provided through the operator, usually have a neutral or regressive impact, while demand-side subsidies, which are provided directly to users, are usually not effective in improving the livelihoods of the poor (Serebrisky et al., 2009). For poverty alleviation, it is best to move away from supply-side subsidies and integrate the transport subsidies with the existing welfare system, thereby empowering households to prioritise on how and where to spend money (Serebrisky et al., 2009). Targeted subsidies can take the form of concessionary fares (where special groups of people such as the elderly pay discounted fares), travel vouchers, special employer benefits, or through cross-subsidisation by higher-class travellers.

7.1.3 Lessons learnt elsewhere about public transport subsidies

Historically public transport was provided as government-owned and controlled services. A variation of this arrangement included instituting a monopolised government-owned operating entity. Progressively, contractual relationships were established between authorities and operators, especially between the state and private operators, who were allowed to provide additional capital resources. Over time, competitive tendering for providing subsidised services was introduced, with the aim of driving costs down, particularly labour costs. This was shown to lower public transport costs (Costello and Teeling, 2003).

Two forms of competitive contracting regimes emerged. These options vary on the basis of the nature of risk sharing between the operator and the contracting authority (Shaw et al., 1996):

- Gross cost contracts – the revenue risk is carried by the authority
- Net cost contracts – the operator carries both revenue and cost risks.

Within a network context, net cost contracts have a negative impact on service integration efforts, as competitors operating in the network are not interested in entering into cooperative agreements. This is because, with net cost contracts, operators focus more on reducing their own risks and pay less attention to overall network requirements.

In South Africa, the incumbent operator has the right to refuse the awarding of a new contract to another operator, if the bid price difference is within 10% of the incumbent operator's price. This practice has the potential to make the environment uncompetitive.

After comparing contracts across different countries, Shaw et al. (1996) comes to the conclusion that the authority needs to evaluate the total cost of the contract prior to selecting a contracting mechanism. This includes contract monitoring requirements and takes into account the likelihood of attracting a critical mass of bidders to enable costs to be minimised. The authority also needs to understand the nature of the demand in the area and the inherent incentives within the contract. A combination of elastic demand and net contracts thus tends to be effective, whereas a combination of an elastic demand and gross contracts without built-in operator performance incentives tends to result in lower passenger numbers and long-term costs for the authority. Costello and Teeling (2003) propose an approach where authorities need to introduce gross contracts first in order to minimise uncertainties, and then move gradually to net cost contracts.

The competitive tendering processes focus overwhelmingly on costs and less on systematic service quality assessments. In response to this, Hensher and Prioni (2002) developed and proposed a service quality index that measures the effectiveness of a service quality-oriented competitive tendering. Performance-based contracting is more attractive because it secures maximum social surplus to the community for a given amount of subsidy, whereas competitive tendering typically focuses on minimising costs to government rather than on delivering specific quality outcomes (Hensher and Stanley, 2002). With performance-based contracting, individual operators are offered a subsidy per vehicle kilometre for providing minimum service levels. They are also offered an incentive subsidy payment per passenger trip for passenger numbers above trip numbers associated with minimum service levels. These service levels are subject to social and environmental criteria. Performance-based contracts allow operators to continuously configure public transport services in order to have the best value for money, but subject to the approval of the authority.

In developing and transitional economies (including South Africa), problems in implementing contracting systems can be classified as (Gwilliam, 2005):

- *The uncommitted reformer:* The adoption of new contracting approaches is because traditional systems have failed, rather than the authorities believing in the merits of the franchising system. This is demonstrated by dual systems, where private sector operators are subjected to stringent market-based rules, whereas public sector operators have more lenient rules and regulations.
- *Protection of vested interests:* Countries make a commitment to reform but still find it politically convenient to protect the vested interests of incumbent operators. Governance systems that combine transport operations and policy functions aggravate the situation because of the need to protect the public operating entity's interests. In some countries, operators reportedly enjoy political support and are therefore able to influence the awarding of contracts.
- *Unrealistic expectations of market processes.* Governments tend to have completely unrealistic or inappropriate expectations of what the market can achieve and how it can be exploited. As a result, reform is accompanied by an unrealistic risk burden being placed on the operators, such as stringent fare restrictions and short-term contracts, restricting the vehicle types to non-versatile vehicles and compelling the operator to make large investments in an uncertain environment.

Based on typical problems found in public transport contracts, Gwilliam (2005) identifies some solutions from international case studies. First, political commitment to the reform is essential, which in turn improves the credibility of contracts. Second, regulatory instruments must be properly drafted in order to prevent selective enforcement and "harassment" of certain operators by the enforcement agencies. Third, the administrative agency responsible for the contracts must be expert and trustworthy, and must not have any business links with any operator. Around the world, the protection of the incumbent parastatals, in particular, has been a major impediment to effective reform. Lastly, in order to preserve revenue for the contracted operators, illegal operators who undermine the contracted operators must be removed from the network.

7.2 Research Methods

The investigation is aimed at recommending a transport policy responsive subsidy framework for South Africa and has the following objectives:

- To review the current public transport subsidy framework, assessing its effectiveness in relation to national transport policy.
- To identify measures that have previously been put in place by government to rationalise the allocation of public transport subsidies, and reasons why such measures have been ineffective.
- To design and recommend a subsidy framework that would be effective in supporting the national transport policy.
- To provide an implementation plan for the recommendations.

The investigation comprised three key tasks:

- Review and benchmark the current subsidy framework based on published information;
- Develop and evaluate the subsidy framework; and
- Solicit stakeholder inputs.

7.3 Findings

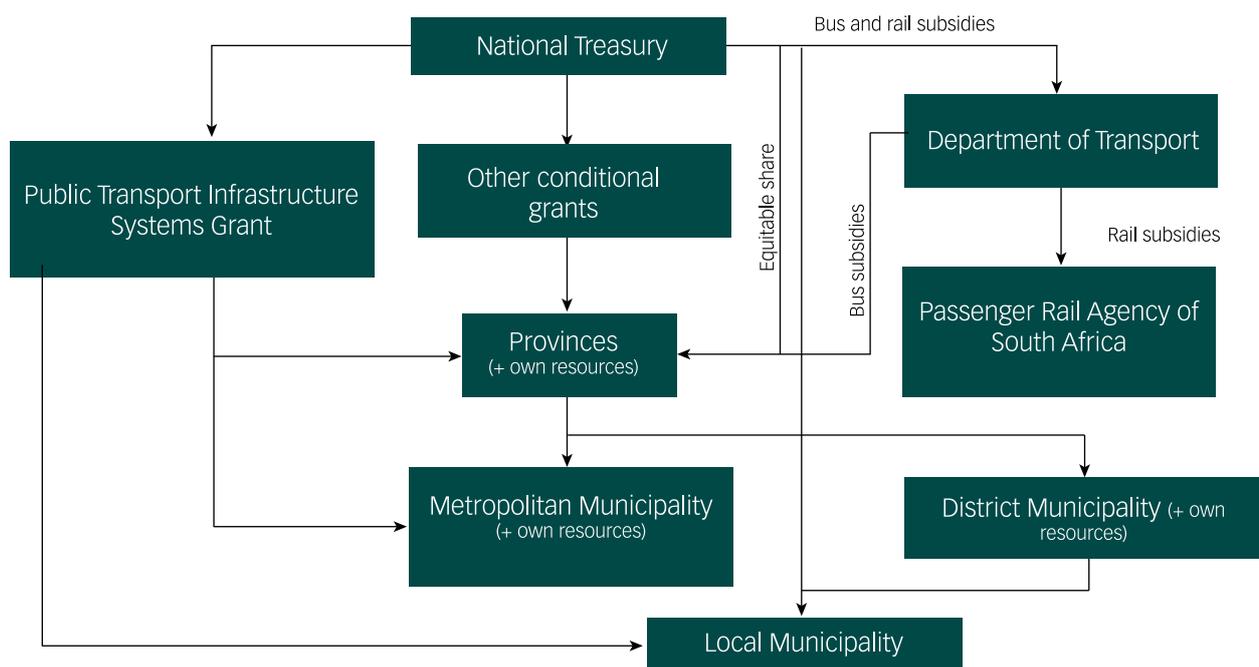
7.3.1 The current subsidy framework

Current public transport operational subsidies are based on the historic practice of providing some financial relief to households, particularly workers displaced by apartheid policies. The subsidies are supply-side oriented, targeted at bus and rail commuters, mainly for trips with at least one leg ending in urban areas. Rail services also receive direct capital subsidies (government owns the rail assets), while limited subsidised peak and off-peak services are provided mainly for the small number of services dedicated for learners. In addition, provincial education and health departments provide limited subsidies for some specific user categories, for instance, subsidies targeted at “farm schools” in areas where schools are located more than 8km from residential areas. Minibus taxis are not subsidised but in some cases provide agreed contracted scheduled services, which support the tendered subsidised bus contracts.

National and provincial departments of transport manage most of the subsidies. However, some municipalities have long-standing business interests in municipal-owned and controlled bus services, which are subsidised only by the municipalities through a deficit subsidy (to bridge the shortfall between operational expenses and fare income). Subsidies are paid per mode of transport and no integrated strategy for allocating subsidies is in operation.

Figure 59 summarises how subsidy funds are allocated across the different spheres of government and other government entities.

Figure 59: Summary of the flow of subsidy funds across the three spheres of government and government entities



Source: Adapted from DoT (2007)

The total subsidy amounts to over R17.4-billion per annum and increases annually based on inflation and other factors, such as escalation in capital, labour and fuel costs. Escalation of interim contract costs is calculated and reimbursed annually, whereas tendered contracts are adjusted monthly. Table 80 provides a breakdown in terms of geographical areas and subsidy types.

Table 80: Categories and amounts of public transport subsidies in South Africa

Transport subsidy type	Geographical area	Expenditure (R million)
Transport subsidy paid by the DoT and referred to as Public Transport Operations Grant	Eastern Cape	174
	Free State	193
	Gauteng	1 626
	KwaZulu-Natal	808
	Limpopo	261
	Mpumalanga	439
	Northern Cape	39
	North West	81
	Western Cape	696
Transport subsidy paid, by municipalities who own and operate services, directly from the municipal budgets.	City of Johannesburg	420
	City of Tshwane	144
	City of Ekurhuleni	44
		161
Gautrain	Gauteng	831
Taxi recapitalisation (capital)	Country wide	407

Transport subsidy type	Geographical area	Expenditure (R million)
Passenger Rail Agency of South Africa (operational)	Country wide	3 527
Scholar transport	Eastern Cape	210
	Free State	36
	Gauteng	165
	KwaZulu-Natal	134
	Limpopo	147
	Mpumalanga	324
	Northern Cape	93
	North West	200
	Western Cape	203
Subsidy paid to bus contract directly from provincial funds	Limpopo	338
	Eastern Cape	156
	North West	414
Public Transport Infrastructure and Systems Grant (includes some operational aspects as well as capital)	Selected cities implementing Integrated Rapid Public Transport Networks	4 988
Total		17 259

Source: Based on DoT (2012a); DoT (2012b); National Treasury (2012); RSA (2012)

The Passenger Rail Agency of South Africa (PRASA) receives a shortfall subsidy from national government, based on a reported 546.4 million passenger trips per annum, which includes PRASA-operated bus services (National Treasury, 2012). The PRASA subsidy amounts to an estimated R6.28 per passenger trip, which is equivalent to a one-way 12km minibus taxi trip at the current average minibus taxi fare of 50 cents/km.

The total transport subsidy amount in Table 78 is equivalent to about R30 per month for every person living in South Africa. However, not everyone travels, and not everyone who travels uses subsidised public transport services. In the absence of figures that estimate the number of beneficiaries of public transport subsidies in the country, Figure 60 shows the proportion of people who use different modes of transport for work trips: about 10% of work trips and about 5% of learners (DoT, 2003a) use subsidised modes of transport (rail and bus). Therefore, for each beneficiary, the estimated subsidy is an average of R690 per month,⁶³ or about 1 380km of "free travel" per month (69km per day for a 20-day month) by minibus taxi (at a rate of 50 cents/km).

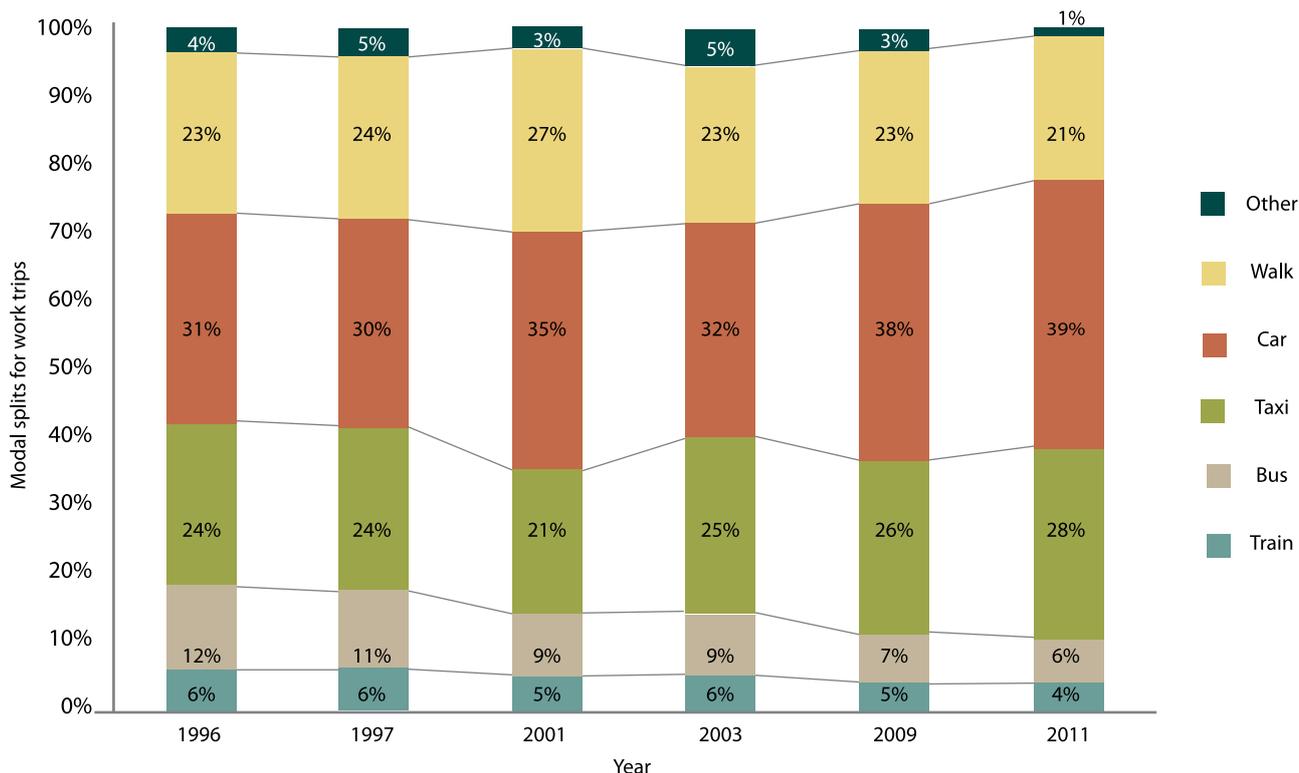
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⁶³ Employed people amount to about 13.5 million, therefore 10% of workers amounts to 1.35 million. Total learners using bus and taxi is 740 000. It is assumed that work trips and education trips make up the bulk of subsidised transport modes.

Figure 60: Modal split trends in South Africa for work trips



Source: Stats SA (1996, 1997, 2001, 2010, 2011); DoT (2003a)

The current subsidy framework also has a number of design shortcomings. Operationally, the system is fragmented. For example, there is no coherent policy on concessionary fares, and the framework is not linked to other state welfare programmes such as social housing programmes. Also, the current interim bus contracts, which make up the bulk of the bus contracts, are based on permits issued under the provisions of the Road Transport Act (No. 14 of 1977). In terms of the Act, bus operators applied for a permit from the former local road transport boards in order to operate a subsidised bus route. The permits were perpetual, and the subsidy was paid based on the difference between the economic fare deemed to be affordable to customers and the ticket price. This “economic fare system” included the operator’s costs and profit margin, multiplied by the number of tickets sold. Currently, the majority (over two-thirds of budget) of government-subsidised bus services still fall under interim contract arrangements. Furthermore, the spatial allocation of subsidies has remained virtually the same, and very little spatial restructuring has been implemented since the end of the enforcement of apartheid policies.

To address these internal inefficiencies, in 1988 the government tested and introduced the tendered and negotiated contract system. The first tendered bus contracts for the provision of subsidised bus services were implemented from 1991 onward. However, National Treasury issued directives to limit the growth of bus subsidies to below the inflation rate, which led to a moratorium on the approval of additional routes or tickets until the full implementation of competitive tendering or negotiated contracts, which is currently well behind schedule.

In 2008/2009, bus operators instituted a court action against government over unpaid subsidies. The DoT argued that it was unable to pay fully subsidised buses because it had received less appropriations than requested from the fiscus, which over time resulted in accumulated shortfalls (DoT, 2009). Since then, the position of bus operators has not changed, and in 2013 the operators were of the opinion that the current subsidy framework holds them “to ransom” because they are effectively pressured by government and communities to expand services without equivalent extra funding (SABOA, 2013). Furthermore, operational costs increase at a much higher rate than subsidy increases, which results in industry practices that include overloading, poor fleet maintenance and

poor reliability of services. Bus operators' fare income is restricted by provincial and national government prescriptions on fare levels and fare structures, and is purportedly inadequate for day-to-day fluctuations in operational costs.

The current subsidy framework is clearly not sustainable, but the desire for change coexists with a strong inertia that maintains the status quo.

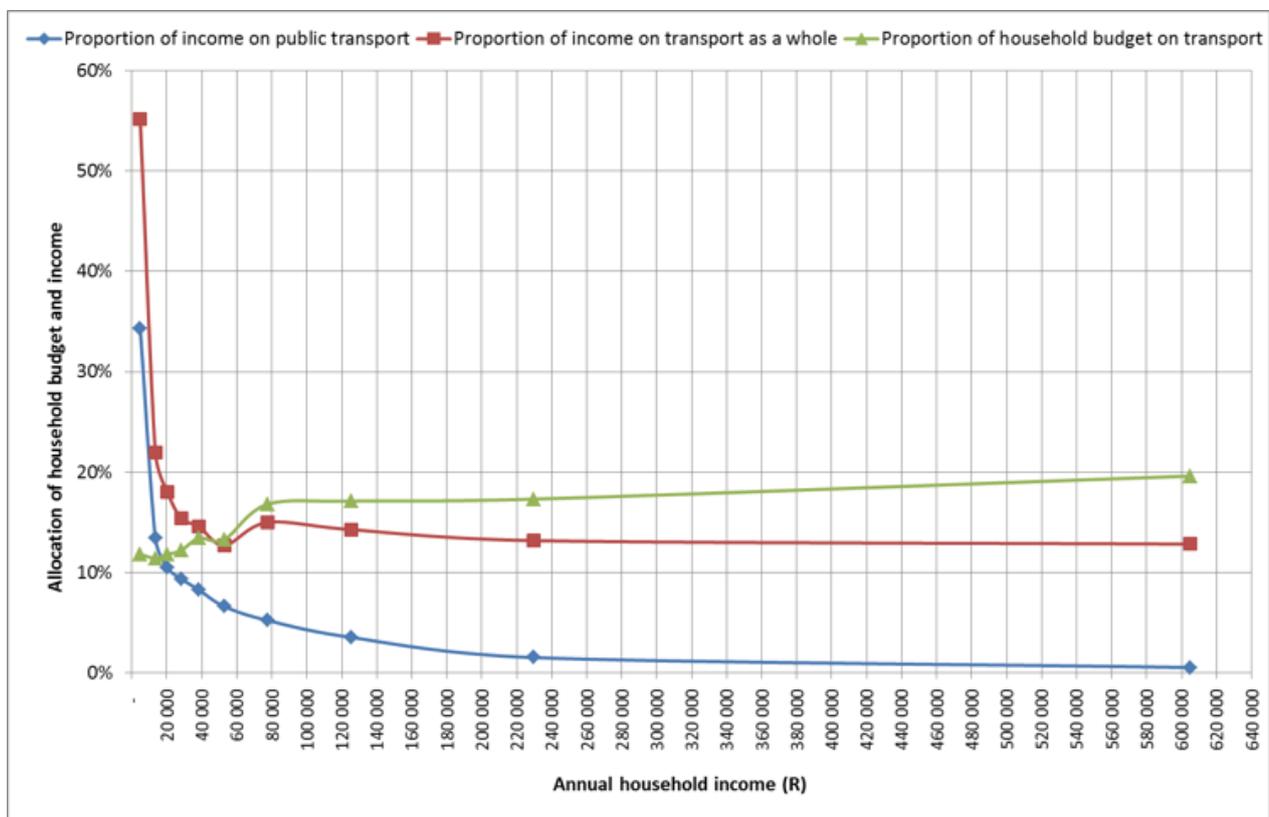
7.3.2 Profiling of existing and potential beneficiaries

A transport subsidy framework that is user responsive requires an improved understanding of the targeted beneficiary. To identify the role of subsidies in alleviating the travel cost burden, this section examines household transport.

Households spend R235.7-billion per annum on public and private transport, which is equivalent to 12% of GDP (Stats SA, 2012). Household expenditure on public transport alone amounts to R38.8-billion per annum, which is equivalent to 2% of GDP. If expenditure by households and the state are added together, the total spent on public transport operations in the country amounts to R55.4-billion, which is equivalent to 3% of GDP and about 7% of South Africa's national tax revenue (excluding municipal and provincial taxes). In comparison, the amount spent by the state on social grants is over six times that spent on transport subsidies.

Low income households tend to spend a large proportion of their income on transport. Figure 61 shows household expenditure on transport (private and public) and public transport only across household income deciles, as a proportion of the annual average household income and as a proportion of household expenses.

Figure 61: Profile of household expenditure on transport and public transport

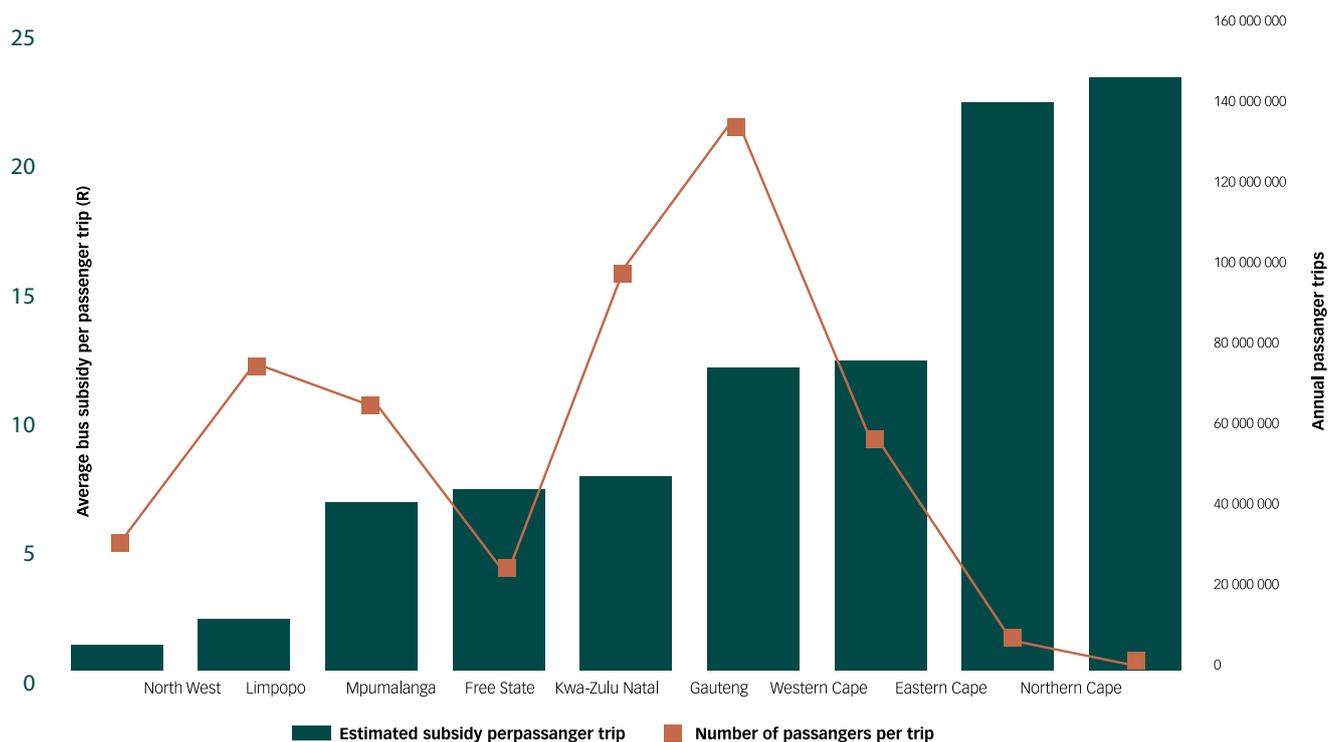


Source: Stats SA (2012)

The significance of Figure 61 is that, while transport may be a relatively small proportion of expenses, it represents over 50% of household income for the lowest income households, indicating that many of the households have household expenses beyond their income. This finding is consistent with other research that found low income households in South Africa tend to have expenses that are higher than their incomes (Nunez et al., 2008; Nagdee, 2004).

Figure 62 shows the average subsidy per passenger trip and the number of trips for each province. Generally, the higher the number of passengers, the lower the subsidy per trip, implying that increased travel demand has the tendency to lower the subsidy unit costs.

Figure 62: Illustration of the subsidy per trip and number of passenger trips across provinces



Source: DoT (2009)

The notable exception is Gauteng, where the comparatively high number of trips does not translate to a lower subsidy per trip. This may be because of the Mohring effect of increased marginal costs of larger networks (as explained in Section 7.1.2). Based on the same dataset, the relationship between the subsidy and travel demand is made clearer in Figure 63, where the subsidy is shown to reduce with increased demand. At this stage, bus kilometres cannot be incorporated in the calculations because the DoT does not report on this metric. Therefore, the conclusions drawn from Figures 62 and 63 assume that the route distances across the provinces are comparable.

Using household income deciles and average income per decile, Table 81 estimates the affordable distance per household based on a 10% affordability threshold.

Figure 63: Relationship between subsidy per passenger trip and number of passengers per day

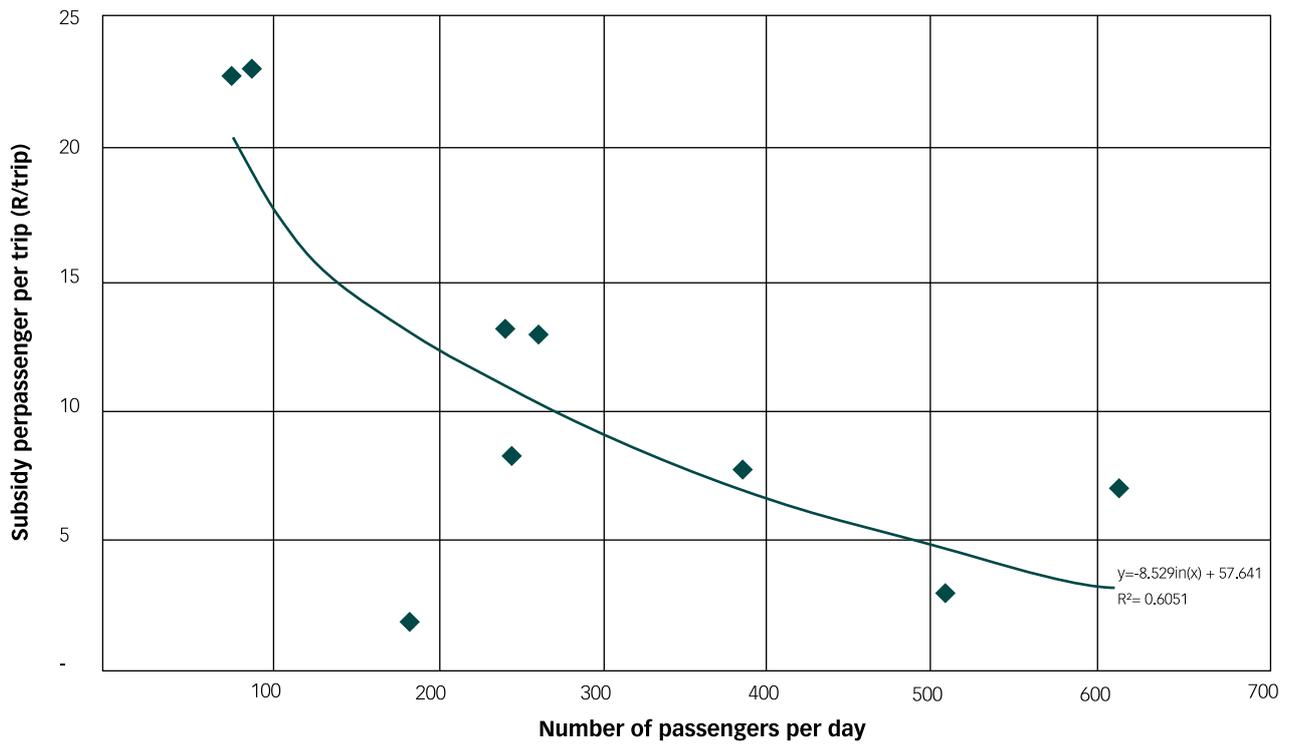


Table 81: Estimation of policy-based affordable kilometres per household income decile

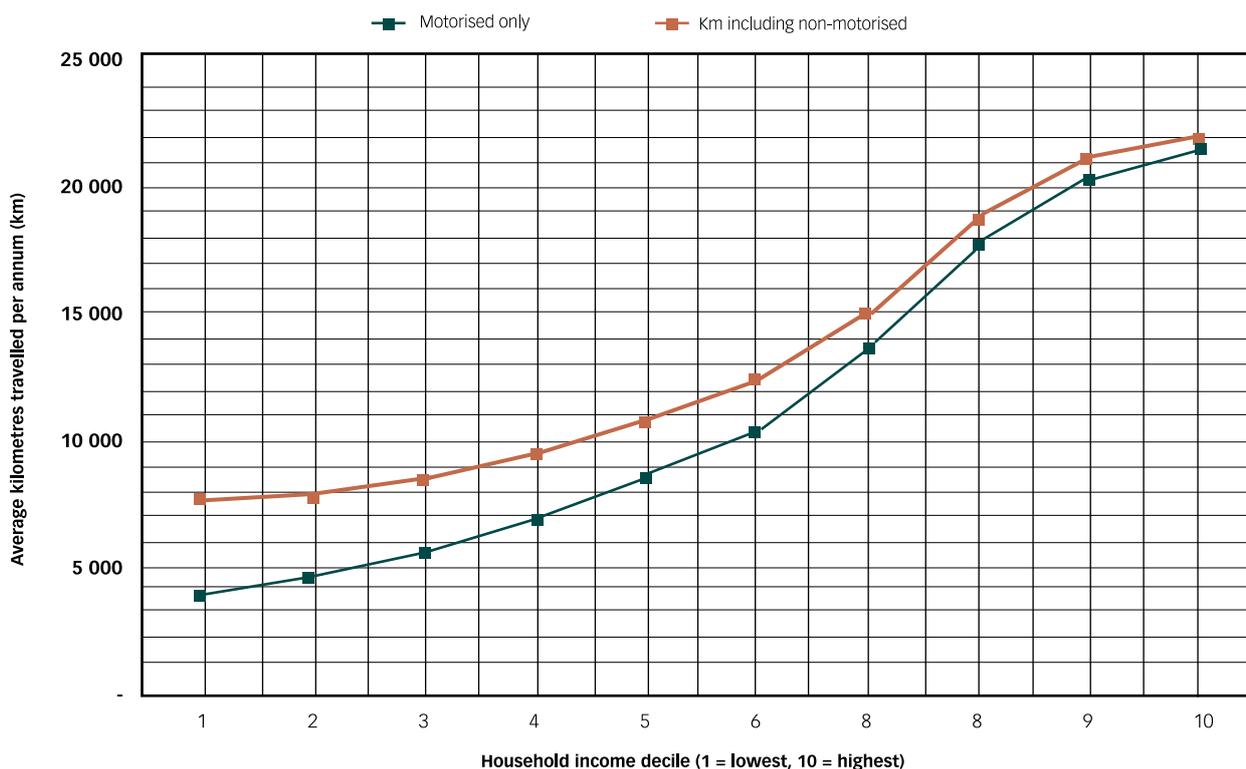
Income decile	Average annual household income (R)	10% household income (R)	Affordable travel distance per annum (km) ⁶⁴
1	4 757	476	1 189
2	13 426	1 343	3 357
3	20 324	2 032	5 081
4	28 242	2 824	7 061
5	38 345	3 835	9 586
6	52 907	5 291	13 227
7	77 570	7 757	19 393
8	125 327	12 533	31 332
9	229 558	22 956	57 390
10	604 773	60 477	151 193

As Table 81 shows, affordable travel distances range from 1 189km per household per annum for low income households to 151 193km per household per annum for high income households. However, there is no policy target for equitable minimum kilometres that a household should travel. If such a target existed, then the required subsidy per household would simply be equivalent to the kilometre shortfall between the minimum required distance and the affordable distance.

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⁶⁴ Affordable travel = 10% of income divided by 50 cents/km. This is the average fare charged by unsubsidised minibus taxis.

In the absence of empirical measurements, Figure 64 is an attempt to estimate the actual number of kilometres travelled by households in each income decile for both motorised and non-motorised transport. The motorised transport profile is estimated from household fuel expenditure (reported in Stats SA, 2012), with in addition an assumed step function for non-motorised kilometres cascading down from 10km per day to 1km per day for income deciles 1 and 10 respectively. Based on this profile, the estimated average minimum number of kilometres travelled by households is 8 000km per annum, which is 6.7 times the kilometres deemed to be affordable to the lowest income decile in Table 81. Crudely, based on the affordability criterion in the White Paper if all travel were public transport based, 50% of households from income deciles 1 to 5 travel more kilometres than they can afford.

Figure 64: Estimation of kilometres travelled per household income decile



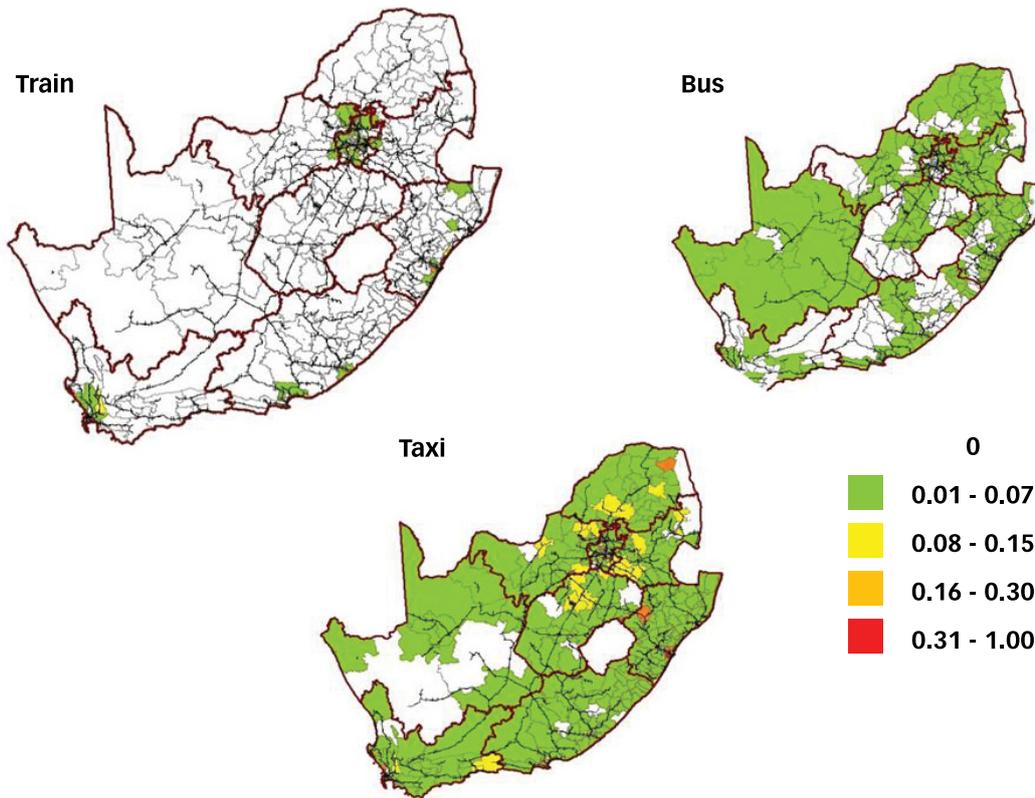
Source: Stats SA (2012)

Figure 65 shows the relative spatial coverage of the different public transport modes in the country. The graduated colours indicate the intensity of passenger demand in each area normalised to the highest demand areas. For example, the intensity range 0.07–0.15 represents an intensity of demand of 7%–15% in the areas of highest demand in the country.

Figure 65 shows clearly that rail has the minimum spatial coverage, and minibus taxis have the widest coverage. Moreover, minibus taxis have more higher-intensity areas than all the other modes.

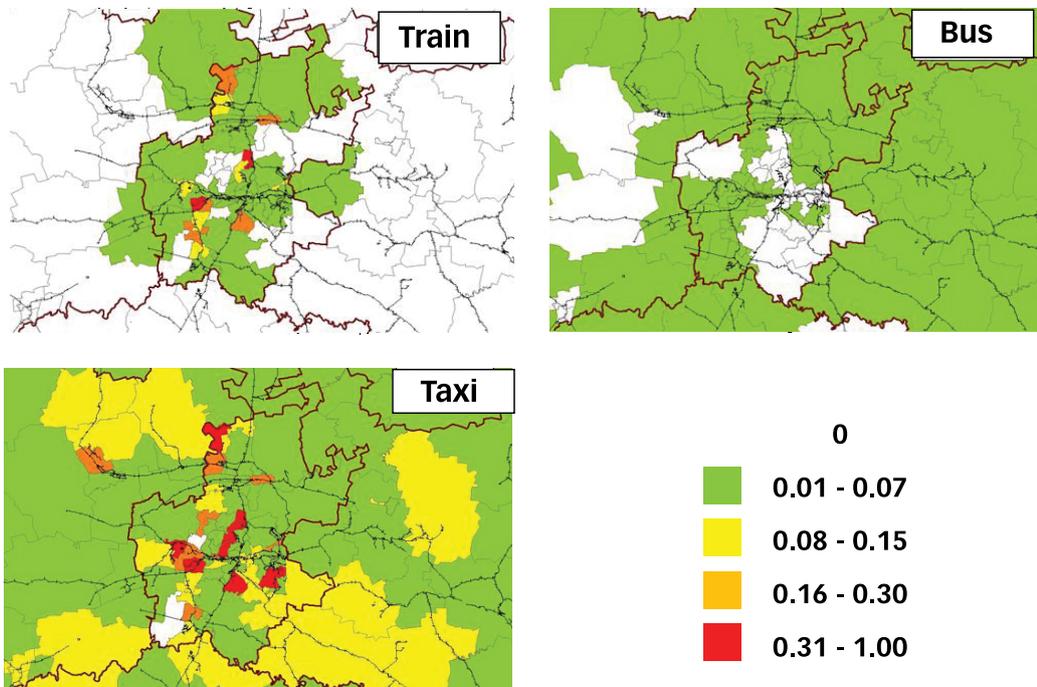
Figure 66 illustrates the same map in the province of Gauteng and shows that minibus taxis play a greater mass transit role than the other modes.

Figure 65: Spatial coverage and intensity of use for different public transport modes



Source: DoT (2003a)

Figure 66: Gauteng spatial coverage and intensity of use for different public transport modes



Source: DoT (2003a)

Based on the survey of Metrorail train services in Gauteng (PRASA, 2008), Table 82 shows the transport modes used by train users before boarding and after disembarking from the train. The bulk of passengers walk to and from train stations, but a significant proportion use minibus taxis. The lack of functional integration between the modes means that passengers have to pay separately for both the minibus taxi and the train service. In order to save costs, train users often walk long distances.

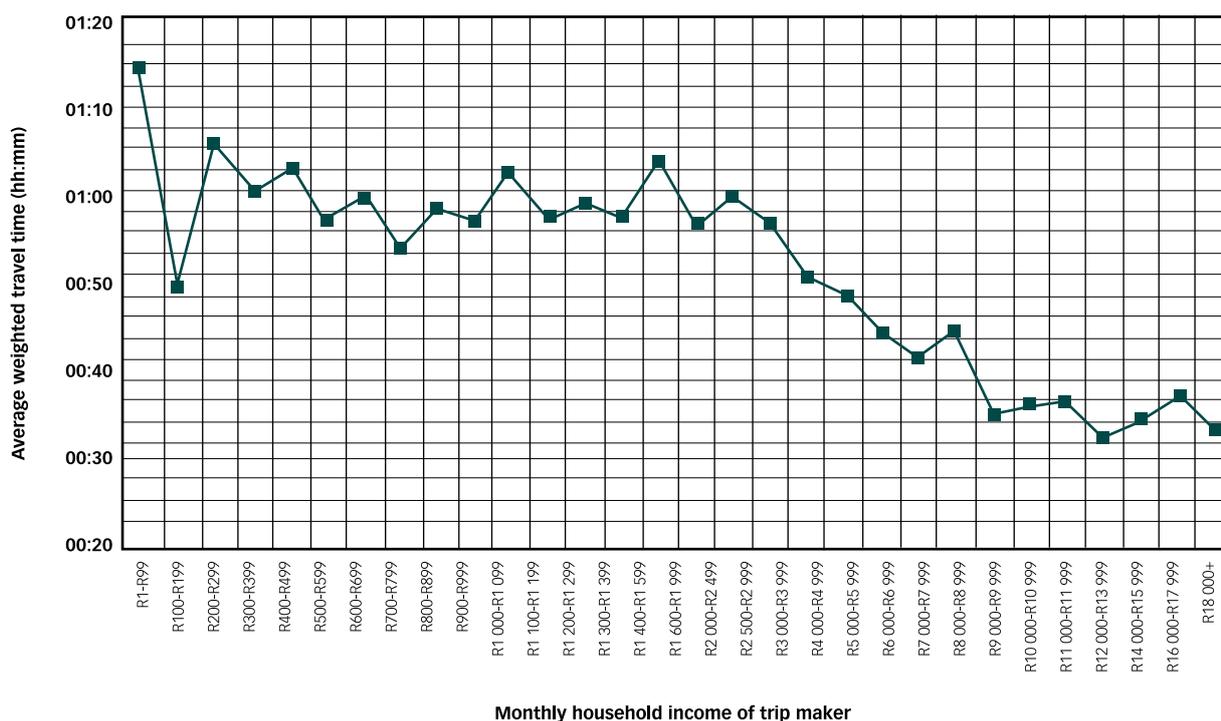
Table 82: Transport modes used by train users to connect to train services

Mode used before boarding train			Mode used after disembarking from train		
Mode of transport	Number of passengers	Modal split	Mode of transport	Number of passengers	Modal split
Walk	65 916	81.2%	Walk	65 815	81.1%
Taxi	10 113	12.5%	Taxi	11 109	13.7%
Unspecified	2 794	3.4%	Unspecified	3 274	4.0%
Train	1 296	1.6%	Car	335	0.4%
Car	509	0.6%	Train	311	0.4%
Bus	307	0.4%	Bus	233	0.3%
Other	256	0.3%	Other	114	0.1%
Total	81 191	100%	Total	81 191	100%

Source: PRASA (2008)

People from low income households tend to have significantly longer travel times than those from higher income households. This is evident in Figure 67, which illustrates the relationship between travel time to work and household income. Commuters from lower income households tend to spend more time travelling, which is possibly because of longer travel distances and/or the relatively poor efficiency of the modes used.

Figure 67: Illustration of the relationship between travel time to work and household income



7.3.3 Proposed subsidy framework

The subsidy framework must be consistent with policy and be easy to implement. As sustainable transport policy seeks to create a balance between social, economic and environmental goals, a desirable transport subsidy framework for South Africa must:

- (i) address social equity associated with structural poverty;
- (ii) incentivise the productivity of public transport operations; and
- (iii) encourage a modal shift from private to public transport, which will assist in the reducing greenhouse gas emissions and promote the attractiveness of the service to all users.

The model can generically be formulated as follows for a specific period:

Social equity

Service productivity

Environmental

$$Subsidybill = [KA_{MLL}.C_f + (1-\theta)N.C_u] \beta \frac{MS_c}{MS_b}$$

KA_{MLL} (km) = Policy kilometre apportionment to designated travellers. This is obtainable from summing all the network kilometres used by designated travellers in a specific period.

C_f (R/km) = Per km fare charged to passengers

θ (Ratio with no units) = Expected operations cost recovery ratio

N (km) = Operational kilometres

C_u (R/km) = Unit cost of operations expressed in terms of R/km

MS_b (Ratio without units) = Modal split in the base year expressed, for the base year, as a ratio between passenger kilometres in the area and vehicle kilometres

MS_c (Ratio without units) = Current modal split expressed, in the current year, as a ratio between passenger kilometres in the area and vehicle kilometres

β (Scaling factor without units) = Modal split policy incentive factor. $\beta = \frac{MS_b}{MS_c}$ if $\frac{MS_c}{MS_b}$ for the assess-

ment period < 1. The value of this parameter is determined by the authority and would be expected

to be an increasing function of the ratio $\frac{MS_c}{MS_b}$

The social component of the model allocates subsidy based on a specified number of free kilometres per month to designated travellers, particularly recipients of social grants. In order to estimate the basic kilometres associated with designated travellers, benchmarking with the current welfare system payouts is necessary. Old age and disability grants are currently R1260/month, the foster care grant R800/month, and child support grant R290/month (SASSA, 2013). Based on the White Paper provisions, a transport subsidy equivalent to 10% of these welfare payouts would be required. For example, with the disability grant, 250km per month is equivalent to 10% of the grant for a fare rate of 50 cents/km. Government paid about R105-billion per annum to social grant recipients, who numbered over 16 million as of June 2013 (SASSA, 2013). Applying the transport policy target of 10% of income implies that over R10-billion would be required just to support the social equity.

The economic component of the model relates the subsidy to the productivity of the service in terms of contracted cost recovery. In a typical city (City of Tshwane), where a municipal-owned bus service travels about eight million kilometres every year, and assuming a cost recovery rate of 30% (usually worse), with operational costs of R30/km, the subsidy bill related to service productivity amounts to about R168-million. The complex relationship between population density, network size and travel patterns makes it difficult to extrapolate this figure to the rest of South Africa. However, extrapolation based on population size alone results in the economic component of the subsidy amounting to about R35-billion.⁶⁵

The environmental component incentivises increased public transport demand relative to private travel and, when implemented, should be sufficiently attractive to operators. The amount of subsidy required for this component depends on the authority's policy on emission control and affordability of the incentives. Indications are that the subsidy required would be in the order of R45-billion, which is more than 2.6 times the current subsidy bill. However, it should be noted that the current subsidy supports a tiny proportion of the population and is not strictly aligned to transport policy.

Table 83 summarises the various scenario permutations for the proposed framework in respect of the total subsidy bill. The base scenario is estimated and, relative to the base scenario, parameters associated with the social, productivity and environmental components of the model are changed. While the permutation shows some sensitivity, in practice many of the variables change concurrently in a non-linear manner. A more dynamic modelling platform, such as a systems dynamics model, would be more suitable for such scenario computations.

The proposed framework's fundamental assumption is that public transport is implemented and functions as an integrated network, and therefore does not distinguish between the subsidised modes. The failure to have a subsidised public transport system that functions as an integrated network would essentially perpetuate the status quo. Implementing the framework would require an authority both to design a network that achieves the desired access and mobility objectives and to monitor continuously the network and operations. It will also be very important to separate operations from planning and regulation.

7.3.4 Proposed implementation plan

The implementation plan for the proposed public transport subsidy framework requires the following:

- Stakeholder mapping and consultation
- Institutional relationships and the roles of the institutions required to implement the recommendations
- Legal requirements
- Resource requirements
- Transition management
- Implementation time-frames
- Cost implications for different stakeholders.

Stakeholder mapping and stakeholder consultation

Written comments should be solicited from the key stakeholders, i.e. National Treasury, the DoT, provinces and municipalities. Although the proposed new framework is in line with transport policy, it is a fundamental change from the status quo. National Treasury's interest will be to ensure value for money and affordability to the fiscus. Apart from affordability aspects, the DoT will want to ensure that the proposed framework is consistent with transport policy. Provinces and municipalities are more likely to be concerned with the practical aspects of implementing the framework. Other role-players to consult are the public transport operator associations, and PRASA, and care should be taken to ensure that vested interests do not impede service delivery interests.

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⁶⁵ The service covers 11% of Tshwane, implying, nominally, that the service needs to be expanded more than tenfold to cover the entire population. Tshwane is one of eight metropolitan municipalities, which together are home to 38% of the total population: R35-billion = R168-million/10% \times 8/38%.

Table 83: Example subsidy framework scenario permutations

Scenario	Social equity				Service productivity				Environmental			
	Number of designated travellers (million)	Distance apportioned to designated traveller (km)	Per km fare (R/km)	Social equity subsidy per annum (R billion)	Operating cost recovery ratio	Unit costs of operation (R/km)	Operational kilometres (billion km)	Service productivity per annum (R)	Base year passenger kilometres/vehicle kilometres	Current year passenger kilometres/vehicle kilometres	Scaling factor	Subsidy bill (R)
Probable baseline	16	1 250	0.5	10	30%	30	1.66	34.86	0.68	0.68	1	44.86
10% reduced cost recovery	16	1 250	0.5	10	20%	30	1.66	39.84	0.68	0.68	1	49.84
10% increase in social grant beneficiaries	17,6	1 250	0.5	11	30%	30	1.66	34.86	0.68	0.68	1	45.86
10% improvement in passenger kilometres relative to vehicle kilometres	16	1 250	0.5	10	30%	30	1.66	34.86	0.68	0.75	1.1	49.35
10% increase in service coverage	16	1 250	0.5	10	30%	30	1.83	38.33	0.68	0.68	1	48.35

Legal requirements

After making refinements based on stakeholder inputs, the framework will have to follow a parliamentary process, which may culminate in gazetting for public inputs. It will be essential to ensure that the framework promotes and does not violate any constitutional provisions. Ultimately, planning authorities (mainly municipalities) would need to adopt the framework in their integrated transport plans, for implementation in their areas of jurisdiction.

Resource requirements

From an institutional setup perspective, no special resources are needed to implement the framework. However, the implementation of the framework will probably result in the increase of the subsidy bill. Practical application of the framework would also require trained personnel within the implementing agencies.

Transition management

Transitioning from the current to the new subsidy framework will require phased implementation in order to minimise risks. The regulatory authority will need to have full control of the network, and public transport services will have to be fully provided in line with an approved transport plan for the area.

Implementation time-frames

The implementation of the proposed plan will probably take at least two years, unless it is fast-tracked using special mechanisms. The first year would largely be focused on consultations and refining the framework. During the second year, the planning and regulatory institutions would need to be aligned to the framework, as well as budgeting for implementation. Parallel to this, an integrated ticketing system will need to be implemented in areas where the roll-out of the subsidy system will begin.

Implementation cost implications

The implementation of the proposed subsidy framework is likely to result in a significantly increased subsidy bill because of the larger network and number of beneficiaries, and in turn increased fiscal expenditure on transport. Apart from operational costs, the implementation of the framework will require capital expenditure on supporting.

7.4 Conclusion

The White Paper (DoT, 1996) considers public transport as a “socially necessary” service that therefore requires support through appropriations, grants or subsidies, in order to achieve equitable distribution of resources or act as an incentive to provide access to services that facilitate socio-economic development. This study investigated the status quo of the public transport subsidy, with the aim of identifying shortcomings of the current system, and proposing interventions, in the form of a subsidy framework, for implementation.

Current public transport operational subsidies are based on the historic practice of providing some financial relief to households, particularly workers that were historically displaced by apartheid policies. However, the transport policy does not envisage subsidies as simply a financial relief mechanism, but as an instrument for sustainably transforming the public transport system in the country. While the current transport policy is progressive, the lack of policy implementation has led to unsustainable practices. Rationalisation plans, as part of municipal integrated transport plans, have yielded few results, mainly because vested interests want to protect the status quo.

No single public transport subsidy framework exists that will work for all circumstances, but some good-practice principles have been established. Demand-side subsidies (user-focused) work better than supply-side subsidies. Subsidies are also more sustainable if implemented within a framework where the regulatory authority has full control of the network, and operations are institutionally separated from regulations.

The currently subsidy system is relatively expensive, as the large amount spent benefits very few people. The fragmented administration of the transport subsidy exacerbates the situation: it is common to find many different parties independently administering subsidies within one municipality – for example, municipal buses, scholar transport, PRASA and province-subsidised buses. Fundamental changes are proposed in order to align the framework with policy. Although these changes will result in a larger subsidy bill, the number of beneficiaries will increase and the subsidy will be aligned to the country’s transport policy provisions. In the short term, however, implementation will necessitate the use of existing resources which may in turn imply a reduced subsidised network.

The proposed transport subsidy framework has three components: (i) social equity, which addresses constraints associated with structural poverty; (ii) service productivity, which incentivises the productivity of public transport operations; and (iii) environmental impact, which incentivises a modal shift from private to public transport. The framework’s fundamental assumption is that public transport is implemented and functions as an integrated network that does not distinguish between the subsidised modes. Implementing the framework would require an authority to design a network that achieves the desired access and mobility objectives. A phased approach to implementing the framework is proposed, linked to the availability of financial resources.

7.5 Recommendations

- The investigation has shown that the current subsidy framework is not aligned with transport policy. Beneficiaries of the system are currently limited to rail and bus, which have very limited network coverage compared to minibus taxis. Nonetheless, the framework to be implemented must transcend modes and focus on network-level service delivery. Continued perpetuation of the status quo has been shown in the investigation to be ineffective.

It is recommended that the Department of Transport (the custodians of national transport policy) formulates and implements a transport subsidy framework, which explicitly incorporates social welfare, service productivity and environmental management, which are the three aspects endorsed by national transport policy.

- Recommendations, from previous studies commissioned by the DoT, for realigning the subsidy framework to national transport policy have not been implemented.

It is recommended that the DoT use the findings of this study as input into the recommended policy implementation process.

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Effective Assignment of Transport Functions to Municipalities: Towards an Optimal Transport System

By: *Ghalieb Dawood and Mathetha Mokonyama*⁶⁶

8.1 Contextual Background

The national transport policy and previous resource by the Financial and Fiscal Commission (the Commission) supports the assignment of transport functions to the “lowest appropriate level of government” (DoT, 1996; FFC, 2013b). As illustrated conceptually in Chapter 7, assigning transport functions to municipalities can facilitate improved integrated planning and transport service delivery. Such municipalities would need to have full transport network authority for land passenger transport, which implies that they must design the network and decide how the network should operate. This means that no other entity or sphere of government would be allowed to make any network changes, unless the municipality had pre-identified such changes as essential for transport service delivery. Transport service delivery has been shown to be strongly linked with politics and is therefore susceptible to political manipulation, which may not have long-term benefits (Iles, 2005). Therefore, when reassigning functions to municipalities, it is important to ensure that long-term service delivery objectives override short-term political interests.

A number of additional questions raised in Chapter 7 are addressed in this chapter:

- What are the individual stakeholder requirements for assigning the transport function?
- What is the appropriate function assignment model for the South African context?
- What critical constraints need to be overcome to effect transport function assignment?
- What are the resource requirements for assigning the transport function?

After providing some background about the reassignment of transport functions and summarising relevant previous studies by the Commission, transport functions are profiled based on the South African transport legislation. The delivery of transport functions in the country is then assessed, followed by stakeholder inputs and perspectives about assigning the transport function. Local and international case studies are used to illustrate the successes and failures of devolving and consolidating transport functions. Lastly, the critical success factors for effective reassignment of functions are summarised, concluding with recommendations.

8.1.1 Assignment of transport functions

The movement of people and goods is necessary to support life and consists of two distinct aspects: mobility and access. Mobility refers to how fast one is able to move between any two points in space, while accessibility refers to the ease with which one is able to move between the two points. An efficient and effective transport system maximises both mobility and access. Passenger land transport (the focus of this chapter) aims to achieve the goal of moving large numbers of people – not vehicles – within a given time and space at low cost. Failure to provide such a public transport system increases societal unit costs and reduces the economy’s competitiveness. In South Africa, the absence of an efficient and effective public transport system risks violating some of the human

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⁶⁶ Council for Scientific and Industrial Research (CSIR)

rights enshrined in the Constitution, such as freedom of movement and the right to equality. The delivery of desirable public transport services requires appropriate and effective institutional structures and rationalisation of functions across the national, provincial and local spheres of government.

The National Land Transport Act (No. 5 of 2009) (NLTA) empowers the Minister of Transport to assign functions to the most appropriate sphere of government, subject to Sections 99 and 156(4) of the Constitution, and Sections 9 and 10 of the Municipal Systems Act (No. 32 of 2000) (MSA). Section 99 of the Constitution states that assigning a function to a municipality must be agreed with the Municipal Council. The assignment must also be consistent with the Act of Parliament from which the function is exercised, and must only take effect upon proclamation by the president. Section 156(4) of the Constitution allows national and provincial spheres to assign any function to municipalities, if the function would be administered most effectively by the municipality and provided that the municipality has the capacity to administer the function. Sections 9 and 10 of the MSA extend consultations required to the Minister of Finance, Provincial Member of Executive Council for Finance, organised local government, the Commission, and the Minister of Cooperative Government and Traditional Affairs. These sections also refer to the need for appropriate funding and capacity in the municipality concerned. The municipality seeking to be assigned a transport function must also comply with the above requirements. The Commission, in particular, requires that the function assignment satisfy the detailed requirements listed in Annexure A (FFC, 2007), and the business plan to assign a transport function must indicate how each of the requirements in Annexure A is addressed.

The NLTA contains the land transport functions of the three spheres of government in South Africa, as summarised in Table 84. In brief, the role of national government is to define the country's transport policy and strategy, for municipalities to implement with some support from the provinces. Section 11(iv) empowers the three spheres of government to assign functions to the most appropriate sphere of government. Furthermore, one or more adjacent municipalities may jointly undertake a function, or even establish a joint entity for the purpose of fulfilling the function.

Table 84: Transport functions for three spheres of government in the NLTA

National
<ul style="list-style-type: none"> • Formulating national transport policy and strategy. • Planning and coordinating national transport strategy. • Preparing a National Land Transport Strategic Framework. • Coordinating provinces and addressing arrangements between the three spheres of government and public entities, to ensure the effective and efficient execution of the land transport function. • Assigning functions to the most appropriate sphere of government. • Liaising with other government departments in the national sphere that have responsibilities that affect transport issues, with a view to coordinating land transport. • Capacitating and monitoring provinces and municipalities that lack capacity or resources to perform their land transport functions. • Coordinating transport relations between the Republic and other countries and implementing international agreements. • Performing Act-specific functions in relation to applications for operating licences. • Regulating tourism transport. • Regulating interprovincial road transport. • Acting as contracting authority for subsidised service contracts, interim contracts, current tendered contracts and negotiated contracts.
Provincial
<ul style="list-style-type: none"> • Formulating provincial transport policy and strategy, within the framework of national policy and strategy. • Planning, coordinating and facilitating land transport functions in the province. • Preparing the Provincial Land Transport Framework. • Coordinating municipalities, to ensure the effective and efficient execution of land transport in the province. • Liaising with other government departments in the national and provincial spheres that have responsibilities that affect transport and land use planning issues, and bringing together key players. • Ensuring that municipalities that lack capacity and resources, within the respective provinces, are capacitated to perform their land transport functions.

Provincial

- Ensuring implementation of the provincial integrated development strategy and public transport strategy, with due attention to rural areas, focusing on less capacitated municipalities or those that do not fulfil their responsibilities in respect of transport service delivery, either by direct implementation or assistance

Municipal

- Developing land transport policy and strategy within its area based on national and provincial guidelines, which includes its vision for the area and incorporates spatial development policies on matters such as densification and infilling as well as development corridors.
- Promulgating municipal by-laws and concluding agreements, as appropriate, in the municipal sphere.
- Ensuring coordination between departments and agencies in the municipal sphere that have responsibilities that affect transport and land use planning issues, and bringing together the relevant officials in its capacity as planning authority.
- Preparing transport plans for its area, ensuring the implementation thereof and monitoring its performance in achieving its goals and objectives.
- Financial planning with regard to land transport within or affecting its area, with particular reference to transport planning, infrastructure, operations, services, maintenance, monitoring and administration, with due focus on rehabilitation and maintenance of infrastructure.
- Managing the movement of persons and goods on land within its area by coordinating such movement.
- Encouraging and promoting the optimal use of the available travel modes so as to enhance the effectiveness of the transport system and reduce travelling time and costs.
- Developing, implementing and monitoring a strategy to prevent, minimise or reduce any adverse impacts of the land transport system on the environment in its area.
- Developing, operating and maintaining a land transport information system for its area.
- Encouraging, promoting and facilitating public consultation and participation in the planning, regulation and implementation of public transport, and applying the requirements of the Municipal Systems Act (No. 32 of 2000) in that regard.
- Marketing and promoting public transport and promoting publicity associated with the public transport system.
- Providing information to users or potential users of public transport.
- Promoting safety and security in public transport.
- Ensuring there is provision for the needs of special categories of passengers in planning and providing public transport infrastructure, facilities and services to meet their needs, in so far as possible by the system provided for mainstream public transport.
- Liaising on a continuous basis with the South African Police Service, Road Traffic Management Corporation, the relevant provincial and municipal law enforcement authorities or agencies, and the inspectors appointed under the Cross-Border Act No. 4 of 1998), with a view to ensuring coordinated transport law enforcement within its area.
- Applying traffic management techniques aimed at improving road traffic movement.
- Undertaking functions relating to municipal roads, as well as measures to limit damage to the road system.
- Planning, implementing and managing modally integrated public transport networks and travel corridors for transport within the municipal area and liaising in that regard with neighbouring municipalities.
- Service level planning for passenger rail on a corridor network basis in consultation with the Passenger Rail Agency of South Africa.
- Introducing, establishing or assisting in or encouraging, and facilitating the establishment of integrated ticketing systems, the managing thereof including through-ticketing and determining measures for the regulation and control of revenue-sharing among operators involved in those systems subject to standards set by the Minister of Transport.
- Setting standards for interoperability between fare collection and ticketing systems in its area.
- Formulating and applying travel demand management measures for its area.
- In the case of gross cost contracts for subsidised services, determining fare structures and fare levels and periodically adjusting fares after publishing the proposed adjustment for public comment.
- Determining concessionary fares for special categories of passengers.
- Exercising control over service delivery through the setting of operational and technical standards and monitoring and compliance therewith.
- Monitoring contracts and concessions.
- Concluding subsidised service contracts, commercial service contracts, and negotiated contracts with operators for services within their areas.
- Developing and managing intelligent transport systems for their areas.

Source: RSA (2009)

Table 85 summarises the overall organisational structure responsible for the transport functions in South Africa, showing the entities and their high-level strategic roles for all the three spheres of government. The table includes functions other than land passenger transport, which is the focus of this investigation. With over 300 entities involved in transport service delivery, the structure is large and continues to expand, especially in metropolitan municipalities with the formation of entities to manage the integrated public transport networks. Such a large structure would ordinarily require seamless coordinating in order to deliver on a coherent transport service delivery mandate. However, in practice the current transport institutional arrangement is prone to potential duplication of functions (FFC, 2013b). It therefore requires some rationalisation and this will mean more effective service delivery.

The consolidation of transport functions brings many benefits, such as fare integration, integrated marketing of public transport, integrated scheduling of services as well as funding and implementation of joint programmes (Meyer et al., 2005). Much of the success of public transport services in Germany and Switzerland is ascribed to using a “verkehrsverbund”, which is a coordinating institutional framework (Stone, 2011). A survey of transport functions in the United States found that entities that use integrated network planning tend to have improved public transport services (Rivasplata, Iseki and Smith, 2012). However, financial, technological, political and administrative hurdles have first to be overcome, while the entity managing the integration needs to be autonomous in order to define network standards (Meyer et al., 2005). Having uniform standards for the public transport network is especially beneficial to users, allowing them to travel seamlessly (Dodson et al., 2011). However, such a network needs to be designed and managed as an integrated network, not as isolated modes of transport, which is currently the case in South Africa (Walters, 2011).

What makes transport a priority for rationalising functions, particularly in South Africa, is that transport accounts for significant costs in household and business transactions (NPC, 2011). Furthermore, the spatial dislocations inherited from the apartheid era mean that the costs fall disproportionately on black and poor households. A more efficient transport system can translate into reduced household costs and reduced costs of doing business in the country, as well as contribute towards improved social inclusion (NPC, 2011). This study aims to identify the most appropriate model for assigning the transport functions and the associated resource implications.

Table 85: Transport functions for three spheres of government in the NLTA

Sphere of government	Overall structure and strategic role
National	<p>National Department of Transport: Formulating national transport policy and legislation; monitoring transport policy; and overseeing its agencies.</p>
	<p>National Department of Transport agencies/entities:</p> <ul style="list-style-type: none"> • Passenger Rail Agency of South Africa (PRASA): Planning, managing and providing passenger rail services and associated infrastructure, as well as state-owned long-distance bus services. • South African Roads Agency Limited: Planning, managing and providing national roads and associated infrastructure. • Road Traffic Management Corporation: Implementing transport policy relating to road traffic safety. • Road Traffic Infringement Agency: Implementing transport policy relating to the administration of road traffic infringements. • Road Accident Fund: Administering the fund to compensate victims of road traffic accidents. • Railway Safety Regulator: Regulating railway safety for both passenger and freight transport. • Cross-Border Road Transport Agency: Implementing transport policy relating to cross-border passenger and freight transport. • Airports Company of South Africa (ACSA): Planning and managing of state-owned airports. • Ports Regulator of South Africa: Implementing transport policy in respect of regulation of sea port operations. • Air Traffic and Navigational Services: Planning and providing air traffic navigational services. • South African Maritime Safety Authority: Implementing transport policy relating to maritime safety. • South African Civil Aviation Authority: Implementing transport policy relating to the regulation and management of aviation safety.
	<p>Department of Public Enterprises: Managing state-owned enterprises</p>

Sphere of government	Overall structure and strategic role
National	Department of Public Enterprises transport-related entities: <ul style="list-style-type: none"> • Transnet: State-owned enterprise for planning, managing and providing state-owned infrastructure and services for freight. • South African Airways: State-owned airline. • South African Express: State-owned airline.
Provinces	Nine provincial departments of transport: <ul style="list-style-type: none"> • Some provinces have entities that own and provide bus services (Limpopo and North West). • Limpopo has a provincial Roads Agency.
Planning and coordination	Eight departments of transport in metropolitan municipalities: <ul style="list-style-type: none"> • Some metropolitan municipalities own and provide bus services (e.g. Johannesburg, Tshwane, and Ekurhuleni). • The City of Johannesburg has a Roads Agency. • Some cities are planning to establish entities to manage integrated rapid transport services.
	<ul style="list-style-type: none"> • 44 x departments of transport (or technical services) in district municipalities.
	<ul style="list-style-type: none"> • 226 x departments of transport (or technical services) in local municipalities

8.2 Research Methods

Both primary and secondary research methods were used. The primary research included stakeholder interviews and research workshops, while the secondary research entailed studying published research. The investigation was based on the idea that performance should be measured according to the extent to which transport can reduce costs (i.e. monetary, time, and environment) to society and can support inclusive growth.

8.3 Findings

8.3.1 Root cause analysis

South Africa's transport function was assessed using a sustainable transport measurement framework proposed by Litman (2013), which is adapted for local conditions for land transport. Each transport system goal was assessed against objectives and associated performance indicators. Table 86 shows clearly critical gaps between what is required for a sustainable transport system and what is currently being delivered.

These transport system problems are best described as service delivery backlogs. Experiences elsewhere shown that addressing such backlogs requires focused interventions and the elimination of half-hearted implementation approaches. The integration of fares, marketing and scheduling is effective in consolidating transport functions (Meyer et al., 2005). An integrated public transport network also makes it easier to align the public transport subsidy (where appropriate) to network objectives. However, in South Africa, the public transport subsidy amounts to over R17-billion per annum. This total transport subsidy amount is equivalent to about R30 per month for every person living in South Africa, or R690 per subsidy beneficiary per month – or about 1 380km of “free travel” per month for the beneficiaries.

Table 86: Summary of the state of transport service delivery based on the sustainable transport evaluation framework

System goals	Objectives	Performance indicators	Overview of Performance in South Africa
Economic			
Economic productivity	<ul style="list-style-type: none"> Transport system efficiency. Transport system integration. Maximum accessibility. Efficient pricing and incentives. 	<ul style="list-style-type: none"> Productivity benchmarking. Per capita congestion delay. Efficient pricing (road, parking, insurance, fuel, etc.). Efficient prioritisation of facilities. 	<ul style="list-style-type: none"> The South African transport system is suboptimal, consisting of isolated transport modes rather than an integrated network (Walters, 2011). The lack of a coherent strategy for managing congestions both on roads and in public transport means that the transport system tends to experience sharp directional peaks resulting in congestion in urban areas (based on various transport models). However, there is no coherent strategy for the management of congestion either on roads or in public transport. Transport policy provides for user-pays principle (DoT, 1996). However, there is no coherent strategy on transport user charges or levies. Most of the entities, including municipalities, do not have proper asset management systems, which makes budgeting and prioritising infrastructure development and maintenance difficult (Wall, Milford and Kubuzie, 2007).
Economic development	<ul style="list-style-type: none"> Economic and business development 	<ul style="list-style-type: none"> Access to education and employment opportunities. Support for local industries. 	<ul style="list-style-type: none"> Travel times are long, with 18% of work trips taking over an hour and a third of education trips taking more than 30 minutes (DoT, 2003). There is no coherent strategy on how to manage travel time. The Department of Transport and the Department of Trade and Industry have recently developed guidelines on the procurement of rolling stock infrastructure to support local industries.
Energy efficiency	<ul style="list-style-type: none"> Minimise energy costs, particularly fuel imports. 	<ul style="list-style-type: none"> Per capita transport energy consumption. Per capita use of imported fuels. 	<ul style="list-style-type: none"> Indications are that travel demand is very sensitive to fuel prices, to the extent that fuel consumption per registered vehicle has been declining over the recent past (Mokonyama and Mubiwa, In press). However, travel remains energy intensive, in terms of kilometres travelled per trip (based on various transport models), and reliant largely on fuel imports because South Africa meets only one-third of its own fuel demand (DoE, 2014).
Affordability	<ul style="list-style-type: none"> All residents can afford access to basic essential services and activities. 	<ul style="list-style-type: none"> Availability and quality of affordable modes (walking, cycling, ridesharing and public transport). Portion of low income households that spend more than 10% of budgets on transport. 	<ul style="list-style-type: none"> The largest proportion of trips in South Africa are in the form of walking (DoT, 2003). However, infrastructure to support walking is mostly unavailable or grossly inadequate (Maphakela et. al., 2013). There is no coherent strategy to provide non-motorised transport infrastructure in the country. Higher income households with car access tend to use cars even for basic trip purposes such as going to the nearest convenience store. This is an indication of poor settlement design, poor non-motorised transport infrastructure, and/or these households tend to reside in inaccessible areas (Mokonyama, 2010). The policy states that no more than 10% of disposable income should be spent on transport. However, low income households tend to spend a larger proportion of their disposal income on public transport. Higher income households tend to spend higher proportions of income on private transport. There is generally no coherent strategy on containment of transport costs (StatsSA, 2012).
Efficient transport operations	<ul style="list-style-type: none"> Efficient operations and asset management maximises cost efficiency. 	<ul style="list-style-type: none"> Performance audit results. Service delivery unit costs compared with peers. Service quality. 	<ul style="list-style-type: none"> As South Africa does not have comprehensive transport policy targets, reporting on service delivery progress is difficult. Service delivery progress tends to be measured in terms of the amount of money government spends relative to budgets, instead of the systematic impact of the expenditure. Therefore, indicators such as customer satisfaction in response to service quality, as well as unit costs of transport are generally unavailable.

System goals	Objectives	Performance indicators	Overview of Performance in South Africa
Social			
Equity / fairness	<ul style="list-style-type: none"> Transport system accommodates all users, including those with disabilities, low incomes, and other constraints. 	<ul style="list-style-type: none"> Transport system diversity. Portion of destinations accessible by people with disabilities and low incomes. 	<ul style="list-style-type: none"> South Africa does not have a coherent transport strategy for vulnerable groups such as persons with disabilities, and the elderly.
Safety, security and health	<ul style="list-style-type: none"> Minimise risk of crashes and assaults, and support physical fitness. 	<ul style="list-style-type: none"> Per capita traffic casualty (injury and death) rates. Traveller assault (crime) rates. Human exposure to harmful pollutants. Portion of travel by walking and cycling. 	<ul style="list-style-type: none"> South Africa has one of the world's worst records on road traffic safety (WHO, 2013). Despite this, South Africa does not have a coherent strategy for road traffic safety. Many of the public transport users, especially train users, feel vulnerable when using the transport system and fear becoming victims of crime (Page, Moeketsi and Schurink, 2001). Public transport users are concerned and dissatisfied with safety of public transport vehicles (DoT, 2003). Compared to EU standards, South African vehicles have significantly higher emission rates (Goyns, 2008). However, there is no coherent strategy on management of transport emissions. Low income people generally walk and cycle over long distances because they cannot afford alternative modes of travel, whereas higher income people usually walk only for leisure purposes (Maphakela et al., 2013).
Community development	<ul style="list-style-type: none"> Help create inclusive and attractive communities. Support community cohesion. 	<ul style="list-style-type: none"> Land use mix. Supportive of non-motorised modes e.g. walking and cycling Quality of road and street environments. 	<ul style="list-style-type: none"> South Africa's transport system is still suffering from the spatial distortions caused by the apartheid planning framework, which resulted in a transport system characterised by relatively long travel distances, especially for low income households (NPC, 2011). Town planning schemes are used as administrative tools to guide land-use development, rather than as instruments to address these historical distortions (Mokonyama, 2009). Furthermore, road reserves continue to be generally designed to accommodate vehicle travel as opposed to the movement of people (Mokonyama, 2010). This is despite the DoT publishing comprehensive guidelines for non-motorised facility design in 2003. The City of Cape Town is the only municipality that has adopted and implemented these guidelines on a large scale.
Cultural heritage preservation	<ul style="list-style-type: none"> Respect and protect cultural heritage. Support cultural activities 	<ul style="list-style-type: none"> Preservation of cultural resources and traditions. Responsiveness to traditional communities. 	<ul style="list-style-type: none"> South Africa has a comprehensive Environmental Impact Assessment framework that is diligently implemented for transport infrastructure projects.
Environmental			
Air pollution control and climate stability	<ul style="list-style-type: none"> Reduce global warming emissions. Mitigate climate change impacts. Reduce air pollution emissions. Reduce exposure to harmful pollutants. 	<ul style="list-style-type: none"> Per capita emissions of greenhouse gases (CO₂, CFCs, CH₄, etc.). Per capita emissions (PM, VOCs, NO_x, CO, etc.). Air quality standards and management plans. 	<ul style="list-style-type: none"> Emission rates of South African vehicles are much higher than contemporary EU standards (Goyns, 2008). A baseline greenhouse gas inventory for the transport sector was compiled by the DoT based on 2000 datasets. However, there is no coherent transport strategy for greenhouse gas emissions and climate change.
Prevent noise pollution	<ul style="list-style-type: none"> Minimise traffic noise exposure. 	<ul style="list-style-type: none"> Traffic noise levels. 	<ul style="list-style-type: none"> Traffic noise mitigation is usually part of the Environmental Impact Assessment framework for transport infrastructure projects. Through the South African Bureau of Standards, South Africa also has a framework for measuring and control of transport generated noise.
Protect water quality and minimise hydrological damages.	<ul style="list-style-type: none"> Minimise water pollution. Minimise impervious surface area. 	<ul style="list-style-type: none"> Per capita fuel consumption. Management of used oil, leaks and storm water. Per capita impervious surface area. 	<ul style="list-style-type: none"> South Africa does not have a coherent strategy on the management of water pollution caused by the transport sector.

System goals	Objectives	Performance indicators	Overview of Performance in South Africa
Open space and biodiversity protection	<ul style="list-style-type: none"> Minimise transport facility land use. Encourage more compact development. Preserve high quality habitat. 	<ul style="list-style-type: none"> Per capita land devoted to transport facilities. Support for smart growth development. Policies to protect high value farmlands and habitat. 	<ul style="list-style-type: none"> South Africa has a comprehensive biodiversity protection framework implemented by the National Biodiversity Institute, which is taken into account as part of the EIA process for transport infrastructure projects. Nonetheless, from a transport perspective the implementation of this framework tends to be at a project level not at a system level.
Governance			
Integrated, comprehensive and inclusive planning	<ul style="list-style-type: none"> Clearly defined planning process. Integrated and comprehensive analysis. Strong citizen engagement. Least cost planning (most beneficial solutions are selected and funded). 	<ul style="list-style-type: none"> Clearly defined goals, objectives and indicators. Availability of planning information and documents. Portion of population engaged in planning decisions. Range of objectives, impacts and options considered. 	<ul style="list-style-type: none"> The National Land Transport Act (DoT, 2009) is clear on the types of transport plans that are in different spheres of government. Key among the types of plan is the municipal integrated transport plan (ITP) that guides transport service delivery at a municipal level. While these plans are clear on goals and objectives of the transport system, they tend to fall short in terms of auditable planning targets. These plans form part of the integrated development planning process, which incorporates public participation, and are generally available to the public. The identification of projects is not always in line with these plans. For example, many of the municipalities (including metropolitan municipalities) are implementing large-scale transport projects that are not even identified in their approved ITPs. Furthermore, other spheres of government, as well as agencies, implement projects and programmes in municipal jurisdictions that have not been incorporated in the ITPs. This in turn implies that the prioritisation of projects and programmes may not be optimal and best for the communities in the municipalities. The phrase 'integrated transport planning' is often used loosely. Municipalities are not exercising their transport network ownership to the advantage of implementing integrated transport systems. Public transport tends to be managed as isolated routes as opposed to a network.
Adequate funding for transport	<ul style="list-style-type: none"> Sustainable revenue streams to fund transport service delivery. 	<ul style="list-style-type: none"> Level of funding for transport infrastructure implementation. Level of funding for transport systems and operations. Level of funding for infrastructure maintenance. 	<ul style="list-style-type: none"> There is no coherent strategy for transport funding in South Africa. There is often a mismatch between funding requirements and actual funding for transport. There is no comprehensive transport infrastructure backlog analysis in the country. This is as a result of poor transport asset management practices. Maintenance of transport infrastructure tends to be underfunded (Wall, Milford and Kubuzie, 2007).
Appropriate human resource capacity	<ul style="list-style-type: none"> Appropriately skilled work force to manage the transport system. 	<ul style="list-style-type: none"> Filled of vacancies. Number of appropriately skilled professionals. 	<ul style="list-style-type: none"> Transport service delivery in municipalities is often hampered by the shortage of appropriately skilled personnel, with inadequate skills levels for critical technical positions in municipalities (AGSA, 2013) and a dire shortage of engineering personnel in municipalities (Lawless, 2007).

8.3.2 Stakeholder inputs

Inputs from stakeholders on the main issues related to the reassignment of transport functions to municipalities were obtained at a workshop and through interviews. Stakeholders included National Treasury, the DoT, City of Cape Town, City of eThekweni, the Gauteng Department of Roads and Transport, South African Local Government Association (SALGA), City of Tshwane, National Ports Regulator, and Limpopo Provincial Government.

The following questions were raised at the initial workshop:

- What political accountability is required to ensure that the assignment of transport functions is sustainable?
- Is current funding for transport sufficient even to address existing transport problems in municipalities?
- How should funding follow the assignment of functions to municipalities?
- Should the current transport backlogs be addressed before reassignment of functions takes place?
- What plan should be followed to implement the assignment of transport functions to municipalities?
- What are the requirements to fulfil transport aspects of the NDP?

These questions are addressed in Table 85, but more detailed inputs received from stakeholders are given below.

National Treasury

National Treasury supports the assignment of functions as provided for in the NLTA, so long as it results in improved and more efficient transport service delivery, which is currently inefficient and poorly provided. Furthermore, given resource constraints and the need to provide context-appropriate solutions, the focus must be on cities rather than adopting a wholesale approach for all municipalities. Municipalities, whether they take on new functions or not, are encouraged to seek innovative ways of generating revenue to fund public transport and should not rely solely on national funds, such as the Public Transport Infrastructure Systems Grant. National Treasury also pointed out that municipalities are entitled to submit requests for the assignment of transport functions, but only the City of Cape Town had made a formal request (at the time of the interview).

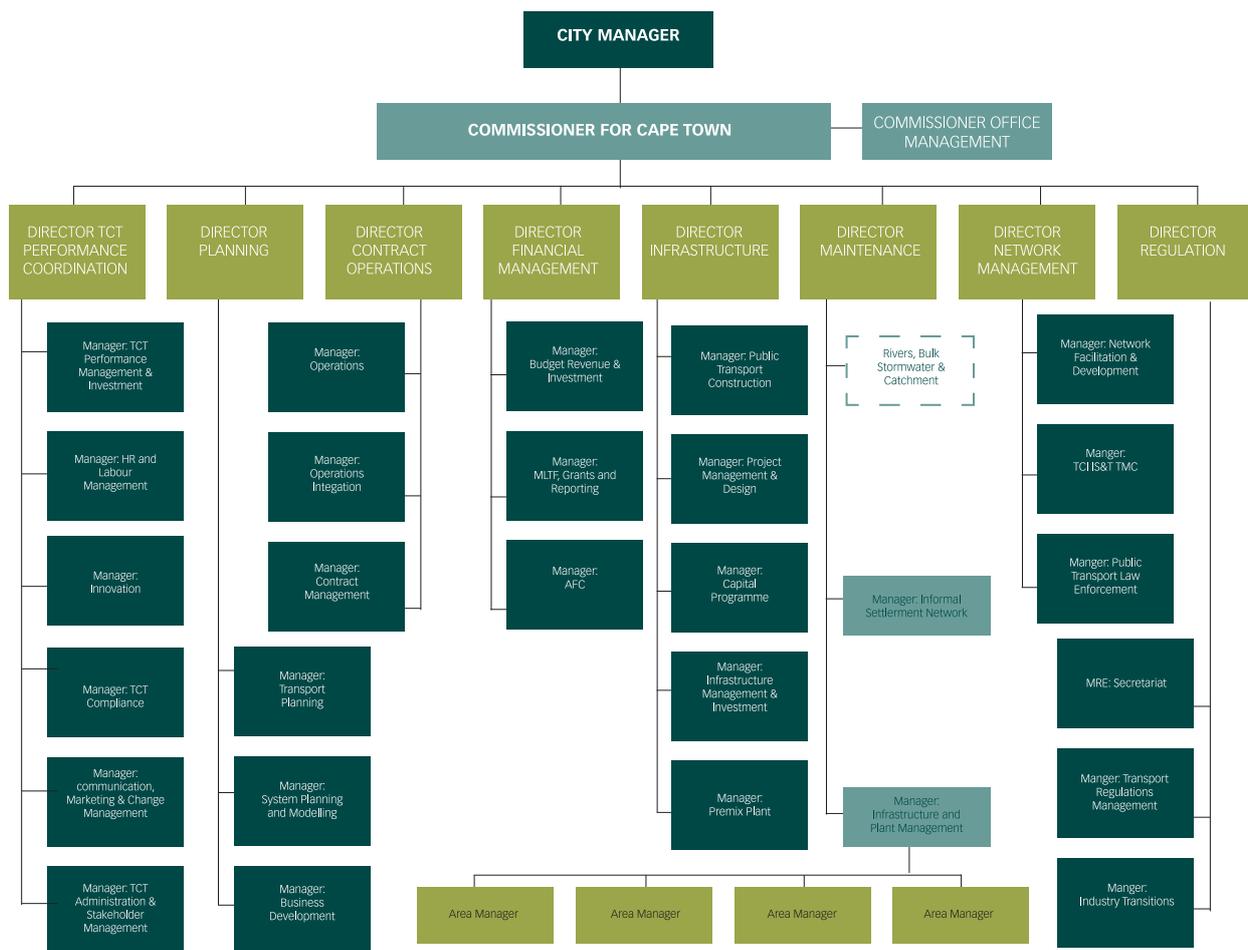
Department of Transport (DoT)

According to the DoT, if not all functions are shifted to municipalities, the correct term to use is “assignment”, not “devolution” because, legally, devolution cannot be asymmetric. The DoT has identified two critical functions for assignment: contracting function (i.e. managing public transport contracts, inclusive of the design, adjudication, awarding, and monitoring of the contracts) and the licencing function (i.e. receiving and adjudicating operating licence applications). In fact, in terms of the NLTA, municipalities are supposed to manage (by default) any new public transport contracts and can be assigned the management of older contracts. The DoT supports the reassignment of functions but is concerned about the technical capacity constraints across all the three spheres of government to implement the NLTA fully.

The City of Cape Town

The City recently established Transport for Cape Town (TCT), an entity designed with the purpose of consolidating all transport functions in the City for more focused transport service delivery (see Figure 68 for the structure). To date, TCT has prepared business plans for the reassignment of both contracting and licencing functions to the City. Once fully operational, the contracting function is estimated to cost in the order of R50-million per annum and the licensing function R100-million per annum. If both plans are approved, the City of Cape Town will become the first municipality to have an authority that controls its road-based public transport network. For now, the City intends entering into performance agreements with the PRASA until it has a better understanding of passenger rail transport.

Figure 68: Transport for Cape Town structure



The City of eThekweni

The eThekweni Transport Authority (ETA) was established in terms of the now-repealed National Land Transport Transition Act (No. 22 of 2000) (NLTTA). The ETA, with a political head, was given the responsibility of coordinating all transport functions in the city. However, many transport functions are still spread across the three spheres of government. In 2009, the NLTA replaced the NLTTA. Given that the NLTA has done away with TA arrangements, the City of eThekweni is in the process of reconfiguring the ETA to meet legislative requirements. The City found that, unlike an ordinary city transport department, the ETA had quick turnaround times for decision making and was able to attract and retain technical skills. Because of not having the full contracting and licencing functions, the ETA was largely reliant on the KwaZulu-Natal provincial government.

Problems experienced with the province included data used to verify the status of route licences not being up to date, which made assessing whether to grant operating licences difficult. The City also found it difficult to coordinate municipal plans with provincial and national transport strategies, as the Provincial Land Transport Framework (a legislative provincial mandate) and the National Land Transport Strategic Framework (the legislative national mandate) were not updated. A particular problem in the city is the management of freight transport, as it is unclear which sphere of government should take responsibility, particularly regarding budgetary matters. The City is willing to take over some of the province-owned roads that currently function as local roads, on condition that the province first restore and maintain the roads to acceptable levels. Past experiences warrant a dedicated transport law enforcement function for the city. For example, metropolitan police can shift resources to priorities other than transport priorities identified by the Municipal Transport Authority. This may be to the detriment of transport service delivery. The City has not yet implemented the coordination structures provided for in the NLTA, such as the Intermodal Planning Committee, because it is waiting for guidance nationally from the DoT regarding the terms of reference for the structures.

Gauteng Department of Roads and Transport

In line with Section 12(1) of the NLTA, the Gauteng Department of Roads and Transport recently established the Gauteng Transport Commission (GTC), an entity whose purpose is to coordinate transport programmes in the Gauteng Province. Extensive transport functional area overlap across the Gauteng municipalities, which makes the entity necessary. The GTC is not a mere coordinating structure but is intended to direct transport-related expenditure in the province. Decisions made by the GTC will be binding to the province and all the Gauteng municipalities.

Figure 69: Proposed Type A SALGA transport function structure

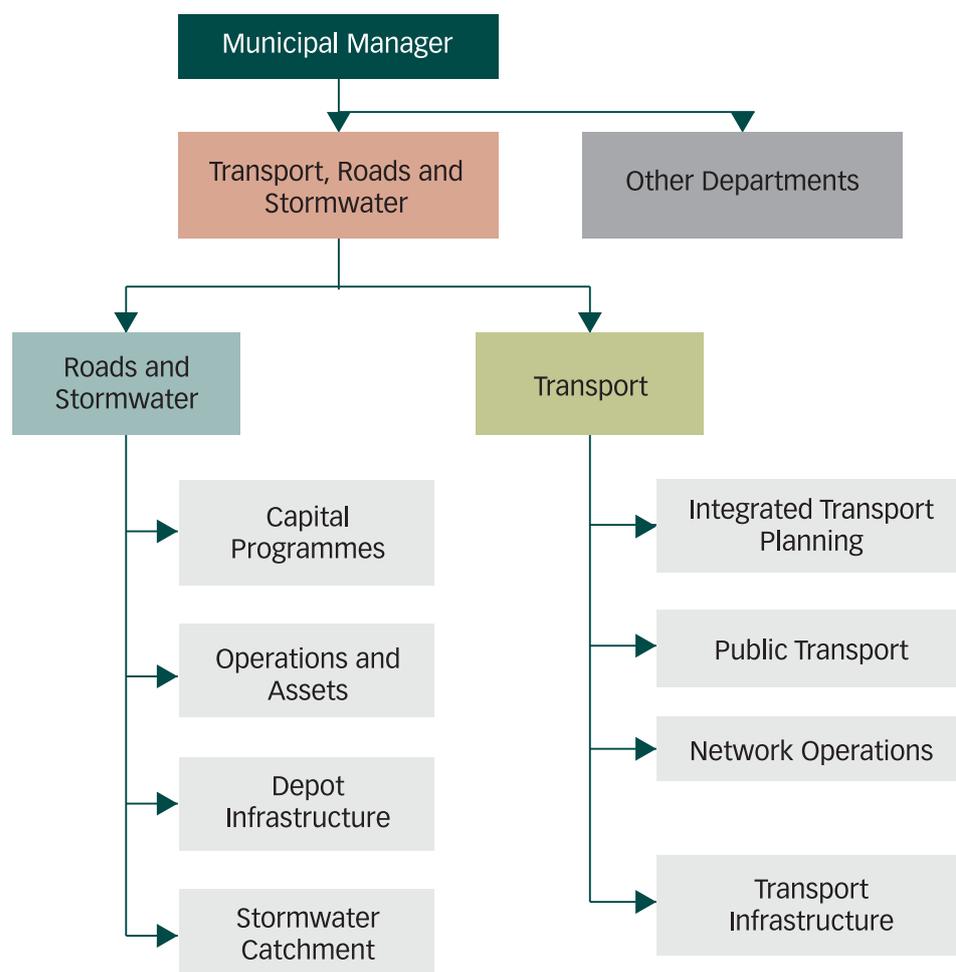
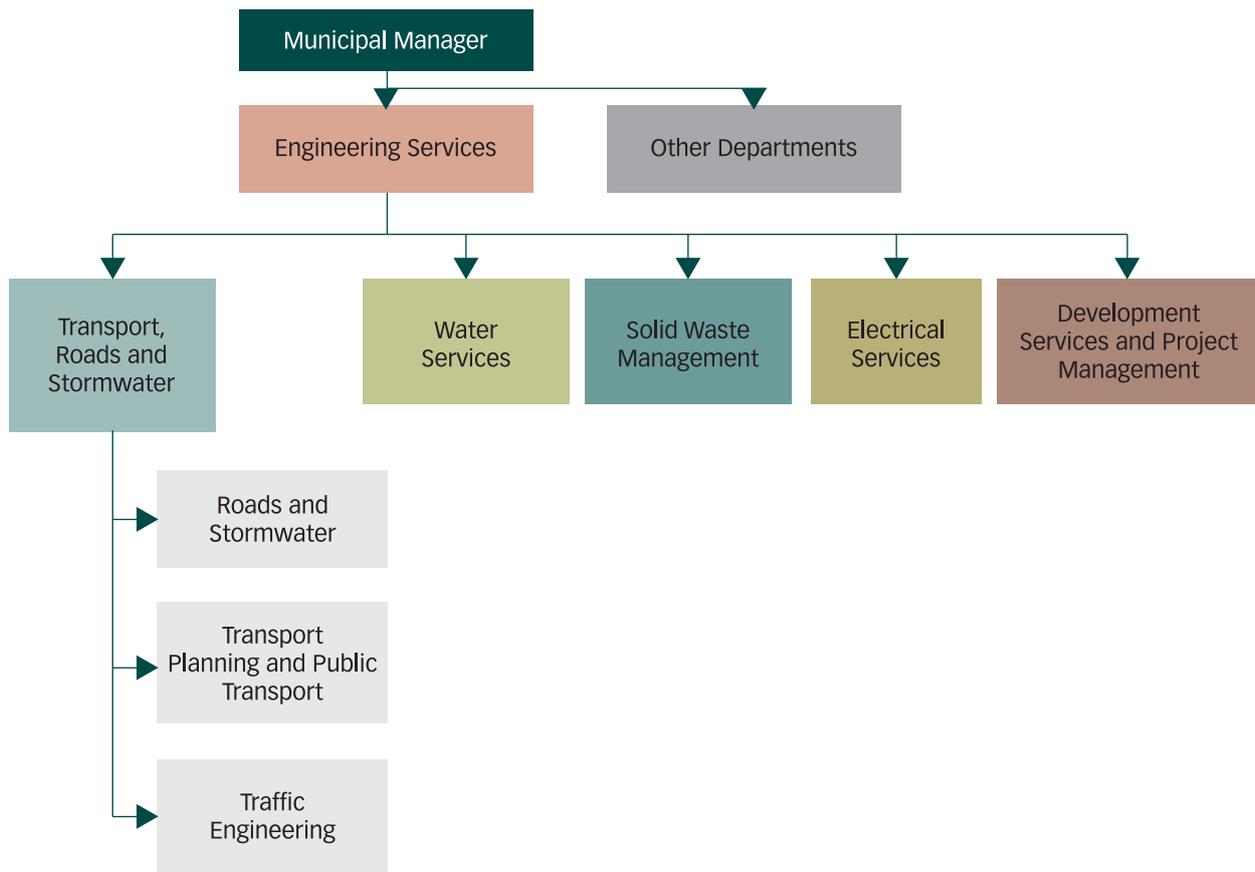


Figure 70: Proposed Type B SALGA transport function structure



SALGA

SALGA is in the process of promoting two specific structures for transport in municipalities, which are presented in Figures 69 and 70 as Type A and Type B. The Type A structure is proposed for municipalities with more resources, while Type B is for lesser resourced municipalities, which lack organisational structures to deal with transport functions.

Annexure B provides an alphabetical list of the current provincial DoT structures for all nine provinces. What is striking is how the structures differ significantly from province to province, while in some provinces, the transport portfolio contains functions that are not directly related to transport such as social crime policing and buildings. The differing structures show that different approaches will be required for function assignments in different provinces.

Table 87: Responses to questions raised at the stakeholder workshop

Question	Response
Which transport functions are appropriate for assigning to municipalities?	The DoT supports the assigning of contacting and licensing functions. Cape Town and eThekweni, two municipalities that have currently indicated some state of readiness, have also identified these functions as a priority.
Under what conditions is the assignment of transport functions to municipalities appropriate?	The three essential conditions are (i) Assignment must be in the best interests of transport service delivery. (ii) The municipality receives equivalent funding. (iii) The municipality has appropriate capacity to take over the functions.
What are the risks associated with assignment of transport functions and how should these risks be managed?	Each municipality must carry out a detailed business plan, which will be the basis for deciding on the assignment of functions. Failure to do this properly will increase the risks substantially.
What process should be followed for effective assignment of transport functions?	The Commission provides a comprehensive framework, which should be followed for the assignment of any function, including transport functions.
What are the resource implications for assignment of transport functions to be effective?	The capital and operational financial resources required to carry out assigned functions are significant. In the case of the City of Cape Town, the assignment of the licensing function is equivalent to about 0.5% of the City's operational budget.
How effective are the recent interventions provided for in the NLTA to address the historical shortcomings of poor intergovernmental relations on shared transport competencies?	In their current form, coordinating committees, such as Intermodal Planning Committees as provided for in the NLTA, appear to be insufficient for effective coordination of transport activities.
What accountability frameworks will be most effective to ensure that assigned transport functions are not compromised in the long run?	Transport performance must be an explicit component of a municipal performance framework that is communicated to the communities.

8.3.3 Proposed model for allocating and devolving transport functions

Previous investigations into improving transport service delivery through reconfiguring institutional structures have generally proposed three models:

- (i) An institutional structure that coordinates transport functions across different spheres of government. For example, the Transport Coordinating Committees (instituted under the repealed NLTA) between Gauteng Province and municipalities, and Intermodal Planning Committees instituted nationally through the NLTA. The coordination takes the form of scheduled meetings agreed to by member institutions, to discuss matters of common interest. This type of structure is good for sharing information but has weak decision making and accountability, because the member institutions are not bound by the structure's decisions.
- (ii) A service level agreement, as promoted by NLTA regulations. Although none exist yet in South Africa, an example would be a municipality entering into a service level agreement with PRASA that covers services offered by PRASA within the jurisdiction of the municipality. Practical challenges of such an agreement include non-uniformity across different municipalities (and the effect on customer experiences), and limited enforcement powers of municipalities over autonomous public sector bodies such as PRASA. In the absence of incentive provisions within the service level agreements, such as increased payment for achieving service goals, the enforcement of such agreements may be subject to legal processes of mediation and arbitration.
- (iii) A municipal transport authority, which is a model that has received much attention in the past and has been used successfully in other parts of the world. However, to date its success in

South Africa has been very limited mainly because of the transport authority's limited powers and underfunding of the function (as shown in the Commission's previous research (FFC, 2013a) into eThekweni municipality).

The ideal transport function assignment model needs to take into account the practical challenges that are unique to South Africa. The model should be affordable. For example, in City of Cape Town, with over 40 specialist personnel, just taking over the contracting and regulatory functions alone will require an estimated additional 7% on the current transport operating budget, excluding initial setup costs (Transport for Cape Town, 2013). Practical considerations, as described in Table 86, suggest that in the short term, many municipalities may not have the resources (both human and financial) required to effectively take over transport functions. SALGA, without quantifying the problem, has described local government as generally having a poor skills base and lacking training and career paths for personnel. Local government also tends to underinvest in personnel, particularly where technical, management and leadership skills are required.

A differentiated approach is needed because municipalities have very different levels of challenges, as highlighted in a report on the state of local government (DCoG, 2009). The Commission has proposed that municipalities be classified as metropolitan municipalities, secondary cities, large towns, smaller towns and rural municipalities (FFC, 2011). Metropolitan municipalities were ranked as having a local rates and tax revenue generation capacity of 1.00, followed by secondary cities, large towns, smaller towns and rural municipalities with self-generated revenue capacities of 0.59, 0.46, 0.30 and 0.04 respectively.

In the light of the above, a dual approach to assigning transport functions should be adopted, through a combination of:

- (i) The direct assignment of functions to municipalities, municipal partnerships or municipal entities (in terms of Section 76a of the Municipal Systems Act), provided they demonstrate the necessary ability and capacity.
- (ii) The formation of a national entity for coordinating passenger transport service delivery to assist municipalities that are unable to deliver adequately on the functions. This is justifiable in terms of Section 76b of the Municipal Systems Act.

The Municipal Service Partnerships (MSPs) promoted in the White Paper (DCoG, 2004) are similar to the conceptual framework of a national entity for coordinated passenger transport service. MSPs aim to improve municipal service delivery through partnership arrangements between municipalities and public institutions, the private sector, non-governmental organisations or community-based organisations. One example is the Municipal Infrastructure Support Agency (MISA), which was established to provide technical advice and support, including capacity building, to municipalities in order to optimise municipal infrastructure provision and maintenance (DCoG, 2013).

The proposed national entity will pool resources required to design, implement and manage passenger transport network systems in selected municipalities. In due course, once they have sufficient resources, the municipalities can take over all the network management functions, including contracting and regulation. The entity can also act as an incubator for the selected municipalities to enable them to take on additional transport functions. The White Paper on National Transport Policy (DoT, 1996) recommended agencies for roads, aviation safety and the maritime safety be established, to "allow for more professional focused service provision" (DoT, 1996). The proposed national entity will need to be guided strictly by the municipal ITPs, which form an integral part of their integrated development plans (IDPs). IDPs are key instruments for managing municipalities (including the allocation of resources) in terms of the Municipal Finance Management Act (No. 56 of 2003) (MFMA) and the MSA. Transport developments by other state entities, for example PRASA and Transnet, must be an integral part of ITPs. Therefore, the proposed entity will need to ensure that municipalities have proper ITPs and to perform these primary functions:

- Facilitation of the preparation of municipal ITPs.
- Technical review of the ITPs.
- Technical oversight for the implementation of the ITPs.
- Public transport network design, control and management.
- Public transport contracting.
- Public transport regulation.
- Management of transport asset management systems, such as public transport facilities, roads, and bridges.
- Transport system monitoring and evaluation.

The above functions require a multidisciplinary team that includes transport planners, public transport service designers, transport and contract law experts, project managers, transport economists and mathematical statisticians.

Furthermore, the proposed entity should be based on a model that ensures that:

- The entity is an autonomous public entity established in terms of national legislation. Autonomy is particularly important for entities adjudicating public transport contracts and operating licences.
- Municipalities retain executive power over their respective jurisdictions, including the decision to either adopt or reject the recommendations from the proposed entity.
- The entity has both executive and technical arms. The executive arm is responsible for ensuring that the entity fulfils its strategic mandate sustainably, while the technical arm is solely responsible for ensuring effective and efficient transport service delivery.
- The entity is able to recruit personnel and to procure specialist professional services.
- The entity prepares a budget whose costs are covered by appropriation from the national fiscus. As beneficiaries of the entity's services, municipalities should contribute equitably to the entity's funding. The entity needs to be completely funded so that it can focus on its service delivery mandate. This is justifiable because the cost of poor transport service delivery is likely to be far higher than the entity's funding requirements.
- The entity is accountable to an appropriate national government department.
- Risks associated with the implementation of the proposed entity, together with possible mitigation actions, are summarised below:
 - The ITPs, from which the entity derives its operational mandate, are not properly formulated and do not address the needs of the respective municipalities in a sustainable manner. To mitigate this risk, the entity must be resourced with appropriately qualified and experienced personnel.
 - Municipalities implement plans that are contrary to the entity's recommendations, resulting in the entity becoming effectively redundant. This risk will be minimised by developing trusting relationships between the municipalities and the entity and by forming a tripartite relationship involving the municipality, the entity and the communities being served by the municipality in order to ensure accountability.

- Municipalities develop a permanent dependency on the entity and neglect to strengthen their own capabilities. To mitigate this risk, an approved plan must be developed, with clearly defined timelines, on how the municipality will be assisted to take over the functions.
- Conflicts with other state organs such as PRASA and Transnet. This risk should be minimised by ensuring that all state entities are guided by municipal ITPs, which are an integral part of their strategic and operational plans.

Table 88 summarises the key advantages and disadvantages of the three proposed models.

Table 88: Summary of key advantages and disadvantages of transport function execution

Option	Advantages	Disadvantages
Institutional coordination	<ul style="list-style-type: none"> • Low setup costs. • Improved communication among role-players. 	<ul style="list-style-type: none"> • Weak joint decision-making ability. • Low accountability.
Service level agreements	<ul style="list-style-type: none"> • Expectations among role-players transparently communicated. 	<ul style="list-style-type: none"> • May lead to legal disputes when targets are not met.
Authority control with direct assignment of functions to a municipality.	<ul style="list-style-type: none"> • Focused service delivery interventions. • Increased economies of scale at a municipal level. 	<ul style="list-style-type: none"> • Requires significant increase in resources per municipality. With the relatively large number of municipalities in South Africa this becomes unaffordable in the short term.
Assignment to national entity	<ul style="list-style-type: none"> • Improved transport service delivery in poorly resourced municipalities. • Focused service delivery interventions. • Increased economies of scale at a national level. 	<ul style="list-style-type: none"> • Requires trusting relationships between the entity and the municipalities.

8.3.4 Implementation action plan

The implementation plan requires the following:

- Stakeholder mapping and consultation.
- Institutional relationships and the roles of the institutions required to implement the recommendations.
- Legal requirements.
- Resource requirements.
- Transition management.
- Implementation time-frames.
- Cost implications for different stakeholders.

Stakeholder mapping and consultation

The key stakeholders that will be required to be consulted are:

- National Treasury: to agree to fiscal implication of assignment of functions.
- Department of Public Service and Administration: to address any shift in human resources that may be required.
- Department of Cooperative Government and Traditional Affairs: to ensure that intergovernmental relations requirements are addressed.

- Department of Transport: to ensure that it is in the best interests of transport service delivery.
- Organised local government: to ensure that the interests of the municipalities are taken into account.
- Organised labour: to ensure that the interests of affected workers are taken into account and that labour law requirements and agreements are honoured.
- The Financial and Fiscal Commission: to ensure that financial and fiscal disciplinary principles are adhered to.

Legal requirements

Given the diversity of organisational needs and structure, every assignment process will be different. However, each municipal business plan must comply with the constitutional legislative requirements and domain-specific legislation, such as the NLTA, the MSA and the MFMA. The proposed national entity must be established as a legal entity, which will require legislation to be passed, and assigned necessary administrative, governance and operational powers to support the execution of its functions.

Resource requirements

Capital and operational budgets will be required, and the initial costs could be particularly high because of the need to procure equipment and attract skilled human resources.

Transition management

The implementation of assignment of transport functions should take place strictly in terms of a business plan prepared by the receiving municipality or the national entity.

Implementation time-frames

Assignment of functions should be phased in accordance with the business plan submitted by the municipality or national entity.

Cost implications for different stakeholders

For direct assignment to municipalities, the receiving municipality is likely to have increased capital and operational costs, but the actual cost implications will depend on the size of the municipality and the complexity of its transport network. Personnel from the assigning party, which was previously responsible for the functions, may need to be redeployed or transferred to the municipality. The equitable share would also need to be appropriately adjusted, to reflect the change in budget requirements for both the receiving and assigning parties. In the case of the national entity, the entity should be completely funded through the national fiscus, with additional revenue from the municipalities that receive support. The entity should be established only if its establishment and operating costs are far less than the collective costs of poor transport service delivery.

8.4 Conclusion

The assignment of transport functions to the lowest competent level of government is a South African transport policy mandate. Transport is of particular interest because inefficient transport service delivery has a significantly negative effect on social exclusion and the economy. However, current transport service delivery is fragmented, and the impetus required to make the necessary changes is lacking.

While the assignment of necessary transport functions is supported, South Africa faces practical challenges arising from constraints such as technical skills in municipalities and affordability.

A dual transport function assignment model is proposed for South Africa. The model consists of: (i) direct assignment to municipalities, municipal partnerships or municipal entities, provided they have prepared business plans and demonstrate the necessary capacity to carry out additional transport functions, and (ii) the formation of a national entity to coordinate passenger transport service delivery to assist municipalities that are unable to resource additional transport functions. This entity will also have the capability to be an incubator for delivering technical capacity within member municipalities. The implementation action plan that is proposed includes stakeholder mapping and consultation, legal requirements and resource requirements.

8.5 Recommendations

Recommendation 1: Authority network control is fundamental to effective transport service delivery. Although municipalities are empowered to have control over their network, this is not happening in practice.

The Commission recommends that all the municipal ITPs clearly indicate how the municipalities intend to exercise control over the network, including the required resources. This should be one of the minimum requirements for the preparing and gazetting of integrated transport plans.

Recommendation 2: Transport service delivery is a highly technical endeavour that requires specialised skills and resources. The lack of such skills in municipalities, whose mandate is to implement transport policy, is a critical constraint that slows down service delivery.

The Commission recommends that minimum organisational designs are formulated to enable municipalities to manage modern transport systems. This is one of the critical interventions to unlock service delivery constraints. Findings from this investigation should be used to inform the process.

Recommendation 3: ITPs are the primary tool for transport service delivery. Indications are that these plans are formulated more for legislative compliance rather than as service delivery tools. In many municipalities, including metropolitan municipalities, ITPs are either outdated or non-existent.

The Commission recommends a comprehensive review of the quality of municipal ITPs, with a view to identifying gaps that need to be addressed.

8.6 References

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Annexure 8.A: FFC Checklist for the Assigning of Functions

FFC Function Shift Checklist
Does the proposed shift of the function respect, promote and fulfil the provisions of the Constitution that apply to delegation and assignment?
Does the contemplated shift fit in with a general framework of an established government policy?
Is the decision to assign or delegate a function based on what is appropriate for the Republic as a whole, rather than on what is appropriate for a particular sphere of government or organ of state?
Does the assigning or delegating department or organ of state accept responsibility for constantly monitoring or reviewing the function assigned or delegated?
Has an agreement been reached between the parties to assign or delegate a function by consensus and not forced on either party?
Have the benefits for government as a whole in the Republic been thoroughly explored and understood?
Is it explicit that the authority role will be transferred in full when a function is shifted by assignment between spheres of government or other organs of state?
Is there evidence that the function is being shifted as a whole and that it will not be split between spheres of government?
Promotes equitable, efficient, affordable, economical and sustainable access to basic services by all customers.
Serves to place responsibility of providing services as close as possible to the communities the services are meant to serve (subsidiarity).
Minimises costs of services to consumers and customers.
Achieves economies of scale in the delivery of services.
Minimises jurisdictional spill overs.
Benefits the greatest number of residents.
Causes the least disrupting effect on the delivery of services.
Promotes a safe and healthy environment.
Promotes efficient, effective, accountable public administration.
Promotes cooperative government.
Addresses the historical inequalities in society.
A precise description of the provider role to be performed by the recipient authority is available and specifies: service levels; performance indicators; risks transferred to the recipient authority; remuneration to which the recipient authority is entitled.
Has agreement been reached between the parties?
Has compliance with financial conditions been ensured?
Has compliance with labour requirements been ensured?
Has compliance with legislative requirements been ensured?
Has the Financial and Fiscal Commission been requested to assess the financial and fiscal implications of the legislation?
Has the policy of the department been formulated?
Has the policy been captured in the statutes?
Has the function to be shifted been adequately defined so as to eliminate all ambiguity and to attribute authority and responsibility for that specific function?
Is the definition comprehensive and included in the appropriate memorandum of understanding, delegation or the assigning legislation or proclamation?

FFC Function Shift Checklist

Does the Department understand that when the function is shifted the resources employed to render the function must be shifted with the function?

Has the Minister of Finance directed other than that the transfer of functions must also include the transfer of funds available to the transferring sphere of government for the purpose of performing such transferred function or obligation?

Have the equitable share allocations in terms of the DORA been recalculated?

Has a revision of the formula used for integrated capital grants (such as the provincial and municipal infrastructure grants) been recalculated?

Has the process for the reallocation of any revenue raising powers associated with the function been documented?

Has a conditional grant, rather than adjustment of the equitable share been proposed as an alternative route for the funding of the function through a transitional period?

Has the process and timing of the shift of the equitable share allocations for the financing (assigned, but not delegated or deconcentrated functions) to be transferred to the province, municipality or municipalities responsible for the function before the assignment is implemented, been understood and is it realistic?

Has any "future financial commitment" (as contemplated in Section 66 of the PFMA) been authorised by clearly defined authorities?

Has a plan been documented for settling all contractual obligations and paying all money owing, including intergovernmental claims, within the prescribed or agreed period and before transferring any funds to the entity?

Has there been an assessment of the risks associated with the proposed function shift?

Has the assigning authority established a monitoring function that must assist in identifying and developing the ability of the new authority to fulfil its mandate following the function shift?

Annexure 8.B: Provincial Transport Function Organograms

Figure 71: Eastern Cape

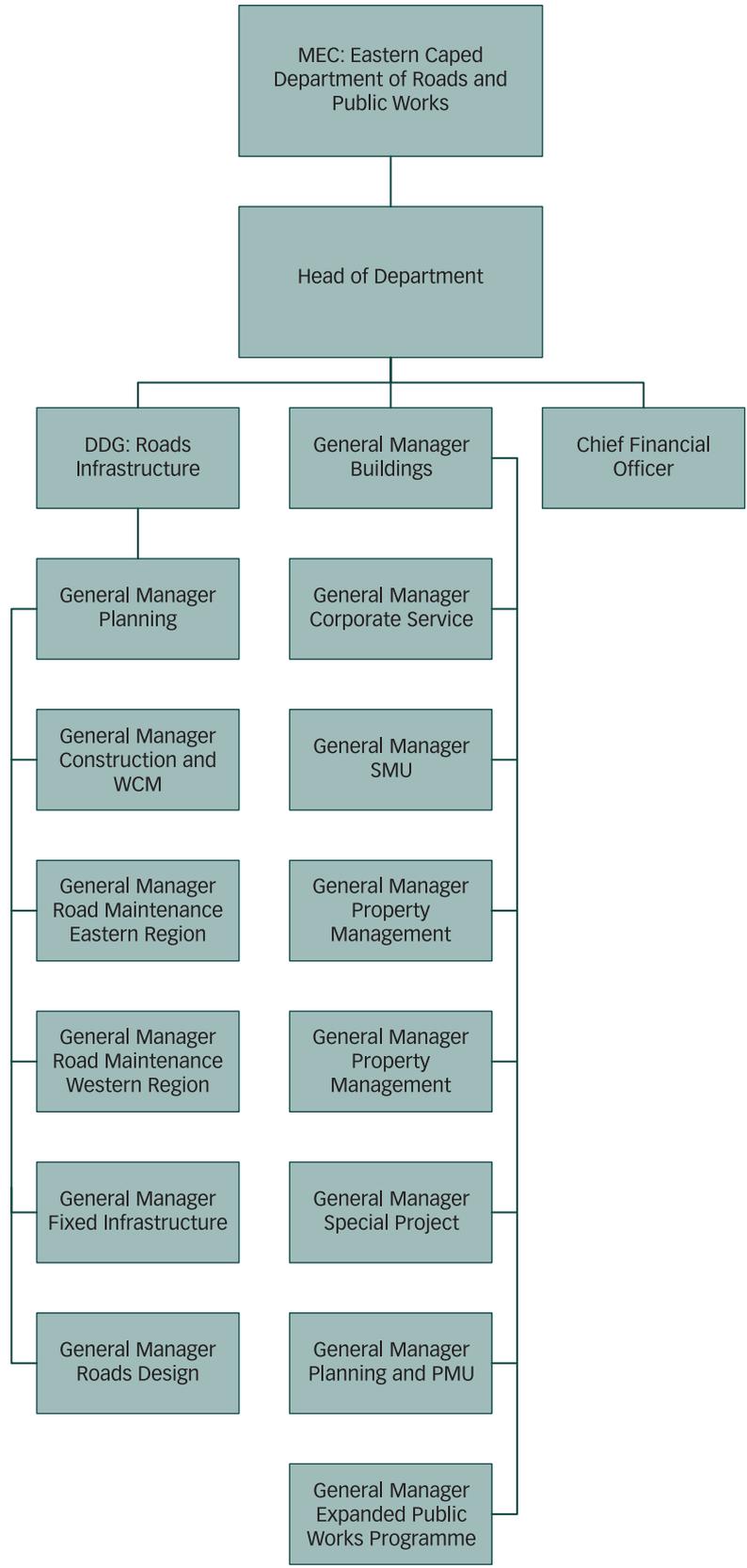


Figure 72: Free State

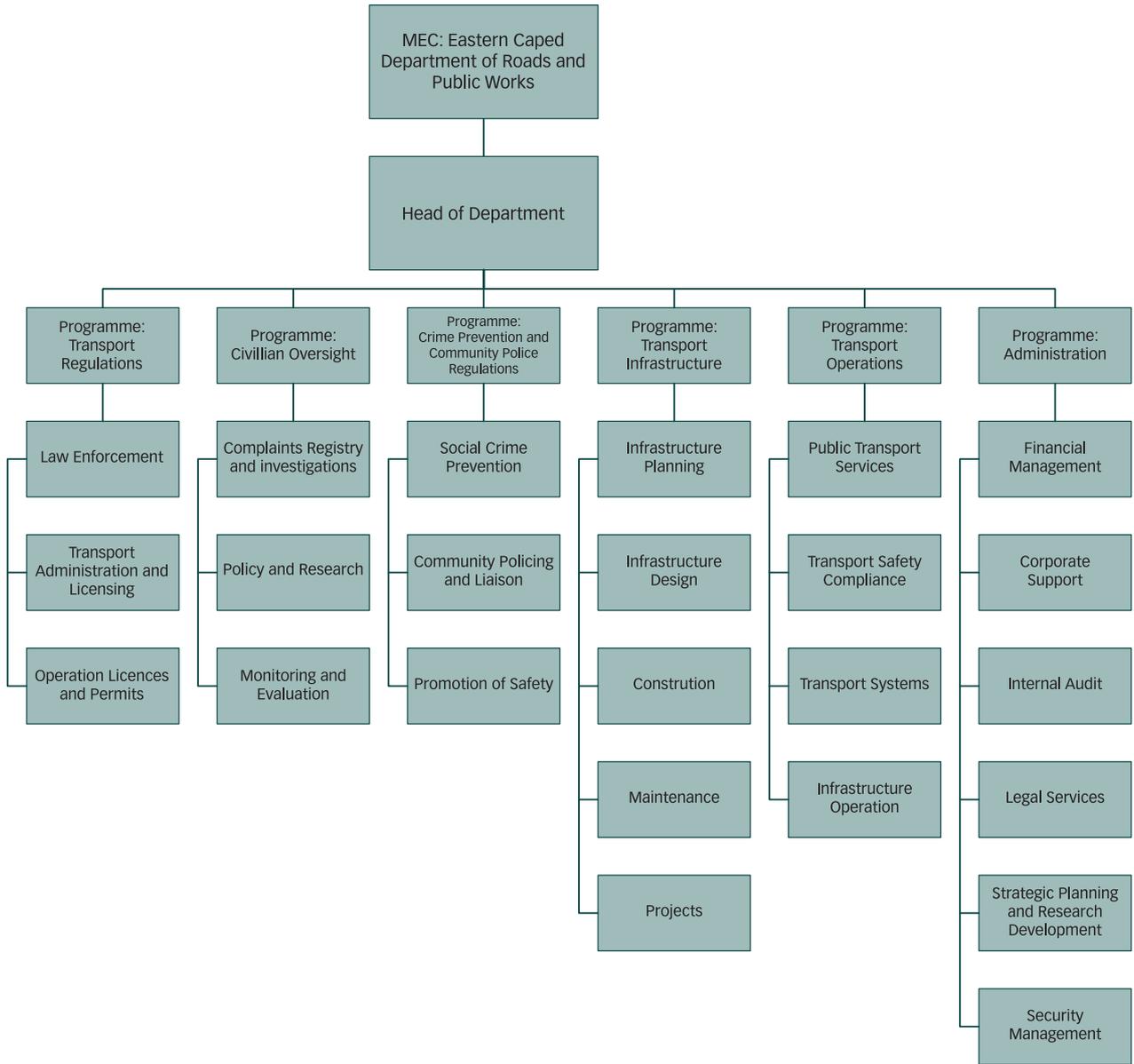


Figure 73: Gauteng

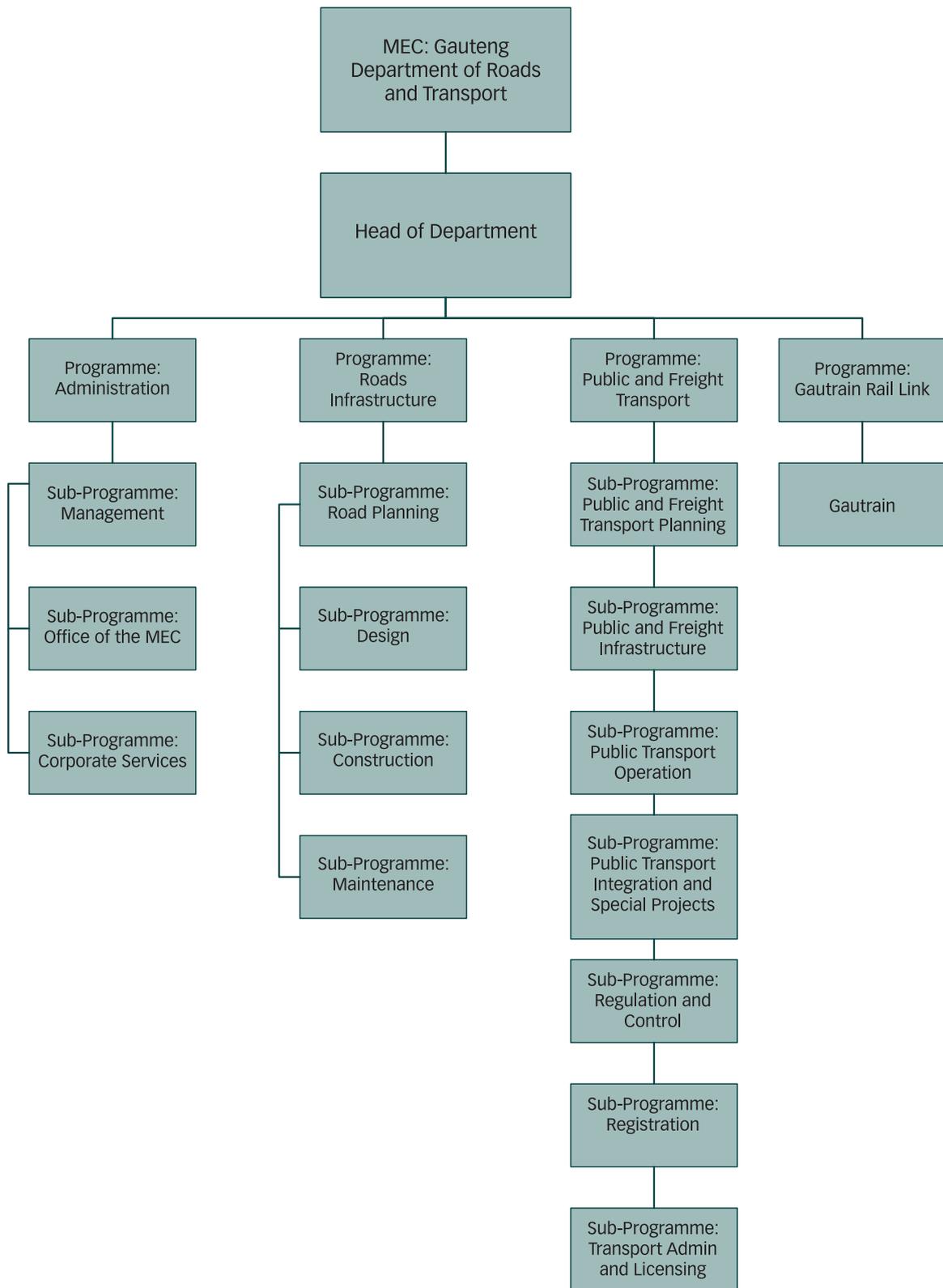


Figure 74: KwaZulu-Natal

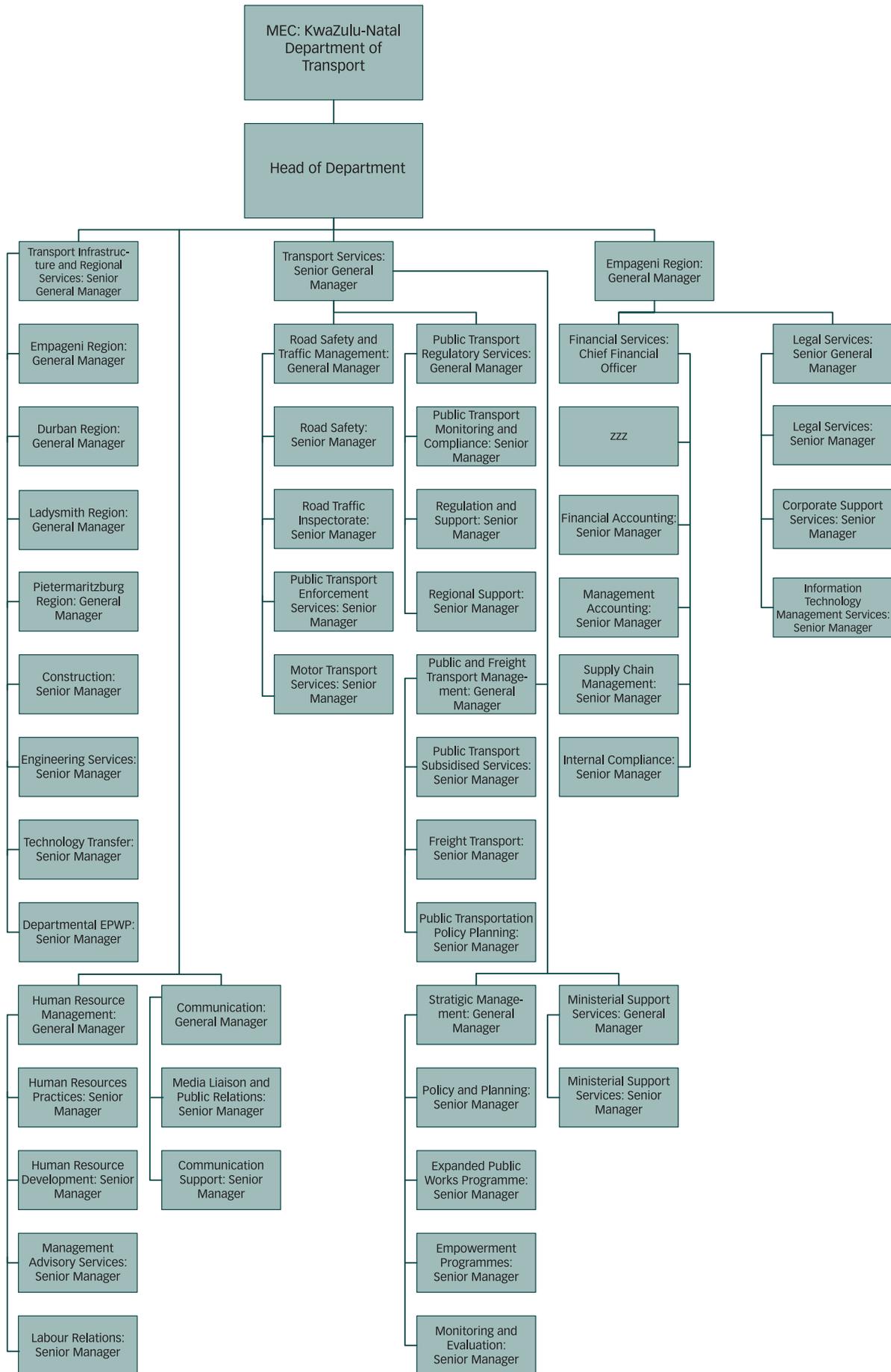


Figure 75: Limpopo

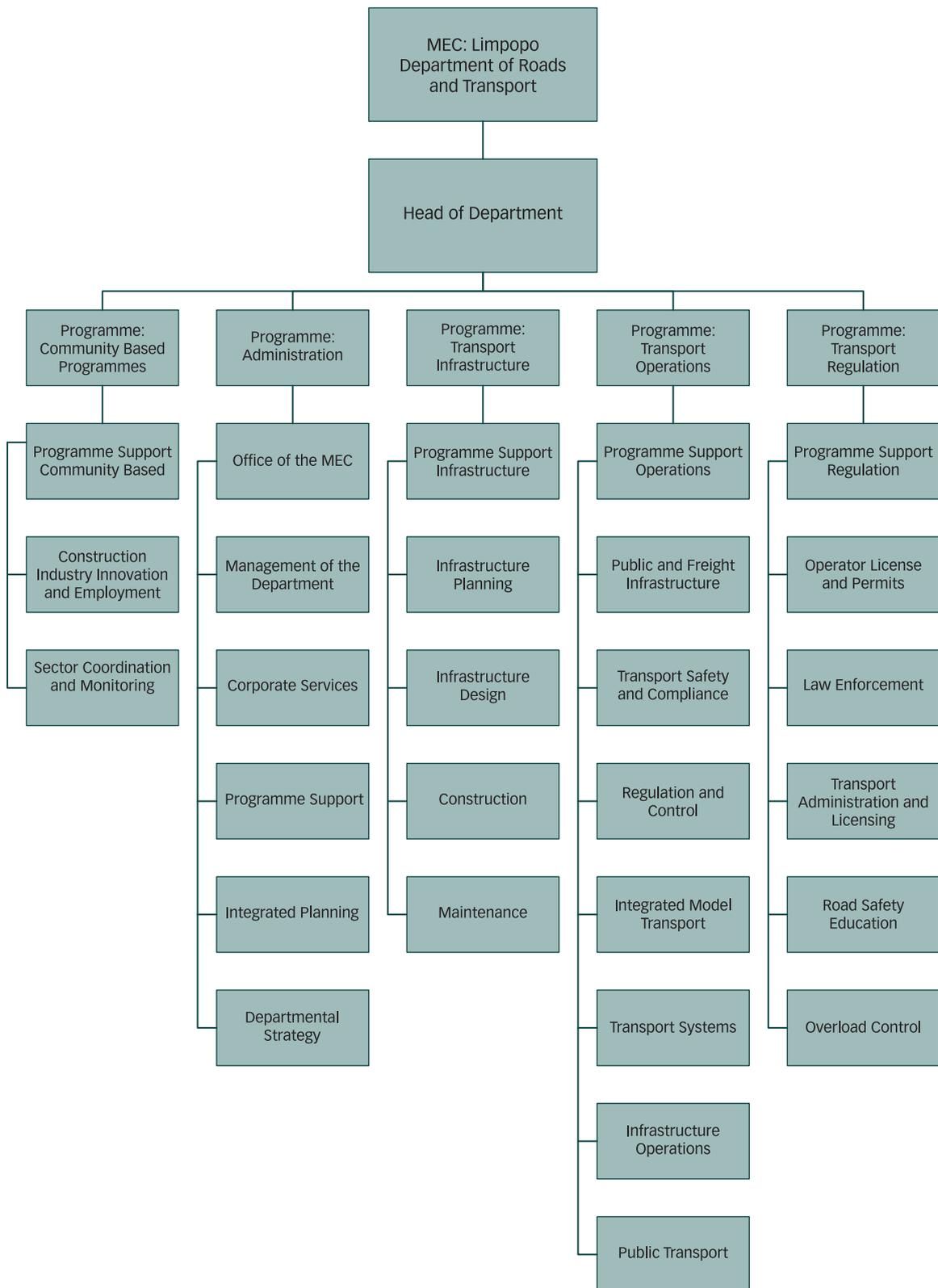


Figure 76: Mpumalanga

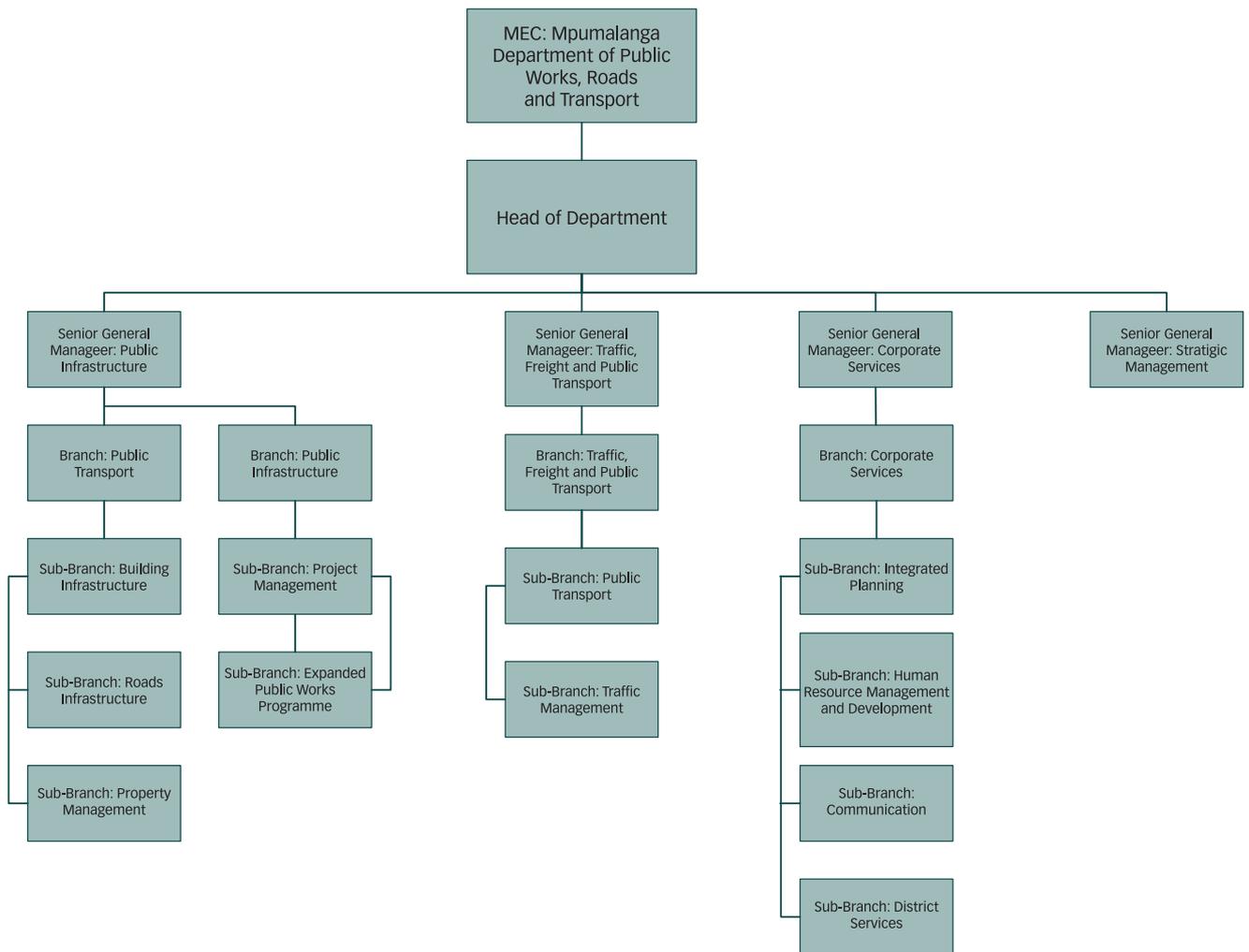


Figure 77: North West

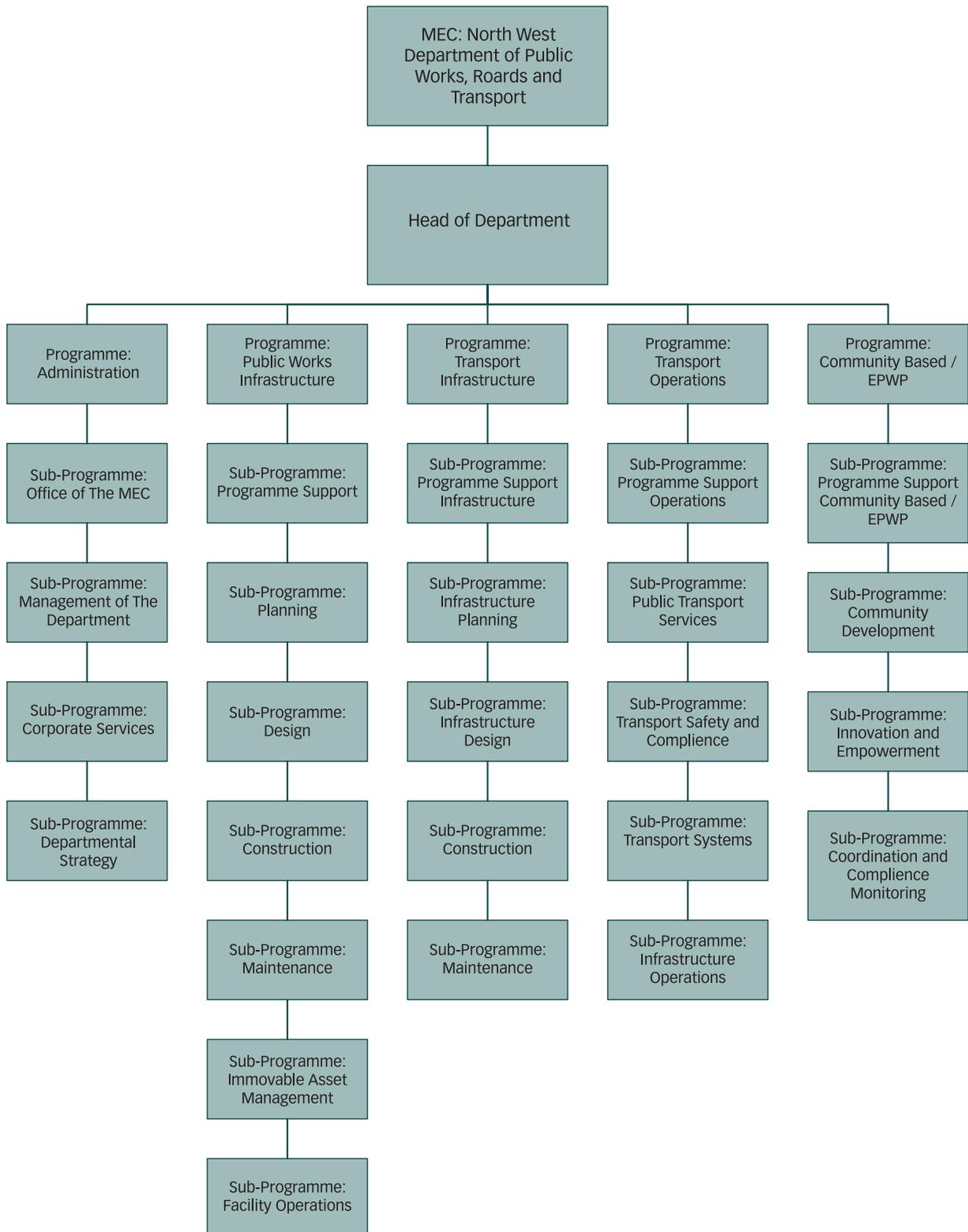


Figure 78: Northern Cape

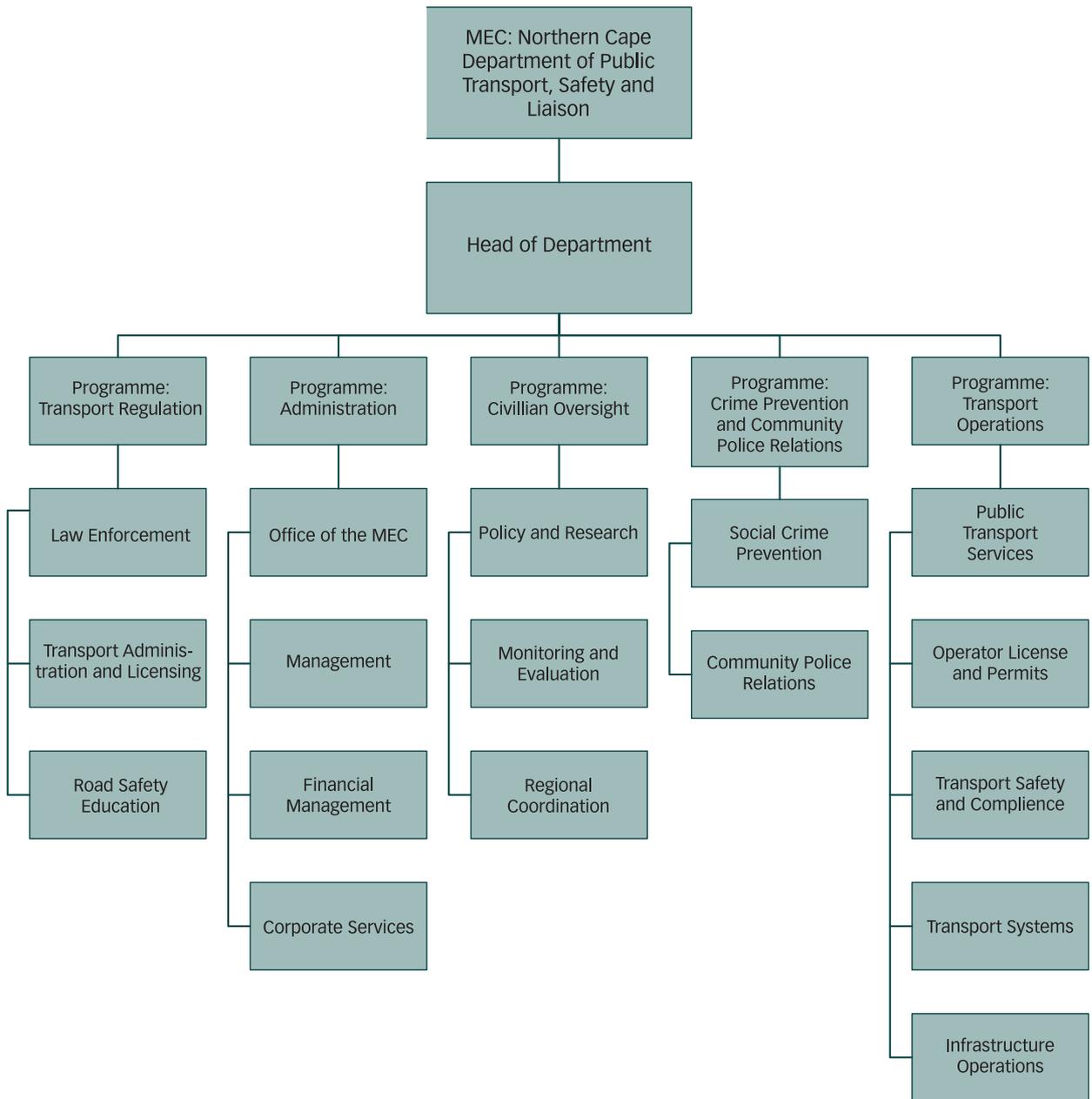
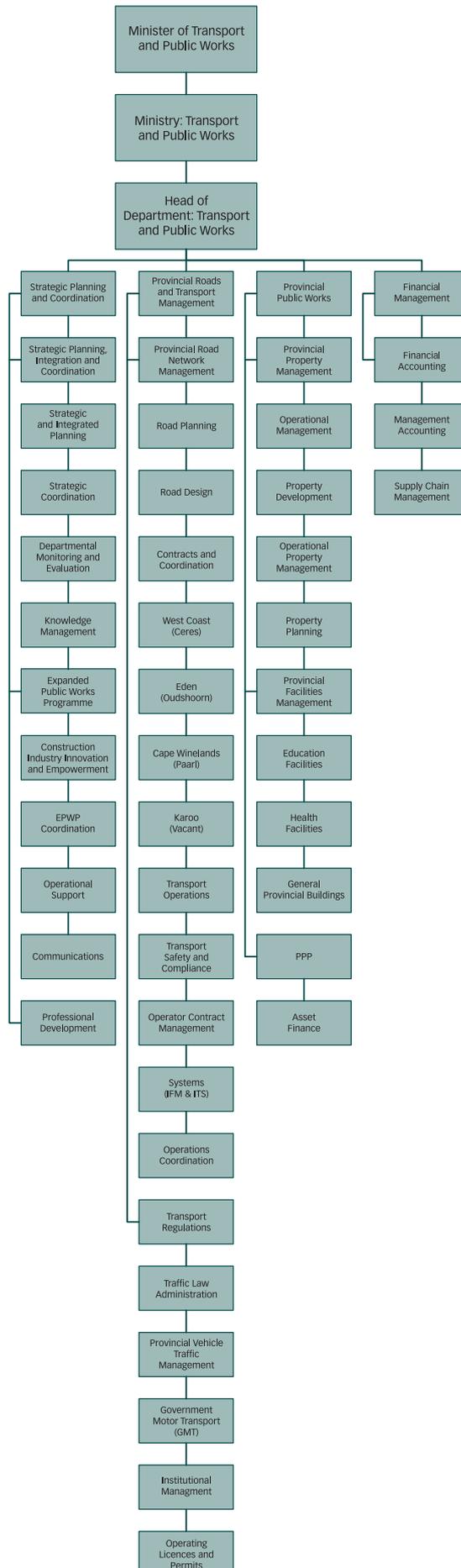


Figure 79: Western Cape



Identifying The Funding Constraints In Municipal Capital Investments

By: Jugal Mahabir and Ntombizodwa Mabena

9.1 Introduction

9.1.1 Background

Municipalities in South Africa are constitutionally mandated to provide basic services to communities in the form of electricity, refuse removal, water and sanitation. In addition, the Constitution of the Republic of South Africa (RSA, 1996) promotes a developmental role for local government. This takes the form of investments in local social and economic infrastructure, which are necessary for both extending services to previously disenfranchised and poor communities, and supporting economic growth.

Central to delivering services and promoting local economic growth is municipal capital expenditure or infrastructure investment in the local economy. Since 1998, local government capital expenditure in South Africa has largely been geared towards eradicating service delivery backlogs, which are a legacy of apartheid separate development policies. Great strides have been made in eradicating service delivery backlogs: by 2011, over 85% of households in the country had access to water and electricity. Furthermore, urban municipalities in particular continue to play an important role in South Africa's economic growth, by investing in supporting infrastructure that is necessary for enhancing private sector investment.

The urban built environment continues to be the hub of economic growth and development in the country. Thus, local government's role in the economic and social wellbeing of communities (and the country at large) is crucial, particularly through municipal capital expenditure and investments in local communities. To meet their devolved social and economic expenditure mandates and obligations, municipalities are empowered with various revenue instruments. Specifically, municipalities fund their capital expenditure through a combination of local tax revenues and credit instruments. Own tax revenues that fund capital expenditure are usually municipal operating budget surpluses that derive from property taxes, user charges and other local taxes. In support of own revenue contributions, local government can also leverage credit financing to support its short- to long-term infrastructure planning.

As with any decentralised expenditure and revenues, fiscal gaps are likely to result when the expenditure need/demand from local communities outweighs the revenues generated from local taxes and borrowing. In this sense, intergovernmental transfers play an important role in bridging the vertical financing gap, mainly taking the form of infrastructure conditional grants to local government. In addition to their fiscal gap-filling role, infrastructure grants to municipalities support national government's priority of eradicating service delivery backlogs and supporting local economic development – hence the 'conditional' nature of such transfers.

9.1.2 Problem Statement

Although great strides have been made in eradicating service delivery backlogs in the country, many households continue to find themselves with limited or no access to services, in particular sanitation and refuse removal services. In addition, the economic needs of cities and the country at large continue to place considerable – and escalating – demand for supporting infrastructure and services on local government institutions.

In 2011, the Financial and Fiscal Commission (the Commission) undertook a comprehensive review of the local government fiscal framework (LGFF) in an attempt to quantify possible funding constraints in local government (FFC, 2013). One of the primary findings of the review was the existence of a vertical funding gap in supporting municipal capital expenditure. The research found that the current quantum of infrastructure grants to local government does not cover the difference between the current capital expenditure needs of local government and own revenue sources. Therefore, the review found, the combination of own revenue contributions, municipal borrowing and grants is insufficient to fund local government infrastructure needs.

Given the increasing demand for local infrastructure investments and continued pressure on municipal revenue instruments that support capital expenditure, this vertical gap is likely to widen progressively. The 2008 global financial crisis had a dampening effect on the wider South African economy and this effect has filtered down to the sub-national level, being felt in the regional and local economies, with municipal own revenue sources for capital expenditure being negatively affected.

With the national government adopting a stimulatory fiscal policy stance to counter the effects of the 2008 global economic downturn, increasing debt-financed government expenditure and/or the debt status of the sovereign state also affect the ability of sub-national governments to borrow funds. The recent downgrading of the South African government's credit rating has resulted in the concomitant downgrading of the credit rating of several of the country's metropolitan municipalities. These factors increase the cost to local government of borrowing, thus hampering one of its revenue instruments for funding capital expenditures.

Given local government's responsibility for fulfilling infrastructure needs, the vertical fiscal gap is of concern because the possible underfunding of municipal capital expenditure poses a risk, not only to the social and economic wellbeing of local economies, but also to the macro-economy.

9.1.3 Research Question and Objectives of the Study

This chapter scrutinises the Commission's finding of a vertical fiscal gap in municipal capital expenditure (FFC, 2013) by undertaking a comprehensive review and analysis of each of the own revenue instruments that support municipal infrastructure investments. The primary aim of this chapter is to ascertain whether each of the local government capital funding sources is indeed currently constrained and, if so, what factors contribute to such pressures. The chapter looks specifically at constraining factors on local government own revenue sources and borrowing decisions, which are the primary municipal own revenue instruments for capital expenditure.

The specific objectives of this research are to:

- Identify the factors that affect own revenue contribution to municipal capital financing.
- Provide a critical assessment of the current state of the municipal credit market in South Africa.
- Critically analyse other funding instruments currently available for financing local government infrastructure.
- Recommend remedial measures to ensure that the capital expenditure needs of local communities continue to be met. Such recommendations can include identifying funding streams to supplement existing revenue streams.

Although, as already mentioned, grants play an important role in the financing of municipal capital expenditure in South Africa, this chapter focuses on reviewing and analysing municipal own revenue instruments. The primary aim is to assess the structural or exogenous constraints on municipal capital financing instruments. However, it is important to emphasise that municipalities continue to spend poorly on their capital budgets. This further exacerbates the potentially growing fiscal gap in capital budgets and compromises new and existing infrastructure investments. As a secondary focus, this chapter touches briefly on performance issues in local government capital spending.

9.1.4 Link to Research Theme, Division of Revenue and the NDP

The proposed theme for the Commission's Submission for the Division of Revenue 2015/16 is: "Balancing fiscal sustainability with socio-economic impact". Currently, there is very little room for fiscal manoeuvring at a macroeconomic level due to prevailing economic circumstances. Given the debt-financed expansionary fiscal policy adopted by government in the face of the 2008/09 global recession, fiscal policy needs to be consolidated, while ensuring that social and economic investments continue to protect the poor and grow the economy respectively. Municipal capital investments are important in stimulating the local economy and rolling out services to poor communities, and constraints on the funding of municipal capital expenditure will obviously limit such positive socio-economic impacts. At the same time, national financial resources in the form of grant funding are constrained. Thus existing funding mechanisms must be used efficiently and local revenue sources extended, to ensure appropriate funding of municipal capital expenditure.

In 2012, government adopted the National Development Plan (NDP) as the country's vision for long-term social development and economic growth (NPC, 2012). It is important that all short- to medium-term development policies are aligned with the longer-term initiatives of the NDP. Public investment in the national economy and in local economies is important in sustaining longer-term economic growth. As mentioned, municipalities play a key role in stimulating local economies through their capital expenditure. By the same token, a lack of municipal investment in new and existing infrastructure can hamper economic growth and compromise longer-term economic development. The current study assesses this important component of longer-term economic growth as aligned with the goals of the NDP.

9.2 Theoretical Framework

9.2.1 Defining Municipal Capital Expenditure

Investment in infrastructure is an important process but is complicated by its multifaceted and interrelated stages. These include the initial planning and budgeting, managing the construction process and operating and maintaining the actual capital asset. Fiscal decentralisation⁶⁷ has resulted in a greater role for local government in the delivery of infrastructure in many economies, including South Africa. Infrastructure investment by sub-national – in this case, local – governments manifest through capital expenditure, which Faas et al. (1982) define as expenditure made to purchase, construct or replace a fixed asset that is a non-recurring project or facility expected to provide services for more than a year. Examples include land, buildings, street lights and utility systems. Generally, the major capital financing instruments available to local governments for capital expenditure are: (i) municipal taxes and tariffs; (ii) intergovernmental fiscal transfers; and (iii) municipal borrowing. The use of these instruments by local governments varies across countries and is largely driven by the decentralisation policies of the particular country.

9.2.2 Municipal Taxes and Tariffs

As pointed out, fiscal decentralisation results in expenditure mandates being devolved to sub-national governments. To fund such mandates, a range of revenue powers is also devolved to local government, including local taxes, user charges or service fees and other local fees and licences. In general, these devolved revenue powers are informed by the nature of the expenditure devolved; in other words, the revenue powers need to be sufficiently flexible to allow for any changes in the expenditure mandates of local government.

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⁶⁷ Fiscal decentralisation means the devolution of fiscal powers and responsibilities from central (national) to sub-national levels of government (Tanzi, 1995).

Gramlich (1990) identifies three different forms of local capital investment: (i) local investments that have no externalities i.e. no spill-over effects into adjacent municipal jurisdictions; (ii) local investments with externalities; and (iii) local investments with distributional effects. The type of revenue instruments devolved to a local government is informed by the nature of these different forms of local capital investments. According to Gramlich (1990) user charges are the best financing mechanism for capital investments that satisfy local needs within a specific jurisdiction and have no externalities. In such cases, local residents that consume the local infrastructure are directly charged for using the good or service.

A user charge (or a tariff) on the use of a good or service, as a revenue instrument, supports the funding of both operating and capital expenditure. Tariffs are designed to ensure that the operating costs of the service delivered are recovered and that the service itself is sustainably delivered (ensuring financial viability of the entity in question), as well as to promote income redistribution and the efficient allocation of resources (Laredo, 1991). It is unlikely that all of these objectives will be met, and trade-offs between the different aims will be necessary. Laredo (1991) highlights that a tariff should recover operating and maintenance costs (including labour), purchases of materials and repairs, capital costs, metering and connection costs and make a return on investment or profit margin.

Among the various components of the user charge, the recovery of capital costs and the return on the investment are important in funding capital expenditure. The capital-cost component of user charges accounts for the cost of using the asset i.e. the depreciation costs over the lifespan of the asset. Expenditure on replacing and refurbishing existing infrastructure constitutes capital investment; as such expenditure affects the value of the asset or its lifespan.

The return on investment portion of the user charge effectively constitutes a profit: “a higher return on an investment than is necessary for capital-cost requirements so as to create a surplus” (Laredo, 1991: 9). This surplus is reinvested in the sector in the form of future infrastructure needs. Thus, portions of the user charge, particularly this operating surplus, can be an important source of revenues for municipal capital expenditure.

Clearly, user charges are an important revenue instrument in funding local government capital investments. The design of such charges tends to ensure the refurbishment of existing capital infrastructure and extra funds for reinvestment in the sector. Whereas surpluses from tariffs are reinvested in the sector, general tax revenues, such as property taxes and other local taxes, also play an important role in funding municipal capital expenditure. General tax revenues generate fungible money that would contribute to the general revenue funds of municipalities. Such general revenues could be used for many possible purposes, including local infrastructure investments. This would pertain particularly to general, non-revenue-generating public infrastructure, such as public parks, where no user fee is charged.

9.2.3 Intergovernmental Fiscal Transfers

The nature of fiscal decentralisation results in fiscal gaps whereby the revenue powers, as described above, are not sufficient to meet the expenditure needs of local government. Such gaps can be vertical – i.e. the local government sphere does not have enough revenue instruments to fund its expenditure needs; or horizontal – whereby individual municipalities cannot meet their expenditure mandates with existing revenue instruments. The existence of these fiscal gaps provides one of the primary rationales for intergovernmental fiscal transfers or grants from other spheres of government to local government.

Intergovernmental fiscal transfers are meant to bridge the existence of vertical imbalances (gaps) in the assignment of expenditures and revenues (Dirie, 2006). Such gaps can be attributed to: limited municipal funds; insufficient municipal powers to determine and manage expenditure and revenue assignments; weak revenue bases; non-stable and/or non-transparent revenue sources, including central government transfers; municipalities’ failure to fully exploit their revenue-generation potential; and a lack of incentives to generate own revenue (ibid.). Importantly, as Dirie (2006) points out, such fiscal gaps can widen, putting increasing financial strain on local governments in meeting their capital expenditure needs.

Of the three types of local capital investments identified by Gramlich (1990), local investments with substantial externalities (i.e. substantial spill-over effects into adjacent municipal jurisdictions) should be financed by intergovernmental fiscal transfers. This is because it is difficult to design user charges that capture the use of a municipality's infrastructure by residents of other municipalities. While this may be an option for certain types of infrastructure, such as roads (where toll fees capture the use of the infrastructure by non-residents), it is not a viable option for other forms of infrastructure. In fact, another aim of grants is to minimise externalities that might arise from one municipality's spending decisions (Shah, 2007). In cases where local capital investments are likely to have spill-over effects on neighbouring local jurisdictions, local governments may not want to bear the full cost of such infrastructure, as the overall benefit will be shared. Conditional grants can ensure that funds are geared towards such investments and compensate the municipality for any possible externality that may arise from the investment (Shah, 2007).

There are generally two forms of intergovernmental transfer: general purpose (i.e. unconditional) and specific purpose (i.e. conditional). Although unconditional and conditional grants can be used for funding both operating and capital expenditure, in most cases capital expenditure is funded through conditional grants. In other words, the grant is made available to local government for the specific purpose of funding infrastructure.

Specific-purpose grants can have input-based conditionality, whereby the grantor can specify exactly what the grant funds should be spent on, or output-based conditionality, where the grantee needs to meet certain requirements in order to receive these funds. According to Shah (2007: 4): "Input-based conditionality is often intrusive and unproductive, whereas output-based conditionality can advance grantors' objectives while preserving local autonomy."

9.2.4 Municipal Borrowing

In addition to the municipal revenue instruments described above, local governments can borrow money for capital investments. Credit instruments play a valuable role in infrastructure financing, particularly if such funds are invested in revenue-generating infrastructure. In such cases, the asset itself will pay off the initial funds borrowed, as per the tariff arrangement discussed in Section 2.2. Municipal access to credit is thus an important revenue source for municipal capital investments.

Like any market, a municipal credit market is largely driven by supply- and demand-side factors (National Treasury, 2012a). Supply-side factors include investment returns, credit ratings and advanced capital markets for lenders, while demand-side factors include municipal capital budgets and municipal creditworthiness. In facilitating an effective and efficient municipal credit market, these factors play a vital role, as they induce activity within the market. Box 1 discusses these factors in relation to their influence on the municipal credit markets.

Box 1: Supply- and demand-side factors affecting a municipal credit market

Supply-side factors (lenders)

Investment return: reflects the risk associated with lending to municipal borrowers and is dependent on factors such as municipal credit ratings, interest rates and macroeconomic conditions.

Credit rating: is defined as an external assessment of a municipality's ability to comply with generally accepted risk standards. It affects a municipality's cost of borrowing.

Advanced capital markets: are characterised by flexibility, transparency and robustness, which ensure market effectiveness e.g. through correctly pricing municipal borrowing and establishing suitable loan maturity terms.

Demand-side factors (borrowers)

Municipal capital budgets: reflect municipal capital spending plans (priorities) and hence the type of infrastructure projects that affect municipal borrowing capacity e.g. revenue-generating projects positively influence borrowing capacity.

Municipal creditworthiness: is based on the extent to which the operating framework, institutional framework, financial performance, debt profile, governance and management, among other economic factors of the region, contribute to default risk associated with the borrower (municipality). (Moody's Investor Services, 2009).

In its most recent report on building South Africa's municipal credit markets, National Treasury (2012a) set out four prerequisites for a well-functioning municipal credit market, as shown in Figure 80.

Figure 80: Characteristics of an effective and efficient municipal credit market



The prerequisites for a well-functioning municipal credit market are explained as follows:

- **Effective regulation** is regulation that does not hinder sub-national borrowing, as it is not complex and does not discourage well-calculated, high-risk borrowing (Liebig et al., 2008).
- **Responsible and efficient lending** aims to protect depositors and lenders against reckless lending and excessive risk taking, sets prudential limits and guidelines on credit extensions, and aims to curb systematic risks associated with sector shocks that negatively spill over into the economy (UK Independent Commission on Banking, 2011).
- **Creditworthy borrowers** are determined by their credit risk, which depends on a number of financial performance measures and non-financial indicators, such as the level of political interference (Moody's, 2005).
- **Appropriate government intervention** is defined as attempts by governments to address market failures, usually through the introduction of municipal credit market enhancers (such as the Colombian Findeter).⁶⁸

Thus, in identifying municipal borrowing constraints in the context of South Africa, cognisance should be given to supply- and demand-side factors alike and the basic prerequisites for a well-functioning municipal credit market.

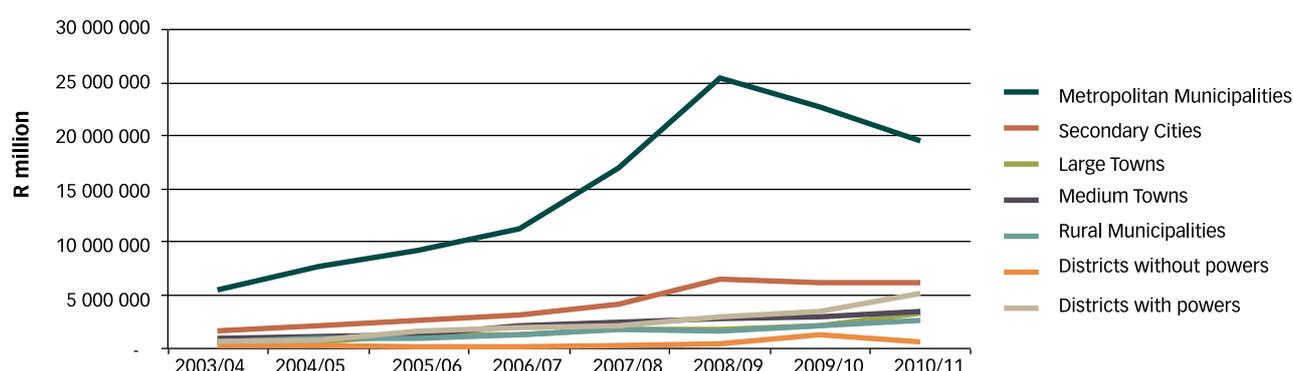
⁶⁸ Findeter (Financiera de Desarrollo Territorial SA) is the Colombian majority state-owned institution (86% government ownership) that serves as a guarantor for local governments when borrowing from commercial banks.

9.3 The South African Capital Financing Situation

9.3.1 Municipal Capital Expenditure

Local government expenditure in South Africa comprises both operating and capital expenditure. Municipal operating expenses are the recurrent expenses incurred in delivering immediate services to households, while municipal capital expenditure constitutes investment in social and economic infrastructure. Capital expenditure takes place over longer periods of time and does not result in an immediate benefit to the consumer, rather offering long-term benefits. Figure 81 disaggregates capital expenditure from 2003/04–2010/11 by municipal type.

Figure 81: Municipal capital expenditures by municipal type (2003/04–2011/12)



Source: FFC own calculations using National Treasury data (2010)

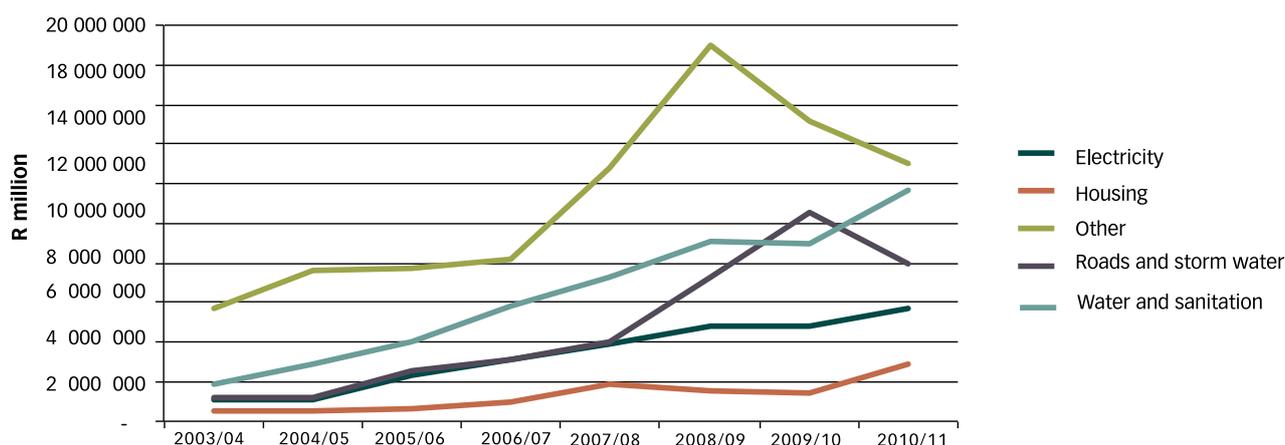
As indicated in Figure 81, municipal capital expenditure has increased over time, with total capital investment exceeding R40-billion in 2010/11. Since 2008/09, the slight downward trend in capital investments suggests that such expenditure was affected by the global financial crisis. The fact that capital investment by metros declined in 2008/09 possibly highlights their greater use of credit markets to finance capital expenditure, which is relatively more volatile during economic downturns. Other types of municipalities have seen steady increases in capital expenditure. These include rural municipalities, which require an estimated R131-billion investment capital (26.2% of overall requirement) over ten years from 2009 to finance new infrastructure, rehabilitate existing infrastructure and eradicate backlogs (World Bank, 2009). Therefore, it is encouraging that capital investments in such areas increased in nominal terms by 328% between 2003/04 and 2010/11, resulting in cumulative capital expenditure of R12.1-billion over the period.⁶⁹

Municipal capital expenditure reflects the service mandates devolved to local government in South Africa, as specified in Schedules 4B and 5B of the Constitution. Local government service mandates include the provision of important basic services such as water, sanitation, refuse removal and the distribution of electricity. Figure 82 shows capital expenditure by services (budget line item) for 2003/04–2010/11. In general, the 'other' line item makes up the bulk of municipal capital investments and includes infrastructure expenditure (e.g. town halls or municipal buildings), which for the most part do not generate any revenue. The second largest capital expenditure was on water and sanitation infrastructure until 2008/09, whereafter expenditure on roads and storm water drainage constituted the second largest capital expenditure item.

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⁶⁹ This calculation considers spending by local (category B) municipalities only. The overall capital expenditure in rural areas by local government is likely to be higher if one considers district municipal spending.

Figure 82: Municipal capital expenditure per budget line item (2003/04–2010/11)



Source: FFC Own Calculations using National Treasury data (2010)

Figure 82 also gives an indication of the intergovernmental arrangements for infrastructure investment at a local government level. Electricity and housing clearly constitute relatively smaller shares of municipal capital expenditure, which is because distribution of electricity is shared between local government and Eskom.⁷⁰ Although electricity distribution is constitutionally a municipal mandate, Eskom distributes electricity to around 40% of total electricity consumers in the country (National Treasury, 2008) and so invests significantly in local electricity infrastructure.

Housing is a provincial competency, but Figure 82 shows that local government invests significantly in this sector. This is probably a reflection of municipalities undertaking such expenditures on behalf of provinces or being assigned certain portions of the housing service. It is important that the funding received by provincial government for housing delivery accrues to local government in instances where municipalities are spending on the province's behalf.⁷¹

Although the increases in capital expenditure, as indicated in Figure 82 are encouraging, it is necessary to ascertain whether such spending levels are sufficient to meet the demand for local infrastructure. The municipal budgeting process can give an indication of the capital investment needs. When formulating their budgets, municipalities have to consider local needs and community demand for infrastructure to ensure that resources are allocated accordingly.

The under-spending of municipal capital budgets is endemic in South African local government. Between 2003/04 and 2009/10, the trend was for municipalities to under-spend their capital budgets (Table 1): in 2009/10 under-expenditure of capital budgets was 18.1% in total. However, metropolitan and district municipalities that are not water service providers managed to decrease these under-expenditures during this period. National Treasury (2012b) attributes such poor capital spending to: poor capital budgeting practices by municipalities; a shortage of planners and engineers to facilitate project bids; poorly managed procurement processes; poor management of adjustment budgets and political interference.

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⁷⁰ Eskom is a state-owned enterprise that is responsible for most of the generation and transmission of electricity in South Africa. Although electricity distribution is a constitutionally mandated municipal competence, Eskom is also active in the electricity distribution industry.

⁷¹ There is currently a proposal to assign the housing function to the country's metropolitan municipalities by 2014.

Table 89: Under-expenditure of capital budgets by municipal type (2003–2010)

Location	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Metropolitan Municipalities	31.1%	11.5%	29.2%	14.9%	3.1%	-10.5%	3.2%
Secondary Cities	30.0%	21.8%	33.9%	34.6%	30.7%	27.9%	29.4%
Larger Towns	51.4%	45.3%	21.2%	30.7%	27.7%	34.3%	36.0%
Smaller Towns	43.0%	27.2%	43.9%	35.3%	40.9%	33.6%	30.1%
Rural Municipalities	47.4%	36.9%	51.4%	48.9%	24.1%	32.8%	33.5%
Districts (not water service providers)	36.3%	-4.4%	57.0%	75.8%	41.3%	56.9%	-24.0%
Districts (water providers)	64.3	49%	33.5%	31.8%	52.7%	44.9%	40.3%
Total	38.0%	21.6%	33.4%	27.3	21.3%	13.0%	18.1%

Source: FFC Own Calculations using National Treasury data (2010)

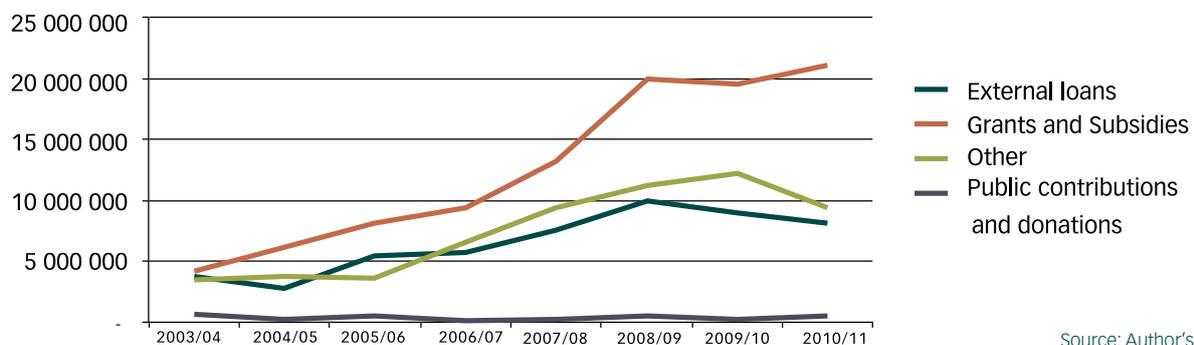
The under-spending of municipal capital budgets adds an important – but separate – dimension to assessing the funding needs for municipal capital expenditure. These needs should be determined solely on the basis of the demand for local capital investment and the funding mix available. Although under-spending exacerbates the problem, it should not be considered when assessing the funding required for capital expenditure.

In addition, the apartheid legacy complicates municipal capital investment requirements in South Africa. Apartheid policies skewed the distribution of resources on racial grounds, with extreme under-investment by the former state in certain areas, which resulted in severe inequalities in access to quality services. Municipal capital expenditure seeks to remedy the service backlogs resulting from apartheid-era planning, as well as to invest in economic infrastructure required to sustain local communities.

9.3.2 Sources of Revenues for Municipal Capital Expenditure

In line with the general theory of financing capital expenditure, municipalities in South Africa currently rely on four broad sources: external loans, grants and subsidies (i.e. intergovernmental transfers), other sources, and public contributions and donations. The trends in these revenue sources are depicted in Figure 83.

Figure 83: Sources of Funding for Capital Expenditures (2003–2011)



Source: Author's Own Calculations using National Treasury data (2010)

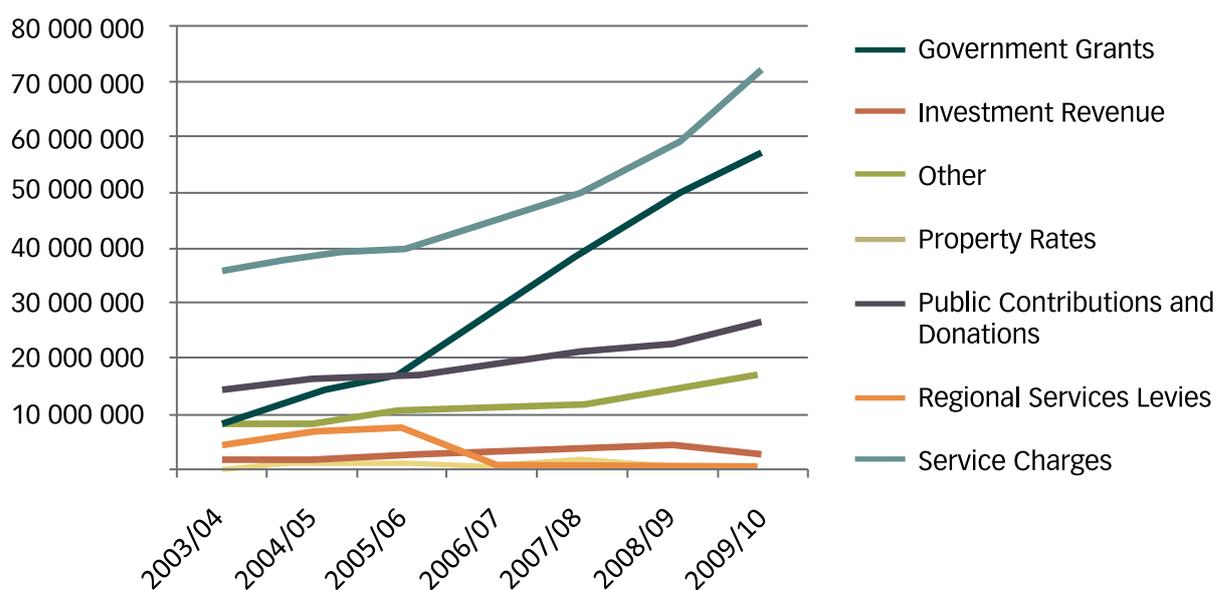
In general, grants and subsidies from national and provincial government constitute the bulk of capital revenues. Municipal own revenue (“other”), which largely comes from local taxes and tariffs for services such as electricity, water supply, sanitation and solid waste removal, is the second largest contributor to capital financing, followed by municipal borrowing (external loans). These two revenue sources are likely to be sensitive to general economic conditions, as indicated by downward movements in these revenues after the 2008/09 global financial crisis. Municipal borrowing (“external loans”) also seems to be more sensitive than own revenues to the general economic climate. As Figure 83 shows clearly, public contributions and donations have been growing at relatively constant rates. A number of reasons can be put forward to explain such trends and are critically analysed in the brief discussion of each of these funding sources.

Local municipal taxes

Section 229 of the Constitution empowers municipalities to impose rates on property and surcharges on fees for services provided by, or on behalf of, the municipality, but prevents them from imposing income tax, value-added tax, general sales tax or customs duty. As a result, municipalities generate their revenues mostly through charging for services such as refuse removal and property rates, in addition to intergovernmental transfers.

As indicated in Section 2 of this chapter, municipal own revenue contributions to capital expenditure emanate from general taxes and the surpluses from user charges. In general, the exact contribution of general tax revenues to capital expenditure is difficult to ascertain, as these funds form part of the municipality’s general fungible revenues. Figure 84 gives a general indication of the revenue generated from these sources, although these revenues are used for both operating and capital expenditure. As Figure 84 shows clearly, service charges form a large part of municipal revenues in general. Therefore, the surpluses from such charges are likely to contribute significantly to own revenue on the capital budget. It is important to note that there were no significant downturns in local government revenue sources during the recessionary period from 2008, which contradicts the trends shown on the sources of finance for capital expenditures. As municipalities essentially have discretion over their borrowing decisions and the quantum of internally generated funds that are allocated to capital expenditures, it is likely that municipalities decided to intentionally allocate fewer resources to capital expenditures over the recessionary period.

Figure 84: General local government revenues (2003/04–2010/11)



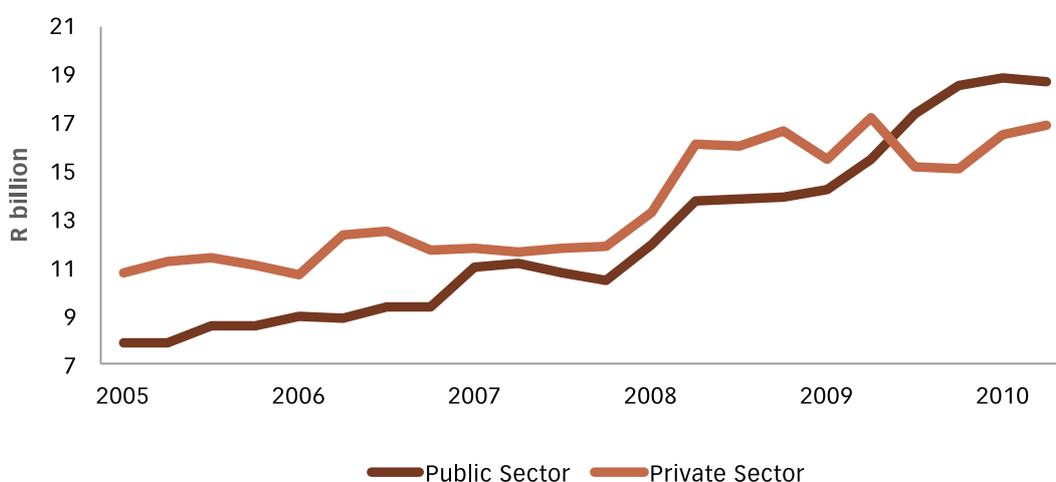
Source: Authors’ own calculations using data from National Treasury (2011)

Local government borrowing

Section 230a of the Constitution (2001 amendment of Section 230 of the Constitution following the “Policy framework for municipal borrowing and financial emergencies”) grants South African municipalities the power to borrow both for capital and current expenditures, on condition that the current expenditures are raised when necessary for bridging purposes during a particular financial year. The section further stipulates that a municipality can only incur debt as an entity itself or as that of a future Council in securing a loan or investment. The Municipal Financial Management Act (MFMA) No. 56 of 2003 (RSA, 2003), which became effective in 2004, further regulates these borrowing powers by stipulating provisions within which municipalities can exercise these powers. In Chapter 6 of the MFMA, Section 45 limits short-term borrowing to financing shortfalls and capital needs incurred within a financial year, while Section 46 limits long-term borrowing to financing capital expenditure on property, plant and equipment and long-term debt re-financing.

Figure 85 illustrates trends in municipal borrowing from the private and the public sectors respectively for 2005–2010. Total municipal borrowing stock – comprising long-term loans (64%), municipal bonds (30%), short-term debt accounts (6%) and commercial paper (4%) – grew from R18.7-billion in 2005 to R38.1-billion in 2010, representing a 15% growth rate (National Treasury, 2011) During this period, the private sector dominated the municipal credit market until late 2009, when the public sector surpassed the private sector. This could be as a result of both the global financial recession and the withdrawal from the municipal credit market of the Infrastructure Finance Corporation (INCA). Reasons cited by the INCA for its withdrawal included declining profit margins resulting from intensified competition with the public sector.

Figure 85: Trends in municipal borrowing, by sector (2005–2010)



Source: National Treasury (2011)

Metropolitan municipalities are the dominant demand-side players in South Africa’s municipal credit market, due to the greater financial and fiscal capacity of these municipalities. This renders the municipal credit market attractive to creditors (due to reduced default risk in the case of metros) and metropolitan municipalities (due to reduced borrowing costs) alike, which explains the dominance of the metros in the municipal credit market.

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⁷² Public sector participation in the municipal credit market largely consists of loans from the Development Bank of Southern Africa (DBSA), a state-owned entity listed under Schedule 2 of the Public Finance Management Act that is mandated to provide financial, technical and other forms of assistance in the development and expansion of economic infrastructure in Southern Africa.

Secondary cities have been rapidly increasing their presence in the municipal credit market through the use of commercial long-term loans. Figures 86 and 87 summarise the borrowing trends of metropolitan municipalities and secondary cities, by credit provider, between 2005 and 2010. Metropolitan municipalities and secondary cities depend substantially on funds from the Development Bank of Southern Africa (DBSA). For credit-rating purposes, the DBSA is deemed part of national government and as such enjoys lower borrowing costs from capital markets than do private banks. With this competitive advantage, the DBSA is able to lend to municipalities at lower rates, which creates a disincentive for the private sector to participate in the market. This has been argued to crowd out private financing (National Treasury, 2010).

Figure 86: Borrowing trends by credit provider for metropolitan municipalities (2005–2010)

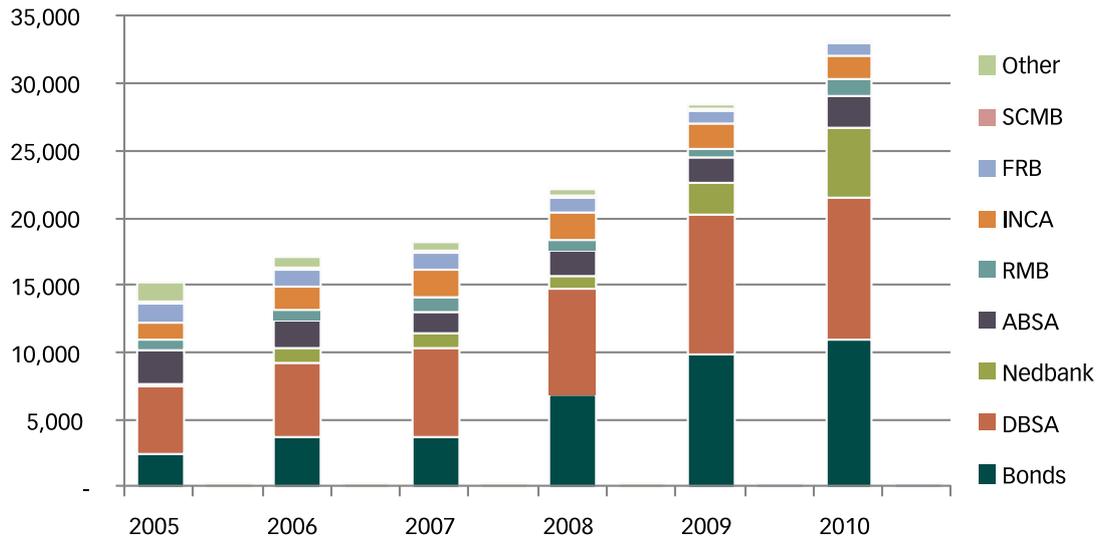
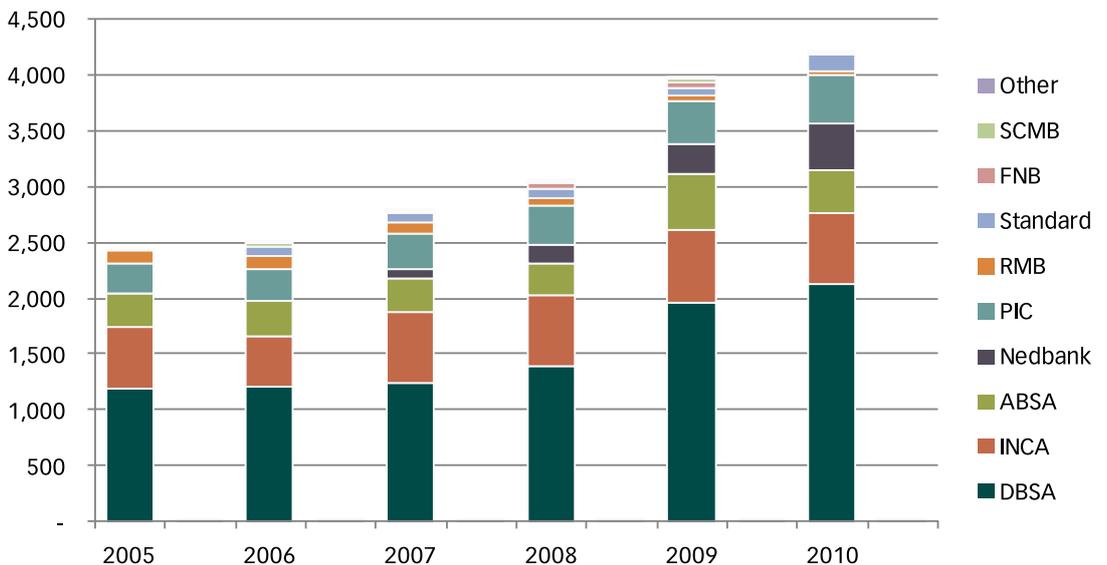


Figure 87: Borrowing trends by credit provider for secondary cities (2005–2010)



Source: National Treasury (2012b)

Table 90 shows the borrowing liability, costs and sustainability measures for metropolitan municipalities. A crucial borrowing sustainability measure is the debt-service-cost to own-revenue ratio. This ratio for South Africa's metropolitan municipalities is just below the acceptable 15%⁷³ level i.e. currently at 14.7%. Individual metropolitan municipalities have debt-service-cost to own-revenue ratios of between 4.4% and 9.4%, which is within the internationally acceptable level. The City of Cape Town has the lowest debt-service-cost to own-revenue ratio (4.4%), which is probably due to the municipality's positive credit rating (Aa2.za) from Moody's rating agency. (Other municipalities, such as the City of Tshwane and Nelson Mandela Bay, have received improved grades of Aa3, one notch lower than Cape Town's rating of Aa2 but still indicating a stable financial outlook.)

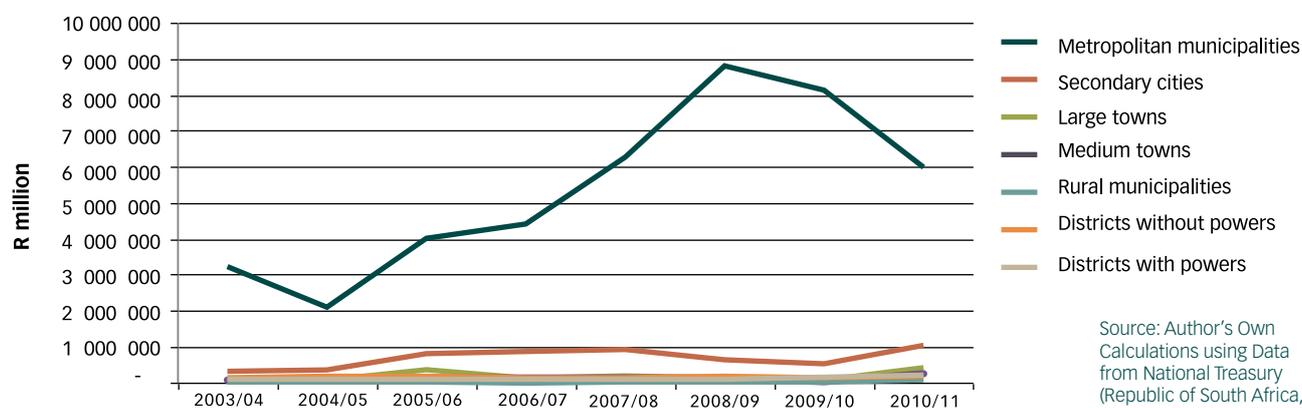
Table 90: Measures of metropolitan municipalities borrowing (2011/12)

R'000	Johannesburg	Cape Town	eThekweni	Ekurhuleni	Tshwane	Nelson Mandela Bay
Total Borrowing Liability	11 456 835	6 679 271	11 270 509	4 333 358	6 487 030	1 729 021
Cost of borrowing for the current financial year	1 844 483	966 040	1 819 044	663 579	1 217 198	312 128
Total cost of debt as % of own revenue	7.5%	4.8%	9.4%	7.8%	7.7%	6.2%
Total cost of debt as a % of operating expenditure	6.5%	4.4%	8.6%	6.6%	6.7%	4.8%

Source: National Treasury (2011)

The above analysis clearly shows that municipalities in South Africa have great potential for accessing credit markets. However, such potential is clearly also limited to the larger and more financially resourced municipalities, such as the metros and secondary cities. These municipalities are better able to finance such loans and can provide higher levels of collateral. By the same token, smaller, poorer municipalities are relatively limited in their ability to borrow, as is evident in Figure 88.

Figure 88: Borrowing trends across municipal types – (2003/04–2011/12)



Source: Author's Own Calculations using Data from National Treasury (Republic of South Africa, 2010)

The prevailing general economic climate also affects the ability to borrow, as the municipality's credit rating and general ability to finance loans influence the decision to borrow. During economic downturn, borrowing abilities (or appetite for borrowing) decline because of limited revenue generation and consequent credit-rating downgrades. Furthermore, economic downturns also result in behavioural changes on the part of private sector lenders, as discussed above.

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⁷³ See also Liu and Waibel (2008) and Liu and Webb (2011).

Local government infrastructure conditional grant system

The primary aim of South Africa's infrastructure grant system is to remedy service backlogs that resulted from the lack of investment in certain areas of the country under apartheid. In general, municipal own revenues should finance the economic infrastructure required to meet the needs of economic and population growth. Thus, it is not surprising that the design and evolution of the conditional grant system reflects this need to eradicate service delivery backlogs.

From its inception, South Africa's municipal conditional grant system has faced a number of complexities, beginning with the 1994 Reconstruction and Development Programme (RDP). The RDP funded the country's municipal infrastructure priorities using grants such as the Municipal Infrastructure Programme, the Bulk and Connector Infrastructure Grant and the Community Water Supply and Sanitation Programme. In 1998, the Consolidated Municipal Infrastructure Programme (CMIP) was introduced, with the aim of consolidating these grants⁷⁴ into a less complex structure (i.e. a single grant) to promote a synchronised and efficient grant system. However, by 2002/03 even more municipal infrastructure grants had emerged, contradicting the consolidated single infrastructure grant, as envisaged by the CMIP. As a result, after consultations, in 2004 the above-mentioned grants were consolidated into the Municipal Infrastructure Grant (MIG), with the aim of introducing a more coordinated system that would complement rather than substitute municipal financing sources.

The MIG replaced the CMIP, with a similar purpose of consolidating all existing municipal infrastructure grants. In 2009/10, a revision of the MIG required infrastructure grants to reflect the different circumstances being faced by the country's municipalities (RSA, 2009). Thus, a portion of the MIG was set aside to create the MIG Cities grant, which focused on supporting metropolitan and other predominantly urban municipalities, with the remainder of the MIG supporting non-urban municipalities. The aim of the MIG Cities grant was to provide a more flexible method of funding infrastructure in the urban built environment by allowing urban municipalities greater control over these funds when planning for infrastructure spending. In 2011/12, the MIG Cities grant was again restructured to form part of the 2011 urban settlements development grant (USDG), which is aimed at supplementing metropolitan municipalities' capital budgets for developing sustainable human settlements.

Table 91 provides a list of infrastructure conditional grants allocated to municipalities from 2005/06. Between 2005/06 and 2011/12, total conditional grants almost quadrupled, increasing from just over R7-billion to over R27-billion. MIG allocations also increased during 2005/06–2011/12 and are expected to increase by 11.6% over the 2013/14 Medium Term Expenditure Framework (MTEF) period. Adding to municipal under-expenditure of capital grants was the under-spending of conditional grants: municipalities spent only 76.9% of their direct conditional grants, excluding the USDG (National Treasury, 2012b).

Given that the design of the conditional grant system reflects a need to eradicate largely historical service delivery backlogs, it is questionable whether the grants allocated play a role in minimising fiscal gaps or infrastructure expenditure externalities. For example, the formula-driven MIG allocates funds based largely on infrastructure backlogs. The formula does not estimate the overall economic and social infrastructure needs of local government or individual municipalities, or the costs of these needs. In addition, the formula does not reflect economic or population growth and is essentially 'backward looking'. Such an arrangement makes it difficult to ascertain the true financing needs of local government in the holistic delivery of infrastructure services.

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⁷⁴ The Integrated National Electrification Programme, the Integrated Sustainable Rural Development Grant, the Local Economic Development Fund, the Urban Transport Fund, the Sports and Recreation Facilities Grant, the Community-Based Public Works Programme Grant and the Water Services Project Grant.

Table 91: National transfers to local government through conditional grants (2005/06–2015/16)

R million	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
	Outcome							Revised estimate	Medium-term estimates		
Direct transfers Subtotal	–	7,447	15,127	18,562	18,699	20,871	24,643	28,029	31,132	33,698	37,121
Municipal infrastructure grant	5,436	5,938	8,754	6,968	8,728	9,704	11,443	13,882	14,352	14,684	15,448
Urban settlement development grant				3,590	4,418	4,968	6,267	7,392	9,077	10,335	10,700
Public transport infrastructure and systems grant	242	518	1,174	2,920	2,421	3,700	4,612	4,988	4,669	5,126	5,279
Integrated national electrification programme grant			462	589	900	1,033	1,097	1,151	1,635	1,565	2,056
National Electrification programme	297	391									
Neighbourhood development partnership grant	0	–	41	182	508	832	738	578	598	591	600
2010 FIFA World Cup stadiums development grant	0	600	4,605	4,295	1,661	302	–	–	–	–	–
Disaster relief	311										
Rural transport grant	0	–	–								
Rural roads asset management systems grant	0	–	–	–	10	10	35	37	52	75	98
Integrated city development grant	0	–	–	9	–	–	–	–	40	150	150
Rural households infrastructure grant	0	–	–	–	–	–	–	–	107	113	118
Municipal drought relief grant	0	–	91	9	54	320	450	–	–	–	–
Municipal water infrastructure grant	0	–			–	–	–	–	603	1,059	2,672
Infrastructure transfers subtotal	783	943	1,484	1,928	2,763	2,620	2,476	4,482	5,399	7,029	8,617
Regional bulk infrastructure grant	–	–	300	450	577	851	1,260	2,523	3,203	4,483	4,872
Backlogs in the electrification of clinics and schools	–	–	45	90	149	–	–	–	–	–	–
Backlogs in water and sanitation at clinics and schools	–	–	105	186	350	–	–	–	–	–	–
Integrated national electrification programme (Eskom) grant	783	893	973	1,148	1,616	1,720	1,165	1,879	2,141	2,488	3,680
Urban settlement development grant	–				–	–	–	–	–	58	65
Neighbourhood development partnership grant	–	50	61	54	70	50	50	80	55	–	–
			–	–	–	62	78	341	–	–	–
Total of Direct and indirect grants	783	8,390	18,678	22,234	23,974	25,699	29,197	35,230	39,994	51,100	57,987

Source: Adopted from National Treasury, 2013.

The current review of the local government conditional grant system

Since the inception of the local government infrastructure grant system, the principle of simplicity (i.e. a few consolidated infrastructure grants) has been promoted but never fully implemented. Attempts to consolidate the grant system, through the CMIP in 1998 and the MIG in 2004, have not worked, with grants proliferating in subsequent years, as confirmed in Table 91.

In 2013, the Minister of Finance announced a review of the local government infrastructure grant system, which the Commission is participating in through its Secretariat. Therefore, this chapter does not comprehensively analyse the current local government infrastructure grant system.

Other sources of financing

Public-Private Partnerships (PPPs)

The MFMA Municipal Public-Private Partnership Regulations define public-private partnerships (PPPs) as commercial transactions between a municipality and a private party. A PPP is a vehicle by which the private party (i) performs a municipal function for or on behalf of the municipality, (ii) assumes substantial financial, technical and operational risks in connection with the performance of the function and/or use or management of municipal property, and (iii) receives a benefit from performing the municipal function. The benefit may be through compensation from the revenue fund, or charges and fees collected from the users/consumers of the services, or a combination of such compensation, charges or fees. The MFMA regulates and stipulates the conditions and processes for municipalities entering into PPP agreements, while the municipal PPP regulations clearly (and in detail) elaborate on these provisions. Table 92 briefly discusses the different possible PPP structures for capital projects or services.

Table 92: Basic forms of PPP agreements

Contract type	Description
Service contract	In a service contract the government pays the private partner a predetermined fee for one of more specified services as contracted, while government remains the primary provider of the infrastructure service and only contracts out only portions of the operations. Such contracts are not necessarily for financing expenditures (e.g. CAPEX) but improve on efficiency levels which in essence releases finances
Management contracts	In a management contract, daily management control and authority is assigned to the private partner at a predetermined rate or even for a share in profits while government (public sector) holds the ultimate responsibility for provision of the contracted service such as primary health care. Typically, a management contract will upgrade financial and management systems and decisions concerning service levels and priorities while their public sector counterpart will retain the obligation to major capital investment projects that are related to expanding or substantially improving the system.
Affermage or Lease Contracts	Under lease/affermage contracts the private partner is responsible for the service in its entirety and also undertakes the obligations relating to quality and service standards. Thus the responsibility of service provision is transferred from the public to the private sector operator and the financial risk for operation and maintenance is borne by the private sector partner. New and replacement investments remain the responsibility of the public sector partner. Therefore the public sector partner is responsible for the initial financing of the system which is then contracted to the private sector partner who in turn transfers part of the tariffs charged to the public sector partner to service raised loans raised to finance extensions of the system. Lease payments are made in the case of lease contracts while an agreed affermage fee is paid to the contracting authority following collection of revenue from consumers by the private partner.
Concessions	Concessions makes private sector partners responsible for the full delivery of the services in a specified area, including operation, maintenance, collection of tariffs, management, construction and rehabilitation of the system i.e. all capital investment relating to the service. Although the private sector partner is responsible for the asset, the asset is publicly owned even during the concession period. The public sectors' role becomes regulation of the price and quality of the service. Government may also provide financing support to assist with capital expenditures, sometimes in return for a commensurate part of the collected tariffs. Concessions are long-term contracts, typically valid for 25 – 30 years so as to allow the private sector partner sufficient time to recover the capital investment while also earning appropriate return from the investment.

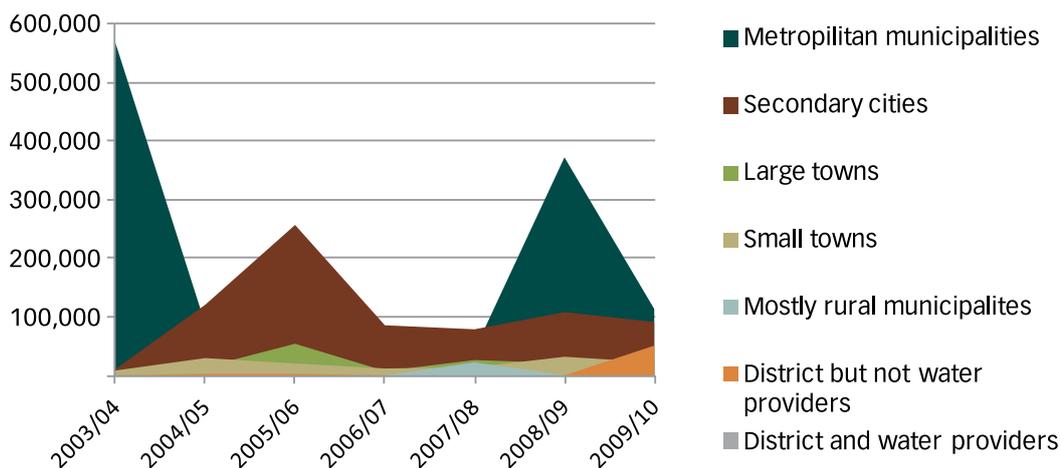
Contract type	Description
Build-Operate-Transfer (BOT) and Similar Arrangements	BOTs and similar arrangements such as Design-Bid-Build, Design-Build or Build-Own-Operate; are specialized concessions in which a private sector or consortium finances and develops a new infrastructure project or a major component according to the performance standards set by government. Under BOTs the private partner owns the assets for the period specified in the concession contract but other arrangements such as Design-Build-Operate (DBOs) ownership is never in private hands. The public sector in such agreements usually agrees to purchase a minimum level of output produced by the facility that is sufficient enough to allow the operator/private sector partner to recover its costs during the operation.
Hybrid Arrangements	These arrangements bring together different characteristics of varying contract types in an attempt to bring together attributes suitable to particular projects' requirements and the operating conditions. They provide tailored solutions in terms of scope and risk sharing arrangements between contracted partners.

Adapted from PPP Handbook, produced by the Asian Development Bank (2008)

Development charges

Development charges are one-off levies imposed by government on property developers, who in turn pass on the cost to the user of the new infrastructure through property taxes and user fees. These levies are equivalent to the upfront cost of the new municipal infrastructure and the cost of using the capacity of existing infrastructure (National Treasury, 2011). Data has always been a constraining factor in conducting a proper analysis of the use of development charges by South African municipalities. Furthermore, the conditions of Generally Accepted Municipal Accounting Practices (GAMAP/GRAP) require that municipalities recognise income from cash and assets regarded as development charges to be classified on municipal budgets as 'Public Contributions and Donations' (Savage, 2009). Figure 89 shows that public contributions and donations (as a proxy for development charges) have been highly volatile financing sources for municipalities, especially metropolitan municipalities, rural municipalities and district municipalities. Possible reasons for this are: the administrative complexities embedded in the structure of development charges in South Africa, specifically relating to methodologies for costing these charges; legal contestations⁷⁵ that have occurred between municipalities and developers over levying charges and weak regulatory frameworks (National Treasury, 2011).

Figure 89: Public contributions and donations, by municipal type (2003/04–2009/10)



Source Authors' own calculations using data from National Treasury (2011)

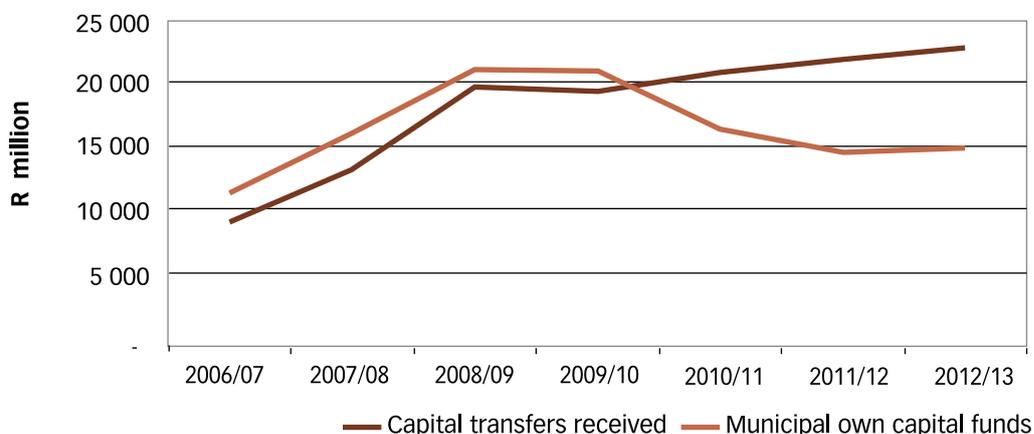
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⁷⁵ When the threshold performance is increased to 50% below average.

9.3.3 Pressures on Municipal Own Revenues for Capital Financing

Figure 90 illustrates the contribution of municipal own revenue sources (on aggregate) and government transfers to municipal capital expenditure from 2006/07 to 2012/13.

Figure 90: Financing of capital expenditures by own funds and transfers (2006/07–2012/13)



Source: National Treasury (2010)

From 2006/07, the contribution of municipal own funds increased steadily, reaching a peak of R22-billion in 2008/09, but then fell to below the level of capital transfers received from government. This was likely due to the recession's effect on municipal own revenue generation and borrowing capabilities. Other possible contributing factors are (i) exhausted municipal historical cash reserves, (ii) cost pressures adversely affecting operating budget surpluses and (iii) municipalities substituting own revenue sources for national transfers in financing capital expenditure (National Treasury, 2011).

From the analysis above, it is clear that intergovernmental fiscal transfers are progressively playing a greater role in the financing of local government infrastructure in South Africa. This raises issues around the sustainability of local government own revenues for financing local infrastructure needs, as well as whether national government is able to finance the bulk of such expenditures. In 2009/10, the Commission found that infrastructure grants currently paid to local government are insufficient to supplement the municipal own revenues needed to fund local government infrastructure needs, i.e. there is a vertical fiscal imbalance in municipal capital budgets (FFC, 2013). Given the downward trend in municipal own revenue contributions to capital investments, this vertical fiscal gap is likely to widen progressively, putting more pressure on national government to fund municipal capital expenditure through infrastructure grants.

Sections 9.5 and 9.6 of this chapter report on an exercise undertaken, using the Stochastic Frontier Analysis (SFA) method, to determine the factors that affect municipal own revenue contributions to capital expenditure and to assess whether municipal own revenue instruments for capital expenditure are constrained, or whether such revenue instruments could be extended.

9.4 Literature Review

9.4.1 Previous Studies

Vertical fiscal gaps at a municipal level and concerns around the sustainability of municipal own revenue contributions towards capital expenditure have been explored internationally. For instance, the McKinsey Global Institute (2013) estimates an infrastructure financing gap⁷⁶ of US\$57-trillion between now and 2030, given the projected global GDP growth rates in developing economies. Alam (2010) estimates a US\$250-billion capital financing gap per annum for Asian municipalities.

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⁷⁶ Three approaches were used to calculate the estimated global infrastructure gap: (i) the ratio of the historical spending patterns of 84 countries that account for more than 90% of global GDP was applied to IHS Global Insight GDP projections (this gave a US\$62-trillion gap estimate); (ii) the perpetual inventory model for 12 countries with comprehensive historical data derived an asset-to-GDP ratio of 70%, thus producing an estimate of US\$67-trillion; and (iii) a comparison of independent future projections of the global infrastructure financing gap from institutions such as the OECD, International Energy Agency (IEA) and Global Water Intelligence (GWI), and the resulting figure was US\$57-trillion.

Furthermore, Mirza (2007) estimates the financial gap (comprising both new and existing infrastructure investment backlogs) to be US\$123-billion for Canadian municipalities. Municipal funding constraints are arguably among the causes of such fiscal gaps and capital financing pressures.

Bagchi (2001) explored the constraints in financing capital expenditure for the provision of basic services by Indian local governments, as well as the options available for exploiting fully capital markets as a capital-financing alternative. Using a case study of Indian municipalities, he analysed the “traditional capital financing approach” (central government transfers) and the “alternative approach” (borrowing through capital markets). The Bagchi study (2001) argues that the following are constraining factors: weak financial position of local governments (resulting from narrow tax bases, inadequate use of user charges for services rendered and high administrative/operational costs); limited/no autonomy in terms of fiscal responsibilities and powers; a lack of fiscal discipline; underdeveloped capital markets; complex and lengthy processes in accessing capital markets; and the exertion of undue levels of political influence.

Banerji et al. (2013) looked at the causes of the deteriorated performance standards of the municipal bonds markets, as well as the constraints preventing Indian local government’s full realisation of own revenue generation potential. These constraints include a lack of autonomy; inappropriately structured transfer systems that give rise to perverse incentives; fragmented coordination in service delivery, due the presence of different bodies involved in similar service delivery functional areas; inadequate tax collection and poor financial management.

A study by United Cities and Local Governments (UCLG, 2010) identified and analysed key constraints on delivering equitable and efficient local government public services in a sample of countries across Africa, Asia Pacific, the Middle East and North America. The study identified a wide range of expenditure and financial constraints, which are summarised in Figure 91.

Figure 91: Summary of identified local government financing constraints

Minimal revenue generation autonomy, characterised by vertical fiscal imbalances (i.e. devolution of expenditure responsibilities that do not correspond with revenue sources or autonomy); unrealised revenue potential, especially in the case of property taxes due to the complex and expensive nature of property tax administration, which tends to be burdensome to municipalities from developing countries with minimal capacity to properly execute the function; undiversified local tax bases (inelastic and narrow); the inability of local governments to establish fees and user charges that feasibly recover incurred costs; political influences on local revenue generation and delayed transfers of centrally collected local revenues.

Inappropriately structured intergovernmental transfer (revenue-sharing) systems, which unintentionally strengthen horizontal imbalances across municipalities; lack of transparency causing volatile municipal revenues, which affect municipal long-term plans; extensive transfers, which tend to disincentivise municipal own-revenue generation, which in essence undermines autonomy and accountability; where equalisation schemes are incorporated in the transfer systems, improperly balanced transfers in terms of fiscal capacity and expenditure needs, and in some cases equalisation systems embed rigid conditions; conditional grant designs, tending to be complex and excessive in number, lack transparency, unstable, vulnerable to political manipulation and tend to deviate municipalities from initial priorities.

Non-optimal use of borrowing as a financing alternative by local governments due to weakly developed and implemented borrowing frameworks (i.e. some frameworks are restrictive and disincentivising e.g. Denmark and Chile, while others are too lax, thus creating perverse incentives e.g. Argentina and Brazil); underdeveloped financial markets; underperforming specialised institutions that are dependent on government; specialised institutions improperly vetting local governments in appraising for loan qualifications (another form of bailout), which in essence disrupts the development of credit markets and disincentivises local government’s gradual reliance on private capital for financing; and curtailed borrowing capacity as a result of uncertain, opaque central government transfers and improper financial management practices.

Source: Adapted from UCLG (2010)

In South Africa, there has been limited work on quantitatively estimating the capital-financing constraints inherent in municipalities. The National Treasury (2012a) used a number of qualitative measures to assess the borrowing capacity of South Africa's six metropolitan municipalities, based on a methodology adapted from the World Bank. The approach assumes two ways to estimate borrowing capacity: the gearing factor and limits, such as prudential limits on borrowing and debt service. Using this methodology, the National Treasury (2012a) study found that, even with escalating debt-servicing costs, metropolitan municipalities still have decent capacity for borrowing, as shown by low gearing ratios and acceptable debt-to-recurrent-revenue ratios on average. This suggests that borrowing is a feasible financing instrument that metropolitan municipalities can use in the next 17 years.

9.4.2 International Examples of Additional Capital Financing Instruments

One of this chapter's aims is to identify additional revenue sources that could support the financing of municipal capital expenditure in South Africa, if indeed current revenue instruments are constrained. The discussion above shows that other countries experience capital expenditure gaps and also confront the challenge of municipal capital-financing constraints, which threaten long-term growth prospects. In redressing this situation, sub-national governments, in partnership with central government, need to be creative in sourcing alternative financing avenues that will assist full exploitation of revenue-generation potential. A number of developed and developing countries have explored alternative municipal capital financing instruments, in addition to the traditional financing approaches discussed above.

Informal taxation schemes (Indonesia and Kenya)

Known as 'gotong royong' in Indonesia and 'harambee' in Kenya, these schemes vary significantly from country to country. Basically they are contributions that local residents make towards the construction and maintenance of local public goods, such as roads water systems. The contributions can be in money and/or labour. Any payments fall outside the formal tax system but are coordinated by public officials. The enforcement of these informal taxes is largely through social customs and norms and involves often complex arrangements to determine how much each household should pay and the penalties for those who don't contribute (Alm, 2010).

Development banks and financial institutions (India)

Development banks and financial institutions are primarily established to offer long-term credit and other financing services for infrastructure projects, even with the existence of municipal borrowing constraining factors (Alam, 2010). An example is the Infrastructure Development Finance Company in India, which was created in 1997 by the Indian government and (foreign and domestic) financial institutions, with the purpose of attracting private capital for financing Indian infrastructure projects. It currently offers a wide range of financing and advisory services for infrastructure projects, such as debt financing, project loans, take-out financing, guarantees for payment obligations and project performance, and advisory and capacity-building services to both government and non-government organisations (NGOs).

Municipal pooled financing (India)

Municipalities and projects are pooled for the purpose of accessing market finance, while minimising costs and risks involved, and thus attracting favourable capital financing terms from the market (Alam, 2010). This type of financing is most applicable to municipalities that need to fund small projects but are not able individually to source capital financing from the market for various reasons (e.g. poor credit ratings). An example of a successful pooled fund is the Karnataka Water and Sanitation fund, which was spearheaded by India's Karnataka Urban Infrastructure Development and Finance Corporation.

Development charges (Canada)

Imposed by the municipality on developers as a condition for approving land development, these charges are used to finance infrastructure projects such as local roads, street lightings and sewers (Kitchen, 2006). In Canada, in an attempt to reduce administrative complexities, municipalities charge the same rate for all properties, regardless of differentiating factors such as the location of property. This approach can lead to inefficiencies and so proper capital provision pricing should be carried out when new development area(s) are identified, to ensure that approximations are close to the true costs of capital projects (Kitchen, 2006).

Municipal bond market (United States)

Developed in the late 1820s and today one of the largest municipal bond markets in the world (Platz, 2009), the US municipal bond market is self-regulating. Participants develop rules that govern the market through assigning rights and responsibilities to participants and providing credible information to investors and the public. Certain bond issuances qualify for tax exemptions, at the discretion of the US Internal Revenue Service (Blaauw and Mantso, 2009).

Full privatisation of a function (Brazil)

The complete privatisation of a function is an attempt to encourage competitive market forces, to lower capital service provision costs and improve service quality (Alm, 2010). An example of successful privatisation is the solid and waste disposal and collection in Brazil. Competitive market forces are key to the successful privatisation of a function, which implies government has an active role to play in ensuring non-restrictive entry and exit conditions into privatised markets (Alm, 2010).

9.5 Research Methodology

9.5.1 Model to Estimate Municipal Own Revenue Contributions

The SFA method was used to determine the factors that affect municipal own revenue contributions to capital expenditure and whether there is space to increase such contributions, given the capital investment requirements. The following general revenue function was estimated:

$$\ln \text{ownrevpc}_{it} = f(x_{it}) - u_{it} + v_{it}$$

In the above equation, a range of factors, captured by x_{it} , determine the municipal own revenue contribution per capita towards capital expenditure. In most cases, the SFA method is used to estimate efficiency scores, particularly the technical efficiency with which decision-making units (such as firms or even municipalities) use their inputs to generate outputs. This efficiency measure is captured in u_{it} in the equation above. However, in this case, the SFA method was used to determine the optimal own revenue contribution required, given the current demand for social and economic infrastructure. The method estimated a frontier (as opposed to a linear function) of own revenue contributions towards capital expenditure, based on the specification for local infrastructure demand. The efficiency scores generated illustrate how much a municipality is contributing relative to this frontier (how much it should be contributing given local demand factors). The average efficiency scores (u_{it}) give an indication of how much more funds are required from local government internal funds. If the calculation suggests that local government will need to double or triple current contributions, the question will be whether municipalities have the ability to generate sufficient internal sources.

As indicated above, the amount of funds a municipality commits to financing its capital expenditure from its own revenues is a budgeting decision and is affected by various factors. Funds for infrastructure investment and refurbishments within a sector (e.g. electricity) are likely determined by and generated from the user tariff, which includes components covering capital depreciation and a surplus for new investments. In addition, municipalities fund capital expenditure using general revenue funds generated from local taxes, which is largely an internal municipal budget decision, based on demand for infrastructure. It is clear that determining a municipality's own revenue contribution towards capital expenditure is highly complex, given the degree of municipal discretion in such decisions and the direct relationship between the operating and capital budgets.

Therefore, it is necessary to accurately identify the key factors that would influence a municipality's decision to contribute internal funds towards capital expenditure. Such factors include: demand for local infrastructure (social infrastructure, given by current backlogs, and economic infrastructure, given by local economic growth); local economic circumstances that can affect tax revenues (percentage of formal households, as an indicator of property rates potential; local unemployment and local disposable income, as indicators of economic activity and ability to pay respectively); and other control variables to capture differences across municipalities (powers and functions and municipality type). A key factor that needs to be determined is the municipality's internal ability to budget appropriately and to determine the capital financing needs of the area. In the SFA exercise, this ability was measured by the audit opinion outcome of the municipality in question. Lastly, increased demand for services and above-inflation increases in administered prices can put pressure on the operating account, resulting in smaller surpluses being generated for capital expenditure. This impact was measured by including a variable looking at the growth of bulk purchases for municipal services delivered (measuring both price and quantity increases).

9.5.2 Data Sources

The data used in the econometric analysis is a panel dataset spanning eight years, from 2003/04 to 2010/11. Accounting for missing data, the total number of observations was 1059. Municipal financial data was sourced from the National Treasury local government financial database, while demographic and economic data was sourced from the Regional Explorer database developed by IHS Global Insight. Audit opinions were sourced from the Auditor-General.

9.6 Analysis and Results

9.6.1 Factors Affecting Own Revenue Contribution to Capital Expenditure

Table 93 gives the results of the SFA regression exercise on municipal own revenue contribution to capital expenditure.

As expected, local economic circumstances and internal municipal planning ability emerge as the primary drivers of municipal own revenue contributions to capital expenditure. The unemployment variable has a negative and statistically significant impact on own revenue contributions. This suggests that municipalities with high local unemployment rates, as an indicator of local economic activity, are less likely to generate sufficient funds to contribute towards capital expenditure. The importance of local socio-economic circumstances is also confirmed by the result on the disposable income variable. Municipalities tend to generate more own revenues from their communities, and thus can contribute more internal funds to capital expenditure, when local disposable incomes are higher. This variable has a positive and statistically significant impact on own revenue contributions.

Municipalities indicating a better capacity to manage their internal financial affairs, as measured by whether they received an unqualified audit opinion, are more likely to contribute internal funds to capital expenditure. This is likely due to a greater ability to prepare budgets, determine the local demand for infrastructure, calculate the capital costs associated with refurbishments, as well as, possibly, a better ability to design tariffs to fund these capital needs. This variable has a positive and statistically significant impact on the dependent variable.

From the analysis above, it appears that the ability to generate own revenues, as a function of local economic circumstances and the ability to plan properly, are the key drivers of municipal own revenue contributions to capital expenditure. The results also suggest that local demand for infrastructure does not have an impact on a municipality's decision to contribute internal funds for capital expenditure. This is confirmed by the variables for water and sanitation backlog having no statistically significant impact on the dependent variable. Furthermore, the growth in the local economy, measured by the growth in gross value added (GVA), has no statistical impact on own revenue contributions. This suggests that the demand for local economic infrastructure, driven by local economic growth, does not affect decisions to contribute municipal own revenues towards capital expenditure. This is a very interesting yet worrying result, as a growing economy is likely to demand greater support from state infrastructure investments. Interestingly, municipalities with higher electricity and refuse backlogs are less likely to contribute internal funds towards capital expenditure. In terms of electricity, this is possibly due to municipalities relying on Eskom to invest

in eradicating such backlogs. These results ultimately confirm the importance of the role of grants, and municipal dependence on such grants, to fund the demand for local infrastructure.

Other variables in the regression exercise did not have statistically significant impacts on the dependent variable. This includes the growth in bulk purchases, which suggests that, in general, municipalities are probably not experiencing significant financial pressures on their operating budgets, to the extent that they are less likely to generate surpluses for capital expenditure. In other words, greater demand for services and increases in administered prices are not yet resulting in large decreases in operating surpluses that result in capital funding pressures.

From the results of the SFA regression exercise, local economic downturns and the ability of local communities to pay local taxes are clearly the greatest pressures placed on the generation of municipal operating surpluses and tax revenues that fund capital expenditure. In addition to isolating the key factors that hinder internal revenue contributions to capital expenditure, the analysis also sought to determine whether local government has the internal revenue capacity to meet infrastructure demands. In this regard, the SFA analysis found that, given local demands for social and economic infrastructure and the current characteristics of the local tax base, municipalities should have contributed at least 48% more towards capital expenditure in 2010/11. This was confirmed by an SFA average efficiency score of 52%, essentially meaning that municipalities are funding 52% of what they should be funding from internal revenues. This suggests that municipalities need to double their current own revenue contributions towards capital expenditure, which is obviously a significant financial ask.

Table 93: Results of municipal own revenue SFA regression exercise

Variables	Own contributions per capita in log form
Percentage of households without water	-0.66 (0.496)
Percentage of households without sanitation	-0.416 (0.377)
Percentage of households without electricity	-1.611*** (0.567)
Percentage of households without refuse	-1.398*** (0.326)
Growth rate in GVA	0.506 (0.928)
Received an unqualified audit opinion	0.297*** (0.101)
Official unemployment rate	-2.560*** (0.888)
Percentage of formal households	-0.518 (0.439)
Local disposable income per capita in log form	0.102** (0.0497)
growth in bulk purchases	0.000474 (0.000428)
water service provider	-0.0331 (0.129)
electricity service provider	0.109 (0.737)
refuse service provider	0.505 (0.466)
urban municipality	-0.175 (0.31)
district municipality	-0.777 (0.883)
Constant	5.217*** (1.219)
Observations	1,059
Number of municipality	223

Standard errors in parentheses
 ***1% significance,
 **5% significance,
 *10% significance,

Source: Authors' calculation

9.7 Conclusions and Recommendations

9.7.1 Conclusion and Key Findings

Municipal capital expenditure is crucial for local economic and social development and a key component of the NDP's vision of long-term economic growth through greater state investment in infrastructure. By failing to plan and spend their capital budgets properly, municipalities are compromising the delivery of key social and economic infrastructure. In addition, municipal revenue sources for capital expenditure are under stress, mainly because of the current poor economic climate. All municipalities have a limited ability to generate surpluses from user charges that can be reinvested in capital expenditure. Urban municipalities have some scope to improve their borrowing potential and, given the strain on traditional revenue resources, the possibility exists to explore extending resources and using more non-traditional revenue sources (such as PPPs). However, the financing sources available to smaller and rural municipalities are very limited, and an alternate arrangement is needed for infrastructure delivery in these areas.

9.7.2 Recommendations

With respect to improving the financing of municipal capital investments, the Commission recommends that:

1. The monitoring and evaluation of municipal capital planning and investment spending are improved. National and provincial treasuries should improve this assessment during municipal benchmarking exercises by:
 - a. Ensuring that capital budgets are realistic and financed, based on capacity to deliver and revenue assumptions.
 - b. Placing a greater emphasis on refurbishing and renewing existing infrastructure stock, as determined by the municipality's asset register
 - c. Ensuring that tariffs are appropriately designed, so that the depreciations costs of existing infrastructure and the funding of new infrastructure are recovered from the tariff. The design of such tariffs should explicitly consider the customer affordability and protection of the poor.
2. Municipalities use alternative and innovative methods to fund and deliver infrastructure, if capacity to plan and spend remains a concern. These municipalities should explore:
 - a. Increasing interaction and partnerships with other organs of state (such as Eskom and Water Boards).
 - b. Greater use of private-public partnerships (PPPs), including fully or partially outsourcing municipal services accompanied by effective contract management and appropriate risk transfer.
3. The PPP unit within the National Treasury improves its monitoring and evaluation of municipal PPPs. This should include:
 - a. Maintaining a dataset of existing municipal PPPs.
 - b. Evaluating the success/failures of existing PPPs and disseminating good practices and awareness of risks.
 - c. Quantifying the uptake of PPP agreements and assessing the current bottlenecks that discourage the use of PPPs.
4. Government explores a new funding and infrastructure delivery model for poorly resourced rural municipalities. It is clear that the capacity to service infrastructure needs in these areas is extremely inadequate. There is potentially a greater role for State-owned companies and other state agents to deliver infrastructure on behalf of these municipalities.

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The Impact of Electricity Price Increases on Municipalities

By: *Sasha Peters*

10.1 Contextual Background

Municipalities are constitutionally mandated to deliver basic services, including electricity (RSA, 1996). In South Africa, the government utility Eskom has a monopoly on the generation and transmission of electricity, and municipalities purchase bulk electricity from Eskom in order to fulfil their constitutional mandate of electricity distribution. During apartheid, electricity was subsidised and Eskom tariffs were kept low, declining in real terms between 1980 and 2007 (DME, 2008). This resulted in an inability to fund the development of new electricity-generation capacity required to keep pace with increased economic growth and electricity demand, and to carry out maintenance and rehabilitation of the electricity distribution network (Eskom, 2012). Eventually in 2008/09, after a loss of R9-billion threatened the sustainability of the electricity sector, Eskom received a government bailout. Since then, there has been a concerted shift towards tariffs that are more closely aligned to costs.⁷⁷ Because of the historical under-pricing, the tariff increases have been significant (between 2008 and 2011, electricity prices increased by 78% in real terms), raising concerns around affordability for end users (Eskom, 2012).

10.1.1 Problem statement

Tariff increases affect not only end users of electricity but also municipalities. The provision of electricity is a significant source of revenue (electricity tariffs represent approximately a third of total municipal revenue) and a major expenditure item for municipalities. Significant tariff increases, coupled with the poor economic environment, present a dilemma for municipalities because the electricity sector is subject to administered prices.⁷⁸ This means that prices (or end-user tariffs, in the case of electricity) are determined through a regulated framework, not through market supply and demand forces. Municipalities purchase bulk electricity at the given price and then resell electricity (at a high tariff) to end users. However, the National Energy Regulator of South Africa (Nersa) imposes regulatory restrictions that limit the extent to which tariffs can be increased, effectively limiting how much of the increased costs can be passed on to end users. This is a particularly important limitation in the context of developmental local government in South Africa, because revenues generated from electricity distribution enable municipalities to reinvest in the sector (ensuring ongoing service sustainability) and to cross-subsidise the delivery of electricity to poor households. Electricity losses and theft further exacerbate the situation. Municipalities have historically overpriced electricity, charging high tariffs and earning large surpluses. These surpluses, which should be reinvested in the electricity sector, are used to fund the delivery of non-electricity services and other expenditure items such as wages (Barnard, 2010; Bisseker, 2012). The consequence is that municipalities depend on electricity profits, beyond what is desirable and legislatively permissible.

In essence, local authorities have to make a number of difficult decisions regarding competing policy objectives. For example, providing free basic electricity (FBE) to poor consumers while (ostensibly) keeping tariffs affordable for other consumers (allowing cross-subsidisation to continue), and ensuring more efficient and sustainable service delivery through pursuing tariffs that are more cost reflective. Adding to the competing policy objectives is the increasing priority being given to environmental sustainability.

The objective of the current study was to establish the impact of electricity price increases on the revenue and expenditure of different categories of municipalities, and to make recommendations on how to minimise the impact of electricity price increases on different categories of municipalities.

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⁷⁷ In addition to costs related to 'production' of electricity, climate change concerns are creating pressures for increasing electricity prices.

⁷⁸ This is also the case for the telecommunications, transport and water sectors.

10.1.2 Electricity distribution in South Africa

Institutional and regulatory arrangements

In South Africa, the supply and distribution of electricity is state led. Through its state-owned entity, Eskom, national government is responsible for the bulk (96%) of electricity generation⁷⁹ and all transmission⁸⁰ (DME, 2008). Schedule 4b of the Constitution assigns responsibility for distributing electricity to municipalities (RSA, 1996). Although only metropolitan and local municipalities distribute electricity, municipalities are allowed to delegate service delivery to an entity.⁸¹ In practice, Eskom and licensed municipal distributors undertake the distribution activity. The municipality has to pay Eskom directly in cases where Eskom distributes electricity on its behalf.

Oversight of the electricity sector lies with Nersa. In terms of the Electricity Regulation Act, Nersa has wide-ranging powers to ensure regulatory compliance. Its role includes considering applications for constructing and operating distribution facilities, issuing rules to facilitate implementation of government's electricity sector policy and objectives, regulating prices and tariffs, enforcing performance and compliance, and acting against instances of non-compliance (RSA, 2006). Nersa is central in setting the tariffs (i) charged by Eskom to municipalities for generating electricity, and (ii) charged by municipalities to end users. Municipalities wishing to exceed the tariff increases charged to their end users are allowed to apply and motivate to Nersa for an above-guideline increase (permission for which is in most cases granted).

Various pieces of legislation further regulate the electricity distribution operations of municipalities:

- The FBE policy stipulates the minimum amount of electricity that each municipality must provide free of charge to poor households (DME, 2003). The amount of FBE is currently set at 50 kilowatt hours (kWh). National Treasury subsidises the delivery of FBE via the Local Government Equitable Share (LGES) allocation and uses a monthly income of R2300 as the threshold for determining indigent households (National Treasury, 2013). Municipalities may increase the amount of FBE provided and the monthly income threshold used to define indigent households, but all municipalities are expected to abide by the minimums set out in the FBE policy.
- The Municipal Systems Act (MSA) provides guidance to municipalities on the principles that should underpin the levying of fees for basic services. Section 74 outlines the items that revenue derived from electricity distribution should be spent on: capital, operating, maintenance, administration, replacement costs and interest. Essentially revenue earned via tariffs should be reinvested in the sector. Section 74 of the MSA calls for special tariffs or subsidisation of service delivery to poor households, while non-poor users should be charged tariffs that are reasonably associated with costs of provision (RSA, 2000).
- The Municipal Finance Management Act (MFMA), in Sections 41 and 42, manages the interface between state utilities (in this case, Eskom, a municipality, and National Treasury) and regulatory agencies within a sector (Nersa). In accordance with the MFMA, Eskom must report monthly to National Treasury on the amount paid by each municipality for bulk electricity, any arrears, and actions taken to recover arrears. In terms of Section 42 of the MFMA, Eskom must submit plans for any increase in the price of bulk electricity to both the Department of Energy and Nersa. Eskom's submission must contain the written views of National Treasury, the South African Local Government Association (SALGA) or any municipality, and must explain how these views have been taken into account (RSA, 2004a).
- The Municipal Fiscal Powers and Functions Act (MFPFA) regulates the imposition of surcharges on electricity tariffs by municipalities (RSA, 2007). Revenue from tariffs and revenue from surcharges are governed by different pieces of legislation and have different purposes. Revenue from tariffs must be reinvested in the sector (as detailed in the MSA) but, as a surcharge is a municipal tax, revenue from surcharges can be used for general expenditure.

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⁷⁹ Chapter 1 of the Electricity Regulation Act (RSA, 2006) defines electricity generation as "the production of electricity by any means".

⁸⁰ Chapter 1 of the Electricity Regulation Act (RSA, 2006) defines electricity transmission as "the conveyance of electricity through a transmission power system".

⁸¹ According to Chapter 1 of the Municipal Systems Act (RSA, 2000), a municipal entity refers to "a company, co-operative, trust, fund or any other corporate entity established in terms of any applicable national or provincial legislation and which operates under the ownership control of one or more municipalities and includes in the case of a company under such ownership control, any subsidiaries of that company".

Figure 92: Structure of the electricity distribution sector in South Africa

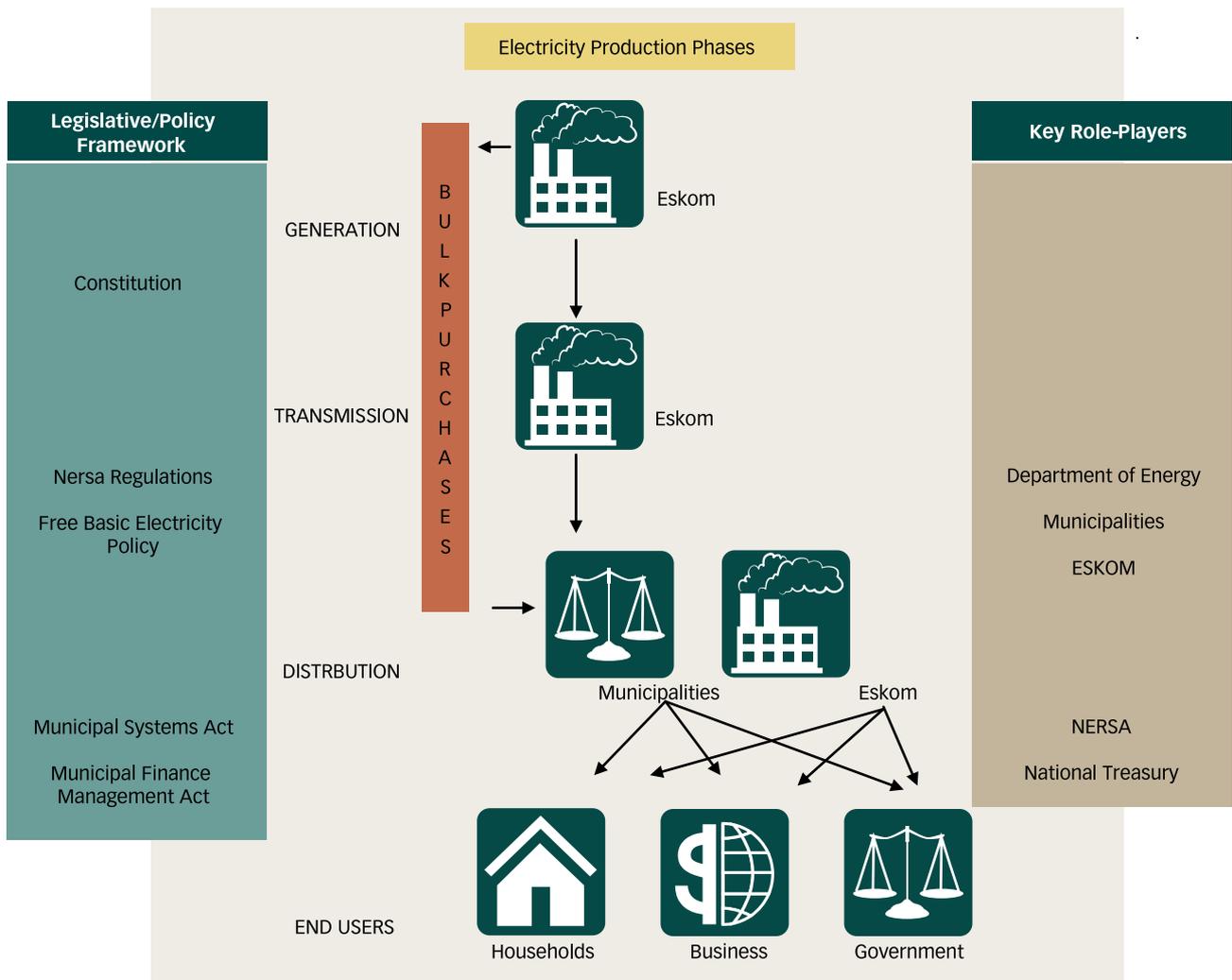


Figure 92 illustrates the structure and various role-players in the electricity distribution industry.

Financing electricity distribution

Distribution of electricity entails significant operating revenues and expenditures for municipalities. These two aspects of electricity distribution are considered below. In order to take a differentiated view of municipalities, the analysis is based on a five-pronged categorisation of municipalities: metropolitan municipalities, secondary cities, large towns, small towns and rural municipalities.⁸²

Municipal revenues derived from electricity services

Municipal operating revenue consists of own revenue and intergovernmental transfers. The provision of electricity is a significant source of revenue (electricity tariffs represent approximately a third of total municipal revenue). Having said that, as Table 94 shows, electricity dominates own revenues for the eight metros.

Various factors can restrict the extent of revenue derived from electricity, including non-payment (stemming from consumer inability or unwillingness to pay) or regulations that limit the size of tariffs that can be applied.

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⁸² Only metropolitan and local municipalities distribute electricity.

Table 94: Budgeted electricity operating revenue as a percentage of total operating revenue, (2006/07–2012/13)

Municipal category	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Metros	26.2%	26.4%	27.6%	33.7%	32.6%	35.1%	38.6%
Secondary cities	31.5%	28.6%	27.7%	34.1%	36.9%	39.3%	41.9%
Large towns	26.2%	25.1%	24.5%	26.4%	27.4%	29.5%	30.6%
Small towns	23.5%	24.7%	22.9%	25.2%	23.7%	23.8%	24.6%
Mostly rural	8.2%	8.1%	8.0%	8.8%	5.6%	5.5%	5.8%
Total operating revenue	24.3%	24.2%	24.6%	29.1%	28.8%	31.3%	34.1%

Source: National Treasury (2011)

Various factors can restrict the extent of revenue derived from electricity, including non-payment (stemming from consumer inability or unwillingness to pay) or regulations that limit the size of tariffs that can be applied.

Figure 93 illustrates the decline in the surplus generated available to municipalities from the distribution of electricity between 2006/07 and 2012/13. A decline in surplus affects the extent to which cross-subsidisation can be used to fund delivery of other basic services and/or to fund distribution of electricity to lower income households. Given that losses are likely, municipalities will have to make difficult decisions on how to use even more limited resources to fulfil their constitutional mandates.

Figure 93: Electricity net surplus, by category of municipality (2006/07–2012/13) (R' million)



Source: National Treasury (2013)

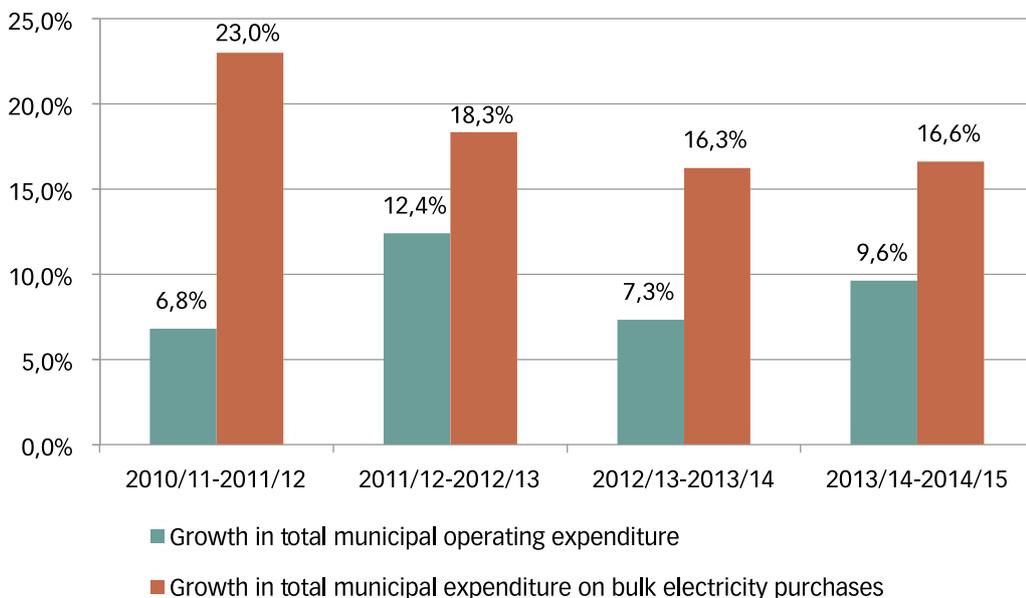
Municipalities also receive intergovernmental grants such as the LGES allocation (which is targeted at enabling municipalities to provide FBS) and various conditional grants aimed at assisting municipalities in extending access to electricity. Currently, through the LGES allocation, municipalities receive a subsidy for each basic service (energy, water, sanitation and refuse removal). As at 2013, the energy subsidy is R56.29, which is then multiplied by the number of households earning below R2300 per month to arrive at the total energy subsidy allocated to a municipality (National Treasury, 2013). Revenue from the LGES allocation is aimed at supplementing the operational and maintenance costs associated with the provision of electricity.

As part of the 2013 Division of Revenue, three electricity-related conditional grants are allocated: the Energy Efficiency and Demand Side Management Grant, and the Integrated National Electrification Programme Grant, which is divided into two: one for municipalities and one for Eskom. Conditional grants are typically used to assist municipalities with capital funding. This is the case with respect to the Integrated National Electrification Programme conditional grant, where the funding is aimed at addressing the electrification backlog, installing bulk infrastructure and addressing rehabilitation and refurbishment needs.

Municipal expenditure on electricity services

Given Eskom’s monopoly of electricity generation and transmission, municipal distributors purchase bulk electricity from Eskom at wholesale pricing, which incorporates wholesale energy charges and transmission charges (DME, 2008). In terms of distributing electricity, this is the major operational expenditure item affecting municipalities. The exact cost at which municipalities purchase electricity from Eskom varies and is based on geographic distance, maximum demand and the pattern of demand (Nedlac, 2010). Figure 94 illustrates the growth in total operating expenditure relative to the growth in expenditure on bulk electricity purchases. In each of the years reviewed, the growth in expenditure on bulk electricity purchases exceeds total growth in operating expenditure.

Figure 94: Growth in total municipal operating expenditure relative to growth in total municipal expenditure on bulk electricity purchases (2010/11–2014/15)



Source: Author’s calculations based on National Treasury data

In 2009, Eskom applied to Nersa for approval to implement a 31.3% increase in electricity-generation tariffs. Since then, Nersa has regularly approved significant increases to Eskom for the generation and sale of bulk electricity: 24.8% for 2010/11, 25.8% for 2011/12 and 25.9% for 2012/13. The large increases are set to continue until 2016, when Eskom has indicated that it will return to inflation-based tariff increases (National Treasury, 2011: 151).

The current emphasis on environmental sustainability has implications for the price that municipal distributors will pay for the purchase of bulk electricity. Developments such as the pending implementation of a carbon tax, which has been postponed to 2016, the already implemented National Environmental Management Air Quality Act of 2004 (RSA, 2004b) and the 2012 National Framework for Air Quality Management (DEA, 2013) all entail compliance costs for Eskom. Ultimately, the associated costs of compliance will get transferred to end users – whether directly from Eskom to end users or via municipal distributors to end users. In the case of municipal distributors, these increased costs are likely to be transferred via higher prices for bulk electricity purchases. It is therefore important to understand the effect of increasing bulk electricity costs on the expenditure and revenue of municipalities.

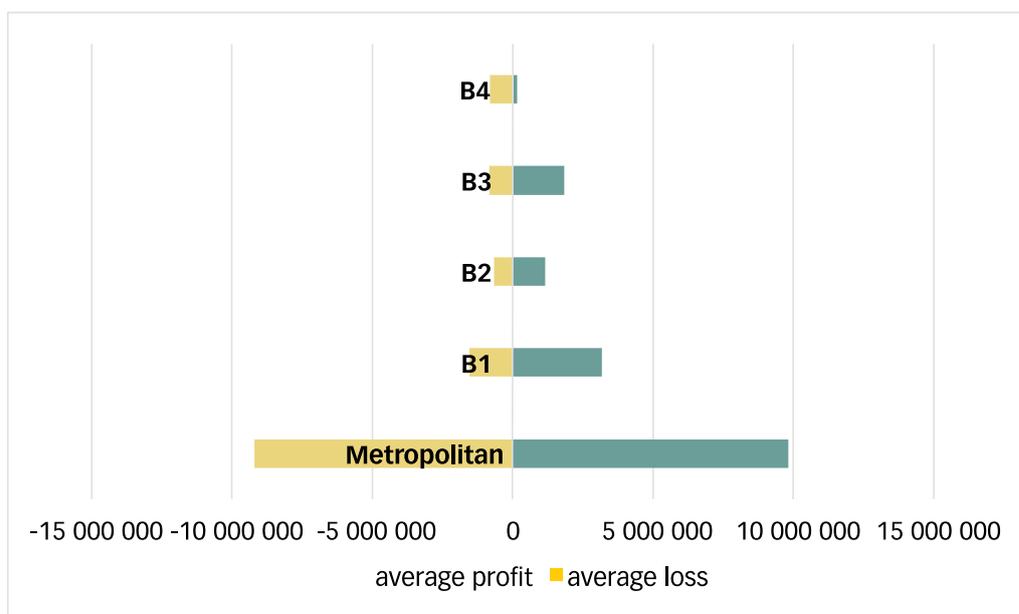
Reinvesting in the electricity sector and cross-subsidisation

Revenue raised through tariffs in a particular sector is aimed, in the first instance, at funding reinvestment in that sector. Section 74(2)(d) of the MSA (RSA, 2000) envisages tariff revenues being reinvested in capital, operating, maintenance, administration and replacement-related costs associated with a service. This provision is particularly important, as it is aimed at ensuring that infrastructure underpinning a service is well cared for in terms of effective spending on maintenance and asset renewal. Within the electricity distribution industry, this reinvestment has not been taking place as well as it should have been. Research by the Commission (FFC, 2013) indicates that municipalities under-budget and under-spend on maintenance and renewals. In 2011/12, municipalities (in aggregate) under-budgeted by R5-billion and under-spent by nearly R10-billion on general maintenance. Within the electricity distribution industry, a backlog in terms of asset renewal of between R8-billion and R41-billion exists. These figures underline two important points. The first is that the infrastructure underpinning electricity distribution is in a state of decay, thus threatening the ongoing, sustainable distribution of electricity. The second is that tariff revenue is most likely being used to cross-subsidise other forms of municipal spending.

Figure 95 illustrates the average difference between revenue and expenditure earned, by municipal category, in seven areas of service delivery: electricity, water, waste water management, waste management, health, housing, and road transport. The average is based on 2010/11, 2011/12 and 2012/13.

With respect to metropolitan municipalities, the operating revenue from particularly electricity, but also water and waste water management, far exceeds the operating expenditure for these services (i.e. a profit). On the other hand, the revenue from waste management, municipal health, housing, and road transport is smaller than the operating expenditure for these services (implying a loss). The size of the 'profit' earned from electricity, water and waste water management is similar to the size of the 'loss' recorded for waste management, municipal health, housing, and road transport, thus pointing to a probable and significant case of cross-subsidisation between services. At the other end of the spectrum, rural municipalities (B4) do not earn enough revenue to cover their significant losses. Secondary cities (B1), large towns (B2) and medium to small towns (B3) all appear to be able to cover their losses without using the full profits earned.

Figure 95: Cross-subsidisation, by municipal category



Source: Author's calculations based on National Treasury data

Municipalities are meant to use tariff revenue to ensure the ongoing viability of the service for which it was earned. However, Figure 95 suggest that municipalities are failing to do so, in the process endangering the continuity and quality of service delivery. In this regard, surcharges are interesting, as they can be used by municipalities to fund cross-subsidisation, without endangering areas of key service delivery infrastructure.

Section 229 of the Constitution empowers municipalities to apply surcharges (RSA, 1996). A surcharge refers to a charge in excess of the municipal tariff that a municipality may impose on fees for a municipal service provided (RSA, 2007). In contrast to revenue from a tariff, which should be reinvested in the sector from which it originates, revenue earned from surcharges are viewed as general revenue, and can thus be reinvested more broadly within a municipality. One of the express aims of the MFPFA is to regulate “the exercise by municipalities of their power to impose surcharges on fees for services provided” (RSA, 2007). Chapter 3 of the MFPFA relates to norms and standards to guide the application of surcharges by municipalities. Responsibility for devising these guidelines lies with the Minister of Finance. The Act envisages that the norms and standards will provide prescriptions on the following:

- The maximum surcharge that can be applied by a municipality.
- Bands or ranges within which surcharges may be imposed.
- How to apply a differentiated approach to the application of surcharges; for example, guidelines may differ based on municipal category, capacity or the service in question.

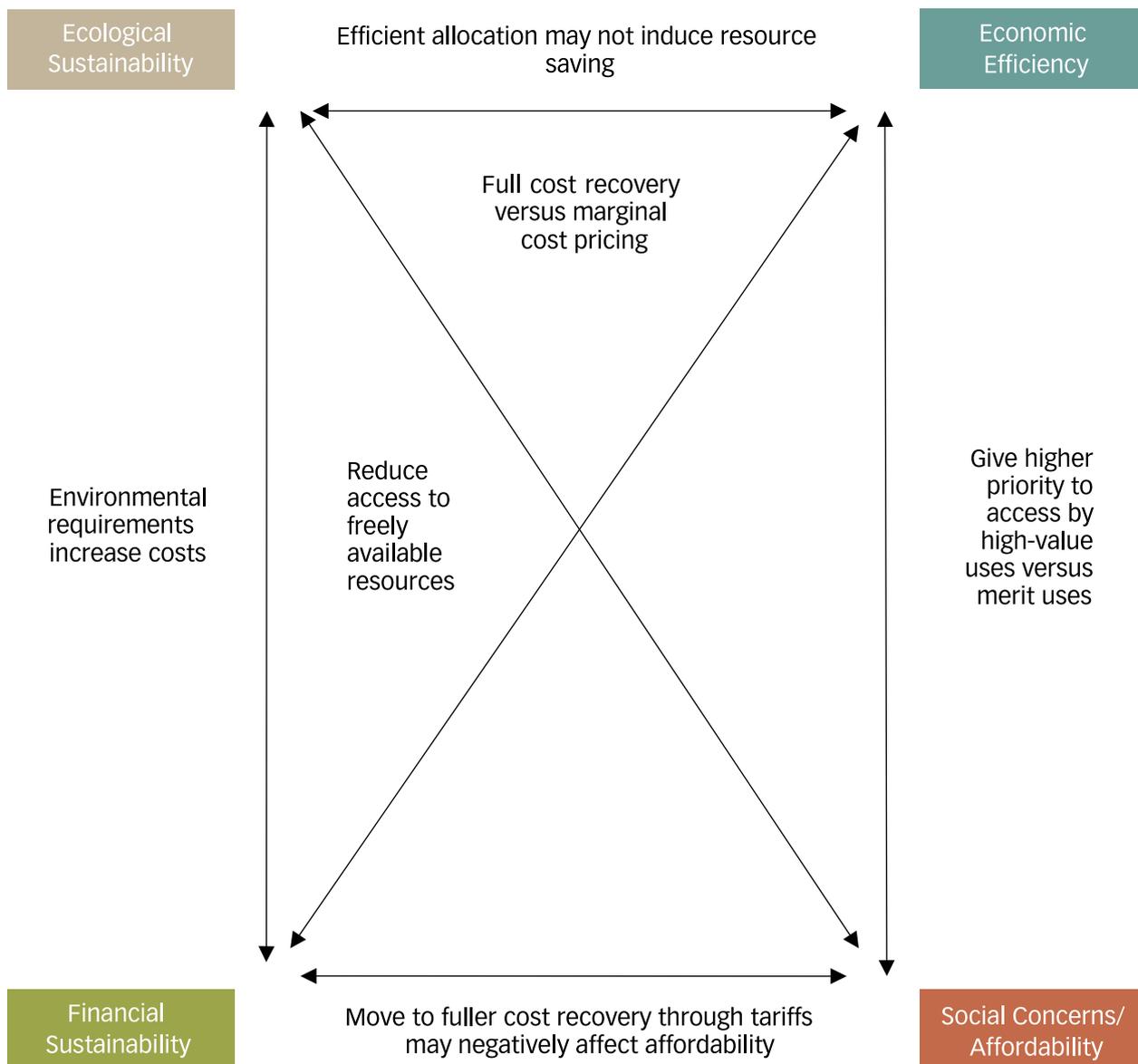
The legislation thus envisages robust norms and standards. However, to date, this section of the MFPFA remains inactive. In practice, it is difficult to determine where the tariff for a service ends and a surcharge begins. What is seen as overpricing could in fact be what municipalities are implementing as a surcharge. For clarity, the practice around surcharges relative to tariffs needs to be regulated. In this regard, National Treasury should devise norms and standards as articulated in the MFPFA. Such regulations would make possible improved oversight of the extent of revenue that should be reinvested in a particular sector, relative to what can be used to cross-subsidise other services.

Apart from adding much-needed transparency, a key implication of applying formal norms and standards to the practice of cross-subsidisation would most likely be the setting of upper limits that would restrict the extent to which cross-subsidisation could occur. This would increase the need for alternative local government revenue sources, such as a local business tax and others. As shown, electricity is an important source of revenue for municipalities, but potential developments in the sector threaten to negatively affect municipal revenue derived from electricity. For example, a shift toward using non-grid energy and renewable technologies by businesses and those households that can afford the initial high costs. Therefore, municipalities need to be innovative and creative about possible alternative sources of revenue. Section 229(1)(a) of the Constitution and Chapter 2 of the Municipal Fiscal Powers and Function Act of 2007 permit such creativity.

10.2 Literature Review

The centrality of electricity revenue and expenditure within a municipality's finances is unquestionable. Revenue earned from electricity goes a long way towards enabling municipalities to meet their developmental role as envisaged in the Constitution. However, the pressure of increasing electricity costs places at risk the very sustainability of a municipality. Gawel and Bretschneider (2011) provide a comprehensive summary of the trade-offs that municipal officials face. While they refer to the water sector, similar parallels can be drawn for the municipal electricity distribution sector. Striving for financial and ecological sustainability and economic efficiency negatively affects affordability and subsequently the ability of poorer households to access electricity. Gawel and Bretschneider (2011) emphasise the importance of comprehensive data on poverty, and willingness to pay, as a means of setting accurate affordability limits.

Figure 96: Trade-offs affecting tariff levels and structures



Source: Gawel and Bretschneider, 2011.

Several studies have evaluated the impact of specific factors on municipal expenditure, with many focusing on economies of scale in delivering municipal services. However, very few incorporate the costs of service delivery, let alone the parameter of bulk purchases.

Kushner et al. (1996) use a model that includes variables, which capture aspects of municipal population such as size and density, age distribution and the relative wealth of municipalities. They find that municipal expenditure increases with population, implying no economies of scale. This confirms an earlier analysis carried out by Bodkin and Conklin (1971) who used a model that had a similar functional form to Kushner et al.'s model. However, Bodkin and Conklin are very specific regarding the shortcomings of their model due to lack of data on factor prices, product prices and a variable capturing the quality of municipal goods provided.

Using spending data from 247 counties in the United States, Ladd (1992) uses a piecewise linear-regression model to evaluate the impact of population growth and density on government expenditure. Unlike the work by Kushner et al. (1996) and Bodkin and Conklin (1971), Ladd's model factors in aspects of demand and, more importantly, the cost of public services. Ladd uses a combination of input costs (e.g. wages) and indirect/environmental cost factors, which are described as aspects over which the municipality does not have control. One such variable is population density, which can affect the cost of delivering a good/service as a result of economies or diseconomies of scale. This is important in the South African context, since the distribution of electricity may be cheaper where density is higher than in more remote parts of a municipality.

Empirical studies on determinants of municipal revenue are less common than on determinants of municipal expenditure. In an evaluation of local tax effort across 200 municipalities in El Salvador, Gallagher (2001) finds that the major determinants of local tax revenue are economic and demographic factors, i.e. the extent of poverty, the size of the population and the level of urbanisation. Luo and Douglas (1996) evaluate the determinants of revenue effort, which (as opposed to revenue capacity) refers to actual revenues collected. Given the emphasis on revenue effort, which is similar to the focus required in the revenue model used in this paper, the specification of Luo and Douglas' model is particularly relevant.

Borge and Rattso (2003) evaluate the relationship between costs and user charges in the sewage industry, focusing specifically on the extent to which higher unit costs are passed on to consumers in the form of higher user charges. Their model is based on two equations (one for unit cost and one for user charge) and uses instruments to mitigate the problem of simultaneity, whereby unit cost is a possible endogenous variable in determining cost and vice versa. Their findings indicate that the relationship between cost and user charges is very robust and that 40% of a cost increase is passed on to the end user. In the South African scenario, an evaluation of this nature would be interesting for two reasons: (i) the extent to which municipalities are allowed to pass on increased costs to end users is regulated; and (ii) if they pass on greater costs to end users, municipalities may inadvertently affect redistribution, given that unaffordable tariffs may prompt non-payment.

10.3 Research Methodology

Econometric modelling was used to quantify the impact of increases in electricity prices on municipal expenditure and revenues. Panel data spanning a ten-year period (2003/04–2012/13) was used in the revenue and expenditure models. A fixed effects (FE) model was used to account for the unique, time-invariant characteristics of municipalities, and its appropriateness was confirmed with a Hausman test. Interaction variables were used to be able to distinguish the impact of electricity price increases on a metropolitan municipality from the impact on a large town. An interaction occurs when the magnitude of the effect of one independent variable (X) on a dependent variable (Y) varies as a function of a second independent variable (Z). Here the effect of an increase in bulk electricity prices on expenditure or revenue will vary according to the category of municipality. Two models were estimated, one looking at the impact of price increases on municipal expenditure and the other focusing on the impact on revenue. Given that bulk electricity purchases are the main cost that municipalities incur in the distribution of electricity, the annual increases in bulk electricity purchase costs were used. This information was sourced from Nersa, while municipal financial data was sourced from National Treasury's local government database and Section 71 reports.

10.3.1 Expenditure model

The estimating equation for the expenditure model is shown below. Increases in the price of bulk electricity purchases are used as a proxy for electricity price increases. The reason for using a proxy is that there are inter- and intra-municipal differences in the electricity prices charged by the 237 municipalities that distribute electricity. However, in the case of all municipal electricity distributors, electricity bulk purchases is the dominant determinant of electricity tariffs charged, determining 70% of the tariff charged to households and thus serving as a good proxy for electricity price increases. Where applicable, all variables are specified in per capita logarithmic form. The basic estimating equation for the expenditure model is as follows:

$$EXP_{it} = \alpha_i + \beta_1 LX_{it} + \beta_2 LZ_{it} + n_i + \epsilon_{it}$$

Where: EXP_{it} = natural logarithm of per capita municipal expenditure in municipality i in year t

X_{it} = percentage increases in bulk electricity purchase costs (the parameter of interest)

Z_{it} = control variables, including population size, indicators of demand (e.g. the number of formal and informal households, wealth of the municipality as proxied by its GVA and annual disposable income) and an intergovernmental variable proxied by grants and subsidies and population density.

n_i = denotes that this is an FE model

Explanation of variables

The variable of interest (increases in bulk electricity purchase costs) and the various control variables used in the expenditure model are listed in Table 95, along with the anticipated signs and accompanying rationales.

Table 95: Explanation of variables (expenditure model)

Variable	Source of data	Expenditure model: Expected sign and rationale
Population in log form	Regional Explorer Database, IHS Global Insight	Positive sign. Population is associated with demand for services. Higher population is associated with higher per capita spending (Ladd, 1992).
Population density	Regional Explorer Database, IHS Global Insight	Inconclusive. Ladd finds a U-shaped impact of density of spending – when density exceeds 250 people per square metre, economies of scale diminish (Ladd, 1992). Kushner et al. (1996) find that regionalisation does not have a significant impact on expenditure per capita.
Disposable income per capita in log form	Regional Explorer Database, IHS Global Insight	Positive sign.
Formal and informal households in log form	Regional Explorer Database, IHS Global Insight	Indicative of the demand for certain services. Kushner et al. (1996) and Ladd (1992) note the importance of including aspects of demand in the model specification.
Wealth of a municipality as measured through GVA per capita in log form	Regional Explorer Database, IHS Global Insight	Positive sign. Kushner et al. (1996) find that commercial development stimulates per capita spending to service the development.
Intergovernmental grants per capita in log form	Section 71 reports, National Treasury	Positive sign. Increasing resources to municipalities results in increased spending (Ladd, 1992).
Increases in bulk electricity costs	Section 71 reports, National Treasury	Ladd factors in the impact of input costs (specifically wages) on municipal per capita spending. According to Ladd, increases in input costs lead to increased expenditure but will have a negative price effect on the demand for services, thus leading to the expectation of a positive but small coefficient (Ladd, 1992).

10.3.2 Revenue model

The following equation is used to model the impact of increasing electricity prices on revenue:

$$LREV_{it} = \alpha_i + \beta_1 LX_{it} + \beta_2 LZ_{it} + n_i + \epsilon_{it}$$

Where: $LREV_{it}$ = natural logarithm of per capita municipal revenue in municipality i in year t

X_{it} = percentage increases in bulk electricity purchase costs (the parameter of interest)

LZ_{it} = control variables, including poverty levels (proxied by annual disposable income), the age distribution within a municipality (specifically those over 15 years old and under 65 years old), and the GVA-R.

n_i = denotes that this is an FE model

Explanation of variables

Table 96 lists the variable of interest (increases in bulk electricity purchase costs) and the various control variables used in the revenue model, along with the anticipated signs and accompanying rationales.

Table 96: Explanation of variables (revenue model)

Variable	Source of data	Expenditure model: Expected sign and rationale
Population in log form	Regional Explorer Database, IHS Global Insight	Positive sign.
Disposable income per capita in log form	Regional Explorer Database, IHS Global Insight	Positive sign. The higher the level of disposable income, the better off people are in a municipality, therefore the more able they are to pay for services.
Formal and informal households in log form	Regional Explorer Database, IHS Global Insight	The housing variable is indicative of demand for services. It is expected that an increase in formal households will have a positive impact on revenue.
Wealth of a municipality as measured through GVA per capita in log form	Regional Explorer Database, IHS Global Insight	Positive sign. It is assumed that the wealthier a municipality, the better the quality of the services that it delivers and therefore the higher the income generated.
Intergovernmental grants per capita in log form	Section 71 reports, National Treasury	Positive sign. It is assumed that when electricity sales increase, revenue will increase.
Electricity sales	Section 71 reports, National Treasury	Positive sign. It is assumed that when electricity sales increase, revenue will increase.
Increases in bulk electricity costs	Section 71 reports, National Treasury	As noted by Ladd (1992), increases in input costs lead to increased expenditure but will have a negative price effect on the demand for services, thus implying a negative relationship between bulk electricity costs and revenue.

10.4 Findings from Econometric Modelling

10.4.1 Impact of the cost of bulk electricity purchases on municipal expenditure

Table 97 shows the results from the expenditure model by different categories of municipalities (metropolitan municipalities, secondary cities, large towns and medium to small towns). The following should be noted:

- Considering the general impact of increases in bulk electricity costs on municipal expenditure can be misleading because it suggests that increases in bulk electricity prices result in an increase in municipal expenditure, and that municipalities simply pay the higher price. However, including interaction variables reveals that the increase in bulk electricity purchase costs has a statistically significant and negative impact on expenditure across all municipal categories, particularly the metros. Given urbanisation and the greater demand for basic services in metros, increases in input costs would be expected to affect output.
- Using municipal expenditure as a proxy for output suggests that increases in bulk electricity prices have a negative impact on municipal electricity distribution.

Table 97: Impact of the cost of bulk electricity purchases on municipal revenue

Independent variables (in log form where applicable)	Coefficient	P> 0
Population	-0.402	0.000
Government grants per capita	0.474	0.000
GVA per capita	0.144	0.002
Formal housing	-0.084	0.043
Informal housing	-0.058	0.013
Increases in bulk electricity purchase costs	0.481	0.000
Increases in bulk electricity purchase costs: metros	-1.049	0.006
Increases in bulk electricity purchase costs: secondary cities	-0.118	0.598
Increases in bulk electricity purchase costs: large towns	-0.636	0.002
Increases in bulk electricity purchase costs: medium to small towns	-0.483	0.001

Source: Author's calculations

10.4.2 Impact of the cost of bulk electricity purchases on municipal revenue

An increase in the cost of bulk electricity purchases was found to have a statistically significant and negative impact on municipal revenue in all categories of municipalities, particularly metros and large towns.

Table 98: Impact of the cost of bulk electricity purchases on municipal expenditure

Independent variables (in log form where applicable)	Coefficient	P> 0
Population	-0.315	0.000
Total disposable income per capita	0.274	0.042
GVA per capita	0.114	0.371
Government grants per capita	0.494	0.000
Formal housing	-0.014	0.675
Informal housing	-0.036	0.067
Increases in bulk electricity purchase costs	0.747	0.000
Increases in bulk electricity purchase costs: metros	-1.372	0.000
Increases in bulk electricity purchase costs: secondary cities	-0.878	0.000
Increases in bulk electricity purchase costs: large towns	-1.089	0.000
Increases in bulk electricity purchases: medium to small towns	-0.815	0.000

Source: Author's calculations

10.4.3 Implications of findings

The modelling indicates a negative relationship between price increases in bulk electricity purchases and municipal expenditure, revenue and electricity surplus. The structure of the data (and indeed reporting in most municipalities) does not indicate the difference between tariff revenue and surcharge revenue. Thus, while the revenue of municipalities is clearly affected by these price increases, what is not clear is which source of revenue – revenue from tariffs or revenue from surcharges – is more severely affected. This is an important distinction for two reasons:

1. A negative effect on municipal revenue could jeopardise reinvestment in maintenance and revenue. Section 74(2)(d) of the MSA (RSA, 2000) envisages tariff revenues being reinvested in capital, operating, maintenance, administration and replacement-related costs associated with a service. This provision is important and is aimed at ensuring that the infrastructure underpinning a service is well cared for through effective spending on maintenance and asset renewal.
2. A negative impact on surcharge revenue, which can be used for general expenditure or cross-subsidisation or other municipal services, means that there may still be scope for increases in bulk electricity purchase costs, but with the understanding that this will limit the ability of the municipality to cross-subsidise other expenditures.

Given the above, government should consider implementing ways of ensuring greater clarity/transparency around the application of surcharges. This will assist in determining the difference between revenue raised through tariff revenue and surcharge revenue and, by consequence, the extent to which resources should be used for reinvestment relative to cross-subsidisation/general expenditure.

Major developments within the energy landscape are the completion of two coal-fired power stations (Medupi and Kusile) and new rules and regulations to ensure environmental sustainability: for example, the implementation of a carbon tax (postponed to 2016), the National Environmental Management Air Quality Act of 2004 (RSA, 2004b) and the 2012 National Framework for Air Quality Management (DEA, 2013). Compliance with these regulations will affect Eskom and the associated costs of compliance will be transferred to end users, either directly from Eskom or via municipal distributors. In the case of municipal distributors, these increased costs are likely to be transferred via higher prices for bulk electricity purchases. Therefore, government needs to manage the risks to municipalities associated with substantial future increases in the price of bulk electricity purchases. Such a plan should consider the possible implications of such price increases for municipal expenditure (to the extent that increases may crowd out expenditure on other items) and revenue (to the extent that revenue needed to fund maintenance, asset renewal or cross-subsidisation may be eroded).

10.5 Recommendations

Based on the analysis, the following recommendations are made:

- **Recommendation 1:** To increase transparency with regard to tariff revenue and surcharges for cross-subsidisation, norms and standards should be devised to guide municipalities on the application of surcharges (as envisaged in terms of the MFPFA). As described in Section 3 of that Act, the norms and standards need to take a differentiated approach, based on both the category and capacity of a municipality and the service in question.

Justification: Due to lack of transparency, it is difficult to say whether electricity tariff revenue, or surcharges on electricity tariffs, are being more severely affected by increases in the price of bulk electricity purchases.

- **Recommendation 2:** These norms and standards should be strictly enforced and used by oversight bodies to determine the extent to which reinvestment should be happening within a particular sector, relative to cross-subsidisation of non-sector expenditure.

Justification: As outlined in the MSA and the MFPFA, revenue earned via tariffs has very different uses from revenue derived from surcharges on a tariff, with the former meant to be reinvested in the sector, while the latter can be used for general expenditure, including cross-subsidisation. To ensure a balance in this regard, municipalities require both better enforcement and guidance.

- **Recommendation 3:** Developments aimed at prioritising environmental sustainability may increase the cost of bulk electricity purchases, which will in all likelihood be passed on to municipal electricity distributors. This will endanger the sustainability of the sector and the ability of a municipality to cross-subsidise service delivery to lower income groups. Government thus needs to put in place a plan to manage the risks associated with increases in the price of bulk electricity purchases.

Justification: Government has emphasised its commitment to ensuring environmental sustainability, as evident, for example, in the pending implementation of a carbon tax (postponed to 2016), the already implemented National Environmental Management Air Quality Act (RSA, 2004b) and the 2012 National Framework for Air Quality Management (DEA, 2013). Compliance with these regulations will affect Eskom and the associated costs of compliance will get transferred to end users, whether directly or via municipal distributors. In the latter case, these increased costs are likely to be transferred via higher prices for bulk electricity purchases. As the modelling in this chapter shows, increases in the price of bulk electricity purchases have a negative impact on the revenue of municipalities and thus on their ability to meet their mandate of basic service delivery.

10.6 References

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Adequacy and Efficiency in Primary Health Care Financing

By: Nomonde Madubula, René Glynnis English, Thesandree Padayachee and Njabulo Mkhize

11.1 Introduction

This chapter assesses the adequacy of public health care funding, looks at how health care budgets are allocated across provinces and ascertains the efficiency and spending pressures of the sector. The study is in line with the theme of the Submission for the Division of Revenue (DoR) 2015/16, "Balancing fiscal sustainability with socio-economic impact" (FFC, 2013), and with the National Development Plan (NDP) (NPC, 2012). The NDP, among other things, puts forward a set of goals, indicators and action points towards the realisation of the 2030 vision. These include public health care reforms so that universal coverage can be achieved.

In South Africa, public sector funding for health care equals about 14% of the total government budget and 4% of GDP (National Treasury, 2010: 112). Table 99 shows that spending on the health care sector increased over the six-year period 2008/09–2013/14. Provinces account for 90% of total public health care spending, while medical aids constitute 80% of private health care spending. In 2010/11 provincial health care spending was close to R100-billion in real terms, with an annual real growth of 5%. This trend is expected to continue, given the envisaged implementation of National Health Insurance (NHI). Relative to national government, provinces carry a higher proportional share of health budgets because they implement the policies set by national government in terms of the Constitution (RSA, 1996) and the National Health Act (RSA, 2003). One of the roles of provincial departments of health is to implement public health care norms and standards and provide health care services.

Table 99: Consolidated funding flows in the South African health sector

R million	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Annual real change 2008/2009 - 2013/2014
Public Sector							
Department of Health	1436	1 645	1 736	1 784	1 864	1961	0,90%
Provincial Health Departments	75 120	88 593	98 066	110 014	119 003	126 831	5,30%
Defence	2 177	2 483	2 770	2 961	3 201	3 377	3,60%
Correctional Services	282	300	318	339	356	374	0,40%
Local government (own revenue)	1 793	1 829	1 865	1 977	2 096	2 221	-1,00%
Workman's compensation	1 415	1 529	1 651	1 718	1 804	1 894	0,50%
Road Accident Fund	797	740	860	980	1 029	1080	0,80%
Education	2 134	2 350	2 503	2 653	2 812	2 981	1,40%
Total public sector health	85 154	99 469	109 769	122 426	132 165	140 719	4,90%
Private Sector							
Medical Scheme	74 089	84 863	90 973	98 069	105 718	113 964	0,00%
Out-of-pocket	15 429	16 200	17 172	18 202	19 294	20 452	3,40%
Medical insurance	2 452	2 660	2 870	3 094	3 336	3 596	0,30%
Employer private	1 172	1 271	1 372	1 479	1 594	1 718	2,40%
Total private sector health	93 142	104 994	112 387	120 844	129 942	139 730	2,40%
Donors or NGOs	5 212	6 319	5 787	5 308	5 574	5 853	-2,90%
Total	183 508	210 782	227 943	248 578	267 681	286 302	3,70%

Source: National Treasury (2009, 2013)

Blecher et al. (2011) characterise South Africa's health system as 'dichotomised', in the sense that it comprises both public and private sectors. The public sector is characterised by insufficient resources and systems to deliver adequate health services to the majority of the population, while in parallel a highly resourced private sector serves a relatively small population. Even though a substantial budget is allocated to the public health care sector, the quality of health care is poor and inequities in health access have widened (Blecher et al., 2011; Thomas et al., 2000). The inequality and polarisation of the health care system is rooted in and fuelled by the funding and institutional arrangements that give rise to inefficiencies (Botha and Hendricks, 2008). These inefficiencies take the form of inadequate human resources, incoherent funding arrangements and governance of the district health services, limited powers of hospital managers over the budget, suboptimal public-private mix and redistribution of resources in favour of the public sector, and cost escalation.

Despite increased spending, the health sector faces many challenges, such as substandard quality of care, inefficiencies in the system, the heavy burden of disease, input cost pressures, a growing uninsured population, inequitable distribution of resources and the widely held perception that health care is underfunded. If left unaddressed, these challenges will continue to undermine the performance and delivery of the health care system and negatively affect progress towards the implementation of NHI. They will also undermine progress towards reaching the Millennium Development Goals (MDGs) for improving equity and quality of health care (Botha and Hendricks, 2008) and the key objectives of the NDP.

Debates about whether the health care system is underfunded are not new and have generated significant scholarly discourses, both locally and internationally. In South Africa, provinces receive funding for health care via the provincial equitable share (PES) and transmit these funds to provincial health programme structures (i.e. district health services). The largest part of the provincial health budget is consumed by district health services, which is where primary health care (PHC) is located. However, the per capita expenditure at district level varies significantly across provinces and is an indication of funding inequities in the system (Blecher et al., 2008). These variations point to the need for a more equitable approach in determining resource allocation and increased capacity to absorb and spend funds effectively.

District health services are the primary drivers of PHC, and their malfunction (because of budgetary issues or inefficiencies) can have serious consequences for the quality of health care. Provincial health departments allocate funding through the different provincial programmes. Yet no PHC financing policy or resource allocation mechanism is in place to ensure that funding is in line with the agreed set of packages that need to be delivered, despite the importance of PHC in meeting national health policy goals (Thomas et al., 2004). Inefficiencies in the South African public health care system are often misunderstood and overshadowed by the financing and payment processes. Such problems will perpetuate unless these inefficiencies are addressed before implementing reforms that require a significant increase in health budgets (Christian and Crisp, 2012). Inefficiencies in the public health care system can be traced back to the 1990s (McIntyre and Owen, 1994). In the 1990s, fragmented and duplicated health service provision and administration resulted in a lack of coordination, few incentives for personnel to contain costs or allocate resources efficiently, and the mal-distribution of personnel and facilities between the different levels of care; i.e. the undersupply of PHC facilities and oversupply of tertiary health care, leading to inappropriate use of services.

In previous submissions on the division of revenue (FFC, 2000), the Commission proposed that health care funding should be based on norms, i.e. determined through the costed norms approach (CNA). This was seen as an efficient way of costing basic health care services provided by provinces (i.e. PHC services), while the other health care services would be covered in the basic element of the PES formula or conditional grants. The Commission also suggested that basic health care services should include a complex bundle of different types of services that would be delivered by different providers, such as community health centres (CHCs), clinics, district hospitals and provincial hospitals. Therefore, the costs of providing PHC services would vary according to the institution that offers the service. Costs would also be influenced by the degree of ruralness in a province, the incidence of poverty, disease profiles and the extent to which provinces can exploit economies of scale in providing services. At the time, government did not accept the recommendation to use

the CNA because of a lack of appropriate data for developing cost estimates, which would mean that policy norms used in developing cost estimates were likely to be ambitious and would lead to unaffordable expenditure projections.

In 2007, the national Department of Health (DoH) also raised these issues, in its Policy on quality care for South Africa, which identified challenges relating to the quality of health care for both public and private health care (DoH, 2007). These are: poor delivery systems, shortages of medicines, improperly kept records, inadequate referral systems, inefficient use of resources, incorrect diagnosis and treatment, disregard for human dignity, inefficient use of or lack of resources, variations in services offered, and avoidable errors. It is in this light that the health sector adopted ten key priorities/point plans for the 2009–14 term of government, which constituted the department's strategic framework for delivering on this mandate (National Treasury, 2010). The aim of these priorities/plans was to improve health outcomes for all South Africans. Hence an agreement between the Minister of Health and the President of the Republic was signed on four key outputs to be delivered by the sector: increasing life expectancy, reducing maternal and child mortality rates, combating HIV/AIDS and decreasing the burden of diseases, and strengthening the effectiveness of health systems.

Furthermore, the DoH has taken steps to improve the quality of services in the sector. It has commissioned an audit of all public facilities in the country, to assess infrastructure, equipment, human resources and the level and quality of services provided. In 2011/12, progress was made to establish the Office of Health Standards Compliance as an independent National Quality Management and Certification Body (DoH, 2010). The department also commissioned a study that assessed the functionality, efficiency and appropriateness of the delegations given to hospital managers and the qualifications of each hospital CEO and district manager. The assessment was completed in 2011/12 and resulted in the regulations of the National Health Act of 2003, which were published in 2011, including a health strategy on improved human resources for 2012/13–2016/17 (Matsoso and Strachan, 2011), which was launched by the Minister of Health in 2011.

Maynard (2001) argues that, internationally, debates about whether health care is underfunded are sometimes misinformed because the crux of the matter is not by how much the sector is underfunded but how to ration access to health care. Maynard argues that the gap between what is demanded and capacity to deliver tends to result in quick fixes, which are not backed by hard evidence on health spending and are often characterised by budget variations and inefficiencies. These quick fixes frequently result in interventions that are not cost effective, which reinforces the perceptions of underfunding and pressures for increased funding.

A report by the Council on Medical Service (CMS, 2007) in the USA indicates that rising costs in health care are attributable to the following: the prevalence of chronic diseases (e.g. diabetes and hypertension); clinical risk factors and unhealthy lifestyles (e.g. heart diseases and obesity); non-clinical spending (costs of administration and marketing); and inefficient medical services in the form of over-use (costly tests and procedures that are not evidence based, emergency visits that could have been provided at a lower level of care, non-availability of patient records) or under-use (patient non-compliance with treatment, failure to provide counselling on patient lifestyle). Therefore, the report argues, how the resources are used and provided needs to improve in order to improve efficiency and reduce the cost of services. It is in the light of such recommendations that a White Paper on measures to eliminate wasteful expenditure in the health sector was adopted in the USA. In the White Paper, categories of wasteful expenditure in the sector are identified and measures to reduce waste are recommended (Kelley and Fabius, 2010). The arguments above for improving how resources are provided and used, so as to reduce costs and improve efficiency, apply equally to the South African context. Such improvements can be through using clinical performance measures that promote efficient use of resources and healthy lifestyles, undertaking comparative cost-effectiveness research and focusing on developing health information technology (Health Affairs, 2012).

This chapter assesses the adequacy and efficiency of PHC financing, but does not quantify the funding gap on PHC financing. However, a case study of the Gauteng province is used to explore the adequacy of PHC financing. Following a discussion of the methodology, the research findings are presented, after which concluding remarks and some recommendations are made.

11.2 Research Methods

The adequacy and efficiency of PHC financing were assessed using a combination of a case study approach and an analysis of health care programme budgets.

The resource requirements/costs of providing the minimum package of services at PHC centres need to be understood thoroughly in order to ensure adequate funding of services provided. For this, a recent case study done for the Gauteng provincial DoH on PHC was used. The norms and standards used in the model were based on the package of essential services developed by the Gauteng DoH. In addition, international funding norms for health care were compared with the status quo on public health care funding in South Africa.

A budget analysis was then conducted using National Treasury's database, Expenditure Reviews, Estimates of National Expenditures, budget reviews and other related documents. This was done in order to ascertain the current budgeting and expenditure in the health sector, and to establish whether overall health care sector budgets and expenditure have remained stable, increased or decreased over the years.

The budget of each health care programme was analysed in order to assess the efficiency and spending pressures in the health care sector. The emphasis was on identifying inefficiencies through analysing incidences of under-spending/over-spending in capital payments and provincial programmes related to: employee compensation, goods and services and capital payments, administration, district health services, health care support services, health facilities, health sciences and training, emergency medical services, provincial hospital service and central hospital service, and conditional grants. In addition, using the Health Systems Trust database, efficiency indicators (bed utilisation, cost-per-patient-day equivalent, immunisation rate, antenatal-pregnant-women-tested-for-HIV rate, and supervision rate) were selected and used to measure the performance of health care programmes at district level.

11.3 Results, Findings and Discussion

This section analyses the results, findings and discussion of the study based on the research methods discussed above.

11.3.1 Wasteful expenditure and operational inefficiencies in the health sector

International literature indicates that rising costs and inefficiencies result from, among other things, the over- and under-use of health care services, including: expenditure on goods and services (e.g. medicines, medical and surgical consumables, laboratory services and patient food); staff turnover; non-adherence to treatment by patients; preventable hospital admissions; treatment variations; hospital-acquired infections; medical errors; and over-prescribing of antibiotics. South Africa is no exception. In 2012/13, close to R5-billion was recorded as wasteful expenditure (see Figure 97), which included using expensive medicines, over-servicing patients, performing unnecessary expensive tests, and wasting patient food, equipment and medicine, as well as consumable items. In addition, service delivery inefficiencies included long average length of stay in hospital, breakdown in the referral system (e.g. patients skip one level of health care and are treated at the next level, which has cost implications) and non-adherence to treatment by patients.

Compared to peer countries (like Mexico, Argentina, Chile and Peru), with a similar level of income, South Africa performs poorly on health indicators: the infant mortality rate is worsening, and maternal and child mortality rates have increased (Harrison, 2009). In response, the health sector has prioritised four major health outcomes: reduction in the mortality rate of infants, mothers, and children under the age of five, and improved life expectancy, as shown in Table 100.

Figure 97: Estimation of wasteful expenditure in the public health care sector

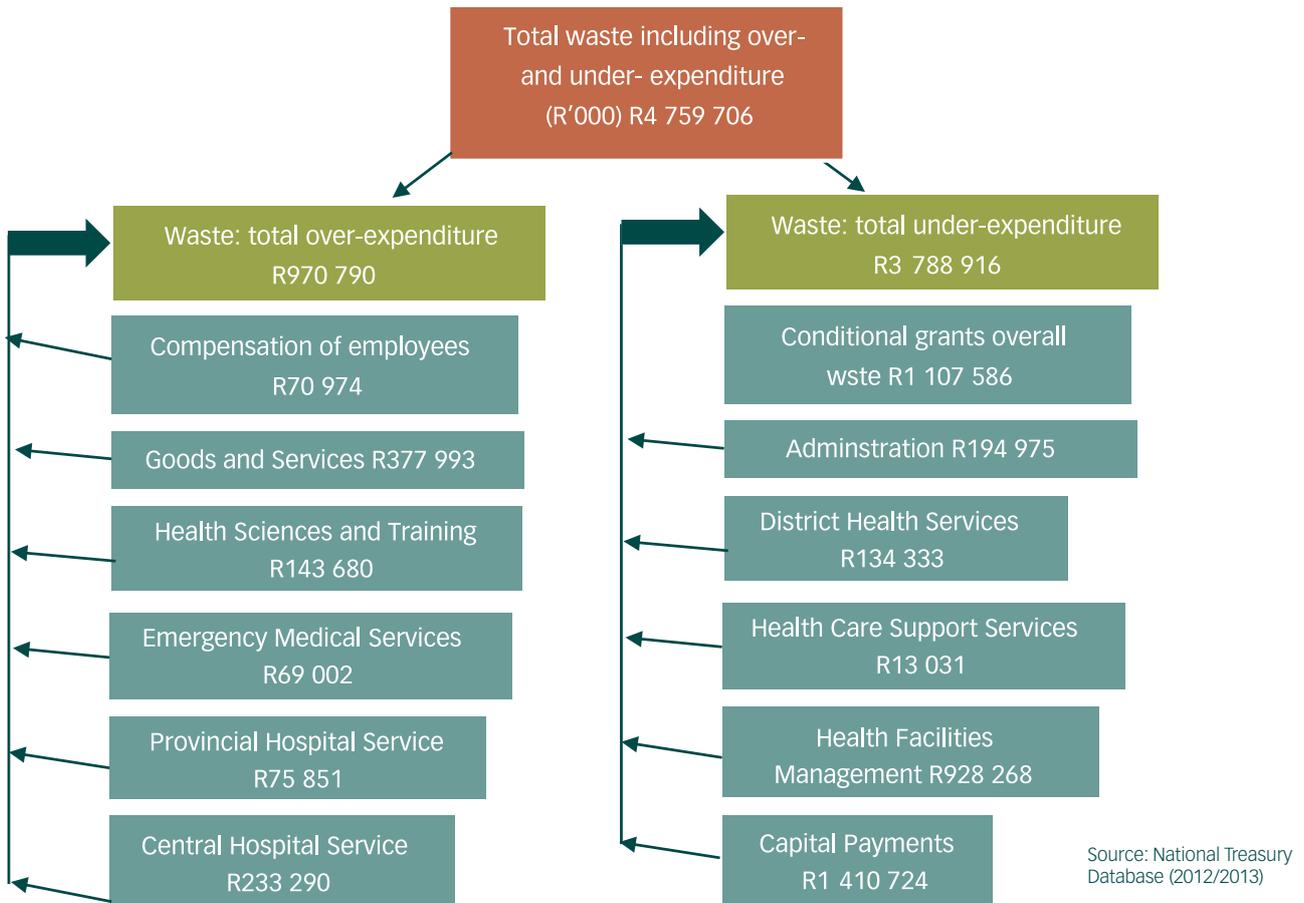


Table 100: South Africa’s performance on health outcomes indicators (2012/13–2014/15)

Health indicator	MDG target	Data source: Health Data Advisory and Coordination Committee Report
Maternal mortality ratio	38/100 000	2008 baseline: 310/100 000 live births
Infant mortality rate	18/1000	2009 baseline: 40/100 live births
Under-five mortality rate	20/1000 (Stats SA) 21 (UNICEF)	2009 baseline: 56/1000 live births
Life expectancy	70-year life expectancy at birth for males and females	Baseline 2009: 54 for males 59 for females

Source: DoH (2010: 18)

Any improvements to these outcomes will depend largely on the provision of PHC services, which will help to prevent mother/child transmission of HIV/AIDS, reduce infant and child mortality, and improve life expectancy. The remainder of this section explores the district health care indicators used to measure how efficiently resources are being used. The indicators, based on routine data at facility level, are bed utilisation, cost-per-patient-day, immunisation rate, antenatal-pregnant-women-tested-for-HIV rate, and supervision rate (Monticelli and Barron, 2007).

The **bed utilisation indicator** measures how efficiently hospitals are using their resources (beds). If the average bed utilisation rate is low, either the hospital (and its beds) is not needed in that area, or communities do not want to use that particular hospital service because of perceptions of poor quality (Monticelli and Barron, 2007). If bed utilisation rates are high, then either patients are spending too much time in hospital and are not being discharged quickly enough, or the number of beds is insufficient. The national DoH sets the average bed utilisation rate at 75%. As Table 101 shows, with the exception of the Western Cape, all provinces show bed utilisation rates below this rate, which implies that provincial departments are not meeting the targets set by the national department. This means that either the community are not using the service (probably because of perceived poor quality), or patients are choosing to go to the next level of care (i.e. regional hospitals), resulting in inefficiency, as these resources could have been used elsewhere in the health system.

Table 101: Bed utilisation rate – district hospitals

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Eastern Cape	61.3	62.6	65.5	70.3	71.0	65.1
Free State	70.1	67.3	67.7	67.5	66.2	62.6
Gauteng	62.4	66.0	64.5	65.1	66.8	62.0
KwaZulu-Natal	63.1	63.6	61.3	62.7	64.5	63.2
Limpopo	66.8	67.3	64.3	68.1	67.0	64.6
Mpumalanga	62.8	64.3	70.2	74.6	67.7	65.9
Northern Cape	65.0	65.5	66.0	64.6	61.6	62.9
North West	59.1	57.5	58.0	58.6	60.9	60.6
Western Cape	78.7	80.4	81.0	81.1	77.6	76.7
South Africa	64.4	65.2	65.3	67.7	67.5	64.8

Source: Health Systems Trust Database, District Health Barometer (2010)

The **cost-per-patient-day indicator** measures the cost per patient on a particular day, by comparing the hospital's total expenditure with service outputs (i.e. in-patients or out-patients). According to Monticelli and Barron (2007), if the rate is higher than the target, then hospital services are being under-utilised, which may mean inadequate control of costs (over-use of expensive medicines or over-servicing of patients), performing unnecessary tests (e.g. expensive lab tests) or wasting resources such as food, equipment, medicine and consumable items. If the rate is lower than the target, then many of the out-patients should normally be seen at clinics and do not require hospital services. In 2006/07, the national DoH recommended a cost-per-patient-day of R814. However, the cost-per-patient-day in all provinces (excluding the Western Cape) was higher than that set by the department (see Table 102).

Table 102: Cost-per-patient-day equivalent – district hospitals (Rand)

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Eastern Cape	987	1 072	1 079	1 114	1 277	1 469
Free State	1 182	1 207	1 142	1 349	15 64	1 612
Gauteng	1 259	1 337	1 401	1 406	1 671	1 996
KwaZulu-Natal	1 009	963	1 133	1 210	1 192	1 287
Limpopo	1 199	1 283	1 371	1 338	1 494	1 732
Mpumalanga	1 363	1 413	1 242	1 340	1 595	1 704
Northern Cape	1 063	1 094	1 270	1 257	1 384	1 575
North West	1 136	1 194	1 387	1 402	1 553	1 655
Western Cape	751	746	1 143	1 195	1 386	1 535
South Africa	1 074	1 109	1 203	1 256	1 384	1 543

Source: Health Systems Trust Database, District Health Barometer (2010)

There is also the **immunisation rate indicator** measures the proportion of infants who are less than one year of old who also have completed their course immunisation. The target set by the department was 90% in 2005/06. However, for provinces such as Mpumalanga, North West, Eastern Cape, Free State and KwaZulu Natal the rates were low and even below the total average (see table 103). This is a concern, given that immunisation plays a critical role towards saving children lives and decreasing mortality on children hence contributing to achievement of MDG and meeting priorities set by the sector.

Table 103: Immunisation rates

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Eastern Cape	73,35	75,7	78,9	81,8	90,2	76,9
Free State	86,82	88,1	86,6	84,3	86,5	83,3
Gauteng	88,89	91,1	91,6	109,9	108,6	107,7
KwaZulu-Natal	82,57	84,5	82,1	82,6	82,7	83,0
Limpopo	79,49	84,9	78,6	91,0	99,3	90,8
Mpumalanga	83,39	81,4	78,5	82,5	89,8	67,9
Northern Cape	92,88	96,2	82,6	89,4	88,0	87,8
North West	78,20	73,5	77,9	83,1	85,1	75,9
Western Cape	91,61	101,8	100,5	100,9	99,6	87,3
South Africa	82,94	85,4	84,2	90,2	93,2	86,7

Source: Health Systems Trust Database, District Health Barometer (2010)

The **antenatal-pregnant-women-tested-for-HIV indicator** measures the number of pregnant women who have been tested for HIV at antenatal clinics. It is calculated by dividing the number of pregnant women who tested for HIV by the number of pregnant women who attended antenatal clinics for the first time. The national DoH has set a target of 100% of facilities in the country providing antenatal HIV testing. There has been improvement in provinces, although in 2010/11 the target of 100% was not reached in the Western Cape, Eastern Cape, KZN and Free State (see Table 104). Monticello and Barron (2007) argue that poor perinatal care, which often leads to maternal deaths, is caused by system failures (lack of ICU facilities, specialised care and transport to the perinatal facility) meaning that deaths could have been prevented and were not due to inadequate resources.

Table 104: Antenatal-pregnant-women-tested-for-HIV indicator

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Eastern Cape	52,1	75,9	88,3	91,1	100,9	94,9
Free State	41,6	66,6	80,1	90,2	94,9	98,9
Gauteng	44,8	61,1	73,3	78,4	95,6	101,8
KwaZulu-Natal	63,2	61,9	70,7	85,6	97,7	98,2
Limpopo	47,6	75,0	90,1	90,2	109,3	112,8
Mpumalanga	31,0	58,7	74,6	84,0	99,4	108,2
Northern Cape	51,8	77,9	88,5	96,1	105,0	103,9
North West	46,7	79,7	85,6	101,6	113,7	110,6
Western Cape	47,6	93,2	95,7	89,6	87,9	91,2
South Africa	49,9	69,2	79,6	86,7	99,1	101,3

Source: Health Systems Trust Database, District Health Barometer (2010)

Lastly, the **supervision rate indicator** measures the number of PHC centres (clinics and CHCs) visited monthly by a supervisor. It is calculated as the total number of PHC centres visited by a supervisor at least once a month divided by the total number of PHC centres. This indicator reflects the quality of care given by the facility, as the supervisor is the intermediary in terms of decisions made by government and the facility; the supervisor thus needs to ensure that the facility has all the required resources and to report any challenges and shortages, as well as what is working well. The DoH's target is that 100% of facilities should have at least one supervisory visit per month, but none of the provinces have reached this target. In 2010/11, the total average supervision rate in all provinces was 69%, which is worrying because PHC is the fundamental requirement for improving health outcomes in line with MDGs. As Table 105 shows, in 2010/11, only Gauteng and the Eastern Cape had supervision rates of over 80%. At 19.6%, the Northern Cape's rate was the lowest of all provinces, followed by the North West at 56.9%.

Table 105: Supervision rate

	2006/07	2007/08	2008/09	2009/10	2010/11
Eastern Cape		48,2	74,8	81,3	81,0
Free State	37,2	48,9	63,4	73,3	65,1
Gauteng	52,0	58,2	74,2	79,2	81,3
KwaZulu-Natal	51,6	58,8	59,8	67,8	61,7
Limpopo	57,4	58,7	66,9	67,4	65,0
Mpumalanga	24,8	26,8	43,7	74,7	76,2
Northern Cape	29,8	20,9	30,2	24,1	19,6
North West	46,3	46,1	46,3	51,6	56,9
Western Cape	30,8	33,7	59,6	72,3	74,8
South Africa	44,2	48,2	61,9	69,9	68,8

Source: Health Systems Trust Database, District Health Barometer (2010)

11.3.2 Funding norms

The Primary Health Care Package for South Africa (DoH, 2000) contains norms and standards for PHC, which serve as guidelines for provinces in allocating resources and for district and local practitioners in assessing their performance and the needs of their population. The document differentiates between core PHC standards and norms. Core PHC standards refer to equipment, medicine and supplies, competence of health staff, printed and educational materials, patient education, records, community and home-based activity, referrals and collaboration. Core PHC norms refer to access, personnel (nurse, doctor and clinical managers), and annual evaluation of the provision of the PHC services and monitoring services (see Table 106, and Appendix 11.1 for the detailed norms and standards package). However, these norms and standards are not explicitly quantified, which makes assessing the cost of delivering PHC difficult, implying that provincial administrators distribute funds as they see fit. This also has an impact on the PHC budget in relation to the PHC service that is to be delivered. In other words, there is no dedicated funding mechanism for PHC.

Table 106: PHC Core Standards

Equipment	Medicines and Supplies	Competent staff	References, prints and educational materials
Diagnostic tests, blood pressure machines emergency transport available, oxygen cylinder, scales, disposal and sterilisation system, adequate consulting rooms etc.	Medicine room and cupboards , medicine and supplies as per essential drug list, available electricity and water etc.	Medicine room and map clinic catchment the area and achievable PHC objectives, reduce waiting times to a minimum and implement district focussed and community based initiatives etc.	Standard treatment guidelines and essential drug list manual, health library with medical and nursing reference books and national and provincial health related circulars etc.

Source: DoH (2000)

In 2008, the Gauteng DoH commissioned a study to determine the cost of providing the core package of PHC services, in the hope that the study would assist the department in motivating for additional resources. The national DoH provides all provinces with the framework for developing service transformation plans, as informed by the National Integrated Health Planning Framework. The aim of the transformation plan is to enable each province to review the shape and size of its health services and to develop an appropriate, adequately resourced and sustainable health service delivery platform that can respond to the current and future health challenges facing each of the provinces and the country as a whole. At the end of 2006, the Gauteng DoH developed its service transformation plan, aimed broadly at optimising the distribution of health facilities, increasing staffing levels, ensuring a good mix of skills and improving the quality of care generally.

The Gauteng DoH sought a thorough understanding of the resource requirements/costs of providing the current minimum package of services at PHC centres, in order to ensure adequate funding for the provision of these services. The Core Plus costing tool was used to achieve this objective,⁸³ while the norms and standards costs used in the model were based on the package of essential PHC services developed by the Gauteng DoH. The study was carried out in 20 sampled PHC facilities. The average cost of PHC services (CHCs and clinics combined) was found to be R75.54 (Table 106). The average cost per visit to a CHC was higher than the cost per visit to a clinic. Average actual costs per visit to CHCs ranged from R172.45 (for HIV/AIDS) to R72.07 (for rehabilitation) per visit, compared to average costs for clinics that ranged from R86.48 (for HIV/AIDS) to R28.92 (for home visits) per visit (see Table 107).

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⁸³ The Core Plus tool, which allows the costs of interventions to be estimated and projected and actual costs to be compared, can help managers and planners to cost individual services and packages of services under different scenarios.

The four highest cost services for CHCs and clinics were HIV/AIDS, mental health, oral health and medico-legal services. The average normative cost per visit to CHCs ranged from R55.04 for rehabilitation to R296.43 for HIV/AIDS; cost per visit to clinics ranged from R50.11 for mental and for oral health to R120.96 for HIV/AIDS.

Table 107: Actual Costs versus Normative Costs for PHC Services

PHC Package Service	Actual Costs			Normative Costs		
	Average Unit cost per PHC visit per service (clinic & CHC combined)	Unit cost per CHC visit per service	Unit cost per Clinic visit per service	Average Unit cost per PHC visit per service (clinic & CHC combined)	Unit cost per CHC visit per service	Unit cost per Clinic visit per service
Integrated management of childhood illness (MCI)	R54.52	R103.42	R35.72	R76.20	R79.94	R72.46
Reproductive Health Curative Services	R56.11	R96.83	R38.87	R65.32	R75.13	R55.51
Home visits	R75.57	R108.37	R45.43	R77.72	R78.47	R76.97
HIV/AIDS	R75.66	R82.25	R28.92	R51.46	R55.04	R47.87
Emergency Care	R135.49	R172.45	R86.43	R208.69	R296.43	R120.96
Mental Health	#	#	#	R59.69	R63.32	R56.05
Oral Health	R84.12	R165.18	R56.44	R62.17	R74.22	R50.11
Rehabilitation	R90.53	R125.56	R57.57	R53.71	R57.30	R50.11
Medico-Legal Services	R68.74	R72.07	R46.24	R55.04	R55.04	#
School Health	R96.26	R112.85	R52.99	R79.86	R79.86	#
Minor surgery	R89.71	R90.23	R65.02	R55.04	R55.04	#
Radiography	#	#	#	R71.87	R71.87	#
Optometry	#	#	#	#	R0.00	#
	#	#	#	R71.87	R71.87	#

Source: Field Survey, Gauteng Case Study.

No costs estimated because of the unavailability of data

Lastly, based on the combined average costs of PHC services, the study by the Gauteng DoH found that over R1-billion will be required to provide PHC services (see Table 108).

Table 108: Normative costs for providing PHC services in Gauteng

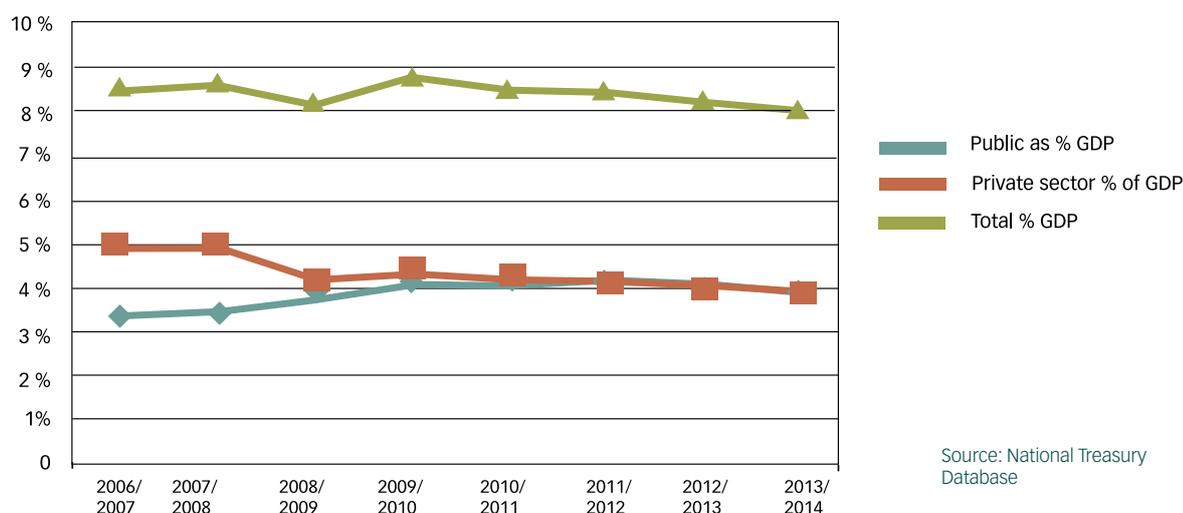
	Average Costs/patient	Total number of patients	Total Costs
Total PHC Costs	R46.70	11 110 242	R518 794 533.08
Total CHC Costs	R111.30	3 728 022	R414 928 848.60
Combined PHC Costs (CHC+Clinics)	R75.54	14 838 264	R1 120 882 462.56

Source: DoH (2000)

11.3.3 Budget analysis

Between 2006/07 and 2013/14, total health expenditure (private and public sector) amounted to just over 8% of South Africa's GDP (see Figure 98). However, if private sector expenditure is excluded, public sector health expenditure as a percentage of GDP was 3.3% in 2006/07 and has been about 4% since 2009/10. This percentage is below the WHO recommendation of 5% of GDP on public health care (National Treasury, 2011). A report by the Development Bank of Southern Africa (DBSA, 2008) suggests that consideration should be given to increasing the resources in the public health care system to 5% of GDP, given the "emerging funding obligation" and priorities that have been set by the sector on e.g. HIV/AIDS, maternal care, prevention of mother/child transmission of HIV, TB treatment, the district health systems, recapitalisation of public health infrastructure and human resources requirements.

Figure 98: Health expenditure as a proportion of GDP



Per capita expenditure can provide an indication of whether funding inequities or imbalances exist in the system. While this measure may not be an indicator of need, it does indicate any inequities in the health system. Table 109 shows significant variation in per capita expenditure across provinces. In 2010/11 the average national expenditure per capita was R514, but the variation among provinces ranged from R430 (Free State and KZN) to R631 (Western Cape).

Table 109: PHC (non-hospital) expenditure per capita (Rand)

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Eastern Cape	318	329	347	440	458	571
Free State	321	325	295	340	384	430
Gauteng	345	371	377	413	500	549
KwaZulu-Natal	303	315	357	375	381	430
Limpopo	259	272	344	425	473	508
Mpumalanga	223	257	296	321	361	445
Northern Cape	297	348	433	436	450	592
North West	357	378	387	428	455	519
Western Cape	431	451	491	516	588	631
South Africa	319	337	367	410	451	514

Source: Health Systems Trust Indicators, District Health Barometer (2010)

An analysis of expenditure per patient visit (Table 109) also found variations among provinces. In 2010/11, the expenditure per patient visit ranged from R146 in KZN to R214 in Gauteng, compared to the national average of R176. Two underlying factors help explain these variations in expenditure among provinces. The first is that no mechanisms are in place to guide how funding should be channelled, including funding norms that explicitly state funding requirements for each programme (Thomas et al., 2004). The second is that provinces are delivering PHC inefficiently, at district hospitals rather than at clinics or CHCs, which implies that clinics are under-used and hospitals are over-used. For example, Gauteng acknowledges that health services tend to be predominately hospital based, because their PHC system is not fully functional and their referral system is inadequate (Gauteng Provincial Government, 2012).

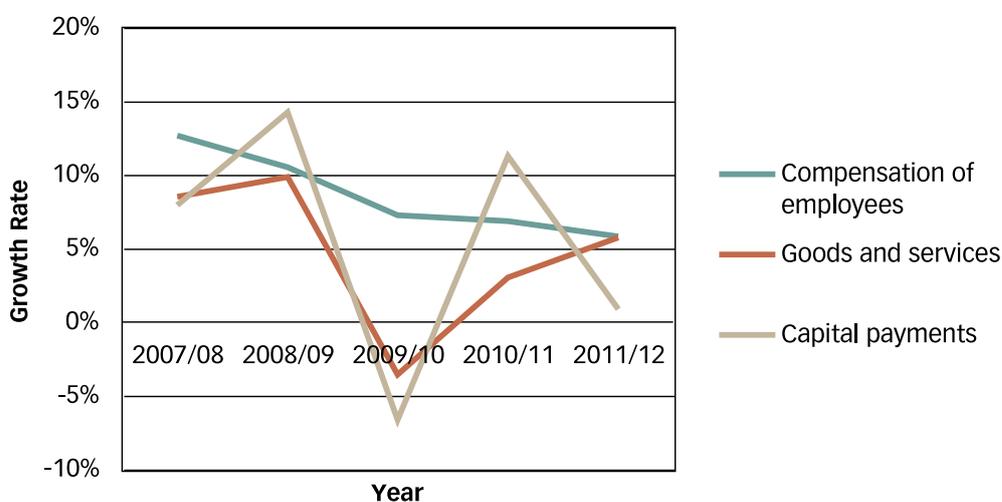
Table 110: PHC (non-hospital) expenditure per patient visit (Rand)

Province	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Eastern Cape	116	118	125	148	147	190
Free State	130	133	121	127	139	158
Gauteng	154	148	183	176	201	214
KwaZulu-Natal	135	132	147	142	134	146
Limpopo	89	91	120	138	149	174
Mpumalanga	91	104	125	127	141	172
Northern Cape	95	108	129	124	131	170
North West	119	134	147	153	161	192
Western Cape	124	138	150	140	153	166
South Africa	122	126	142	146	154	176

Source: Health Systems Trust Indicators, District Health Barometer (2010)

When health budgets are analysed by economic classification (compensation of employees, goods and services and capital assets), some worrying findings emerge. As Figure 99 shows, between 2007/08 and 2011/12, real growth rates decreased overall for three economic classifications: by 7% for compensation of employees, 2% for goods and services, and 7% for capital payments. Some of the reasons for this include unsustainable wage growths, backlogs in payment of suppliers for goods and services, and delays in completing capital projects. This is a concern, especially for capital expenditure, as infrastructure has been identified as a priority for enhancing the effectiveness of the health system.

Figure 99: Real growth rates by economic classification



Source: Own Calculations based on National Treasury Database (2007/08–2011/12)

Decreases in real growth rates have also been recorded at provincial level, and in some cases negative growth rates occurred: in 2009/10, both administration and health training and sciences declined by -5%, and health care support by -4% (see Table 111).

Table 111: Provincial health expenditure growth rates (real) by programme (2005/06–2010/11)

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Administration	-9%	11%	-2%	15%	-5%	-1%
District Health Services	9%	8%	13%	2%	3%	4%
Emergency Medical Services	24%	10%	13%	7%	6%	3%
Provincial Hospital Services	6%	5%	4%	-1%	4%	3%
Central Hospital Services	10%	1%	-1%	-5%	4%	4%
Health Training and Sciences	20%	7%	10%	12%	-5%	0%
Health Care Support Services	28%	0%	12%	5%	-4%	6%
Health Facility Management	31%	29%	9%	24%	8%	6%
Total	10%	7%	7%	3%	3%	3%

Source: Own Calculations based on National Treasury Database (2005/06–2010/11)

In 2005/06, provincial district health services grew by 9%, but had dropped to 4% by 2010/11 (Table 112). This is a concern, given that district health services are considered a key component for strengthening PHC and improving health care services.

Table 112: District health services expenditure growth rates (real) by province (2005/06–2010/11)

	2006/07	2007/08	2008/09	2009/10	2010/11	2010/11	Average growth 2005/06 - 2010/11
Eastern Cape	8%	6%	22%	6%	10%	2%	9%
Free State	7%	1%	8%	14%	8%	3%	7%
Gauteng	8%	23%	10%	19%	13%	7%	13%
KwaZulu-Natal	2%	24%	4%	5%	-1%	1%	6%
Limpopo	15%	5%	17%	9%	7%	5%	10%
Mpumalanga	6%	22%	10%	18%	9%	3%	11%
Northern Cape	17%	34%	3%	11%	15%	-4%	13%
North West	6%	-3%	11%	10%	2%	2%	5%
Western Cape	11%	30%	7%	10%	9%	3%	12%

Source: Own Calculations based on National Treasury Database (2005/06–2010/11)

11.4. Conclusion

Despite increased spending, the public health sector in South Africa is facing many challenges, such as a heavy disease burden and a growing uninsured population. Compared to similar developing countries, South Africa performs badly on health outcome indicators, such as infant mortality rate. Debates about whether the public health sector is under-funded often overshadow the inequities and inefficiencies that exist within the South African health care system. Public health care spending accounts for 14% of total government expenditure and represents about 4% of the GDP, which is below the international standard recommended by WHO, although if the private sector health care spending is included, the percentage rises to 8% of GDP. In South Africa, provinces account for about 90% of total public health care spending, or close to R100-billion in real terms. Health budgets will increase significantly when the proposed NHI is introduced and so, unless the inefficiency issues are addressed, the problems will continue.

The research found the rate of growth of provincial health expenditure has been decreasing, while funding and spending inequities persist across provinces. Explanations for these variations are (1) the lack of alignment between funding and norms and (2) provinces delivering PHC inefficiently, for instance at hospitals instead of at clinics or CHCs. Using five district health care indicators to measure how efficiently resources are being used (bed utilisation, cost-per-patient-day equivalent, immunisation rate, antenatal-pregnant-women-tested-for-HIV rate and supervision rate), in most cases provinces are not meeting the standards set by the national DoH. These inefficiencies are due to a weak institutional framework and poor resource planning (because of an absence of norms). To address this will require fundamental institutional reforms and improved funding levels.

11.5 Recommendations

With respect to improving adequacy and efficiency in primary health care financing, the Commission recommends that:

- Recommendation 1: Government improves levels of PHC funding, to align with the PHC norms and standards, in particular for clinic services such as integrated management of childhood illnesses, reproductive health and HIV/AIDS.

Justification: There is no resource allocation mechanism in place to translate the funding received into the PHC packages that are needed as per the norms and standards. A case study carried out in Gauteng found that in many instances and on average, the normative cost of PHC is less than the actual cost of the service – suggesting that PHC is below the norms and standards and is therefore inadequate.

- Recommendation 2: Measures are put in place to minimise system inefficiencies (wasteful/irregular expenditure) in line with international experience. Specific measures would address different categories of wasteful expenditure, such as clinical waste (through clinical performance measures that promote efficient use of resources), operational waste (through standardisation of processes and procedures) and behavioural waste (through preventative services).

Justification: In addition to inadequate funding, there are inefficiencies in the form of wasteful expenditure/irregular expenditure (expensive use of medicine, over-servicing patients, performing unnecessary tests, wastage on patient food, equipment and medicine, and breakdown in the referral system).

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Appendix 11.1: Primary Health Care Package – Norms and Standards

Core standards include standard treatment guidelines, equipment, medicine and supplies and competent staff.

Norms include accessibility of the service, an integrated PHC facility and a nurse, doctor and specialised professional.

Core Norms And Standards For Health Clinics

Core Norms

1. The clinic renders comprehensive integrated PHC services using a one-stop approach for at least eight hours a day, five days a week.
2. Access, as measured by the proportion of people living within 5 km of a clinic, is improved.
3. The clinic receives a supportive monitoring visit at least once a month to support personnel, monitor the quality of service and identify needs and priorities.
4. The clinic has at least one member of staff who has completed a recognised PHC course.
5. Doctors and other specialised professionals are accessible for consultation, support and referral and provide periodic visits.
6. Clinic managers receive training in facilitation skills and primary health care management.
7. There is an annual evaluation of the provision of the PHC services to reduce the gap between needs and service provision using a situation analysis of the community's health needs and the regular health information data collected at the clinic.
8. There is an annual plan based on this evaluation.
9. The clinic has a mechanism for monitoring services and quality assurance and at least one annual service audit.
10. Community perception of services is tested at least twice a year through patient interviews or anonymous patient questionnaires.

Core Standards

1. References, prints and educational materials
 - 1.1 Standard treatment guidelines and the essential drug list (EDL) manual.
 - 1.2 A library of useful health, medical and nursing reference books kept up to date.
 - 1.3 All relevant national and provincial health related circulars, policy documents, acts and protocols that impact on service delivery.
 - 1.4 Copies of the Patients Charter and Batho Pele documents available.
 - 1.5 Supplies of appropriate health learning materials in local languages.

2. Equipment

- 2.1 A diagnostic set.
- 2.2 A blood pressure machines with appropriate cuffs and stethoscope.
- 2.3 Scales for adults and young children and measuring tapes for height and circumference.
- 2.4 Haemoglobinometer, glucometer, pregnancy test, and urine test strips.
- 2.5 Speculums of different sizes
- 2.6 A reliable means of communication (two-way radio or telephone).
- 2.7 Emergency transport available reliably when needed.
- 2.8 An oxygen cylinder and mask of various sizes.
- 2.9 Two working refrigerators, one for vaccines with a thermometer and another for medicines. If one is a gas fridge a spare cylinder is always available.
- 2.10 Condom dispensers are placed where condoms can be obtained with ease.
- 2.11 A sharps disposal system and sterilisation system.
- 2.12 Equipment and containers for taking blood and other samples.
- 2.13 Adequate number of toilets for staff and users in working order and accessible to wheel chairs.
- 2.14 A sluice room and a suitable storeroom or cupboard for cleaning solutions, linen and gardening tools.
- 2.15 Suitable dressing/procedure room with washable surfaces.
- 2.16 A space with a table and ORT equipment and needs
- 2.17 Adequate number of consulting rooms with wash basins, diagnostic light (one for each professional nurse and medical officer working on the same shift).

3. Medicines and supplies

- 3.1 Suitable medicine room and medicine cupboards that are kept locked with burglar bars.
- 3.2 Medicines and Supplies as per the essential drug list for Primary Health Care, with a mechanism in place for stock control and ordering of stock.
- 3.3 Medicines and Supplies always in stock, with a mechanism for obtaining emergency supplies when needed.
- 3.4 A battery and spare globes for auroscopes and other equipment.
- 3.5 Available electricity, plus cold and warm water.

4. Competence of health staff

Organising the clinic

- 4.1 Staff are able to:
 - 4.1.1 Map the clinic catchment area and draw specific and achievable PHC objectives set using district, national and provincial goals and objectives as a framework.
 - 4.1.2 Organise outreach services for the clinic catchment area.
 - 4.1.3 Organise the clinic to reduce waiting times to a minimum and initiate an appointment system when necessary.
 - 4.1.4 Train community health care promoters to educate caretakers and facilitate community action.
 - 4.1.5 Plan and implement district-focused and community-based activities, where health workers are familiar with their catchment area population profile, health problems and needs and use data collected at clinic level for this purpose.

Caring for patients

- 4.2 Staff are able to follow the disease management protocols and standard treatment guidelines, and provide compassionate counselling that is sensitive to culture and the social circumstances of patients.
- 4.3 Staff are positive in their approach to patients, evaluating their needs, correcting misinformation and giving each patient a feeling of always being welcome.
- 4.4 Patients are treated with courtesy in a client-oriented manner to reduce the emotional barriers to access of health facilities and prevent the breakdown in communication between patients and staff.
- 4.5 The rights of patients are observed.

Running the clinic

- 4.6 A clear system for referrals and feedback on referrals is in place.
- 4.7 All personnel wear uniforms and insignia in accordance with the South African Professional Council's specifications.
- 4.8 The clinic has a strong link with the community, civic organisations, schools and workplaces in the catchment area.
- 4.9 The clinic is clean, organised and convenient and accommodates the needs of patients' confidentiality and easy access for older persons and people with disability.
- 4.10 Every clinic has a housekeeping system to ensure regular removal and safe disposal of medical waste, dirt and refuse.
- 4.11 Every clinic provides comprehensive security services to protect property and ensure safety of all people at all times.
- 4.12 The clinic has a supply of electricity, running water and proper sanitation.
- 4.13 The clinic has a written infection-control policy, which is followed and monitored, on protective clothing, handling of sharps, incineration, cleaning, hand hygiene, wound care, patient isolation and infection control data.

5. Patient education

- 5.1 Staff are able to approach the health problems of the catchment area hand in hand with the clinic health committee and community civic organisations to identify needs, maintain surveillance of cases, reduce common risk factors and give appropriate education to improve health awareness.
- 5.2 Culturally and linguistically appropriate patients' educational pamphlets are available on different health issues for free distribution.
- 5.3 Appropriate educational posters are posted on the wall for information and education of patients.
- 5.4 Educational videos in those clinics with audio-visual equipment are on show while patients are waiting for services.

6. Records

- 6.1 The clinic utilises an integrated standard health information system that enables and assists in collecting and using data.
- 6.2 The clinic has daily service registers, road-to-health charts, patient treatment cards, notification forms, and all needed laboratory request and transfer forms.
- 6.3 All information on cases seen and discharged or referred is correctly recorded on the registers.
- 6.4 All notifiable medical conditions are reported according to protocol.
- 6.5 All registers and monthly reports are kept up to date.
- 6.6 The clinic has a patient carry card or filing system that allows continuity of health care.

7. Community and home-based activity

- 7.1 There is a functioning community health committee in the clinic catchment area.
- 7.2 The clinic has links with the community health committee, civic organisations, schools, workplaces, political leaders and ward councillors in the catchment area.
- 7.3 The clinic has sensitised, and receives support from, the community health committee.
- 7.4 Staff conduct regular home visits using a home visit checklist.

8. Referral

- 8.1 All patients are referred to the next level of care when their needs fall beyond the scope of clinic staff competence.
- 8.2 Patients with a need for additional health or social services are referred as appropriate.
- 8.3 Every clinic is able to arrange transport for an emergency within one hour.
- 8.4 Referrals within and outside the clinic are recorded appropriately in the registers.
- 8.5 Merits of referrals are assessed and discussed as part of the continuing education of the referring health professional to improve outcomes of referrals.

9. Collaboration
 - 9.1 Clinic staff collaborate with social welfare for social assistance and with other health related public sectors as appropriate.
 - 9.2 Clinic staff collaborate with health orientated civic organisations and workplaces in the catchment area to enhance the promotion of health.

10. Leadership and planning
 - 10.1 Each clinic has a vision/mission statement developed and posted in the clinic.
 - 10.2 Core values are developed by the clinic staff and posted.
 - 10.3 An operational plan or business plan is written each year.

11. Staff
 - 11.1 New clinic staff are oriented.
 - 11.2 District personnel policies on recruitment, grievance and disciplinary procedures are available in the clinic for staff to refer to.
 - 11.3 The staff establishment for all categories is known and vacancies discussed with the supervisor.
 - 11.4 Job descriptions for each staff category are in the clinic file.
 - 11.5 There is a performance plan/agreement and training plan made and a performance appraisal carried out for each member of staff each year.
 - 11.6 The on-call roster and the clinic task list with appropriate rotation of tasks are posted.
 - 11.7 An attendance register is in use.
 - 11.8 There are regular staff meetings (at least once a month).
 - 11.9 Services and tasks not carried out due to lack of skills are identified and new training sought.
 - 11.10 In-service training takes place on a regular basis.
 - 11.11 Disciplinary problems are documented and copied to the supervisor.

12. Finance
 - 12.1 The clinic, as a cost centre, has a budget divided into main categories.
 - 12.2 The monthly expenditure of each main category is known.
 - 12.3 Under- and over-spending is identified and dealt with, including requests for the transfer of funds between line items where permitted and appropriate.

13. Transport and communication
 - 13.1 A weekly or monthly transport plan is submitted to the supervisor or transport coordinator.
 - 13.2 The telephone or radio is working.
 - 13.3 The ambulance can be contacted for urgent patient transport to be available within two hours.
14. Visits to clinic by unit supervisor
 - 14.1 There is a schedule of monthly visits stating date and time of supervisory support visits.
 - 14.2 There is a written record kept of results of visits.
15. Community
 - 15.1 The community is involved in helping with clinic facility needs.
 - 15.2 The community health committee is in place and meets monthly.
16. Facilities and equipment
 - 16.1 There is an up-to-date inventory of clinic equipment and a list of broken equipment.
 - 16.2 There is a list of required repairs (doors, windows, water) and these have been discussed with the supervisor and clinic committee.
17. Drugs and supplies
 - 17.1 Stocks are secure with stock cards used and are up to date.
 - 17.2 Orders are placed regularly and on time and checked when received against the order.
 - 17.3 Stocks are kept orderly, with FEFO (first expiry, first out) followed and no expired stock.
 - 17.4 The drugs ordered follow EDL principles.
18. Information and documentation
 - 18.1 New patient cards and medico-legal forms are available.
 - 18.2 The laboratory specimen register is kept updated and missing results are followed up.
 - 18.3 Births and deaths are reported on time and on the correct form.
 - 18.4 The monthly PHC statistics report is accurate, done on time and filed/sent.
 - 18.5 Monthly and annual data is checked, graphed, displayed and discussed with staff and the health committee.
 - 18.6 There is a catchment area map showing the important features, location of mobile clinic stops, DOTS supporters, community health workers and other outreach activities.

The Impact of Demarcations on the Financial Performance and Sustainability of Municipalities

By: Mkhululi Ncube and Nomfundo Vacu

12.1 Introduction and Statement of the Problem

The mandate of the Municipal Demarcation Board (MDB) is provided for in the Constitution (Sections 155 and 157); the Local Government Municipal Demarcation Act, 1998; and the Local Government Municipal Structures Act, 1998 (Schedule 1 and Section 85). The Constitution (RSA, 1996) mandates an independent authority (the MDB) to determine municipal boundaries and to delimit wards. The Municipal Demarcation Act (No. 27 of 1998) is the principal Act that governs the municipal demarcation process in South Africa. For instance, Section 21 guides the MDB in determining municipal boundaries. The Municipal Structures Act (No. 117 of 1998) covers the delimitation of wards for local elections and the capacity assessments of municipalities. The activities of the MDB are also in accordance with other pieces of legislation, such as the Provincial Finance Management Act (No. 29 of 1999) and the Municipal Finance Management Act (No. 56 of 2003).

Since the end of apartheid, the number of local government structures has decreased; a trend that is expected to continue. In 1995/96, 1262 local government structures were amalgamated⁸⁴ into 843 local authorities (or municipalities). With the establishment of the MDB in 1999, the number of municipalities was rationalised to 284 in preparation for the 2000 local government elections. The number was further reduced to 283 before the 2006 local elections, and then to 276 ahead of the 2011 local elections. The current 278 municipalities consist of eight metropolitan municipalities, 44 district municipalities, and 226 local municipalities. The number of municipalities is expected to decline prior to the local government elections in 2016, as new demarcations will come into effect. Table 113 traces structural changes in the local government sector due to boundary adjustments.

Table 113: Number of municipalities post demarcations

Year	Number of local municipalities	Number of district municipalities	Number of metropolitan municipalities	Total
Post-2000 demarcation	231	47	6	284
Post-2006 demarcation	231	46	6	283
Post-2011 demarcation	226	44	8	278
Post-2016 demarcation	215	43	8	266

Source: MDB (2013)

Over the past 18 years, concerns have been raised about the impact of demarcation (i.e. reconfiguring the size, number and types of municipalities) on municipal financial and fiscal performance. The criteria used by the MDB to determine municipal boundaries have been questioned and even condemned for contributing to the establishment of financially unviable and unsustainable municipalities. For example, although most demarcations have been political motivated, at its 53rd national conference in 2013, the African National Congress (ANC, 2013) expressed its concern and resolved that:

⁸⁴ Amalgamate (or amalgamation) is used interchangeably with merge (or merger) in this chapter, referring to the reorganisation of municipalities that involved redrawing boundaries and combining parts of or entire municipalities.

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The MDB should take into account the financial implications of its re-demarcation of municipalities; the challenge of unviable municipalities; the need for ward boundaries to break down racial barriers and a reduced frequency of re-demarcations.

The Department of Cooperative Governance and Traditional Affairs (DCoG) has expressed similar concerns and consequently established a task team to review the process of municipal demarcation as part of the preparations for the 2016 local government elections. The concerns of the government are about challenges relating to the inner and outer boundaries of municipalities, cross-boundary municipalities, and the impact of demarcation decisions on the fiscal performance of municipalities, as well as the consequences of demarcation for the establishment of a truly developmental local government. The issue is whether these concerns are valid and whether the demarcation process is affecting the financial and fiscal performance of some municipalities.

Many factors affect municipal fiscal performance, including the lack of a tax base due to poverty and unemployment; backlogs; poor revenue systems and collection; service and payment boycotts; poor service delivery and budget planning; unfunded mandates; corruption; and skill, knowledge and experience deficits, as well as failure on the part of provincial and central government to intervene to address these in a timely manner. The impact of demarcations on the fiscal performance of municipalities needs to be evaluated to establish the consequences of boundary changes on fiscal variables, such as tax bases, liabilities, revenues and expenditure. The purpose of this chapter is to evaluate the impact of demarcations on the fiscal performance of municipalities and whether municipal boundary changes promote financially and fiscally sustainable municipalities.

12.2 Objectives of the Study

Municipal demarcations should ideally result in financially sustainable municipalities, but many municipalities lack a sound revenue base to sustain their activities. The objectives of this study are to:

- establish the impact/cost of demarcations on the fiscal performance of municipalities and identify other factors that adversely affect the performance and fiscal sustainability of municipalities;
- recommend reforms that are necessary to create a demarcation process that promotes a financially sustainable system of local government.

12.3 Literature Review

Literature on the impact of boundary changes on the fiscal/financial performance of municipalities is vast. In some cases, these boundary changes have been motivated by the desire for government consolidation, i.e. moving away from many fragmented municipal governments to fewer, larger municipalities.

There are arguments for and against consolidation. Consolidation improves the efficacy of municipalities by increasing the effectiveness and efficiency with which local government delivers services, i.e. “bigger is better” or “bigger is cheaper” (Slack and Bird, 2013). The argument is that large municipalities are able to reap the benefits of economies of scale and scope in service provision and to save on administrative overheads (e.g. duplications are eliminated and the number of politicians and bureaucrats possibly reduced): service delivery increases and, as a result, the costs per unit are lower. Larger municipalities are in a better position, technically and financially, than their smaller or fragmented counterparts to provide an array of services (Dollery et al., 2007; Slack and Bird, 2013). Efficiency gains also are used as an argument against municipal consolidation. Many small municipalities are seen to be more efficient and more responsive to the needs of their citizens and to have clearer accountability channels (Faguét, 2004). Furthermore, having many smaller municipalities stimulates competition (which is sometimes an incentive to be efficient). Citizen participation is stronger in a fragmented system and access to authority through public hearings, meetings, elections or direct contact is easier.

However, despite all the strong arguments for and against consolidation, empirical evidence on its impact is, at best, mixed. For example, after reviewing research in the United Kingdom (UK) and United States of America (USA) on economies of scale after mergers, Byrnes and Dollery (2002) and Dollery and Byrnes (2006) concluded that only 8% of the studies found evidence that economies of scale result from mergers, 24% found evidence of diseconomies of scale, 29% found evidence of U-shaped cost curves and 39% found no evidence of economies of scale. Found (2012) saw no evidence of economies of scale with the post-boundary changes in Canada. In the USA, Boyne (1992) found evidence that consolidation is associated with higher spending, while in Canada, Kushner and Siegel (2005) found that amalgamations of local governments improved efficiency in some municipalities while inefficiencies increased in others. Table 114 summarises this literature.

Table 114: Summary of literature on the impact of municipal boundary changes

Author	Country	Findings
Fleischmann (1986)	USA	Using case studies, the study considers the benefits and costs of local boundary changes and identifies the winners and losers. The findings include gains, such as new revenues sources (i.e. an increased tax base). The study finds that areas that were poor before boundary changes benefitted from improved service delivery. The study also notes political and social costs/benefits, finding that the private actors are largely the winners when boundaries change.
Vojnovic (2000)	Canada	The study examines the transactional impacts of municipal consolidation on a sample of five Canadian municipalities. Surveys and interviews were used to capture the data, focusing on factors such as equity, bureaucratic specialisation and employee salaries, fiscal accountability, cost of administration and service levels. The findings suggest that reorganisation of municipal boundaries does not lead to fiscal accountability. The author argues that other alternatives can be used to ensure equity at a lower cost than re-structuring, and so municipal consolidation is not as important for equity as argued by its advocates (e.g. Dollery et al., 2006). Although the study does not provide an answer regarding whether municipal consolidation is the best option, it provides useful information on how consolidation can succeed. Key to success is having a consolidation agreement in place prior to the reform, which covers the changes that should be expected in municipal salaries, service provision, and municipal governance and tax rates, and ensuring representation and participation in the amalgamation process.
Kushner and Siegel (2003)	Canada	Using surveys the study assesses citizens' attitudes towards municipal amalgamation in three Ontario municipalities. The results indicate that municipal amalgamation received very little support prior to its implementation, which had negative effects on citizen participation. Respondents also felt that the value of the services that they were getting declined after amalgamation. This suggests that the amalgamation did not achieve the expected efficiency gains.
McKay (2004)	UK	The study examines the challenges of obtaining efficiencies through amalgamation, using interviews with committee members and reviewing committee minutes. The findings suggest ways in which amalgamation processes can be done so as to achieve efficiency. These include: avoiding the trap of uniformity (as uniformity ignores the specifics of the different municipalities amalgamated); agreeing on a clear committee design that will not change as the process goes forward; sharing information; setting clear goals and deadlines; and discussing openly the changing nature of democracy. The author argues that failure to take these factors into consideration may undermine efforts to obtain efficiency.
Savitch and Vogel (2004)	USA	The study tests the hypothesis that city-county consolidation promotes efficiency, equity and accountability. The study finds that mergers reduce efficiency and increase the costs associated with transition (e.g. harmonising employment conditions and wages), while cost savings are minimal, inequities continue and accountability problems worsen.

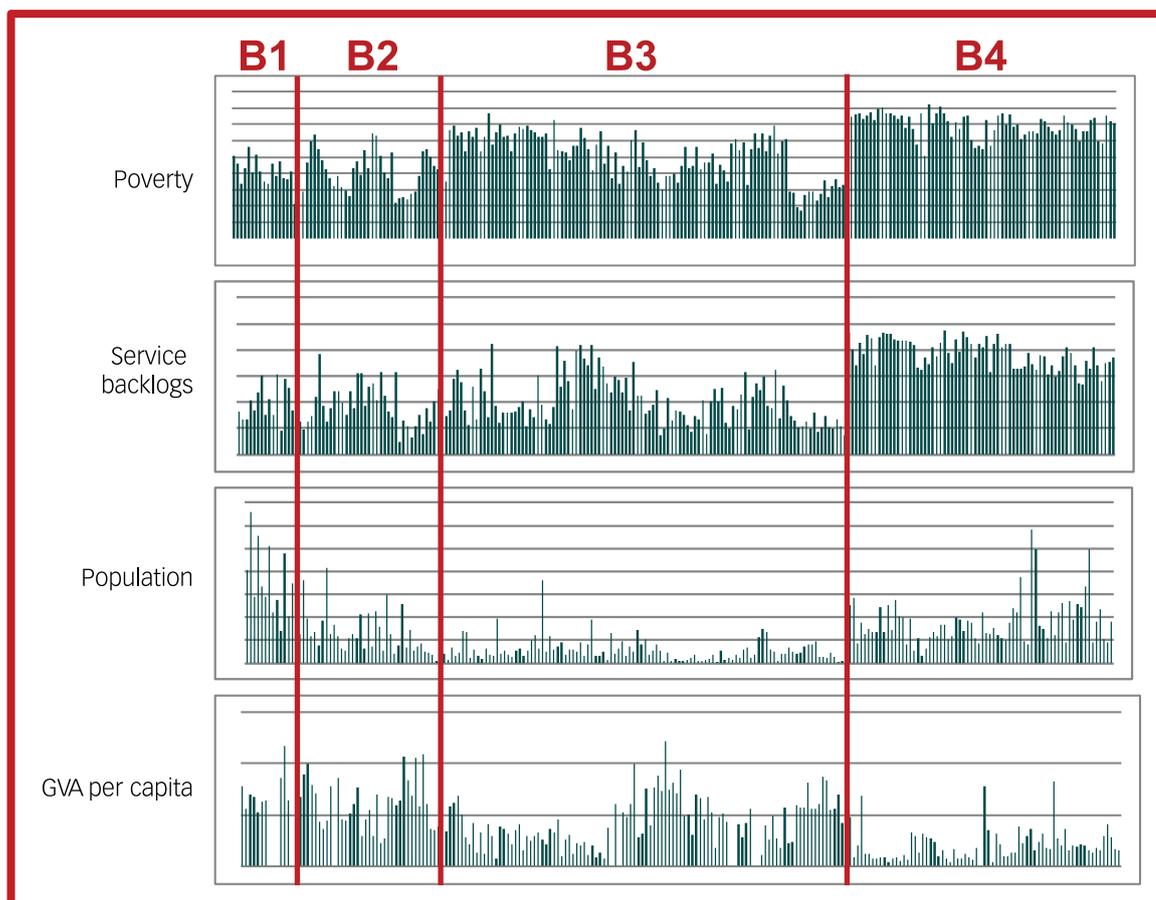
Author	Country	Findings
Dollery et al. (2007)	South Australia	The study looks at the impact of amalgamation on municipal financial performance, with municipal size being used to measure municipal amalgamation. The findings reveal no correlation between the two variables, and the study suggests that alternative methods for improving performance and effectiveness of local authorities be pursued.
Forsyth (2010)	USA	The question asked in this study is: "Is a county's post consolidation (boundary change) economic development significantly better than before consolidation?". Using time series regression analysis, the study concludes that consolidation has a significant impact on the distribution of economic burdens within a county, while impacts on economic development are not significant and are limited to social development. The study also concludes that consolidation of counties gives no efficiency gains.
Hanes and Wikstrom (2010)	Sweden	The cross-sectional study, of 1 005 Swedish municipalities, looks at the impact of municipal amalgamation on population growth and income growth; and uses the ordinary least square estimation technique to assess the efficiency of voluntary municipal amalgamation compared to compulsory amalgamation. The findings reveal that municipal amalgamation has a positive impact on population growth when small municipalities are amalgamated. However, no effect was found on municipal income. The authors suggest that the positive effect on population growth may be attributed to the fact that amalgamation reduced depopulation. The study confirms the high efficiency of voluntary amalgamation compared to compulsory amalgamation.
Fritz (2011)	Germany	The study uses the difference- in-differences approach to examine whether large-scale municipal amalgamations had an impact on the fiscal outcomes of municipalities in Germany. The results suggest that amalgamation had significant effects: a positive impact on debt per capita and expenditure per capita, and a negative impact on expenditure for administrative staff.
Reingewertz (2012)	Israel	The study uses the difference- in-differences method to assess the fiscal outcomes of municipal amalgamation. The results indicate that amalgamation leads to a decrease in municipal expenditure per capita, while causing no decrease in the quality of services provided. Based on this, the study concludes that amalgamation may have a positive impact on municipal performance.
Slack & Bird (2013)	Canada	The study looks at the different ways in which the formal governance of metropolitan areas may be restructured, focusing on municipal mergers in Toronto. In assessing the impact of municipal amalgamation on local spending, the study uses per household spending for four services (libraries, garbage collection, parks and recreation, and fire). The results indicate that municipal amalgamation in Toronto failed to solve any of the problems that the merged municipalities faced prior to amalgamation and, furthermore, that amalgamation has had a negative impact on citizen participation. Nevertheless, the amalgamation may have had some positive effects on the financial performance of the city, through improving the tax base, the economy and equitable service delivery in the City of Toronto. While the study could not answer the question of whether bigger is better, it suggests that, rather than amalgamation, a better approach might be inter-municipal cooperation, which may improve responsiveness and citizen access to government decision making.

The main message from this brief review of literature is that boundary changes can have positive and negative fiscal consequences for municipalities. The precise impact of municipal boundary changes can only be understood through empirical research, as it depends on a number of contextual issues in the country and the municipalities in question. Methodologies for studying the impact of demarcations on municipal viability vary extensively and include surveys, case studies and more rigorous econometric studies.

13.4 Structure of the South African Local Government Sector

Demarcations over the past 18 years have resulted in South African municipalities with very diverse structures. A cursory look at the sector shows significant socio-economic diversity between municipalities, e.g. in terms of gross value added (GVA), population, service backlogs or poverty (see Figure 100).

Figure 100: Diversity of the local government sector



Source: National Treasury (2013)

As the poorest municipalities (B4s in Figure 100) are largely concentrated in the former homelands, the argument that re-determinations result in cross-subsidisation may not hold. In other words, given that many poor municipalities are neighboured by other poor municipalities, boundary re-determinations may not necessarily result in improved revenue bases or some municipalities becoming fiscally viable.

12.5 Methodology

Case studies (local and international) and econometric modelling techniques are used to assess the impact of boundary changes on the financial and fiscal performance of municipalities.

Four local municipalities (the City of Tshwane, Mtubatuba Local Municipality, Matatiele Local Municipality and Bushbuckridge Local Municipality) and two Canadian municipalities (Halifax Regional Municipality and Toronto City) were selected as case studies. The performance of the six municipalities was evaluated using various financial and fiscal indicators, including changes in expenditures, revenues, tax base and debt, both before and after the boundaries were changed. In addition, officials from the selected municipalities were interviewed, data from city budgets was obtained and desktop studies were undertaken.

Econometric models were used to determine the impact of boundary changes on fiscal outcomes (representing financial performance) using changes in bulk costs and revenues as proxies. A dummy variable was included to capture the demarcation process. These econometric models were based on a balanced panel dataset spanning the period 2004/5 to 2011/12. Panel data models can be estimated via fixed effects or random effects models. Both the fixed and random effects models were run and, on the basis of the Hausman test,⁸⁵ which preferred the fixed effects model over the random effects model, the ensuing analysis and interpretation were based on the fixed effects model.

The fixed effects model estimated is of the following form:

$$Exp_{it} = X_{it} \beta_i + Z + \alpha_i + \mu_{it} \tag{1}$$

Where

α_i is the unknown intercept for each municipality

Exp_{it} is the dependent variable and i and t are municipality and time dimensions

X_{it} is a vector of independent control variables that include population density, unemployment rate, and a municipality's gross value addition.

Z is the demarcation process dummy

β_i is the coefficient to be estimated, and

μ_{it} is the error term

12.6 Findings from the Case Studies

12.6.1 City of Tshwane

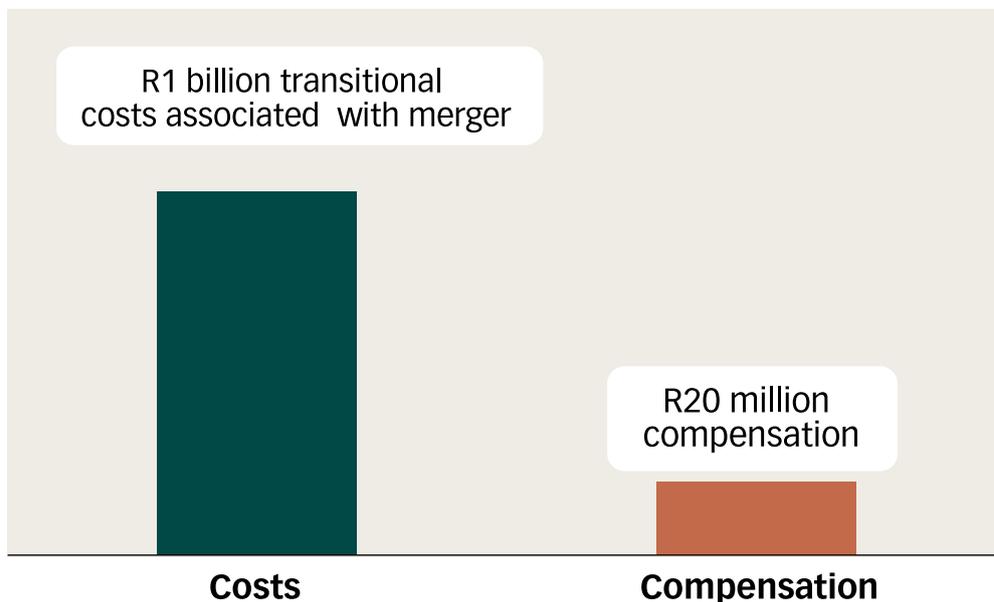
The City of Tshwane is a Category A municipality established in December 2000 following the merger of various municipalities and councils. In May 2008, the Minister of Provincial and Local Government proclaimed the incorporation of Metsweding district municipality and two local municipalities (Nokeng tsa Taamane and Kungwini) into the City of Tshwane boundaries. This was in line with the Gauteng global regional strategy to reduce the number of municipalities in the Gauteng Province. The merger came into effect in May 2011. The reason for the incorporation into the larger metropolitan area was to speed up service delivery and to enable communities from smaller municipalities to benefit from the bigger municipality's good infrastructure and skills needed to run projects efficiently (City of Tshwane, 2011). The 2011 re-determination of the boundaries led to the city population increasing from nearly 2.5-million (2 470 694) people in 2010/11 to nearly 3-million (2 916 785). The land area increased to 6368 km², which resulted in a drop in population density, from 908 persons/km² to 464 persons/km².

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⁸⁵ Hausman test:
 $\chi^2(4) = 175.01,$
 Prob.: $\chi^2 = 0.0000$

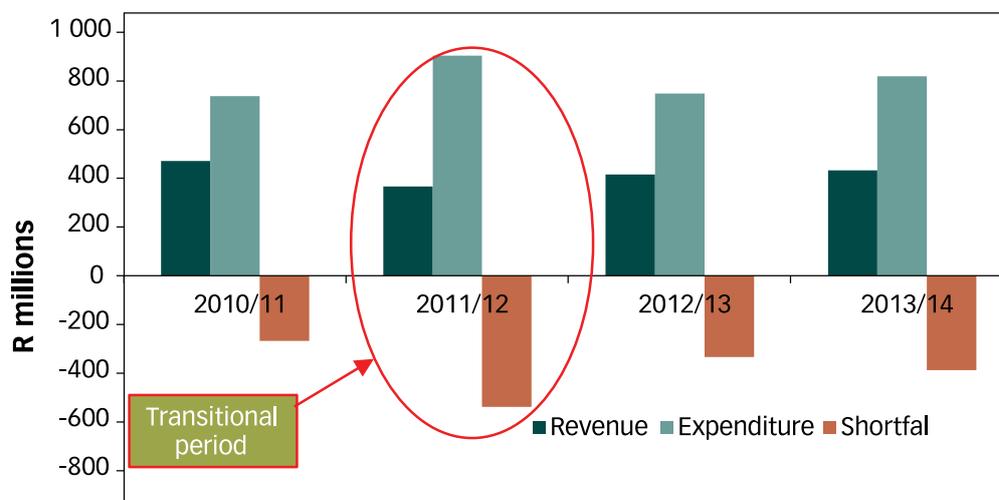
The merger had far-reaching fiscal implications. The transitional costs⁸⁶ were estimated at R1.04-billion, but the Gauteng Department of Local Government and Traditional Affairs provided the City of Tshwane with a one-off grant of only R20-million (see Figure 101). The more than R1 billion difference between the costs and the grant allocation remains a sore point for the new municipality.

Figure 101: Transitional costs of the Tshwane demarcation



The disruptive effect of the merger can be seen in the expenditure and revenue figures for the City of Tshwane. During the first post-merger year (2011/12), expenditures in the incorporated municipalities shot up, although most of these expenditures were not budgeted for, while revenues from the incorporated municipalities declined. The three municipalities did not contribute to an increase in the city's tax base, as the inherited municipalities were relatively poor and a large percentage of their populations was indigent. As a result, the city found itself with a huge deficit (see Figure 102).

Figure 102: Revenue and expenditure in the incorporated municipalities

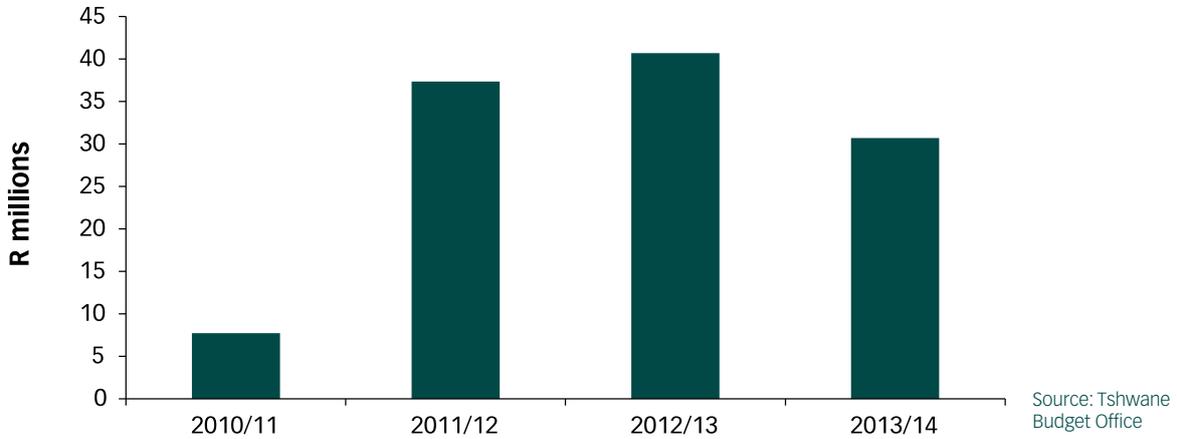


Source: Tshwane Budget Office

⁸⁶ The reader should note that these figures are from the Tshwane municipality and have not been independently verified.

The trend in capital expenditure in the incorporated municipalities tells a similar story (see Figure 103). The five-fold increase in capital expenditure can be attributed to efforts to align the different service delivery systems.

Figure 103: Capital expenditure in the incorporated municipalities



The City of Tshwane also inherited huge debt from the incorporated municipalities. This debt was in part the result of long-term contracts and contractual commitments made prior to the merger. The standardisation of the IT and billing systems also came at a cost.

12.6.2 Mtubatuba Municipality

Mtubatuba Municipality is located in KwaZulu-Natal. In 2011, the municipality's boundaries were extended to include a portion of Mpukunyoni Traditional Council, bringing the municipality's total geographic area to 1970 km². As a result, the municipality's population more than tripled (from 44 953 people in 2010/11 to 160 637 people in 2011/12). The boundary changes resulted in some significant expenditure changes.

As Figure 104 shows, total expenditure for the Mtubatuba Municipality increased by about 18%, from R72-million to R85-million just one year after re-determination. The increase in total expenditure was in part because of increased capital expenditure (see Figure 105), as the municipality had to extend infrastructure provision to the incorporated areas, especially Mpukunyoni, which had huge backlogs. Surprisingly, municipal revenues rose alongside the expenditures. However, this was the result of increased government transfers. Own revenue was stagnant during the period, indicating that the demarcation process did not improve the municipality's revenue base.

Figure 104: Total expenditure and total revenue before and after incorporation

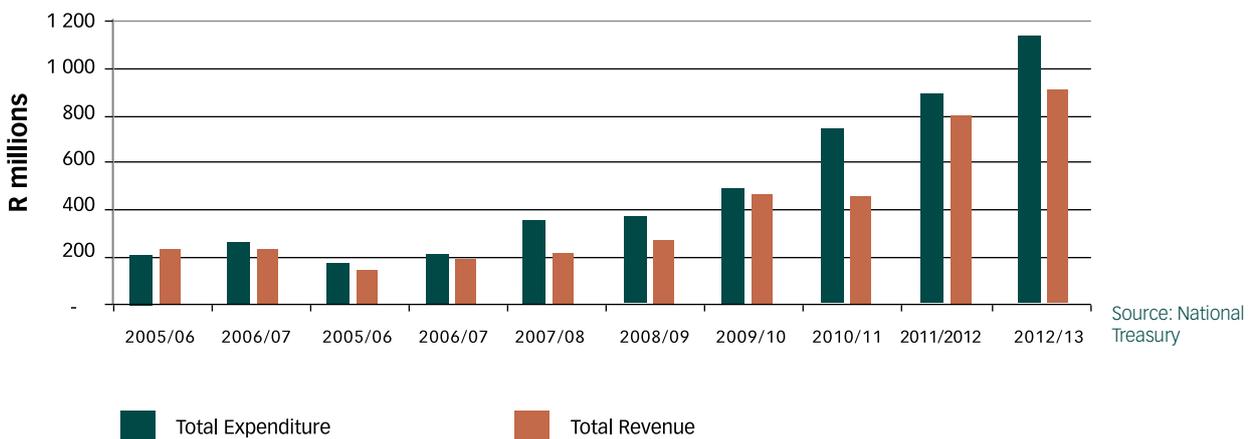
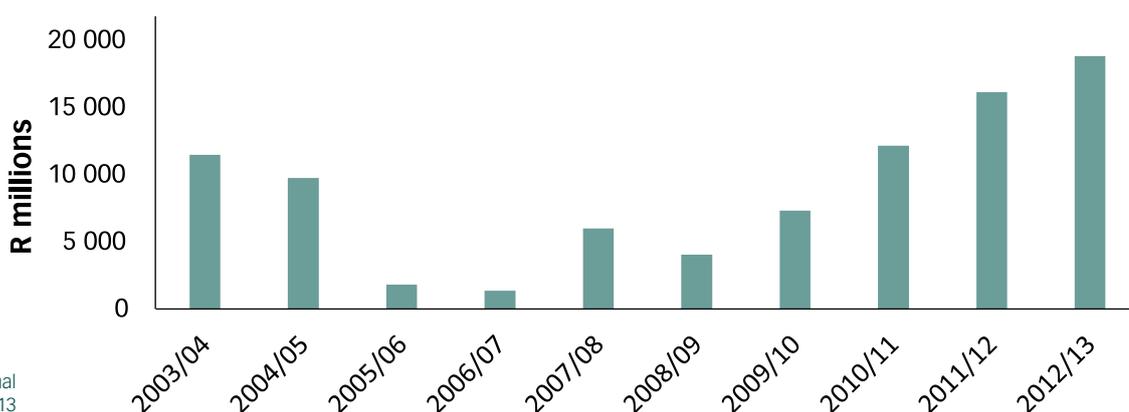


Figure 105: Capital expenditure before and after incorporation



Source: National Treasury 2013

12.6.3 Matatiele Municipality

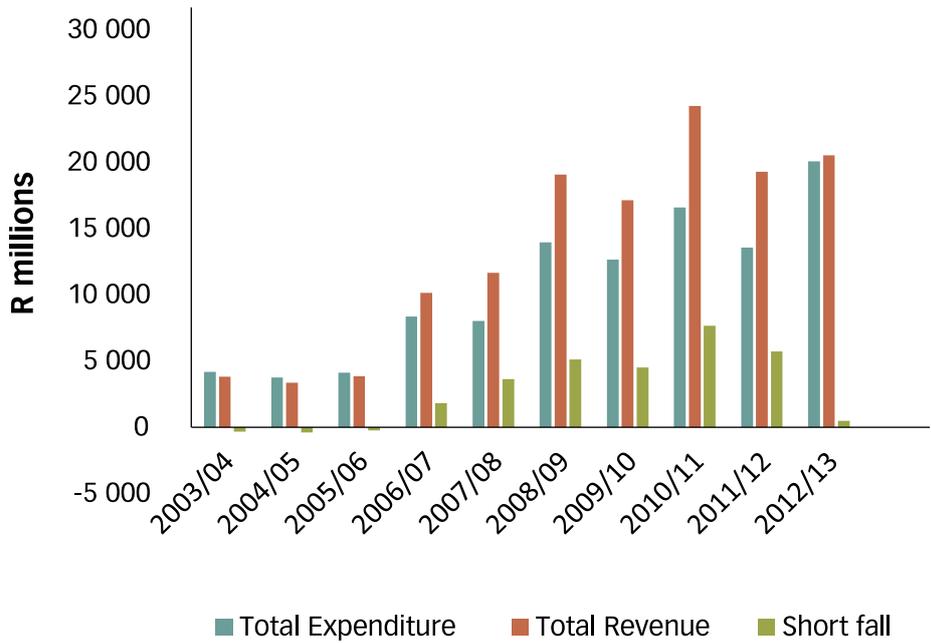
In 2006, the Matatiele Municipality was moved from the Sisonke District Municipality in KwaZulu-Natal and incorporated into the Alfred Nzo District Municipality in the Eastern Cape. The re-demarcated Matatiele Local Municipality included the towns of Matatiele and Cedarville, the magisterial district of Maluti (which formerly fell under the Umzimvubu Local Municipality) and a rural district management area (which formerly fell under the jurisdiction of the Alfred Nzo District Municipality). Prior to 2006, the municipality had a population of just under half a million (597 211), which increased after demarcation by approximately 11%, to 663 271 in 2007/08. The geographic area covered by the municipality increased almost five-fold, from 956 km² to 4352 km². The municipality was forced to establish 24 new wards (Global Insight database) and the large increase in geographic area and population meant additional administrative costs.

Compared to the other case studies, a different story emerges from the Matatiele Municipality's financial indicators. The municipality ran a deficit on its budget prior to the demarcation and a surplus after the demarcation in 2006 (see Figure 106). A key factor explaining the surplus after 2006 was the limited capacity to spend, especially on capital expenditure. Total expenditures jumped from R41-million in 2005/6 to R83-million in 2006/7, driven mainly by increased personnel expenditure, as more people were hired to service the newly incorporated areas – the number of municipal employees grew by more than 100%. The capital expenditure trends presented on Figure 107 show a huge leap, from R7.4-million in 2005/06 (before demarcation) to R26.6-million in 2006/07 (after demarcation).

Other areas that were affected by the boundary changes for Matatiele Municipality include the following:

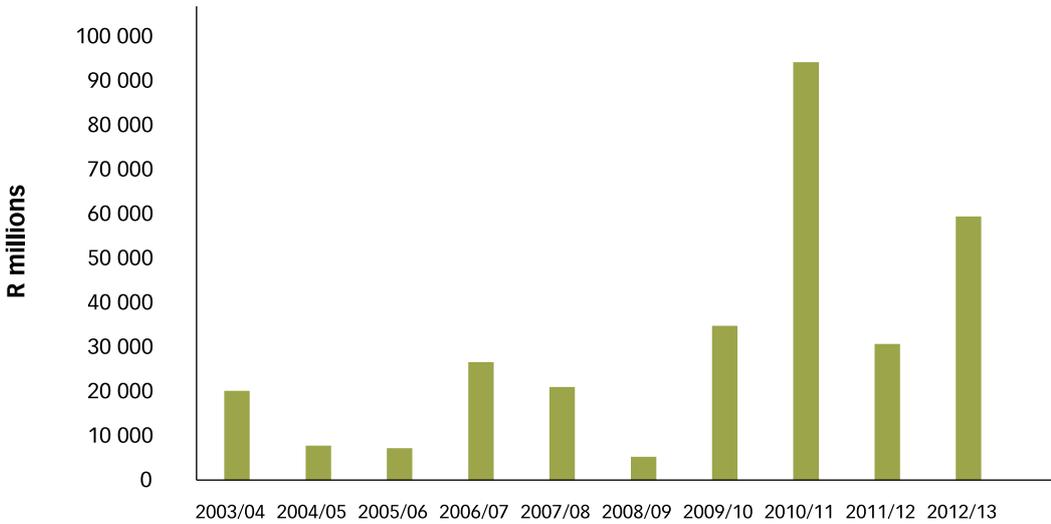
- Tax base. The municipality inherited a huge service delivery backlog from the newly incorporated areas. The Matatiele amalgamation did not improve the municipal tax base, as the acquired areas were characterised by high levels of poverty.
- Debt. The municipality experienced an increase in its debt, from R6.6-million to R46-million (Matatiele Annual Report, 2006/7). A large amount of this debt was inherited from the Maluti areas, as the municipality was unable to charge rates in those areas.
- Human resources. The municipality had to increase its staff by more than 100% to meet the demand for its services from the newly incorporated communities.
- Governance issues. The demarcation led to the establishment of new wards, which had a positive impact in the sense that it improved communication between the municipality and the community.

Figure 106: Total expenditure and total revenue before and after incorporation



Source: National Treasury

Figure 107: Capital expenditure before and after incorporation



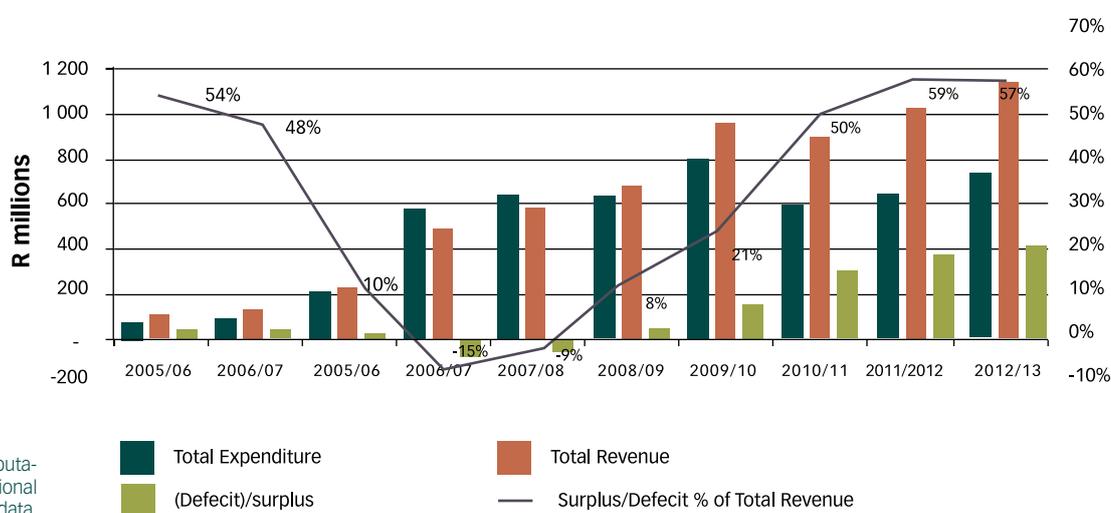
Source: National Treasury

12.6.4. Bushbuckridge Local Municipality

Bushbuckridge Local Municipality is a Category B municipality whose boundaries were changed in 2006. After the disestablishment of the Bohlabela District Municipality, the Bushbuckridge Local Municipality was incorporated into Ehlanzeni District Municipality and received water and sanitation authority and service delivery functions. However, the demarcation did not result in any significant changes to the municipality's tax base.

The transition led to considerable disruptions of service delivery, as shown by the expenditure in Figure 108. Before the demarcation (2003/04–2005/06), the municipality had been under-spending but, in the year of the demarcation and the following year, over-spent by 15% and 9%, respectively. However, within another two years, the municipality was again under-spending and has had surpluses of more than 50% since 2010/11.

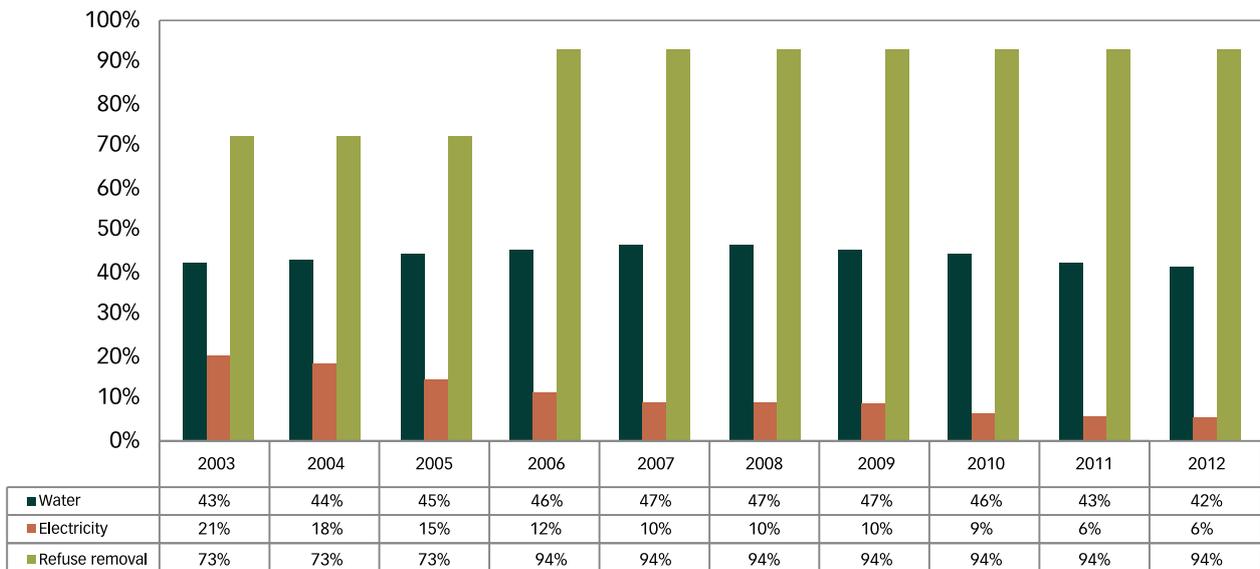
Figure 108: Total expenditure versus total revenue (2003/04–2012/13)



Basic service delivery

Prior to the 2006 demarcations, the municipality had been characterised by high backlogs and a large number of its households with no access to basic services. After demarcation in 2006, the percentage of households with access to refuse removal increased from 73% to 94% (see Figure 109). Prior to 2006, these functions were largely performed by Bohlabela District Municipality. The Bushbuckridge Local Municipality Water Dialogues Synthesis Report (2009) indicates that the municipality still faces challenges with regard to basic service delivery, i.e. water and sanitation. Furthermore, the report highlights that Bushbuckridge residents still receive services that are below Reconstruction and Development Programme standards.

Figure 109: Total expenditure versus total revenue (2003/04–2012/13)



Source: Author's calculations using National Treasury data

12.6.5 International case studies

Two Canadian cities, Toronto City and Halifax Regional Municipality (HRM), underwent restructuring in the late 1990s. In 1998, metropolitan Toronto (comprising East York, Etobicoke, North York, Scarborough, York, and the former city of Toronto) and the regional municipality of Metro Toronto were dissolved and amalgamated into a single municipality called the City of Toronto. In 1996 four municipalities – Halifax, Dartmouth, Bedford and Halifax County – and one regional authority were amalgamated into the HRM.

The purpose of both amalgamations was to improve efficiencies and save costs. For example, Toronto City expected to save \$645-million by eliminating service delivery duplications but in fact only managed to save \$135-million in the first year after amalgamation. The standardisation of salaries, systems and services contributed to higher costs than expected. In HRM, cost savings were wiped out by salaries that were pegged at the level of the highest-paid employee in the original municipalities (Vojnovic, 2000). Employee costs, together with the cost of acquiring new accounting and information systems, contributed to the \$25-million transition cost of the HRM merger. These higher employee costs also contributed to higher operating costs. Similarly, in Toronto City, the standardisation of wages and salaries came at a cost of \$2-million and contributed to the higher-than-expected total transition cost, which was \$55-million more than the original estimate of \$220-million.

Before amalgamation (1990–1996), the merged municipalities (with the exception of Toronto Metro) recorded an operating budget of less than \$2-billion. After the amalgamation, the total operating expenditure for the City of Toronto increased by 22% between 1997 and 1998 and thereafter continued to increase by just under 10% in the years that followed. The amalgamation had no significant impact on capital expenditure, which increased by only 3% between 1997 and 2007.

12.7 Econometric Results

To evaluate the impact of boundary changes on municipal performance, panel data models are used. Panel data models can be estimated via fixed effects or random effects models. In this exercise we first compared the performance of fixed and random effects models (see Table 114) and, for interpretation, the most robust model was selected.

Table 115 records some descriptive information on key variables used in the modelling exercise.

Table 115: Descriptive information on key variables

Year	Own revenue	GVA	Total expenditure	Population density	Unemployment rate
2004	195743.0	6632610	289288.4	86.42555	29%
2005	206850.3	6963436	310494.2	87.48286	29%
2006	228666.2	7330227	354168.5	88.60661	28%
2007	254651.3	7722743	403701.1	89.77707	27%
2008	288855.9	8010203	493101.3	91.0747	25%
2009	350921.2	7915770	577735.5	92.30742	26%
2010	426548.5	8124444	672427.0	93.74696	26%
2011	466335.4	8341204	718719.2	88.0336	25%

Source: Author's calculations

Table 116: The random versus fixed effects model

Variable	Fixed effects model			Random effects model		
	Coefficient	<i>t</i> -value	<i>p</i> -value	Coefficient	<i>t</i> -value	<i>p</i> -value
GVA	0.3029	23.48	0.000	0.7738	23.93	0.000
Population density	0.2424	2.40	0.017	0.1413	3.98	0.000
Unemployment rate	-0.8084	-8.89	0.000	-0.5187	-7.78	-7.780
Demarcation	0.1380	1.62	0.105	0.1686	2.06	0.039
Constant	-9.2587	-11.15	0.000	-0.8439	-1.94	0.052
Diagnostics						
<i>R</i> ² -value	Within	0.2747		0.2733		
	Between	0.5944		0.5917		
	Overall	0.5383		0.5361		
F-value		22.71				
Prob. <i>F</i>		0.0000				
Wald <i>X</i> ²				919.89		
Prob. <i>X</i> ²				0.0000		
Hausman test: <i>X</i> ² (4) = 175.01				Prob: <i>X</i> ² = 0.0000		

Source: Author's calculations

12.7.1 Expenditures

In this case, expenditure proxies output. Table 117 presents the final results of the fixed effects model. The fixed effects model is robust, as evident in the F value, which indicates that the combined effects of the coefficients in the preferred model are different from zero. Apart from the population density variable, all the coefficients are statistically significant and all have the expected and theoretically acceptable signs.

Table 117: Fixed effects expenditure model

Fixed effects model			
Variable	Coefficient	t-value	p-value
GVA	0.9857	19.13***	0.000
Population density	0.1219	1.35	0.177
Unemployment rate	-0.1642	-1.90***	0.057
Demarcation	-0.2468	-3.17***	0.002
Constant	0.1072	22.06***	0.000
R ² -value			
Within		0.4234	
Between		0.5973	
Overall		= 0.5653	
Fvalue		277.11	
Prob. > F		0.0000	

Source: Author's calculations

Note: ***Coefficient is statistically significant at 1%. All variables are in logs except the demarcation variable, which is a dummy.

The GVA coefficient is statistically significant at 1%. The positive sign suggests that a 1% increase in economic growth yields a 1% increase in expenditure. Another significant coefficient is the unemployment rate variable, and the coefficient carries the expected sign. When more people are unemployed, municipal expenditure declines, probably due to the fact that fewer people paying rates causes a municipality to spend less. Time effects are significant, suggesting that municipal expenditure increases with time.

The variable of interest is the dummy representing the demarcation process. The coefficient of the demarcation dummy is negative, indicating that the demarcation process lowers municipal expenditures (in this case a proxy for output). This result confirms the findings of the cases studies that demarcations tend to disrupt municipal expenditures. As this was a proxy for financial performance, this result suggests that demarcation processes negatively affect municipal financial performance.

12.7.2 Bulk costs

A similar model is estimated for the bulk costs (Table 118). Bulk costs proxy the costs of providing basic services. All of the control variables have the expected signs and are statistically significant at 1%.

Table 118: Fixed effects bulk cost model

Fixed effects model			
Variable	Coefficient	t-value	P> t
GVA	0.3636	3.94***	0.000
Population growth	0.7223	2.62***	0.009
Expenditure	0.1264	3.37***	0.000
Demarcation	0.4935***	3.94	0.000
R ² -value			
Within = 0.1301			
Between = 0.1947			
Overall = 0.3131			
F(4,1221) = 45.29			
Prob. > F = 0.0000			

Source: Author's calculations

Note: ***Coefficient is statistically significant at 1%. All variables are in logs except the demarcation variable, which is a dummy.

As expected, the cost of providing bulk services increases when the population grows. When the demarcation variable is introduced into the model, bulk costs increase, suggesting that demarcations could threaten the sustainable development of municipalities, by increasing the costs of servicing communities. This result confirms the cases studies, which showed that demarcations tend to disrupt municipal expenditure. The results on the demarcation variable indicate that demarcations increase the costs of providing basic services, suggesting that demarcations can be a threat to the sustainable development of municipalities.

12.7.3 Own revenue

The impact of the demarcation on a municipality's own revenue was then evaluated. In this model, own revenue is regressed against GVA growth, population growth, unemployment rate, poverty levels in a municipality, and the demarcation dummy (Table 119).

Table 119: Fixed effects own revenue model

Fixed effects model			
Variable	Coefficient	t-value	P> t
GVA growth	0.1100	4.42***	0.0000
Unemployment rate	-0.1908	-1.31	0.1920
Population growth	-0.0332	-0.23	0.8210
Poverty	-0.3466	-9.41***	0.000
Demarcation	0.3533	-2.76**	0.0060
<i>R</i> ² -value	Within = 0.1305		
	Between = 0.1578		
	Overall = 0.2087		
<i>F</i> (5,1678)	= 50.37		
Prob. > <i>F</i>	= 0.0000		

Source: Author's calculations

Note: ***Coefficient is statistically significant at 1%. All variables are in logs except the demarcation variable, which is a dummy.

Municipal economic growth (using GVA) was found to be positively related to own revenue, i.e. a 1% increase in economic growth of a municipality yields a 0.1% increase in own revenue. The GVA coefficient is statistically significant at the 1% level. This result is not surprising, as an expanding economy leads to more revenues being generated and better payment levels.

Population growth was found to be negatively related to own revenue (but statistically insignificant). The plausible explanation for the negative relationship is that most mergers or incorporations involve the incorporation of poorer communities, which will not contribute much to own revenue but will benefit from the existing budget. As expected, unemployment and poverty affect own revenue negatively: when the unemployment rate increases, own revenue decreases; if poverty increases by 1%, own revenue decreases by 0.3%.

When the demarcation variable is introduced, the effect on own revenue is negative, suggesting that the demarcation process does not result in improved revenues for the amalgamated municipalities. A possible explanation is that poorer municipalities are often incorporated, which means that indigent populations increase but without any additional revenue being generated. Therefore, it is a myth that demarcations result in enhanced revenue bases. This result illustrates that demarcations will result in more expenditures for the amalgamated municipality without proportionate increases in own revenues. This implies that additional revenue should be provided to newly amalgamated municipalities to supplement own revenue, at least in the transition phase.

12.7 Demarcation Costs: Who Should Pay?

The Municipal Demarcation Act (Sections 24 and 25) and the Municipal Structures Act clearly set out the objectives and criteria of the demarcation process. In addition, the Municipal Demarcation Act defines the factors/principles that the minister for local government and the MDB must take into account when deciding on a particular boundary change. Section 25(c) states that the MDB must take into account “the financial viability and administrative capacity of the municipality to perform municipal functions efficiently and effectively”. The guiding principle for the MDB is “the need to ensure that all municipalities are financially viable and have administrative capacity”. Although many factors must be considered and prioritisation can be difficult, particular attention needs to be paid to the financial and fiscal implications of demarcation, which can affect the financial viability of demarcated municipalities. The following should be pre-conditions for any mergers:

- Establish financial and fiscal implications of boundary changes. Before announcing the decision to change boundaries, the financial and fiscal implications of boundary changes should be established and made publicly available. A due diligence exercise should be undertaken to isolate potential risks and single out important issues and dynamics. Due diligence should, among other things, establish the following:
 - o the financial situation of the affected municipalities;
 - o the number and remuneration of workers in the affected municipalities;
 - o the value and condition of assets;
 - o the debtors and creditors of the affected municipalities; and
 - o the existing contracts and other legal proceedings for all merging municipalities.

The costs of a merger should ideally consist of transitional (both direct and indirect) costs that can only be attributed to the merger. Before taking a final decision to amalgamate, indicative costs or issues should be established (as per Table 120).

- Adequate funding of demarcation. Before finalising the demarcation decision, a demarcation funding stream should be identified. If the demarcation is a vertical decision (i.e. made by provincial or national government), then the transitional costs should be borne by the national or provincial government, not by the municipalities. Such costs fall outside the municipal budget and have the potential to harm the overall development of the municipality concerned. Ideally, transitional costs that result from a vertical decision should be funded through the transfer system. The most appropriate funding instrument is therefore a transitional grant.

Table 120: Financial and fiscal costs associated with demarcation

Cost		Itemised Costs
Direct Costs	Financial Costs	<ul style="list-style-type: none"> Integrating and consolidating programmes Upgrading of data services Repair and maintenance Eliminating backlogs Rationalisation of services Change management costs Acquisition of new technology for human resources, financial and payroll systems Harmonisation of systems Rationalisation of administrative policies Rationalisation of fees and tax rates Harmonisation of asset registers Rationalisation of voters roll Merger management, coordination and communication costs Harmonisation of wages, salaries and allowance (wages are often set at the highest level paid by separate municipalities) Harmonisation of human resources policies Harmonisation of councillor allowances Costs associated with retraining and retooling of workers Costs associated with staff redeployment Retrenchment or staff layoff costs Debt servicing costs Liabilities Irrecoverable consumer debt Increase in expenditures due to wage and services rationalisation Tariffs may increase for some consumers in previously low tariff municipalities
	Fiscal Costs	
Indirect Costs	<ul style="list-style-type: none"> Perverse Incentives Competition 	<ul style="list-style-type: none"> Amalgamation offers municipalities an incentive to accumulate debt so as to download this to a new municipality Last minute spending that result in budget overruns Diminished competition results in poor services

12.8 Alternatives to Boundary Changes

The benefits of municipal mergers, which include economies of scale, efficiency gains and improvement in fiscal outcomes, often do not appear immediately after the mergers (Hansen et al., 2014). As illustrated by the case studies and econometric evidence, the merger is often accompanied by high transitional costs, which may destabilise service delivery. Given these transitional costs, it may be necessary to consider alternative mechanisms that are less costly but yield similar fiscal and service delivery outcomes. Municipalities need to be allowed to explore other options, especially when the aim is to improve fiscal and service delivery outcomes.

Other viable municipal restructuring options worth exploring include voluntary cooperation among municipalities, inter-municipal service delivery agreements and special purpose vehicles to address particular needs of concerned municipalities.

- Voluntary cooperation can be used to provide services across the region without resorting to a merger. It recognises the interrelationships that exist among municipalities but, at the same time, guarantees municipal autonomy for expenditure, tax decisions or economies of scale.
- Inter-municipal service delivery agreements address the problems of externalities associated with service provision by delivering certain services (e.g. sewerage) jointly. Structures established through these agreements are also easy to disband.
- Special purpose vehicles can be used to manage regional services that are characterised by spill-overs or to provide certain services for several municipalities.

12.9 Conclusion

Demarcation involves redrawing municipal boundaries, and reconfiguring the size, number and type of municipalities. Since 1995/96, the number of municipalities has decreased, from 1262 to 278 in 2011, a number that is expected to decrease further prior to the local government elections in 2016, as new demarcations come into effect. Concerns have been raised about the impact of demarcation on municipal revenues, expenditures, tax bases, and liabilities. The process also compromises other ongoing reforms in the sector. The impact of boundary changes on the financial and fiscal performance of municipalities was assessed using local and international case studies as well as econometric modelling techniques.

Demarcation processes are costly, can be disruptive and distract from a municipality's core business. The case studies and the econometric models indicate that the demarcation process actually results in unintended economic consequences and significant transaction costs, especially during the transition phase. Own revenue is also negatively affected by demarcations. Furthermore, demarcation processes have implications for human resources and other municipal processes. Human resources are sometimes shifted from one municipality to another. Other negative consequences (especially in the transition period) may result from issues related to the supply chain, long-term contracts, municipal plans and policies, financial and other systems, information and databases, asset registers and asset maintenance, and repairs. Disruptions in the billing systems are not uncommon, affecting revenues negatively. Redefining boundaries complicates future projections and budgeting, as such processes rely on historical trends and data. The integrated development plans (IDPs), which are the cornerstone of a municipality's existence, are severely compromised by demarcations. To minimise the negative effects of mergers, role-players need to compare the costs of a merger with the costs of alternative reforms. In addition to considering other reforms, certain conditions should be met before mergers take place. It is also important to point out that the two-year period between the time when the decision to demarcate is taken and when the actual demarcation process begins is crucial, so that role-players have ample time to plan and put in place measures that facilitate a successful transition process.

12.10 Recommendations

Flowing from the analysis reported in this chapter, the Commission submits the following recommendations:

1. The financial and fiscal implications of boundary re-determinations are prioritised and established before any demarcation decision is pronounced. A funding stream for the demarcation process should be identified before the process takes effect. In order to avoid the negative effects of demarcations on municipalities and their populations, economic considerations (i.e. both fiscal and financial) should be at the core of any demarcation decision, both in theory and in practice. The current criteria are clear that economic considerations should be part of the demarcation decision but this does not appear to be the case in practice.
2. For every vertically decided demarcation process, government should bear the transitional costs of the restructuring. A transitional demarcation grant should be awarded to the amalgamated municipality. This grant should be temporary and be awarded over at least three years (at least a year before, the year of and the year after demarcation takes place). The purpose of the grant will be to facilitate the restructuring process. This includes the following:
 - a. planning and preparing an amalgamated municipality's delivery model, e.g. combining the delivery models of individual municipalities;
 - b. rationalising and harmonising policy regimes, IDPs and bylaws of different municipalities;
 - c. rationalising tariffs;
 - d. rationalising employment policies and other human resources systems (grading of workers and job evaluation processes);
 - e. rationalising and harmonising evaluation rolls and asset registers;
 - f. building capacity to deal with change management;
 - g. facilitating communication about demarcation.

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Midrand

2nd Floor, Montrose Place, Bekker Street,
Waterfall Park, Vorna Valley, Midrand, South Africa

Private Bag X69, Halfway House 1685

Tel: 086 1315 710, Fax: +27 (0) 11 207 2344

Cape Town

12th Floor, Constitution House, 124 Adderley Street
Cape Town, South Africa

P.O. Box 1505, Cape Town 8000

Tel: 086 1315 710, Fax: +27 (0) 21 426 4935



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