

A PRELIMINARY EXPLORATION OF THE COMPOSITION AND SUSTAINABILITY OF URBAN FINANCE IN SOUTH AFRICA

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1. Introduction

Background. In South Africa, as elsewhere, urban areas are the engines of economic growth. As such, it is not only critical to the success of the public sector, but truly, critical to the success of the economy as a whole, that urban infrastructure and services are properly funded and effectively delivered. In addition, urban areas play an important role as a space for upward social mobility and social transformation, as many of South Africa's poor continue to look to urban areas as centers of social and economic opportunity.

The success of South Africa's post-apartheid transition was in no small part due to the careful balancing of power and resources among the national, provincial and municipal spheres of government. The system of local and intergovernmental finance that has emerged from the transition is generally recognized as one of the most carefully designed and implemented systems of subnational finance in the world. Through an iterative process of public sector reform, considerable care was taken during its development to ensure that the overarching system of intergovernmental finance—as well as other aspects of intergovernmental relations, such as the jurisdiction size of local governments—were technically well-designed and carefully aligned with key public finance principles—including the notion that “finance should follow function”—to achieve strong urban local governments and to ensure an efficient, equitable and sustainable system of local government finance.

However, intergovernmental fiscal systems and systems of urban finance are seldom static: policy priorities with respect to urbanization may change, macro-fiscal space expands and tightens with the overall performance of the economy and the exposure of fiscal decisions to political economy forces tends to evolve over time. As such, it is possible that the efficacy of the national and local mechanisms used to fund local governments—particularly in urban areas—has gradually eroded. It is *a priori* unclear, however, whether such factors may have combined over time to threaten the long-term sustainability of urban finances.

While different topics related to urban finance in South Africa are individually subjected to regular analysis and well-documented (e.g., urban revenues; urban housing finance; urban transport finance; etcetera), an area that is relatively under-explored in the available body of knowledge is a systematic consideration of the cumulative impact of these different patterns and trends. Only when urban spending programs across different sectors are considered together, an important overarching policy question emerges: what is the cumulative impact of urban investment decisions currently being made—both by different national and provincial departments as well as by local governments themselves—on the long-term fiscal wellbeing of urban areas?

In light of concern about the long-run sustainability of urban finances, the current background paper to the South Africa Urbanization Review seeks to analyze the composition of urban finance in South Africa as a preface to a more detailed and forward-looking analysis of the sustainability of urban finances in the country.

Objective of the analyses. The primary purpose of current background paper to the *South Africa Urbanization Review* is to establish a shared understanding of the state of urban public finance in South Africa as background input into a subsequent analysis into the interaction between urban finances and the urban space economy in the country. In addition, this background paper seeks to complement the existing state of knowledge with respect to urban finances by exploring three aspects of urban finance that will collectively support a better understanding of the composition and sustainability of urban finance in South Africa.

A first step in better understanding the fiscal sustainability of urban finance in South Africa is to consider the composition and trends of municipal finances in the country, by analyzing municipal expenditures and funding streams in support of municipal infrastructure and services across all sectors and all (metropolitan) urban areas (Section 2).

A second step in achieving a better understanding of the composition and sustainability of urban finance in South

Africa is to consider the ‘big picture’ of urban finances, which takes into account not only the expenditures by urban local governments themselves (which are largely funded by a combination of own source revenues and intergovernmental fiscal transfers from either the national or provincial spheres),¹ but which also considers direct spending by national and provincial departments on urban infrastructure and services. Such an analysis (presented in Section 3) thus provides an idea about the total amount and composition of expenditures directed to urban functions by all spheres of government.²

Third, it is useful to tentatively explore the potential impact of specific policy decisions or policy interventions on urban fiscal sustainability. Although it is beyond the scope of the current analysis to engage in analytical “deep dives” in each urban function, it is our intent to (tentatively) identify policy areas and urban functions that pose a greater potential risk to urban fiscal sustainability than others (Section 4).

Summary of findings. In 2015-16, 226 billion Rand (roughly US\$ 17.4 billion) was spent on urban functions in South Africa, with the vast majority (81 percent) being spent on recurrent expenditures versus capital infrastructure (19 percent).³ Out of the total amount of urban spending, close to R 204 billion (90.2 percent) is spent by municipal governments themselves, whereas national departments and provincial agencies are responsible for the remaining 4.2 and 5.6 percent of direct public spending on urban infrastructure and services, respectively.

Our analysis of the composition and trends in urban finances in South Africa suggests that the country’s urban finances are generally on a sustainable trajectory, with no apparent danger of an imminent systemic urban fiscal crisis. However, urban local governments are subject to a range of forces that create upward pressure on local government spending in an environment of revenue-side constraints. While at this stage no single urban function threatens the sustainability of urban finances, the combined impact of policy decisions across different urban functions can pose a long-term cumulative risk.

One area of some concern is the municipal capital budget. In order to provide key municipal services, reduce backlogs and support urban growth, a recent analysis found that metropolitan municipalities need to annually spend on average R 43 billion (PDG/NT 2015). In 2015/16, however, urban local governments spent only R 30 billion on capital infrastructure, and growth in capital expenditures over time seems to be lagging. In order to increase their capital spending, however, urban municipalities need to generate greater operating

surpluses. Alternatively, urban municipalities could be awarded more grants or engage in more extensive borrowing in order to finance the capital infrastructure gap.⁴

An area of potentially even greater concern is the operational side of the budget, as operational expenditures represent the vast majority of urban spending. National policy decisions and current capital investments can potentially have significant implications for future recurrent spending. Among others, the areas of housing and urban public transportation warrant additional attention, as extensive financial involvement of national and provincial departments and agencies in these areas may limit the ability of urban local governments to maintain fiscal balance.

Caveats. These preliminary findings are subject to two main caveats, as the current exploration of urban finances has clear limitations and leaves key areas of in-depth analysis for future efforts. First, the current analysis looks at current and past urban finances; it is explicitly not forward-looking by projecting the future impact of current fiscal decisions. This type of analysis is specifically left for the future. Second, the current analysis looks at urban areas (metropolitan municipalities) in aggregate; it does not look at the fiscal situation of individual urban areas. In doing so, it does sidesteps the very real concerns that under the current incidence of expenditure needs, the current assignment of revenue sources and under the current approach to allocating intergovernmental fiscal transfers, some individual municipalities may be experiencing significant fiscal stress, even though this does not appear to be the case for the urban sector as a whole. Various avenues exist for addressing the different aspects contributing to such horizontal fiscal imbalance. In this light, the National Treasury is already supporting the development of long-term financial strategies for individual metropolitan areas which are aligned with their Built Environment Performance Plans (BEPPs).

2. An overview of urban municipal finances in South Africa

The basic architecture of urban finance in South Africa.

The architecture of urban finances in South Africa is largely defined by the country’s 1996 Constitution (as amended from time to time) which enumerates

¹ Borrowing—particularly for capital investments—is another funding option. Of course, in the long run, borrowing has to be repaid for using either own source revenues or intergovernmental fiscal transfers.

² Composition includes composition by function (e.g., housing, transport, urban services, etc.) and sub-function (e.g., metro rail versus rapid bus transport, etc.) as well as composition in terms of recurrent and capital spending.

³ FY 2015/16 is the most recent year for which data are available. See Section 3 and Table 3.2 for further detail.

⁴ The merits or demerits of these various financing options will be discussed in a subsequent output. The increased reliance by local governments on capital grants as a funding source for capital investments is an important policy concern.

the detailed functional competences and expenditure responsibilities of the different government spheres, and (fairly uniquely) assigns both revenue and borrowing powers to municipalities to finance these obligations. Although a wide range of urban infrastructure and service delivery functions (such as municipal planning, municipal public transport, water and sanitation services, and so on) are constitutionally defined as municipal competences, the responsibility for urban development—writ large—is constitutionally assigned as a concurrent national and provincial legislative function. At the national level, local (including urban) governance and development falls within the remit of the Department of Cooperative Governance and Traditional Affairs (CoGTA).⁵

In international practice, it is unusual for the powers or mandates of (urban) local governments in a country to be defined by the constitution rather than by subsidiary legislation. The constitutional framing of these powers in South Africa has possibly limited the intrusion of national and provincial departments in municipal functions. One characteristic feature of municipal functions and finances in South Africa is the important role played by municipalities in providing municipal utility services. Whereas in many countries (both in Sub-Saharan Africa, as well as in other global regions) water and sanitation service are provided by parastatal water and sanitation authorities (which are typically owned and operated by central or provincial governments), in South Africa, water and sanitation reticulation is squarely a municipal function and is fully accounted for on-budget. Likewise, rather than leaving this responsibility to the private sector, South African municipalities are generally the primary entity responsible for electricity distribution within their respective jurisdictions.⁶

The Constitution further guides the assignment of revenue sources to the different (national, provincial, municipal) government spheres, limiting the types of tax instruments that could be assigned to the local government sphere. As a result, non-tax revenues (especially utility tariffs for electricity and water) are the dominant source of own municipal revenues in South Africa. Property rates are the main general revenue source at the local level. A second important source of municipal revenue, the Regional Services Council (RSC) Levy was found to be unconstitutional and abolished on July 1, 2006. The RSC levy effectively was a tax on business activity as proxied by payroll and turnover within each municipality.

Thirdly, the Constitution provides the framework for the (vertical and horizontal) division of financial resources through the Equitable Shares to Provinces (PES) and local governments (LGES). In line with the concept that “finance should follow function” and that the national government should be responsible for the redistribution function, the LGES allocation formula intends to ensure that all municipalities are able to provide basic municipal services to indigent households in the municipality as well as address any residual mismatch between revenue and expenditure assignments. In order to prevent excessive national government control, however, the LGES allocation is provided as an unconditional grant. The LGES allocation is further supplemented by a number of conditional grants. Municipal financial management responsibilities—including a strong oversight role for the National Treasury—are defined as part of the Municipal Financial Management Act (2003, as amended).

Defining urban areas included in the analysis. For the purpose of the ensuing analysis, urban areas are defined as all metropolitan municipalities.⁷ The analysis in the current note will generally consider the finances of these urban areas in aggregate. Naturally, the aggregate view of urban finances abstracts away from variations in the expenditure and revenue patterns of individual municipalities. However, doing so ensures an unobstructed view of the overall composition and “big picture” of urban finances in South Africa, prior to interrogating specific elements of urban finance.⁸

⁵ This department was previously known as the Department of Provincial and Local Government (DPLG).

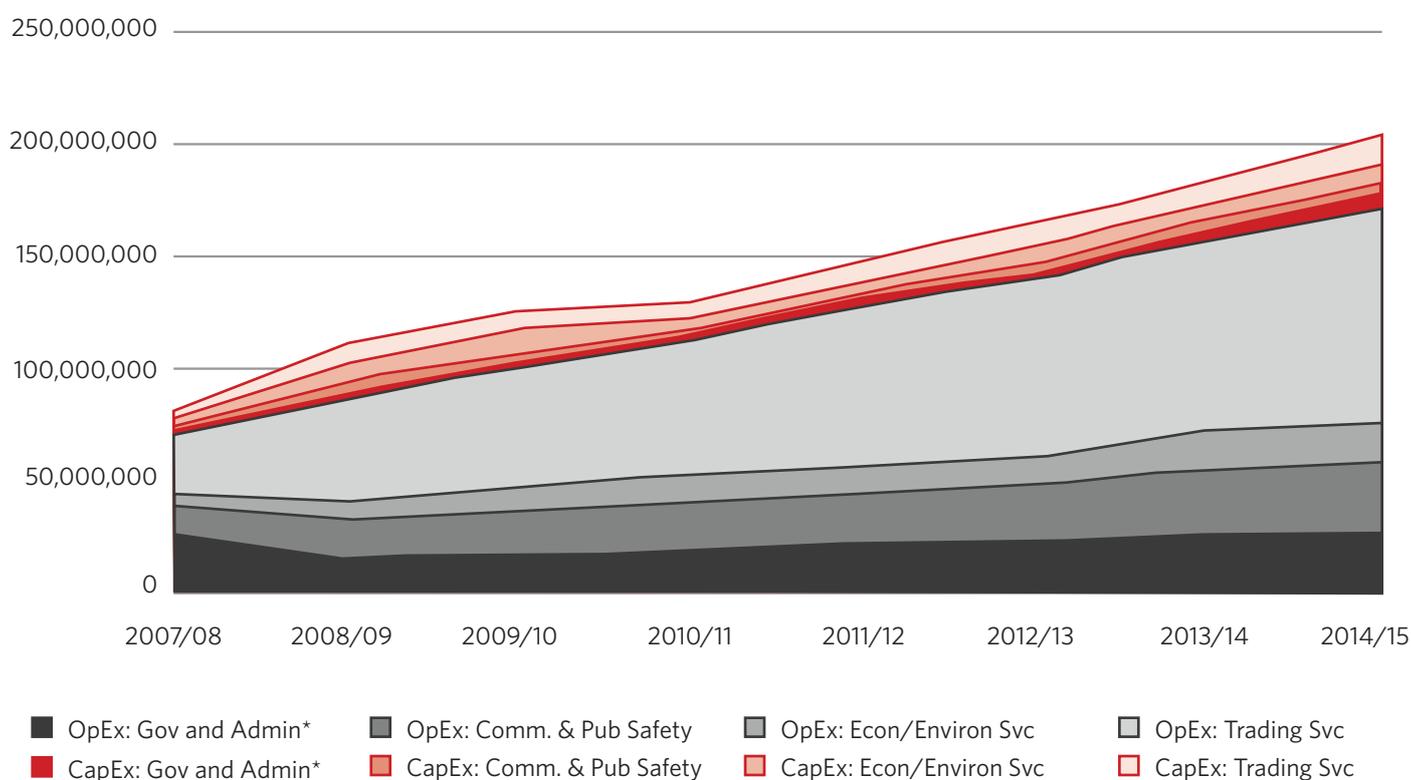
⁶ As further noted in Section 4, ESKOM provides direct electricity services to urban households in some areas.

⁷ Metropolitan municipalities included in the analysis are Buffalo City, City of Cape Town, Ekurhuleni, eThekweni, City of Johannesburg, Mangaung, Nelson Mandela Bay and City of Tshwane. An earlier draft of this paper considered urban areas to include not only all metropolitan municipalities, but also all secondary cities (B1 municipalities). However, secondary cities are served by a combination of local municipalities as well as district municipalities. Using the more expansive definition of urban areas (including secondary cities) would thus have required disentangling district-level spending and revenues across their urban core and non-urban periphery, which is not possible given the available data sources.

⁸ Considerable municipal-level analysis is already conducted by the State of City Finances (SACN). To the extent that this aggregated analysis identifies specific areas of concern with respect to fiscal sustainability, such analysis needs to be followed up by disaggregated analysis at the municipal level to determine how individual urban areas are impacted by these trends.

An overview of municipal expenditures. An overview of municipal expenditures over the period from 2007/08-2014/15 is presented in Figure 2.1.

Figure 2.1: An overview of municipal expenditures in urban areas in South Africa, 2007/08 – 2014/15



Source: Computed by authors based on audited figures from the Local Government Finance Database.

Following the traditional functional classification used for municipal expenditures in South Africa, the figure breaks down municipal expenditures into operating expenditures (blue) and capital expenditures (red), and between four broad functional categories: Governance and

Administration; Community and Public Safety; Economic and Environmental Services; and Trading Services.⁹ The detailed functions included in each grouping are specified in Table 2.1 (further below).¹⁰

⁹ The category "Other Expenditures" forms a fifth functional expenditure category in the budget classification system. Since other expenditures typically represent a minor or even trivial share of municipal spending, the expenditure category for 'Other' has been included in Governance and Administration spending in Figure 2.1. In the first few years of the time series, some minor inconsistencies in reporting were detected in the source data. No audited municipal expenditure figures are available yet for FY 2015/16.

¹⁰ One challenge with the municipal functional expenditure classifications is that urban public transportation (e.g., municipal spending on bus rapid transit) has traditionally lacked its own sub-category. As such, it is difficult to trace municipal spending on urban public transportation over time.

A detailed breakdown of municipal expenditures. A more detailed breakdown of municipal expenditures by function is presented in Table 2.1 based on end-of-year audited expenditures for FY 2014/15. Again, the analysis covers municipal expenditures across all metropolitan local governments.¹¹

Table 2.1 An overview of municipal expenditures in urban areas in South Africa, FY 2014-15

	OpEx	CapEx	Total	OpEx	CapEx	Total	OpEx	CapEx
	Rand Million			(% Total)			(% Subtotal)	
Gov. & Administration	29,247	4,549	33,795	14.2	2.2	16.5	16.8	14.6
Executive & Council	6,279	508	6,787	3.1	0.2	3.3	3.6	1.6
Budget & Treasury Office	12,256	344	12,600	6.0	0.2	6.1	7.0	1.1
Corporate Services	10,711	3,697	14,408	5.2	1.8	7.0	6.2	11.9
Comm. & Public Safety	30,461	6,020	36,481	14.8	2.9	17.8	17.5	19.4
Community & Social Svc	3,987	572	4,559	1.9	0.3	2.2	2.3	1.8
Sport And Recreation	5,136	499	5,635	2.5	0.2	2.7	2.9	1.6
Public Safety	11,383	637	12,020	5.5	0.3	5.9	6.5	2.0
Housing	6,109	4,082	10,190	3.0	2.0	5.0	3.5	13.1
Health	3,846	230	4,077	1.9	0.1	2.0	2.2	0.7
Econ. & Environm. Svc	17,965	9,022	26,987	8.8	4.4	13.1	10.3	29.0
Planning & Development	4,342	908	5,249	2.1	0.4	2.6	2.5	2.9
Road Transport	12,767	8,021	20,788	6.2	3.9	10.1	7.3	25.8
Environmental Protection	856	94	950	0.4	0.0	0.5	0.5	0.3
Trading Services	95,437	11,376	106,813	46.5	5.5	52.0	54.8	36.6
Electricity	58,484	5,380	63,864	28.5	2.6	31.1	33.6	17.3
Water	19,996	3,137	23,132	9.7	1.5	11.3	11.5	10.1
Waste Water Mgmt	8,625	2,208	10,832	4.2	1.1	5.3	5.0	7.1
Waste Management	8,333	652	8,985	4.1	0.3	4.4	4.8	2.1
Other	1,032	134	1,166	0.5	0.1	0.6	0.6	0.4
Subtotal / Total	174,142	31,100	205,242	84.8	15.2	100.0	100.0	100.0

Source: computed by authors based on Local Government Financial Database (audited; 2014/15).

The first finding clearly visible in Figure 2.1 and emphasized by Table 2.1 is the prominence of operational spending in the composition of municipal expenditures in South Africa: approximately 85 percent of municipal spending is spent on the operating cost of urban municipalities, with only slightly more than 15 percent of municipal spending in urban areas being dedicated to capital expenditures.

Although analysis of recurrent expenditures is part and parcel of urban finance analysis, the traditional presentation and analysis of recurrent municipal expenditures in South Africa has been by economic type, rather than by functional responsibility.

Within operating expenditures, the largest functional category by far is Trading Services (Rand 95.4 billion), followed by Community and Public Safety spending (Rand 30.5 billion), Governance and Administration (Rand 29.2 billion), and Economic and Environmental Services (Rand 17.9 billion). Within the category of trading services, the main municipal functions (as indicated by their expenditure share) are electricity services (Rand 58.5 billion) and water supply (Rand 20.0). About half of these expenditures reflect the cost of bulk purchases of electricity and water as inputs, which are then provided to local residents against the payment of user charges¹² In an international context, it is unusual for the expenditures of municipal utilities to be included in the municipal

¹¹ Note that the ensuing analysis considers urban (metropolitan) municipal spending only; this analysis cannot be generalized to all municipalities, as the composition of spending in other municipalities is considerably different. Also, as already noted above, this aggregate municipal finance picture abstracts away from variation between metropolitan municipalities. Disaggregated (municipal-level) analysis falls beyond the scope of our current effort.

¹² One possible approach would be to exclude the cost of bulk purchase costs for trading services from both sides of the balance sheet since these costs represent a pass-through to the final consumer. However, such an in-depth analysis of utility finances and the degree of cross-subsidization that occurs within urban areas from trading services to the general budget falls beyond the scope of the current analysis.

budget accounts, particularly as these services are essentially individual (private/household) services rather than collective municipal goods or services.

Capital expenditures are not evenly distributed across functional areas. The breakdown between operational and recurrent expenditures is informed in part by the reliance on capital goods vis-à-vis the cost of operating this infrastructure for different services, and in part by the pace at which municipalities are putting in place new infrastructure (as required, for instance, to serve new residents or businesses). Unsurprisingly, perhaps, municipal expenditure patterns suggest that roads, housing and waste water services are relatively capital-intensive municipal services, whereas governance and administration, waste management, public safety, and health services are relative more intensive in operational inputs.

Recent modelling of the need for infrastructure investment by metropolitan municipalities finds that—all things considered—there is a relatively limited backlog in urban infrastructure (NT/PDG, 2015). Projected municipal infrastructure needs covering all eight metropolitan municipalities suggest that R 24 billion would be required over the coming ten-year period for the elimination of the infrastructure backlog. This reflects approximately 5 percent of the projected metropolitan infrastructure needs over the same period. According to the estimates derived from the infrastructure needs model, future population and economic growth form the most significant drivers of infrastructure need, accounting for about R 228 billion (53%) of the projected need over ten years. The

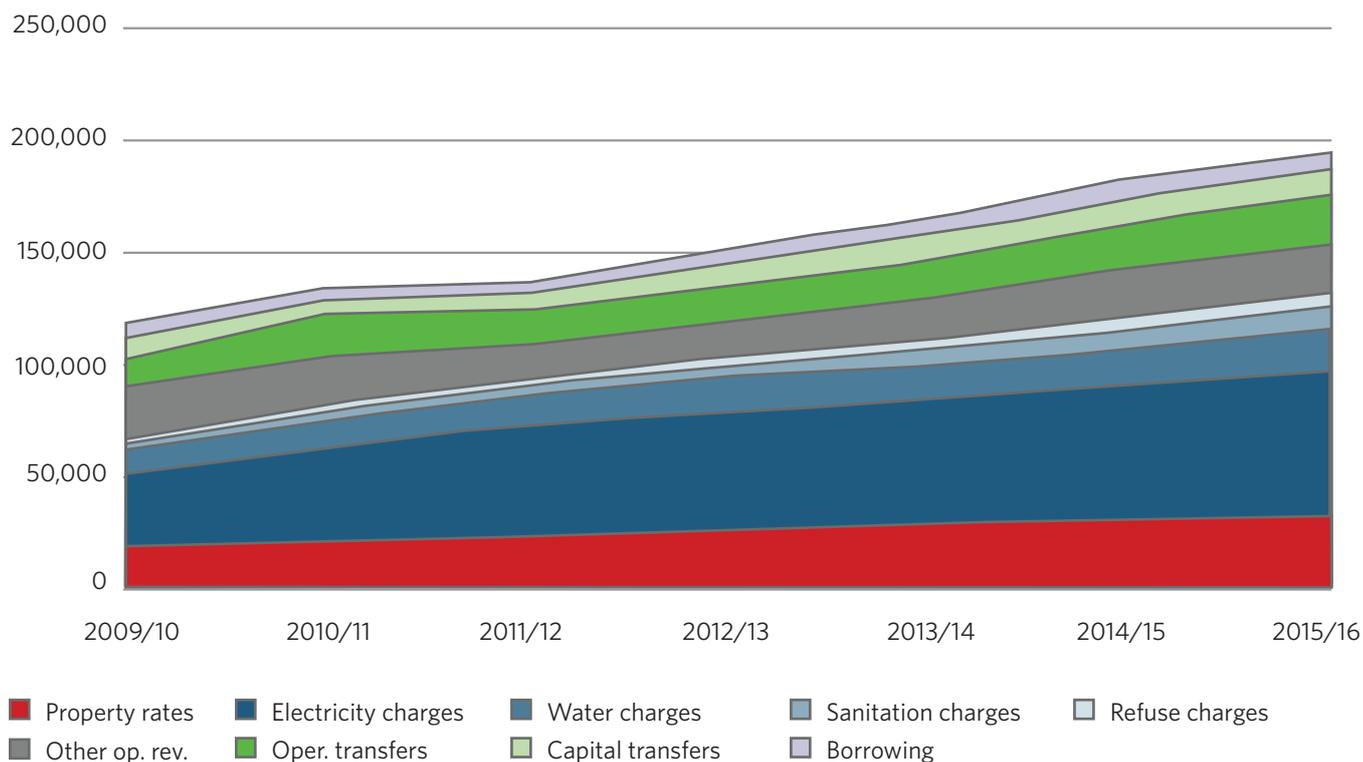
remaining R 179 billion (42%) is for renewal of existing infrastructure. Unfortunately, these estimates exclusively deal with the capital side of the budget, without addressing the potential recurrent implications of these additional investments.

Trends in municipal expenditures over time. The expenditure composition identified above for 2014/15 does not reflect a static situation, as there appears to be a gradual shift over time towards a greater emphasis on operational spending. As visible in Figure 2.1, operating expenditures are steadily increasing over time, whereas capital expenditures on average have increased at a much slower pace over time.

Closer analysis further reveals further shifts among functions within operating expenditures. For instance, recurrent spending on governance and administration functions has gradually declined in relative importance over time, from close to 17 percent of operational expenditures in 2010/11 to less than 15 percent in recent years. In contrast, operational spending on trading services (especially electric services and water services) has increased more-than-proportionally over the period under consideration.

An overview of municipal revenues. Figure 2.2 presents an overview of municipal revenues in urban areas, covering the period from 2009/10 – 2015/16. The figure highlights property rates (at the bottom of the chart, in red), user charges for trading services (in blue); other revenues (grey); operational and recurrent transfers (in green), and borrowing (light blue).

Figure 2.2: An overview of municipal revenues in urban areas in South Africa, 2009/10 – 2015/16



A detailed breakdown of municipal revenues. Municipal revenue patterns for urban areas in South Africa are presented in Table 2.2.

As already noted, unusual by international standards is the large share of urban revenues that is derived from user charges for municipal trading services. As was the case on the expenditure side of the budget, this is largely due to the fact that service charges for trading services are typically not accounted for on the municipal budget, as in many countries, electricity provision and water and sanitation services tend to be either supplied by the private sector, by national parastatal entities, or by off-budget municipal entities. In any case, in other countries, these revenues tend to be excluded from municipal accounts by prevailing IMF budget classification standards.

A second noteworthy revenue pattern is that an overwhelming share of municipal expenditures in urban areas is funded from own local revenue sources: over 82 percent of municipal spending is funded from own sources, while operational and capital transfers only contribute 10.8 and 6.7 percent to urban revenues, respectively.^{13,14}

An aspect that is underemphasized in the current presentation of urban revenues is the extent to which own source revenues fund operational expenditures versus capital expenses. In practice, the vast majority of own source revenues in urban areas is dedicated to operational expenditures, whereas more than 40 percent of urban capital investments is typically funded by capital grants. This is particularly worrying if one accepts that the bulk of investment needs are to support revenue-generating growth and could be self-financing.

Table 2.2 An overview of municipal revenues in urban areas in South Africa, FY 2015-16

	R thousands	As percent of total
Property rates	33,823.1	17.1
Property rates (proper)	33,521	16.9
- Penalties and collection charges	302	0.2
Service charges	100,013	50.5
o/w - electricity revenue	64,490	32.5
o/w - water revenue	19,900	10.0
o/w - sanitation revenue	8,441	4.3
o/w - refuse revenue	6,017	3.0
o/w - other	1,165	0.6
Other non-tax revenues	9,038	4.6
Rental of facilities and equipment	1,256	0.6
Interest	4,099	2.1
Fines	2,384	1.2
Licenses and permits	195	0.1
Agency services	1,104	0.6
Transfers - operational	21,388	10.8
Other own revenue	12,026	6.1
Total - Operating Revenue	176,288	89.0
Transfers - capital	13,270	6.7
Borrowing	8,151	4.1
Public contributions and donations	466	0.2
Total OpRev plus capital finance	198,176	100.0

Source: computed by authors based on Local Government Financial Database (preliminary; 2015/16).

¹³ It is possible that own source revenue collections are overstated due the fact that accrual accounting is used: in accordance to these accounting rules, property rates and user fees are recorded when they become due, rather than when they are actually collected. PDG estimates suggest that the cost of providing trading services to low-income households in metros was roughly R 21.8 billion in 2016 (approximately one-third of the total cost of providing trading services, with actual receipts of R 2.2 billion). It is unclear to what extent municipalities record the roughly R 20 billion in foregone revenue on the revenue side of the ledger, or whether the foregone revenue goes simply unrecorded on municipal accounts.

¹⁴ Naturally, this ratio changes considerably if service charges for electricity and water were to be excluded from the revenue amounts (as would be the case in municipal revenues in most other countries). Also note that this revenue composition is specific to urban municipalities: for non-urban municipalities, operational and capital transfers account for a combined 52 percent of municipal revenues.

Trends in municipal revenues over time. Unlike the expenditure side of the budget (which experienced a gradual, minor shift towards operating expenditures), the relative composition of municipal revenues has been quite steady over the previous years.

National and provincial financing of urban infrastructure and services through intergovernmental fiscal transfers.

Intergovernmental fiscal transfers—more commonly referred to as grants—account for a relatively small portion of urban local government funding. As noted above, grants account for less than 20 percent of financial resources in urban municipalities. Table 2.3 provides a

detailed view of the composition of intergovernmental fiscal transfers to urban municipalities in South Africa, including the share of Local Government Equitable Share, as well as direct, indirect and provincial grants.¹⁵

Whereas the single-largest funding flow to urban local governments is formed by the Local Government Equitable Share (39.0 percent), the largest category of transfers to urban municipalities is formed by direct conditional grants from national to municipal governments (51.3 percent). Provincial grants and indirect grants account for the remaining 9.7 percent of intergovernmental fiscal transfers to urban municipalities.

Table 2.3 Grant allocations to urban municipalities, 2015/16

	R thousands	As percent of total
Local Government Equitable Share	12,651,296	39.0
Total LGES	12,651,296	39.0
Municipal Infrastructure Grant	0	0.0
Public Transport Network Grant	4,770,198	14.7
Urban Settlement Development Grant	10,554,345	32.6
Other direct grant schemes (14)	1,298,648	4.0
Total direct (conditional) grants	16,623,191	51.3
Int. Nat. Electr. Progr.(Eskom) Grant	225,142	0.7
Other indirect grant schemes (3)	35,454	0.1
Total indirect grants	260,596	0.8
Health	1,269,938	3.9
Housing and Local Government	653,646	2.0
Public Works, Roads and Transport	590,278	1.8
Other provincial grant schemes (6)	362,890	1.1
Total provincial grants	2,876,752	8.9
Grand Total	32,411,835	100.0

Source: Computed by authors based on Local Government Financial Database (budgeted allocation; 2015/16).

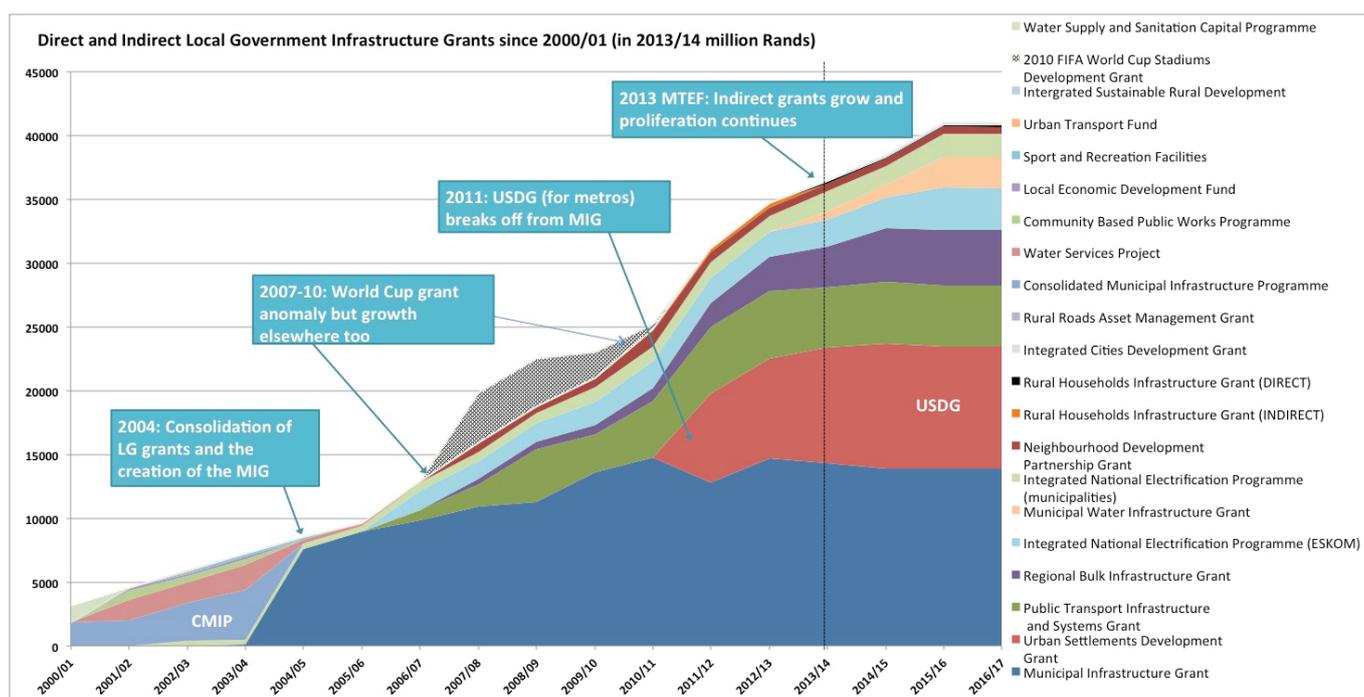
¹⁵ Direct conditional grants are transferred directly into the bank account of the recipient (for example, to a municipality) and must be used for the stated purpose and comply with stipulated conditions and reporting. In the case of indirect grants, a national sector department or public entity performs a function on behalf of a municipality or province. Thus no funds are transferred to the province or municipality concerned, but any infrastructure developed becomes the responsibility of the relevant subnational government (Mtantato and Sasha Peters, 2016).

The important role of operating grants in the intergovernmental fiscal transfer system seems to be consistent with the conceptual underpinning of the intergovernmental fiscal system in South Africa, which aims to balance the desire for equitable access to local services with the desire to ensure a high degree of fiscal discretion at the local level. In order to promote equitable access to local public services, the Equitable Share provides unconditional recurrent funding. At the same time, however, the allocation formula for the ES ensures that each municipality receives a sufficient grant amount to afford the provision of adequate municipal services to the urban poor.

Along the same lines, capital infrastructure grants are targeted to support the expansion of basic municipal infrastructure to ensure service provision to indigent households. However, capital infrastructure grants do not necessarily seem to be taking into account the changing ("second generation") municipal infrastructure needs of the urban local governments. In addition, the relatively high degree of reliance on grants for the funding of urban capital expenditures is a relevant policy concern.¹⁶

In contrast to the operating subsidies provided implicitly through the Equitable Shares, capital infrastructure grants are provided through a much more fragmented system of conditional grants (Figure 2.3). Although a number of urban infrastructure grant schemes were consolidated into a single Municipal Infrastructure Grant (MIG) scheme in 2004, there continues to be a fragmentation of conditional grants for municipal infrastructure. It should be noted, however, that Figure 2.3 overstates the fragmentation of the capital grant system with respect to the financing of urban infrastructure in metropolitan municipalities, as different types of local governments are eligible to receive different types of grants. For instance, whereas metropolitan municipalities are eligible to receive a (relatively large and less conditional) Urban Settlement Development Grant, smaller municipalities are eligible to receive a Municipal Infrastructure Grant and numerous other (smaller and typically more conditional) capital grant allocations.

Figure 2.3: Direct and indirect Local Government Infrastructure Grants since 2000/01



Source: National Treasury. 2014. Review Of Local Government Infrastructure Grants: Recommendations for Reform. Report to Budget Forum – September 2014.

¹⁶ This concern is closely related to the limited level of capital infrastructure development funded from own sources and borrowing. It should be noted, however, that the degree of grant funding of municipal capital expenditures has remained more or less constant over time.

The review of local government infrastructure grants led by the National Treasury recognized the ongoing fragmentation of municipal grants as a concern, especially as different types of municipalities face different contexts. As a result, reforms are being proposed (and gradually implemented) that ensure greater local discretion and less grant fragmentation for metropolitan municipalities through the introduction of a Consolidated Urban Grant. For instance, in an effort to rationalize unnecessary and duplicative grants, two separate public transport grants to cities—one for capital and one for operational expenditures—were merged into a consolidated grant named the public transport network grant (PTNG) in 2015. This move is also expected to enhance the sustainability link between capital investment and on-going operational costs (NT, 2015).

With respect to the composition and sustainability of urban finances, it is important to note that the two largest conditional grants provided to urban local governments are the Urban Settlement Development Grant and the Public Transport Network Grant. To the extent that these grant (implicitly or explicitly) require co-funding from municipal governments—either during the investment stage, but especially if the investment has long-term operating cost implications—there may be potentially significant long-term implications for the composition and sustainability of urban finances.

It is difficult to judge the relative size and role of provincial grant allocations without a more detailed analysis of the functions and services these provincial grants are intended to fund. To the extent that there are specific service delivery mandates that provinces assign to municipalities within the set of concurrent provincial-local functions, it is important to ensure that these mandates are adequately funded.

An overview of municipal fiscal balance and sustainability.

The primary motivation for the analysis of urban finances in this note is to substantiate whether or not the positive role that urban municipalities are playing with regard to economic growth and social transformation in South Africa is fiscally sustainable.

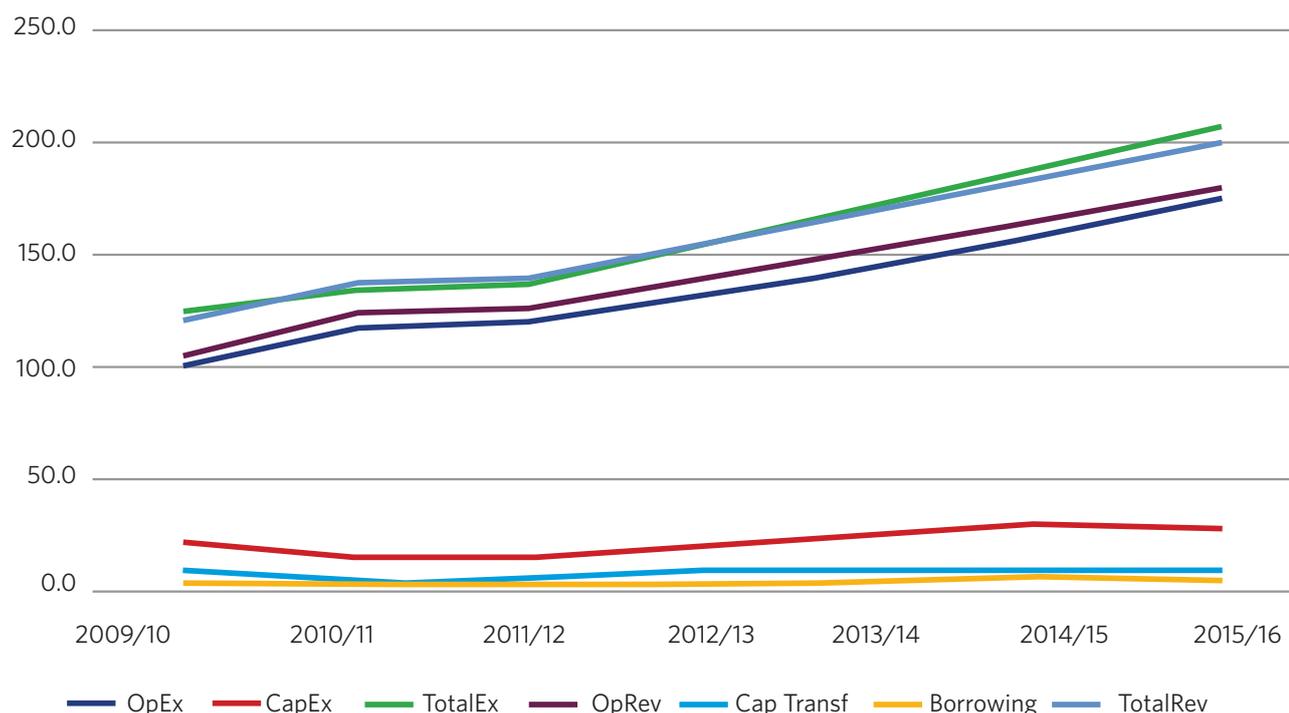
Fiscal balance is achieved when a government balances its expenditures and revenues, so that the budget operates without a deficit and no debts are incurred. Municipal borrowing, however, is an appropriate way to finance long-term capital urban infrastructure for which the benefits are spread out over future years. As such, municipal borrowing is generally not a sign of imprudent financial management or unsustainable municipal finances (as long as borrowing is primarily used to fund capital investments).

Fiscal sustainability means that government expenditures and revenues are balanced in such a way that government debt does not grow continuously over the long term as a share of the economy. As such, long term fiscal sustainability requires analyzing municipal government expenditures and revenues, along with the resulting deficits and the accumulated debt. If the ratio of government's debt to its tax base (e.g., the debt-to-GDP ratio) increases steadily over time (and is projected to rise over the long term), at a certain point fiscal policy will become unsustainable.

Figure 2.4 (and further below, Table 2.4) presents an overview of municipal fiscal balance in South Africa.¹⁷ Figure 2.4 shows a steady increase over time in the operating expenditures and operating revenues of urban municipalities, with municipal operating expenditures nearly doubling from 99.4 billion Rand in 2009/10 to 173.8 billion Rand in 2015/16. Over the same period, however, operating revenue increases from 103.7 to 176.3 billion Rand. In contrast to the steady upward trend on the operating side of the budget, capital expenditures and revenues remain at a much lower level and much steadier over time, staying relatively constant in nominal terms over the period under consideration.

¹⁷ Note that final audited figures for FY 2015/16 were not yet available when this background paper was completed. Furthermore, audited figures are not consistently available for all urban municipalities for earlier years. As such, unless otherwise noted, unaudited preliminary municipal expenditure and revenue figures are used for each year based on end-of-year Section 71 reports.

Figure 2.4: An overview of municipal fiscal balance in urban areas in South Africa, 2009/10 – 2015/16 (R billions)



Source: Prepared by authors based on preliminary figures from the National Treasury (Local Government Finance Database).

Table 2.4 presents the same basic information as in Figure 2.4 above, albeit with the amounts expressed as a percent of GDP. Once presented in proportion to the national economic base, these figures suggest a much more stable municipal finance picture, with operating expenditures fluctuating between 3.9 and 4.3 percent of GDP, while capital spending falls within the 0.6-0.8% range.¹⁸ Operating revenues consistently fall within the 4.1-4.5% range, whereas capital transfers have been consistent at around 0.31-0.33% of GDP for the past four years.

For all but the first year of the time series presented in the table, municipal borrowing is steady at close to 0.2% of GDP.¹⁹ The total outstanding long term debt for all municipalities as at the end of the fourth quarter of the 2015/16 municipal financial year amounted to R60.9 billion, with the outstanding long term debt of metropolitan municipalities (R 52.85 billion) amounting to 87 percent of total municipal long term debt.²⁰ Most of the growth in outstanding long term debt has been in the metropolitan municipalities, which require the greatest infrastructure investments.

¹⁸ The capital spending peak of 1.0 % in FY 2009/10 is likely related to the 2010 World Cup.

¹⁹ For reference, the consolidated (national) budget deficit for 2015/16 was 3.9 percent of GDP (Budget Review 2016:31).

²⁰ National Treasury. 2016. Municipal Borrow Bulletin, Issue 2. September 2016.

Table 2.4 An overview of municipal fiscal balance and sustainability in urban areas in South Africa, 2009/10-15/16

(Amounts expressed as percent of GDP)

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Operating Expenditures	4.15	4.25	3.94	3.99	4.02	4.08	4.33
Capital Expenditures	0.97	0.63	0.58	0.70	0.74	0.81	0.75
Total Expenditures	5.11	4.88	4.52	4.69	4.76	4.89	5.08
Operating Revenue	4.33	4.50	4.15	4.21	4.18	4.30	4.39
Capital Transfers	0.38	0.20	0.25	0.32	0.33	0.31	0.32
Borrowing	0.29	0.20	0.17	0.17	0.19	0.21	0.20
Total Revenue*	5.00	4.90	4.57	4.70	4.69	4.82	4.91

Note: Total revenue is defined here as OpRev plus Capital Transfers and Borrowing. Source: Computed by authors based on preliminary figures from National Treasury (Local Government Finance Database) and StatsSA.

Based on the historical municipal fiscal picture in aggregate, there is little reason to believe that municipal finances as a whole are at immediate risk of becoming fiscally unsustainable as growth in urban expenditures and revenues is taking place in a gradual and balanced manner. Municipal borrowing and debt are likewise equally stable over time.

Of course, this aggregate picture hides considerable variation in fiscal balances and reliance on borrowing between different urban municipalities. Smaller metros tend to rely considerably less on municipal borrowing for infrastructure financing than larger municipalities (NT, 2016). The more limited reliance of smaller municipalities on borrowing as a way to finance capital investments may be driven by a combination of potential supply factors (higher cost of borrowing; more limited access to capital), but may also reflect potential demand factors (less extensive need for new urban infrastructure; weaker planning; greater risk aversion). As such, the absence of more extensive municipal borrowing should not necessarily be understood to reflect the absence of fiscal stress.

Additionally, it is important to recognize that fiscal sustainability is not the only policy objective of an effective urban finance system: indeed, fiscal sustainability may be achieved at the expense of improved services or at the expense of investments needed to ensure urban growth. As such, the analysis of urban finances should look in a more granular manner at the funding of specific urban infrastructure and services (Section 3) and identify specific areas of potential risk with respect to fiscal sustainability (Section 4).

3. A comprehensive overview of urban finance in South Africa

Although the preponderance of urban functions in South Africa are performed and funded by urban local governments, a big picture overview of urban finances in the country would not be complete without considering the extent to which spending on urban functions and services takes place by all spheres of government. In other words, urban finance in South Africa is more than just municipal finance.

National and provincial governments provide, support, and finance urban public services in two distinct ways. First, as already noted, the national and provincial spheres provide a range of intergovernmental fiscal transfers to lower-level governments in order to finance urban infrastructure and services. This spending on urban functions could be categorized as *indirect* national and provincial spending on urban functions and services, as municipalities still make the final outlays of resources. As such, these indirect national and provincial expenditures on urban functions are already reflected in the analysis of municipal expenditures and financing in Section 2 above.

Second, national and provincial governments directly provide, support and finance a number of specific urban public services. For instance, the national government directly supports the provision of metropolitan rail services in major urban areas of the country. For the

purposes of our analysis, we could categorize any direct outlay—by national, provincial and municipal governments—on urban infrastructure and services as *direct* spending on urban functions. This direct spending on urban services does not show up on the balance sheets of the relevant urban local governments.

Direct national and provincial provision and financing of urban infrastructure and services. The responsibility for urban development is constitutionally assigned as a concurrent national and provincial legislative function, thereby providing wide latitude for national and provincial spheres to support specific urban functions. In addition, Schedule 4 of the Constitution assigns specific urban functions, such as housing and public transport, as functional areas of concurrent national and provincial legislative competence.²¹ In this context, national and provincial governments spending on housing, roads, public transport and trading services should be considered part and parcel of urban finances. A comprehensive overview of urban finance in South Africa requires consideration of direct national and provincial expenditures in support of these urban functions.

In contrast to municipal expenditures—which are relatively easy to define and measure—it is much harder to accurately define and measure direct national and provincial financing of urban infrastructure and services.

In fact, in some cases exact expenditure figures for direct national and provincial spending on urban services are not always available. In these cases the analysis relies on budget estimates or on detailed estimations, as discussed further below.

The basic question this section seeks to answer is what share of spending on urban functions is done by national and provincial governments, rather than by urban municipalities themselves. Further, it is useful to consider the distribution of municipal, provincial and national spending for urban functions across operating and capital expenditures. The latest year for which data are available is the 2015/16 financial year, which runs from April to March at the national and provincial government levels and from July to June at the municipal level.

Figure 3.1 gives a comprehensive overview of “who spends what” on urban functions and services across the three spheres of government. As analyzed in Section 2 above, local (or municipal) government spending was divided across four functional areas: Governance and Administration; Community and Public Safety; Economic and Environmental Services; and Trading Services. Direct national and provincial spending on urban functions takes place in three of these four areas: housing, transport and the delivery of certain trading services.

Figure 3.1 A comprehensive overview of urban finance in South Africa

	Governance/ Administration	Community/ Public Safety (incl. housing)	Economic/ Environmental Services (incl. transport)	Trading/ Services (electricity, water, sanitation, solid waste)
National Expenditures		Social Housing Regulatory Agency	National Roads Agency, Passenger Rail Agency	ESKOM
Provincial Expenditures		Provinces: Human Settlements	Provinces: Roads & Transport	
Local Expenditures	Local Government	Local Government	Local Government	Local Government

²¹ While other national and provincial functions and services may benefit urban as well as rural residents (for example, the provision of public education or health services), the current analysis focuses specifically on national and provincial spending on functions that are considered to be true “urban services”. Note that to the extent that specific public services are delivered by urban municipalities, this municipal spending is automatically considered to be urban in nature (even in functional areas such as health or other social services).

Direct national and provincial provision and financing of urban housing

The implementation of human settlements and housing is mainly a provincial function in South Africa. The Human Settlements Development Grant (HSDG) is transferred from the national Department of Human Settlements to provinces for the creation of sustainable and integrated human settlements. A large share of

this grant is budgeted to be spent by the provincial governments on public housing construction in urban areas and is therefore included in this analysis as direct capital spending on urban infrastructure and services by provincial governments. In addition, provincial funding for financial housing interventions (such as FLISPs) and social housing subsidies is captured as recurrent provincial spending on urban housing (Table 3.1).

Table 3.1 Budgeted Provincial Spending on Human Settlement Programmes in Urban Jurisdictions, 2015/16 (R millions)

1. Financial Intervention (OpEx)	1,358.0
2. Incremental Housing Programmes (CapEx)	3,685.2
3. Social & Rental Housing (OpEx)	784.4
4. Rural Housing (CapEx)	126.1
5. Priority Projects (CapEx)	161.1
6. Provincial Specific Programmes (CapEx)	99.2
Grand total	6,214.0

Source: Prepared by authors based on National treasury data.

According to the Housing Act (1997), provinces may use municipalities as developers for HSDG-supported housing projects, leading to the on-transfer of HSDG grants to municipalities. Indeed, Table 2.3 indicates provincial transfers to urban municipalities in the amount of R 653.6million for Housing and Local Government.²² To the extent that municipalities spend housing transfers on the construction of RDP housing, these expenditures should appear as operating expenditures on the account of the municipality (rather than as capital expenditures), as the spending is regarded as a transfer to households (rather than the accumulation of capital stock for the municipality). It is unclear, however, to what extent such PFM guidance is accurately being followed by municipalities. For the purpose of the current analysis, all budgeted HSDG spending by provincial governments on housing programs in urban areas is considered provincial housing expenditures.

In addition to direct provincial spending on urban housing, national government also provides a limited amount of direct funding for human settlements. The Social Housing Regulatory Agency regulates and invests to deliver affordable rental homes and renew communities in urban areas. This expenditure should be considered direct national housing expenditure in the urban space.

Direct national and provincial provision and financing of urban transport

The determination what roads are “urban” versus “rural” is a difficult determination in any country. South Africa is no exception in this regard. South African roads are categorized into national, provincial and municipal roads. Although there is no stringent methodology on what classifies a road as being assigned to one of the spheres, most freeways connecting major cities are generally designated as national roads, whereas regional trunk roads and other major arterial roads generally are classified as provincial roads, while municipalities generally construct and maintain local roads within their jurisdiction that are not designated as either national or provincial in nature.

National roads in urban areas make up around 22 percent of the total national road network. However, spending on national roads can be assumed to be disproportionately higher in urban areas, as major urban arteries are used by more people on a daily basis and therefore can be expected to be wider. Therefore, by way of approximation, a share of 30 percent of total national roads spending by the South African National Roads Agency (SANRAL) is considered to be direct national spending on urban roads. In addition, provincial governments construct

²² To the extent that these transfers are in fact funded from the HSDG, the provincial spending amount should in principle be reduced by the same amount. However, it is difficult to trace the exact amount of HSDG on-granting from provinces to municipalities, as provinces may or may not record such spending as direct transfers to households, even when these funds are channeled through municipalities. Municipalities record receipts, but these are only recognized once expenditures are incurred, or once the province approves claims. Thus, exact matching is difficult.

and maintain provincial roads in urban areas. National Treasury monitors these roads on a project basis and is therefore able to identify exact direct provincial spending on roads in urban areas.

In addition to the construction and maintenance of urban roads, the provision of local public transport services is a municipal function which is supported by provincial and national governments through Metrorail and provincial bus systems connecting urban areas. The Passenger Rail Agency of South Africa (PRASA) is the implementing arm of the National Department of Transport and is responsible for delivering commuter rail services in the metropolitan areas of South Africa, long-distance (inter-city) rail and bus services within, to and from the borders of the Republic of South Africa. For this analysis, only Metrorail services are relevant as they operate in metropolitan municipalities. The national Department of Transport subsidizes operations and capital investments of Metrorail and these subsidies are considered direct national spending on urban public transport.

Provincial buses connect urban as well as rural areas. A large share of operational funding for provincial bus services comes from the national Public Transport Operations Grant (PTOG), which subsidizes commuter bus services. Some of the provinces spend most or all of their PTOG in urban areas, such as Gauteng, Western Cape and Eastern Cape and KwaZulu-Natal. In addition, some of the provinces use part of their Provincial Equitable Share to operate additional provincial bus services. As it is difficult to track the exact amount of direct provincial spending on urban public transport, the allocation of the PTOG to each province that contains a metropolitan area is used as a reasonable approximation of this amount.

While the national government also provides considerable support to the development and operation of urban public transit systems (i.e., bus rapid transit) in different urban areas, this support comes in the form of a conditional grant (the Public Transport Network Grant or PTNG), and therefore, this reflects an indirect—rather than a direct—national expenditure on urban transportation.²³

Direct national and provincial provision and financing of urban services

The provision of basic municipal services (so-called “trading services”) is one of the main mandates of municipalities in South Africa and as shown in Section 2, it is a major driver of municipal revenues and expenditures. However, given that many trading service involve two

stages—production and distribution—it is difficult to determine an exact cut-off point what part of the services is local and urban in nature, versus the part that is national or upstream in nature. For the discussion at hand, production (e.g., water extraction and bulk distribution, as well as power generation and bulk distribution) are considered national, non-urban functions. In contrast, for the purpose of the current analysis, local distribution or reticulation of water and electricity within urban areas are considered to be urban functions or services.

The two trading services that have a degree of support or involvement by national government are water and electricity. Drinking water extraction and bulk distribution in South Africa is a function provided by 13 Water Boards, which fall under the National Department of Water Affairs. These Water Boards operate on a cost-covering basis by selling bulk drinking water to municipalities. Since municipalities pay for the bulk water that they buy from the Water Boards as an expenditure item on the municipal budget, the cost of extraction and bulk distribution are already incorporated into the price of municipal water. As such, there is no need (in fact, it would be duplicative) to incorporate the expenditures of Water Boards or other national water expenditure in this analysis.

In the area of electricity provision, the state-owned electricity provider ESKOM is responsible for over 95 percent of electricity generation in the country and all of its bulk transmission. In general, the distribution of electricity to households, businesses and industry is a municipal function, where the municipality buys bulk from ESKOM and then distributes and sells electricity on to the final consumers. In these cases, similar to the case of water provision, the upstream cost of municipal electricity services is already built into the retail price of electricity. In some cases, however, ESKOM supplies electricity to its consumers directly. Mostly, this happens in rural municipalities where ESKOM takes on all distribution, or in selected urban areas where ESKOM has historically supplied certain parts of the municipality. Overall, ESKOM distribution focuses on poor households, with the exception of Johannesburg’s wealthy Sandton area, which is directly supplied by ESKOM.

In areas where ESKOM retails electricity directly to households, consumers generally pay ESKOM for the supply of electricity. It is not necessarily clear whether this total amount should be considered “direct national spending on urban service provision” in this analysis. Given that ESKOM is a national-level parastatal that operates on a commercial basis, and given the fact that the costs of electricity provision are funded by user

²³ Table 2.3 indicates that metros were budgeted to receive R 4.77 billion in Public Transport Network Grants in FY 2015/16. Based on unaudited year-end spending reports for the same year, these urban local governments incurred R 2.92 billion in operational expenditures for public bus transportation, as well as R 1.67 billion in capital acquisitions for public bus transportation. These amounts are reflected in Table 3.2 as municipal public transportation spending. The figures suggest that either not all PTNG grants were disbursed as planned, municipalities did not spend the entire grant amount received, or some combination of both.

payments rather than from national financial resources, the IMF's standards for government financial statistics tend to exclude the expenditures and revenues of such parastatal organizations from consideration.²⁴ In line with this practice, we do not consider all expenditures made by ESKOM in the provision of retail services to urban residents as part of "direct national spending on urban service provision". However, if households fail to pay ESKOM and the company accumulates outstanding arrears from its direct retail operations, the analysis considers the arrear amount to be an (implicit) direct national subsidy in support of local electricity provision. As ESKOM identifies Soweto as the main jurisdiction where significant arrears have been accumulated, we attribute the annual accumulation of arrears in ESKOM's retail activities as direct national spending on urban service delivery.

The overall role of national and provincial spheres in urban spending. Based on the available data, Table 3.2 and 3.3 (next page) reflect the overall role of the national, provincial and local government spheres in urban spending. Based on the specific national and provincial programs identified above, the tables capture the operational and capital spending per function for each government sphere for the 2015/16 financial year.²⁵ The same information is further visually conveyed in Figure 3.2.

Figures 3.2 and 3.3 confirm that the vast majority of urban spending in South Africa is done at the municipal level, both on the recurrent side of the budget as well as on the capital side. In total, around 90.2 percent of urban expenditures is conducted by urban local governments, whereas around 4.2 percent of direct urban spending is done by national departments and 5.6 percent by provincial governments.

Table 3.2 A comprehensive overview of urban finance in South Africa, 2015-16 (R billion)

	Gov. / Admin	Community & Safety		Economic & Environmental Services			Trading Services				Other	Total
	Gov. / Admin	Housing	Other	Roads	Public Tr.	Oth. E&E.	Electricity	Water	San	SW	Other	Total
Operating Expenditures												
National	0.00	0.04	0.00	1.28	3.62	0.00	0.56	0.00	0.00	0.00	0.00	5.50
Province	0.00	2.14	0.00	0.55	4.00	0.00	0.00	0.00	0.00	0.00	0.00	6.70
Municipal	27.06	4.51	23.62	8.60	2.92	5.28	63.85	22.47	6.36	8.32	0.80	173.79
Subtotal	27.06	6.69	23.62	10.43	10.54	5.28	64.41	22.47	6.36	8.32	0.80	185.99
Capital Expenditures												
National	0.00	0.15	0.00	2.57	1.27	0.00	0.00	0.00	0.00	0.00	0.00	3.99
Province	0.00	4.07	0.00	1.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.96
Municipal	3.13	3.87	1.88	7.32	1.67	1.37	4.41	2.87	2.64	0.69	0.16	30.02
Subtotal	3.13	8.09	1.88	11.79	2.94	1.37	4.41	2.87	2.64	0.69	0.16	39.97
Total	30.19	14.78	25.50	22.22	13.48	6.66	68.83	25.34	9.00	9.01	0.96	225.96

²⁴ Instead, government financial statistics typically only consider the net balance from parastatal organization as part of government finances. In other words, if the national government were to provide a parastatal with an operating subsidy, this subsidy would be counted as a government expenditure, rather than considering the entire spending budget of the parastatal as a government expenditure. It should be recognized that the way in which trading service are carried fully on-budget at the local level in South Africa thus gives rise to a somewhat inconsistent and asymmetric treatment of national expenditures in support of urban electricity services.

²⁵ Unfortunately, the intensive data requirements for this exercise made it impossible to conduct such an analysis for multiple financial years.

Table 3.3 Relative expenditures of different spheres for urban functions in South Africa, 2015-16
(percent of total)

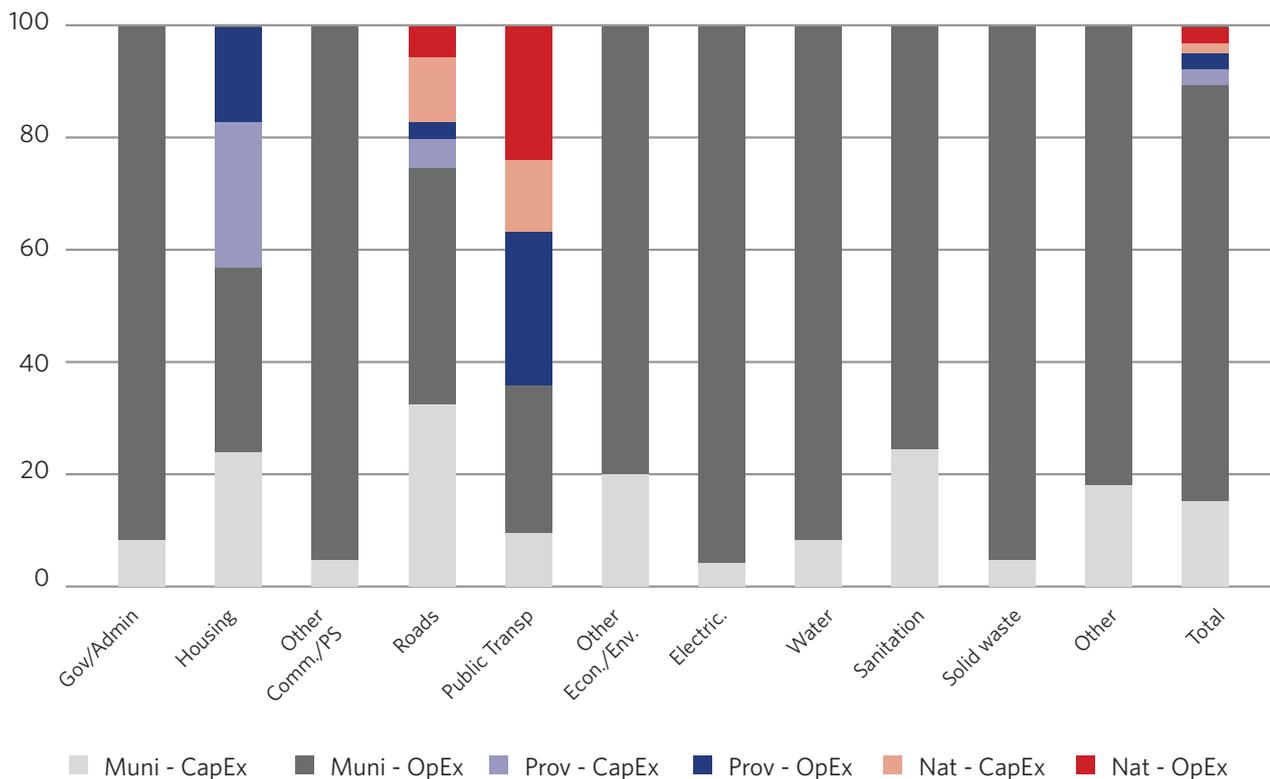
	Gov. / Admin	Community & Safety		Economic & Environmental Services			Trading Services				Other	Total
	Gov. / Admin	Housing	Other	Roads	Public Tr.	Oth. E&E.	Electricity	Water	San	SW	Other	Total
Operating Expenditures												
National	0.00	0.25	0.00	5.74	26.84	0.00	0.82	0.00	0.00	0.00	0.00	2.43
Province	0.00	14.49	0.00	2.49	29.69	0.00	0.00	0.00	0.00	0.00	0.00	2.96
Municipal	89.63	30.51	92.62	38.71	21.69	79.35	92.77	88.67	70.67	92.33	83.58	76.91
Subtotal	89.63	45.25	92.62	46.94	78.22	79.35	93.59	88.67	70.67	92.33	83.58	82.31
Capital Expenditures												
National	0.00	0.99	0.00	11.58	9.40	0.00	0.00	0.00	0.00	0.00	0.00	1.76
Province	0.00	27.54	0.00	8.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.64
Municipal	10.37	26.21	7.38	32.97	12.38	20.65	6.41	11.33	29.33	7.67	16.42	13.29
Subtotal	10.37	54.75	7.38	53.06	21.78	20.65	6.41	11.33	29.33	7.67	16.42	17.69
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

However, as clearly visible in Figure 3.2, the involvement of national and provincial governments is not spread evenly across functions: national and provincial governments play a particularly important role in three urban functions: urban housing, roads and public transport. In these three areas, national and provincial governments rough fund between one-third to two-thirds of the expenditures. In the case of public transport, in

fact, the majority of expenditures are made by national and provincial governments, rather than by the municipal sphere. It is important to note that these shares only reflect direct national and provincial funding of urban infrastructure and services, as (for the purposes of the current analysis) grant-funded municipal spending on urban infrastructure and services is considered municipal spending.²⁶

²⁶ In addition to the direct role played by national and provincial governments in housing and public transportation, the USDG and the PTNG comprise the vast majority of conditional grant resources for metropolitan municipalities, suggesting the overwhelming direct and indirect role played by the national and provincial spheres.

Figure 3.2 Relative expenditures of different spheres for urban functions in South Africa, 2015-16 (percent of total)



In the case of urban housing, over 40 percent of urban housing expenditures are made by provincial governments. The majority of these funds are directed towards urban public housing development. Whereas the provincial level generally pays directly for the construction of public housing (often on available land on the outskirts of the urban area), in other cases the province on-grants the resources to the municipality. In either case, housing expenditures create a significant additional burden in the municipality, as it is responsible for providing housing-related services to the new residents. Although urban areas receive an Urban Settlement Development Grant in order to offset the associated cost of linking low-income housing to the municipal infrastructure network, these capital injections may leave cities with an operating burden going forward, particularly from the cost of providing poor households with subsidized or free basic services and transport.

Similarly, national and provincial governments play an important role in urban public transportation, with close to two-thirds of urban public transit spending being done by national and provincial governments. Depending on the nature of the public transit system being supported, public transportation can be quite capital intensive (e.g., commuter rail) or more labor intensive (mini-bus taxis). The capital intensity of urban bus systems depends considerably on the specific design of the system (for instance, whether it relies on dedicated bus lanes). Another aspect of the fiscal impact of urban public transit that until recently was underemphasized was the importance of fare collection and enforcement. In

many cases, however, fare revenues cannot realistically cover the costs of the service, in which case (potentially considerable) operating subsidies are required on an ongoing basis.

4. A preliminary assessment of the composition and sustainability of urban finances in South Africa

The intergovernmental fiscal system in South Africa was designed to balance the functions and finances of urban local governments in South Africa: to the extent that municipalities mainly provide urban public services that are considered “club goods” with direct benefits to local residents or local businesses, these services are funded by the municipality itself through user fees or property rates acting as quasi-user fees. Functions and public services that have large scale economies or interjurisdictional spillovers (such as urban trunk roads) or a strong social aspect (such as education) tend to be assigned to the provincial or national spheres. To the extent that local governments are expected to engage in urban functions that are redistributive in nature—for

instance, supporting the construction of public housing for urban residents, providing free or reduced cost access to municipal utility services to households too poor to afford them, or providing other specific social services—funding is provided through the Equitable Share or through conditional grants.

Two decades after the 1996 Constitution introduced the current intergovernmental dispensation in South Africa, the analysis of the composition of urban finances suggests that the envisioned balance between functions and finances has been maintained to a considerable extent. Of course, as with any intergovernmental system or urban finance system, there are areas of tension and concern where it would be appropriate to ensure additional analytical focus to ensure the ongoing sustainability of the urban finance system:

The fiscal impact of urban growth. Although South Africa's migration patterns seem to have evolved in a non-linear manner over the past two decades, there continues to be a movement of people towards urban areas in the country. The World Urbanization Prospects (2014) projects that whereas slightly over half of South Africans lived in urban areas in 1990 (52%) and close to two-thirds of the population is urbanized today (64 %), by 2050 almost 4 out of 5 South Africans will live in urban areas by 2050 (77%). While increased urbanization and urban population growth are generally seen as a positive process contributing to economic growth and upward mobility, urban growth is not without its fiscal challenges. Whereas existing residents and local businesses have contributed to the development of existing urban infrastructure over time, in-migrants place an additional demand on urban infrastructure networks. Since in-migrants fail to bring urban infrastructure with them as they move to urban areas, what mechanisms exist to ensure that new (non-indigent) urban households and new businesses pay for the expansion of urban infrastructure networks required by their influx?

An important way to fund municipal infrastructure expansion is to effectively shift the cost of urban network infrastructure to the developer—and ultimately, to the new household or business—through development impact fees and the resulting higher land prices. Development impact fees (recorded onto municipal budgets as “public contributions and donations”) are used in various municipalities in South Africa—in line with good practice—to offset the cost of expanding urban infrastructure networks: metropolitan municipalities raised about R 3 billion per annum in development charges.²⁷ In order to fund urban infrastructure investments, projections suggest that metros would

have to collect, on average, R 7 billion per year in development charges over the next ten years. Although “the assumption that the full cost of bulk and connector infrastructure for high income households and non-residential consumers is recovered through development charges is very optimistic” (PDG/NT 2015: 27), the expanded use and application of development impact fees and other land-based financing options should be further considered.

Another long-run concern on the revenue side of the urban finance equation is whether municipalities have the revenue tools they need to tax local business activities in accordance with the benefits principle. Urban local governments currently rely considerably on the excess revenue that is being generated on trading services, which is subsequently used either to cross-subsidize the provision of these services to the poor, or as general revenue for the municipality as a whole. Although this provides local governments with a strong revenue handle, this approach is potentially distortive and could fail when input prices go up.

Conceptually, municipal borrowing is another important mechanism to fund the expansion of urban infrastructure to meet the demands on new (non-indigent) in-migrants and businesses. In line with the fact that operating revenues have been growing more or less in proportion to national GDP growth in recent years,²⁸ the relative role of municipal borrowing appears to have remained virtually constant in importance over time.

The fiscal impact of indigent in-migration and the urban poor. In-migration of indigent individuals or households into urban areas brings with it an additional fiscal challenge: not only does this type of in-migration place an added burden on the stock of municipal infrastructure for which they are effectively unable to fiscally contribute, but indigent households further place a recurrent burden on municipal coffers through the requirement that these households are to be provided with trading services at reduced or no cost. This makes it pertinent to investigate whether the initial capital cost of providing housing to new in-migrants—as well as the recurrent cost of providing new indigent residents with access to basic services—is adequately offset by the relevant conditional grants and the Local Government Equitable Share allocations aimed at offsetting these costs.

Unlike many other urban infrastructure and services (where the municipality is squarely responsible), the provision and funding of urban public housing is primarily a provincial responsibility, with municipalities playing a secondary role. Despite the government delivering

²⁷ PDG/NT (2015: 27) suggests that, on average between 2009 and 2014, metropolitan municipalities raised about R 160 million per annum in development charges. This figure under-estimates development contributions considerably, as this figure excludes the in-kind provision of development charges.

²⁸ In fact, municipal operating revenue as a share of GDP seems to have increased slightly since 2011/12. Although our time series is too short to make any definitive conclusions, the scale of this increase since 2011/12 is consistent with the pace of continued urbanization of South Africa's population and the likely urbanization of the country's economic (tax) base.

more than 3 million fully subsidized housing units to poor households over the past 17 years, South Africa still has a backlog of over 2 million houses, which is rising annually (FFC 2012). The actual delivery of subsidized housing units has consistently fallen short of the government's targets, and the budgetary implication of the government's policy commitment is recognized to fall far beyond the state's current fiscal capacity. In recent years, the government has sought to shift away from municipally-driven subsidy projects providing RDP houses in informal settlements, to encouraging the development of a secondary housing market and providing subsidies within integrated areas (FFC 2013).

It would be prudent to further explore the impact of public housing on urban finances given (i) the sizeable share that urban public housing represents as part of total urban finances (R 14.8 billion per year, or roughly 6.5% of total urban spending); (ii) the fiscal unsustainability of the traditional approach to increasing low-cost housing availability; and (iii) the close interrelationship between housing location and other key urban services delivered across urban space (housing-related services; public transportation; retail and employment opportunities; and so on). This is particularly true as there are fiscal risks for urban municipalities associated both with reducing national or provincial funding for public housing opportunities in urban areas (which may effectively impose this function on municipalities as an unfunded mandate), as well as with expanding public housing in urban areas (due to the recurrent impact of expanding public housing opportunities).

Of course, the provision of housing sites or housing units themselves is only one part of fulfilling the urban infrastructure demands placed on urban areas by indigent newcomers. Municipal are expected to put in place the necessary infrastructure for a number of housing-related services, such as electricity, water, and sanitation, but also roads and other infrastructure (e.g., fire protection). A recent study by the FFC and SALGA (2015: p. 104) estimates that total annual need for municipal infrastructure spending across all relevant municipal services is R 44.8 billion for 2015/16. Of this amount, R 9.0 billion is attributable to the municipal investment needs of poor households, including the infrastructure needs of poor in-migrants. If we exclusively focus on metropolitan municipalities, the annual capital cost of municipal services for the urban poor is estimated at R 4.6 billion.

This municipal investment requirement is considerable, but seems to largely be covered by capital grant schemes as metropolitan municipalities were budgeted to receive R 10.5 billion in Urban Settlement Development Grant resources for FY 2015/16. The total amount of direct conditional grants budgeted to be allocated to urban local governments was R 16.6 billion.

In addition to these capital costs, across all municipal services, the FFC and SALGA (2015: p. 105) estimate that the total annual operational cost for providing municipal services to poor households amounts to R 55.1 billion for all (urban and rural) municipalities (FY 2015/16). This figure is well above the actual allocation of LGES to all local governments for FY 2015/16, which amounted to R 45.4 billion, although less than the total amount of operational grants provided to local governments (R 64.6 billion).

Given the large fiscal impact of housing-related service provision to the urban poor, it would be prudent to drill down further into this issue in subsequent analysis. For instance, do the service delivery cost numbers relied on for providing grant support accurately reflect the true cost of urban network expansion and urban service provision? Relevant related questions include whether municipalities accurately report their performance in providing municipal services to the poor, and whether the reliance of the Local Government Equitable Share formula on census data (every ten years) fails to incentivize pro-poor service delivery at the municipal level.

The fiscal impact of unfunded mandates. A third broad area worth assessing is whether—and if so, the extent to which—the gradual imposition of unfunded mandates (such as increased expectations regarding municipal spending on libraries and public health vis-à-vis the funding being provided by provincial governments) are contributing to local fiscal distress in urban areas. Although the apparent underfunding of such mandates may be contributing to urban fiscal pressure, to the extent that the imposed service delivery standards or mandates are not strictly enforced, some anecdotal evidence suggests that some municipalities are choosing to deviate from the service delivery standards rather than engaging in unsustainable fiscal behavior.

How big is the potential impact of unfunded mandates on the budgetary balance of urban local governments? One of the more pertinent examples of unfunded mandates is posed by the norms and standards for local public library and information services envisaged by the South African Public Library and Information Services (Arts and Culture, 2013). According to the norms and standards envisaged by the Bill, provinces and municipalities across South Africa would collectively operate 4,170 libraries, whereas currently 2762 public libraries exist. In addition the total capital cost of the backlog of R 16.2 billion, municipalities would face an additional R. 2.3 billion in annual operating costs to operate these additional facilities.²⁹ When considered by itself, this amount reflects less than a one-percentage-point increase in urban operating expenditures. However, if this additional requirement would be strictly enforced without being offset—in part or in full—by additional provincial grants or alternative revenue sources, this requirement would have to come out of the general (tax) resources of urban municipalities,

²⁹ Unfortunately, this figure is not broken down further across urban versus rural municipalities.

thus adding to the fiscal pressure building on urban local governments.

The fiscal impact of urban inclusiveness efforts. A fourth and final broad area for further consideration is related to the government's stated concerns about the inefficiency and inequity of urban spatial form. National government has expressed its concern that the low density and spatial segregation of urban areas is contributing to higher transportation costs, congestion costs, the spatial mismatch between workers and employment opportunities, as well as and other inefficiencies and externalities.³⁰ Among others, these concerns have led to national policy guidance on integrated urban planning as well as on targeted support for improving public transport systems through bus rapid transit and integration zones.

The intention of integrated urban planning is to stimulate social inclusion and economic development in urban areas. Whereas social inclusion and greater equity are important policy objectives in their own right, a more efficient and equitable urban space economy could further improve national and local revenues and reduce the number of indigent households. To the extent that the primary benefit of a more integrated urban form may end up being greater equity and social inclusion, it is difficult to define a metric that accurately captures the equity-value that is gained from a more inclusive urban structure.³¹

Initial experiences with urban inclusion and densification efforts in South Africa seem to broadly coincide with experiences in other countries, namely, that non-organic densification and social integration—including through the promotion of mixed-use housing and improved public transportation—are both expensive and generally hard to achieve.³² For instance, international experiences suggest that—with a few notable exceptions—it is rare for urban property values to sufficiently increase around urban transportation nodes in order to offset the required investment in capital infrastructure. To the extent that such infrastructure investments have a positive return on investment through their economic and fiscal impact (e.g., as may be the case with specific Gautrain nodes), these investments tend to benefit higher-benefit households rather than the urban poor. In fact, when densification efforts go against the grain in terms of the prevailing demand for low-density housing, such interventions are not only costly, but may simply fail to achieve the densification and integration that they seek to achieve.

Of course, the exact (fiscal and non-fiscal) costs and benefits (both in terms of efficiency and equity) of efforts to enhance the inclusive nature of urban space through interventions in urban housing and public transportation can vary sharply between urban areas. As a result, any conclusion about the fiscal sustainability of urban inclusion and densification efforts would have to be subjected to further study.

5. Concluding remarks

Despite the preliminary and aggregate nature of our analysis, a number of tentative conclusions are emerging about the urban municipal finance picture in South Africa. While these findings largely confirm conclusions from other recent analyses (e.g., PDG/NT, 2016), these findings identify a number of policy areas where further consideration is needed to ensure the long term sustainability of urban finance in South Africa.

Based on the main indicators of fiscal sustainability, urban municipal finances in South Africa in aggregate appear to be on a balanced and sustainable trajectory: overall, fiscal balance is maintained on the operating side of the budget, and municipalities tend to fund a reasonable portion of their capital budget from recurrent resources. In aggregate, no unsustainable accumulation of debt or arrears is apparent, while the relatively limited urban infrastructure backlog suggesting the relative health of urban areas' finances.

It should be emphasized that this tentative conclusion does not mean that South African urban municipalities have excess fiscal space, nor does it necessarily mean that all urban local governments in South Africa are on sound and sustainable financial footing. Indeed, as one would expect in any country, some municipalities appear to face greater difficulty providing effective municipal services given their financial constraints and their governance situation than other municipalities. However, urban local governments across the board balance their operating and capital budgets and no municipality appears to be moving towards an unsustainable accumulation of debt or arrears.

We should not, however, expect an unsustainable fiscal trajectory to manifest itself solely by an immediate worsening of municipalities' fiscal balance. When faced

³⁰ For instance, see FFC. 2012. *The Economic and Fiscal Costs of Inefficient Land Use Patterns in South Africa*.

³¹ Furthermore, the equity-gain from a more inclusive urban form would have to exceed the equity-gain that could be achieved from a similar investment in other social mobility strategies and interventions, such as education, job-training programs, and so on.

³² Given prevailing preferences and given that existing urban (road) transportation networks are premised on a low-density polycentric urban form, the fiscal costs associated with the imposition of a denser urban form are relative high, while the effectiveness of the policies that are currently being pursued is uncertain at best. Anecdotal evidence suggests that there is a potentially considerable negative fiscal impact of densification efforts on the municipal budget, as the cost of developing mixed-use housing options exceeds the (already extensive) fiscal impact of traditional housing programs. Similarly, the operational losses associated with the roll-out of bus rapid transit lines based on overly optimistic fare collection projections are posing a potentially substantial long-run impact on the municipal budget.

with expenditure needs exceeding available resources, municipalities are likely to respond in ways that are not necessarily immediately apparent on their budget books. For instance, municipal officials may reduce access to (or the quality of) selected municipal services. While such a pattern would not necessarily be desirable, such steps would be a reasonable response to imposition of unfunded mandates (or other budget stressors that result in having “to do more with less”) in a way that staves off imminent fiscal imbalances.

With this in mind, there are some signs that, while continuing to be sustainable, fiscal space for urban municipalities is tightening at the municipal level. For instance, the (gradually) declining share of municipal capital spending may be a signal that fewer resources remain after recurrent expenses are taken care of. There is anecdotal evidence to suggest that municipalities are prioritizing available resources around the most urgent infrastructure projects, thereby (implicitly or explicitly) putting off remaining needed investments for future years. At the same time, the relative share of operating spending on Governance and Administration functions has been steadily declining.

Even though urban municipal spending has been steady when considered as a share of GDP, the robust increase of nominal urban municipal expenditures over time also presents somewhat of a risk. Fiscal imbalance and an unsustainable fiscal position could arise if municipalities take future increases in their resource envelope for granted: a slowing economy—or other economic shocks—could depress the future revenue flows that municipalities may be counting on to pay the future operating costs of current commitments.³³ As such, the generally cautious fiscal stance of municipalities should not be considered inappropriate.

The potential risks to financial sustainability imposed by some urban functions and programs are greater than others. Equally important, however, is the ongoing need to recognize the aggregate fiscal risk caused by “overgrazing of the commons” that occurs when different sectoral departments expect municipal governments to partially pick up the tab for additional municipal services, even when each sectoral program individually does not pose a major fiduciary risk.

Two urban sectors or functions can be identified that require further study in order to ascertain their impact on the sustainability of urban finance, namely urban housing and urban public transportation. Both of these policy areas pose a potential long-term risk to the sustainability of urban finances as (a) they comprise a substantial and/or growing share of urban finances, and (b) the national government is pursuing national policy objectives in each

of these areas in ways that has the potential to create significant recurrent fiscal implications for urban local governments.

First, to the extent that national housing policies and implementation modalities are evolving away from traditional RDP housing toward higher-density and arguably more sustainable housing solutions, there is a potential risk that part of the associated higher cost—and as a result, a greater share of the public housing expenditures—is placed on urban local governments. As a closely related concern, it is worth analyzing in greater depth whether the Local Government Equitable Share approach and the rest of the intergovernmental fiscal transfer system will continue to provide adequate support to urban local governments in order to ensure adequate (generally housing-related) municipal services to the urban poor, including compensation for the infrastructure and service delivery demands imposed by indigent in-migration into the urban areas.

Second, there has been a push in recent years by the national government to encourage greater densification, promote more efficient land use, and reduce spatial mismatch between residential and employment locations by funding the establishment of bus rapid transit in major urban areas. What are the projected fiscal impacts of recent investments in urban public transportation? In particular, what are the recurrent implications of current investment patterns for years to come?

From a fiscal sustainability viewpoint, a key question to be answered is whether major interventions in the areas of urban housing and public transport in support of urban densification would be sustainable. Perhaps equally important would be to consider the likely effectiveness of these interventions in achieving a more efficient and equitable urban form. What does existing evidence tell us about the likely impact of these interventions on urban location patterns? Within the range of fiscally sustainable interventions, are such investments likely to lead to a meaningful densification of urban space along integration zones?

³³ Given the heavy reliance on user fees for trading services (including apparent cross-subsidization using electricity rates), one risk specific to South African municipalities is increases in bulk electricity costs, which would limit the ability to extract fiscal surplus from electricity charges.

MODELING THE FISCAL IMPACT OF URBANIZATION AND THE INTEGRATION OF URBAN SPACE IN SOUTH AFRICA

1. Introduction

Background. The Cities Support Program at the South African National Treasury has asked the World Bank to carry out an Urbanization Review for South Africa. The objectives of the review are to (a) clarify the economic, social, and fiscal implications of the evolution of the national urban system and individual metropolitan areas; (b) identify key policies that are most likely to promote inclusive economic growth, and highlight policies that need to be recalibrated; and (c) provide a framework for prioritizing and sequencing policy initiatives and institutional reforms.

With respect to urban public finances, the Urbanization Review aims to investigate the implications of the evolving spatial structure of South Africa's urban areas on the sustainability of urban finances at the national and local level. As such, the analysis seeks to look at the interplay between urban infrastructure investment decision-making, the recurrent implications of such investments, and the character of the urban spatial structure.

The conventional wisdom in South Africa is that a vicious cycle has emerged wherein costly urban infrastructure and urban service subsidies (e.g., capital transport subsidies, commuter subsidies, water subsidies) are provided to mitigate the costs to households and firms of an inherited, spatially inefficient urban structure in a way that is economically inefficient, socially exclusive, and fiscally expensive. In an uncertain macro-fiscal climate, an important policy question to be answered is whether capital investments in a more efficient and inclusive urban form would be effective and sustainable.

A background review of urban public finances was prepared to provide a historical perspective on the patterns and trends in urban finance in South Africa (World Bank, 2017). The analysis of the composition and trends in urban finances suggests that the country's urban finances are generally on a sustainable trajectory, with no danger of an imminent systemic urban fiscal crisis. However, urban local governments are subject to a range of forces that create upward pressure on local government spending.

While at this stage no single urban function threatens the sustainability of urban finances, the combined impact of policy decisions across different urban functions could potentially pose a long-term cumulative risk.

Objective of the RSA Urbanization Impact Model (RUIM). In order to analyze the impact of urbanization patterns and policies aimed at making urban (physical) space more inclusive, the World Bank has developed an Excel-based RSA Urbanization Impact Model (RUIM). The RUIM model aims to look at the interaction between urbanization patterns, urban public finance and urban spatial form by analyzing the fiscal impact of six specific urbanization trends and policy areas: (i) urban growth; (ii) indigent in-migration; (iii) the (existing) urban poor; (iv) unfunded mandates; (v) inclusive housing efforts, and (vi) inclusive public transportation interventions. This note discusses the model's structure, methodology and assumptions, and draws key lessons from the simulation exercise.

A number of policy questions will be central to the analysis: what is the impact of these trends and policy areas on urban public finances? Are they sustainable? And furthermore, at the projected patterns of urbanization or at the projected spending levels, what is the impact—to the degree that we are able to determine—of these policy drivers on urban space? In particular, will they have a meaningful, positive impact on the inclusiveness of urban space?

A more difficult challenge to address, beyond fiscal sustainability, is the extent to which fiscal constraints are externalized to households, businesses (economic productive activity) and the environment, through for example, rationing access to local services, externalities (such as congestion or pollution), or inequities resulting from the failure to mitigate spatial mismatch. Beyond the obvious difficulties merely quantifying these phenomena for urban areas in South Africa (e.g., estimating the congestion cost associated with urban transportation), the available metrics generally do not facilitate comparisons or trade-offs between different policy objectives. Although the RUIM model allows us to project the fiscal impact of different policy options related to pro-

poor access to local services, transportation patterns, and interventions related to spatial mismatch, the model itself is not designed to analyze cost-benefit trade-offs between different policy options and their social and economic impacts.

Urbanization patterns and policies in South Africa. Over the past quarter century, six urbanization patterns and drivers can be observed in South Africa that are likely to (a) have an impact on the sustainability of urban public finances, or (b) where there might be an interaction—in either direction—between urban public finances and urban spatial form. These six main drivers include the following:

- **1. Urban growth.** The post-apartheid era in South Africa has seen important demographic and economic shifts, including a considerable movement of people and economic activity into the country's main urban (metropolitan) areas.¹ However, residential migration has not been even across racial categories, income classes, or educational status.

A first urbanization pattern shaping urbanization and the urban space economy over the past quarter century is the general movement over the past twenty years of higher-income, better educated South Africans (regardless of race) towards urban areas. This pattern of urbanization of higher income (non-poor or non-indigent) residents has coincided with a concentration of economic activities and employment opportunities in urban areas.² Urban growth—driven by the urbanization of economic activity and high-income households—has important implications not only for the urban space economy, but also for the urban fiscus. Urban growth requires additional investments in urban infrastructure, including in roads, electricity, water, sanitation, and so on. In addition, new urban residents and businesses increase the demand for recurrent services, which requires greater operational outlays in urban areas.

Of course, urban growth also drives increases in urban revenues and increases in urban land value. The urban finance system in South Africa is broadly based on benefit principle, whereby the user of urban services (i.e., the urban resident) pays for the delivery of the service either through tariffs (in the case of trading services) or through local taxes that serve as quasi-user fees (such as property rates) in the case of other local public services. Thus, to the extent that new urban residents can afford to do so, they will contribute to urban revenues through local taxes and tariffs.

- **2. In-migration of indigent residents.** Second, there

has been pattern of urban migration of lower-income, less-well-educated people to urban areas. While lower-income (poorer or indigent) people or households are generally less mobile, they represent the larger share of the total number of migrants within South Africa. Although both poor and non-poor South Africans are generally urbanizing, the rates of urbanization of these two groups are not necessarily the same; their location choices within urban areas tend to be different; and the fiscal impact on the receiving urban jurisdiction is vastly different. While in-migration of indigent residents—particular to the extent it takes place on the urban fringe or in previously unsettled areas within the local government's boundaries—requires additional investments in urban infrastructure (along with the associated recurrent service delivery implications), the incidence of indigent in-migration should be expected to be very different from the influx of non-poor households.

In line with prudent public finance principles, however, the benefits principle is set aside in financing services for indigent residents and households. Local governments receive funding through the Although the Local Government Equitable Share (LGES) is unconditional in nature, since 1998, its vertical and horizontal distribution has been driven to a large extent by the equity objective to ensure that poor residents in local government jurisdictions receive access to basic municipal services (Manuel, 1998). In addition to the LGES, local governments receive targeted (albeit quite fragmented) capital grant funding to support the urban infrastructure expansion needs associated with the urban poor.

- **3. Supporting the (existing) urban poor.** Given the premium paid in the public and political discourse in post-apartheid South Africa to equity and inclusion, the local governments sphere plays an important role in supporting the urban poor. Local services provided and funded by metros focusing largely on providing housing-related service or so-called trading services: recurrent provision of water, electric, sanitation, and solid waste management. Although all spheres of government have redistributive responsibilities, the provision of local public services to the urban poor is funded to an important extent by intergovernmental fiscal grants rather than exclusively by local taxpayers, who might avoid this redistributive burden—if imposed on them beyond the level of equity implied by the social compact in each urban area—by “voting with their feet”. Of course, to the extent that the LGES and capital infrastructure grants do not adequately fund the responsibility of providing free services to the urban poor, this would impose a

¹ See Shilpi, Xu, Behal, and Blankespoor (2016).

² Naturally, the experience of different urban areas in South Africa diverges. See Box 2.1 for a more detailed discussion,

fiscal burden on urban local governments themselves and compete for scarce local resources. Beyond the existing levels of pro-poor spending implied by existing national standards, local political leaders may choose to engage in various redistributive activities and/or may self-impose certain service delivery norms to pursue greater equity between poor and non-poor residents that implies greater redistribution.³

- **4. Unfunded mandates.** In addition to specific municipal services which are required to be delivered to certain national standards (with implicit funding support through the LGES), there is a potential for the imposition of additional unfunded mandates by national governments on urban local governments. It appears that national departments are increasingly interested in providing detailed guidance on the public service delivery standards which local governments are expected to follow (such as library services). As the number of volume of unfunded mandates becomes increases as a result of such “functional scope creep”, this could undermine the overall sustainability of urban finance.
- **5 and 6. Achieving a more integrated and inclusive urban spatial form: housing and public transportation.** South Africa’s apartheid legacy has resulted in segregated cities and spatial mismatch. The conventional wisdom is that, as a result, its urban areas have an unnatural, non-inclusive and inefficient spatial form, and that policy intervention is required to shape them in accordance with the model of a typical or “ordinary” (i.e., monocentric) city (Turok 2012; 2016).⁴ The final two areas of urbanization to be investigated by the RUIM model are the fiscal impacts of the policy desire of the government to achieve a more inclusive urban spatial form through more inclusive housing efforts, and more inclusive public transportation systems.

Cities are being tasked with achieving a more inclusive urban spatial form, guided by the Spatial Planning and Land Use Management Act (16 of 2013) (SPLUMA). This transformation of urban space must meet the need for inclusivity, mobility and access, economic development that drives local and national growth prospects and transforms space

in a manner that is socially and environmentally sustainable (SACN, 2015).⁵ Beyond improved spatial planning, moving towards a more inclusive urban spatial form would require considerable investments and public transportation and public housing. For instance, in recent years, the national government has promoted urban local government to introduce and expand Bus Rapid Transportation (BRT). To some extent, the objective of achieving a more inclusive urban form—for instance, by promoting denser and more connected housing—is clashing with other government policy objectives, such as the rapid construction of public housing (which is typically done on the urban fringe, where land is more readily available).⁶ As such, it remains to be seen whether investments in densified housing, combined with investments in urban public transportation, are able to achieve a more inclusive urban form while staying within the limits of the available fiscal space.

Purpose and structure of this note. This note does not provide a comprehensive and exhaustive review of each of the six drivers of urbanization; such deep dives are beyond the scope of this analysis.⁷ Instead, this note limits itself to the development, presentation and analysis of the RSA Urbanization Impact Model (RUIM). Section 2 presents the model’s structure, methodology, and general assumptions. Section 3 will present a general summary of the simulation model’s results. In turn, Sections 4 through 9 present the detailed simulations for each of the six areas of urbanization examined by the RUIM model. Each of these respective sections discusses the main drivers of urbanization or urban policy (in sub-section 1); detailed assumptions underlying the simulations for recurrent or operating expenditures (OpEx), capital expenditures (CapEx), grants, revenues, and impact on physical space (in sub-sections 2-7); as well as a discussion of the simulation results (in sub-section 8).

Section 10 engages in a more detailed discussion of the model’s strengths, weaknesses, and results, while Section 11 draws tentative conclusions. A more in-depth discussion of the policy implications—based on the current state of knowledge of urban public finance in South Africa, as well as on the model’s results—will be prepared as a separate work product.

³ Examples may include local political support for loss-making public bus routes to provide access to low-income townships, or local political support to ensure that road infrastructure serving low-income areas meets the same specification as roads in higher-income areas.

⁴ A strong argument could be made that South African urban areas have a polycentric spatial structure that is pretty typical for a modern, post-automobile city, with diverse household incomes and housing preferences.

⁵ In reality, different actors focus on different aspects of the inclusiveness of physical urban space. For instance, those actors dealing with human settlement may be more prone to focus on the residential locations of the poor; those concerned about equity may be more concerned with resolving certain aspects of spatial mismatch (e.g., the mismatch between residential locations and employment opportunities); while those concerned with traffic congestion, air pollution, or public transportation advocates are likely to focus more on certain types of population concentration or densification.

⁶ Likewise, investments and subsidies for urban public transportation systems have the potential of accommodating continued housing segregation and sprawl, rather than supporting urban densification.

⁷ In fact, in parallel to his analysis of urban public finance, deep dives are prepared as part of the Urbanization Review on the interrelationship between urban public finance and inclusive housing efforts, as well as on the interaction between urban public finance and urban public transportation.

2. Methodology

Overview / scope of the RUIM model. The RSA Urbanization Impact Model (RUIM) is an Excel-based simulation model. The model considers the impact on fiscal space (or fiscal sustainability) of the six aspects of urbanization noted above, including: (1) urban growth; (2) the impact of indigent in-migration; (3) the impact of the (existing) urban poor; (4) the impact of unfunded mandates; (5) the impact of inclusive housing policies; and (6) the impact of inclusive public transportation policies. In a more informal manner, the model also considers the impact of these six policy areas on the inclusiveness or density of urban physical space.

The simulations prepared using RUIM consider the finances (revenues and expenditures, and grants as relevant) of South Africa's eight metropolitan municipalities in aggregate.^{8,9} As such, unless otherwise noted, the term "urban finances" can be used synonymously with the term (metropolitan) municipal finances. As discussed in greater detail below, the impact of urbanization patterns and policies on the National Budget is mainly tracked through the system of intergovernmental fiscal transfers.

Box 2.1 Variations among urban areas in South Africa

The RUIM model deals with urban (fiscal and physical) space in South Africa in aggregate, as the main objective of the model is to consider the overall fiscal sustainability of urban finances in the country. There is considerable variation, however, among urban areas: both between and within metropolitan municipalities and intermediate (secondary) cities, there are large variations between individual jurisdictions with regard to their economic drivers, demographic patterns, geography and location patterns, and fiscal issues (e.g., cost variations across space).

For instance, whereas Gauteng metros and Cape Town are experiencing consistent growth, metros such as Buffalo City and Nelson Mandela Bay are experiencing sustained low growth, and some intermediate cities are declining while others are growing rapidly. Care should be taken, therefore, not to apply the conclusions tentatively identified by this aggregate analysis to individual urban areas. Instead, it would be appropriate to build on the existing analysis as relevant and replicate its approach in a more granular manner for individual metros and secondary cities.

To the extent possible, the model builds on existing analytical work available on various aspects of urban public finances in South Africa. Compared to much of the existing analytical work which tends to focus more on capital expenditures, the urban fiscal sustainability model looks comprehensively at capital as well as recurrent (operational) expenditures, as recurrent expenditures form the vast majority of South Africa's municipal budgets. As such, the recurrent implications of today's capital investment decisions forms an element that cannot be overlooked in an analysis of urban finances in South Africa.

Our fiscal analysis will look at a ten-year period, using 2016/17 as the base year (Year 0). All figures are in constant 2016/17 prices (Rand). For each urbanization driver or urbanization policy aspect, we are interested in its impact on fiscal space, broken down by the impact of each component or factor on (i) recurrent (operational) expenditures, (ii) capital (infrastructure) expenditures, as well as its impact on (iii) local revenues, and (iv) receipt of intergovernmental fiscal transfers.¹⁰ The combination of these expenditure and revenue impacts result in (v) the net fiscal impact on urban local governments and (vi) the net fiscal impact on the public sector as a whole. In addition, for each urbanization component or element, we are interested in (vii) the impact of each component on physical space or the urban spatial form.

Because metropolitan municipalities represent the major urban areas in South Africa, the analysis will focus on the aggregate of the country's eight metropolitan areas. Although the current model looks at metropolitan areas in aggregate, it should be recognized that fiscal and spatial relations in each metropolitan area in South Africa are unique: each metropolitan area has different economic drivers, different growth patterns, different spatial and densification issues, different political and institutional challenges, and so on. Unfortunately, modeling the unique dynamics of urbanization separately for each metropolitan municipality falls beyond the scope of the current review. Thus, it should be borne in mind that the analysis presented here reflects an aggregate picture that is—by necessity—unable to address the variations that make each metropolitan area unique.

Limitation of the overall modeling approach. The development of simulation models is not a precise science. In the context of the Municipal Services Financial Model (MSFM), the National Treasury (2015; 10) reminds its readers that when making use of the results of a simulation model, it is useful to keep in mind the limitations of any modelling approach and bearing in mind that "[a]ll models are wrong, but some are useful." The document (ibid) goes on to note that:

⁸ This includes Buffalo City, City of Cape Town, City of Johannesburg, City of Tshwane, Ekurhuleni, eThekweni, Mangaung and Nelson Mandela Bay.

⁹ This also avoids complications with the structure of secondary cities (which are served by a district municipality as well as by a local municipality).

¹⁰ Note that RUIM does not take into account the revenue impact of urban (economic) growth on national revenues.

Models are not accurate predictors of what will happen in the future and do not provide an 'answer' in terms of creating certainty. Good models deepen understanding and inform decision making. They are most powerful when testing different scenarios in order to deepen understanding of the relative impact of model parameters on a result.

These general observations equally apply to the development and interpretation of the results of the RSA Urbanization Impact Model (RUIM).

The “revealed preferences” approach. The urbanization impact model looks at each aspect of urbanization in isolation in a partial equilibrium manner. The model only intends to project an approximation of the actual fiscal behavior or long-term responses of municipalities, seeking to provide an order-of-magnitude estimate of the fiscal impact of various aspects of urbanization drivers based on how municipalities would be expected to behave if they would have to deal with each of these pressures in isolation¹¹

In contrast to some other models, the projections in the RUIM model are largely based on existing (revealed) expenditure and revenue patterns rather than on technical/engineering cost estimates. As such, the model does not intend to prescribe or estimate a specific level of “optimal” expenditures or expenditure needs (e.g., National Treasury 2015; FFC/SALGA 2015). Instead, the model takes the current municipal expenditure and revenue patterns as the “revealed preferences” of municipalities and makes projections based on the “decision-rules” that are expected to be used at the municipal level.

Box 2.2. Analyzing urban financial sustainability: projecting municipal expenditures and revenues

National Treasury (2015) estimates urban infrastructure expenditure needs through a “top-down approach” as an addition or combination of the “need” for backlog eradication; municipal infrastructure needs driven by (economic and household) growth; and the cost requirements associated with infrastructure renewal based on engineering estimates of unit costs. The National Treasury estimates arrive at an average projected need for municipal capital expenditures over the next ten years of R43 billion per annum (National Treasury 2015; 1). This amount is equal to roughly R 1770 per urban resident per year.

While this approach provides a reasonable projection of municipal capital expenditure needs in the future, it does not necessarily provide an estimate of what is likely to happen: indeed, the National Treasury (2015) analysis explicitly recognizes that municipalities’ fiscal decisions are not likely to conform to these projected expenditure needs: it may simply not be the priority of elected municipal leaders to spend their resources in accordance with these “needs”, and/or resource availability may constrain municipalities from spending at these levels.

In contrast, the projections of municipal expenditures and revenues in the current model are based on the revealed expenditure and revenue choices of municipalities, relying as much as possible on their current fiscal choices as a starting point for analysis.¹² Rather than defining the “need” for capital expenditures based on unit-cost estimates prepared by engineers, the current approach starts with the actual average observed recurrent and capital expenditures for the latest year available, which reveals municipalities’ actual preferences and priorities. For instance, in 2016/17, metropolitan municipalities spent R 7,987 per urban resident in order to provide recurrent urban services.¹³ Similarly, average municipal spending on capital infrastructure equaled approximately R 1327 per person for the eight metropolitan municipalities for that year. This amount reflects the *de facto* combined spending on infrastructure backlog eradication; expansion of municipal infrastructure in response to urban growth; and ongoing infrastructure renewal. In order to arrive at the most likely fiscal impact of, say, urban growth on capital expenditures, our model tries to isolate the share of actual municipal infrastructure spending that goes towards the expansion of municipal infrastructure in response to urban growth as the basis for future projections.

The partial-equilibrium approach chosen here stands in contrast to estimating a more comprehensive (but less tractable) general-equilibrium type model, in which metropolitan governments would presumably moderate their expenditures (presumably by rationing access to services or deferring maintenance) or increase municipal revenue collections in response to budget constraints (in order to balance their budget, as required by law). In order to maintain budget balance, a third option would be for municipalities to increase municipal borrowing. The model itself does not seek to predict how metropolitan governments (or the national government) would deal with cumulative contractions or expansions in urban fiscal space. Instead, the policy options available to urban local governments are discussed in Section 10.

¹¹ The partial-equilibrium approach chosen here stands in contrast to estimating a general-equilibrium type model, in which metropolitan governments would presumably moderate their expenditures or increase municipal revenue collections in response to budget constraints (in order to balance their budget, as required by law). In order to maintain budget balance, a third option would be for municipalities to increase municipal borrowing.

¹² It should again be noted that the modeling approach aggregates all metropolitan municipalities. As such, the model will not represent the fiscal choices made by any individual municipality.

¹³ In addition to these municipally-provided services, urban services include certain services provided by national and provincial departments, such as urban housing or urban rail services.

Representative agents. In general, the model is based on two types of “representative” urban residents: non-poor (or non-indigent) urban residents and poor (indigent) urban residents. A poor resident is assumed pays no local taxes, is not formally employed, and is entitled to free municipal services. Non-poor urban residents are assumed to be economically productive, pay local taxes, and pay for municipal services through user fees and charges. These two types of urban residents are thus assumed to have different fiscal impacts (with regard to OpEx, CapEx, Grants and Revenues).

In addition, based on existing locational patterns, these two types of representative agents are also expected to make different locational choices (unless specific efforts are made to influence their locational choices), with wealthy households typically locating in developed urban nodes close to the urban center, while poor households more commonly locate at the urban fringe.¹⁴ The relative growth of these two groups of representative agents is a critical driver of the model (Box 2.3).

Box 2.3 Demographic trends in urban areas in South Africa

There are gaps in the state of knowledge regarding demographic trends in urban areas in South Africa. For instance, it is difficult to gauge what the exact growth rate of non-indigent residents and households has been over the past five years (since the Census in 2011), and to what extent that growth is due to in-migration versus social mobility (poor households climbing the income scale from indigent to non-indigent). In the absence of the necessary data, key assumptions had to be made for the purpose of the RUIIM model.¹⁵ Achieving a better understanding about these social and demographic dynamics—while beyond the scope of the current analysis—will be critical to achieving more economically productive, inclusive and socially mobile cities.

What we do know is that the urban poverty rate declined precipitously from 2001 to 2011. During this period, the number of poor households in urban areas (based on the classification specified in Assumption D2) increased slightly from 3,038,981 to 3,281,895, whereas the number of non-poor households more than doubled from 1,502,112 to 3,126,579 households. This reflects a decline in the urban poverty rate from 67 percent to 51 percent. To the extent that the increase in non-poor households results from upward mobility rather than from in-migration, urban areas in South Africa appear to be effective catalysts for social and economic transformation.

It is unclear whether (or the extent to which) the net figure accurately reflects the true number of indigent in-migrants into urban areas, or whether the actual number of indigent in-migrants is larger, with the net increase being offset by social and economic mobility of low-income households moving into the higher-income category. If this latter scenario is the case, it is further unclear whether the socio-economic mobility of households is the result of increased access to (formal or informal) employment opportunities, or whether such socio-economic “mobility” is merely a reflection of successful social programs.

These census figures clearly suggest a relatively high population growth for non-poor residents, and a low growth rate for poor residents. However, these are not the assumptions generally made by other urban finance models in South Africa (e.g., NT/PDG, 2015). In fact, other models assume a relatively high indigent population growth rate (presumably, due to in-migration) and a relatively low non-indigent growth rate. For the purpose of the simulation model, we have cautiously assumed an overall 2.32% growth rate for both population groups from 2011-2016 (reflecting the average urban population growth rate from 2011-16). This assumption—which is aimed to err on the side of caution—is likely to have a considerable impact on the simulation results.

Further research is needed to understand whether this trend has continued past 2011, and the extent to which this trend has been driven by in-migration versus social mobility or natural growth.

The model also recognizes the existence of a non-residential sector (i.e., local businesses, retail, manufacturing, etc.). The non-residential sector receives services (requiring OpEx and CapEx) and pays local taxes. As explained in further detail as part of the simulations, business expenditures and business revenues are assumed to be proportionate to the number of non-indigent residents (i.e., proportionate to the number of employees).¹⁶

Data. Data have generally been extracted from two basic sources. First, basic demographic and socio-economic data was extracted from publications by StatsSA, including from the Census. Second, municipal finance data was generally taken from the National Treasury data base, including as collected through the Section 71 reports. Details about specific data sources are reported in the sections below, and noted in the respective Excel worksheets as relevant.

¹⁴ While not specifically addressing locational issues by race, the model is consistent with the observed reality of continued racial and income segregation at the neighborhood level in South Africa's urban areas.

¹⁵ While these assumptions are unlikely to change the direction of the results, the size of the results may be meaningfully impacted.

¹⁶ This assumption is referred to further below as Assumption F2.

Model structure. The RSA Urbanization Impact Model (RUIM) comprises three types of worksheets:

- **Summary worksheet(s):** The worksheets present summary tables for presentation and analysis purposes, based on the data and simulations contained in the other worksheets.
- **Data worksheets:** These worksheets contain source data.
- **Simulation worksheet:** there are six simulation worksheets which contain detailed simulations – one worksheet for each of the six urbanization patterns/elements identified in Section 1.

The core of the fiscal analysis for each urbanization pattern or policy area is performed in its respective simulation worksheet. Horizontally, each simulation worksheet captures data for the base year (2016/17) as well as the projections for the ten-year simulation period from 2017/18 through 2026/27. Each simulation worksheet is vertically organized in an identical manner in order to systematically prepare and analyze the fiscal (and to some extent, spatial) impact of the six relevant urbanization pattern or policy areas. The following seven elements/sections are contained in each simulation worksheet (and the corresponding description in the sections below):

1. **Simulation results.** Each simulation worksheets begins with a table that summarizes the simulation's results.
2. **Main driver(s) of the urbanization pattern/element.** Captures the main driver(s) of the urbanization pattern or policy. For instance, with respect the urban growth, the main driver is expected to be the increase in the (non-indigent) urban population.
3. **Variables and parameters.** Captures main variables and parameters used for the simulation.
4. **OpEx Impact Simulation.** Prepares and presents a ten-year simulated impact on OpEx.
5. **CapEx Impact Simulation.** Prepares and presents a ten-year simulated impact on CapEx.
6. **Revenue Impact Simulation.** Prepares and presents a ten-year simulation of OSR impacts.
7. **Grant Impact Simulation.** Prepares and presents a ten-year simulation of the expected impact on grant receipts by urban areas.
8. **Spatial Impact Expectation.** Gives an indication of the expected spatial impact.

As noted, the simulation model uses aggregate metropolitan municipal finances as the basis for the analysis, and thus primarily focuses on municipal-level urban public finances. To the extent that urban services are funded by intergovernmental fiscal transfers, these are also captured by the model. As a result, the RUIM model is able to project the impact of urbanization trends

and policy on municipal fiscal space by looking at the net fiscal impact on local governments, while at the same time considering the overall or total net fiscal impact on the public sector (which also takes into account not only the fiscal impact on urban local governments, but also the fiscal impacts on the national budget).¹⁷

However, not all spending on urban functions is done by municipalities: national as well as provincial-level agencies deliver certain municipal-level services and infrastructure directly. To the extent that urban programs are delivered by the national and provincial spheres in a direct manner (e.g., MetroRail, or provincial housing programs), the model includes the related national or provincial urban expenditures into the local-level spending totals (for OpEx and CapEx), while offsetting these expenditure by recording an equivalent amount on the other side of the balance sheet as (quasi-)grant funding.¹⁸

The indication of the extent of the expected spatial impact of urbanization patterns or policies will be rather general: None / Low / Medium / High. The designation will be based on the expectation of whether (and the extent to which) the component is expected to results in a more inclusive spatial form. "None" may also be used when a worsening of spatial form is expected.

Simulation model assumptions. Any simulation model relies on assumptions. Assumptions are needed to make the simulation model tractable and manageable, while at the same time, the making of overly general or faulty assumptions reduces the predictive power and accuracy of the model. In addition to simplifying assumptions, in most cases, the accuracy and granularity of a model's assumptions are driven by the availability of systematic and reliable data for the issue at hand.

Specific assumptions used in the RUIM model about parameter values or relationships between different variables are explicitly stated in the sections below (which correspond to Simulations 1-6). In addition, the Annex provides details and clarifications about specific (sometimes problematic) assumptions or parameter details which are believed to have a substantial impact on the model's projections. Using square brackets, references may be made in the text to General (G), Demographic (D) or Fiscal (F) assumptions; e.g., [Assumption D1].

Simulation scenarios. Because the future is uncertain and medium- to long-term projections about the impact of patterns and policies on fiscal and physical space are hard, the simulation model starts by sketching three alternate scenarios: Scenario 1 provides an optimistic baseline scenario (generally reflecting a fiscally positive scenario); Scenario 2 projects a medium-change scenario; whereas Section 3 reflects the fiscally negative scenario.¹⁹

¹⁷ Accordingly, the analytical tables refer to Net Fiscal Impact (Local Government) versus Net Fiscal Impact (Overall).

¹⁸ For instance, if the national government spends R 1 billion on MetroRail capital infrastructure, this is recorded as R 1 billion of CapEx, in addition to recording a R 1 billion (quasi-) grant to the local level. This way, the simulation model reflects urban spending levels appropriately, while at the same time accurately reflecting the net fiscal impact on municipal budgets.

¹⁹ Naturally, endless different combinations and permutations of these scenarios can be specified. Some further analysis of this sort will be done in Section 10.

The scenarios are not sequenced in order of greatest likelihood (in other words: Scenario 1 is not assumed to be the most likely scenario). In fact, in some cases Scenario 2 is quite possibly the most likely scenario (for instance, for simulation 1 and 2 on urban growth), whereas in other cases Scenario 1 may be more likely scenario.

Sections 4 through 9 of this report provide details of the three simulations for each of the six drivers of urbanization. Table 2.1 provides an overview of the three simulated sets of scenarios.

Table 2.1: Overview of Simulation Scenarios

	Scenario 1 (Fiscally Positive)	Scenario 2 (Fiscally Medium)	Scenario 3 (Fiscally Negative)
Sim 1: Urban Growth (non-indigent)	High non-indigent growth (3%)	Medium non-indigent growth (2%)	Low non-indigent growth (1%)
Sim 2: Indigent in-migration	Low indigent growth (1%)	Medium indigent growth (2%)	High indigent growth (3%)
Sim 3: Existing urban poor	Moderate decrease in pro-poor services	Moderate increase in pro-poor services	Increase in pro-poor services (plus increase in grants)
Sim 4: Unfunded mandates	Minimal unfunded mandates	Medium unfunded mandates	High unfunded mandates
Sim 5: Inclusive housing policies	“Business as usual”	Medium investment in inclusive housing policies	High investment in inclusive housing policies
Sim 6: Inclusive public transp. policies	“Business as usual”	Medium investment in inclusive public transportation policies	High investment in inclusive public transportation policies

Because fiscal simulation models lack the granularity and precision of spatial models (e.g., GIS-driven housing or transportation models), the RUIM model is not intended to provide detailed projections about spatial location patterns of residents and firms across urban space. As such, the model is limited to developing a very general expectation under each scenario about the impact of each driver on urban spatial form based on the general degree of residential movement or densification we expect (none or very limited; low to moderate; or large impact).

The projections produced by the RUIM model, while acknowledged to be (very) rough, should nonetheless be helpful in informing the medium-to-long term sustainability of urban public finances in South Africa under different scenarios. If urban public finances are not deemed to be fiscally sustainable, different policy responses may be needed at the local and/or at the national level. An unsustainable fiscal trajectory may require municipalities to limit spending by prioritizing the provision of some infrastructure or services over others. It may result in municipalities seeking to increase their revenues. Depending on the source and scale of the unsustainability, adjustments may be required by the national government, for instance, by adjusting the quantum of intergovernmental grants; restricting the overall intergovernmental fiscal framework, as needed; or by informing changes—as needed—to the government’s current ambitions with respect to achieving a more inclusive urban spatial form.

This document, however, does not intend to draw firm policy conclusions: this report focuses on presenting the RSA Urbanization Impact Model, including the model’s structure, data sources, parameters and underlying assumptions. While this report does engage in analysis of the simulation result of each urbanization driver or policy component, in-depth policy discussions and policy conclusions will be contained in a separate output.

3. The overall fiscal impact of urbanization and the integration of the urban space economy: an initial overview

Presentation of simulation results. Based on the approach and assumptions described in the previous section, the RUIM presents the increase or decrease of urban fiscal space that results from urbanization trends or policy decision. In other words, the model presents the simulated incremental impact on urban public finances

relative to the spending and revenues that took place in the 2016/17 base year (Table 3.1). As such, the model's results present the increase or decrease in annual urban spending, urban revenues, and grants compared to the

base year. If the simulation model returns an impact of zero, this means that the simulation suggests that there will be neither an increase nor a decrease in spending (or revenues) vis-à-vis the base year.

Table 3.1 Aggregate Municipal Spending for Metropolitan Municipalities, 2016/17

R Billion	OPEX	CAPEX	TOTAL
Governance and Administration	28.6	2.7	31.3
Executive & Council	5.6	0.4	6.0
Budget & Treasury Office	12.1	0.5	12.6
Corporate Services	11.0	1.7	12.7
Community and Public Safety	29.1	6.7	35.8
Community & Social Services	3.5	0.5	4.0
Sport And Recreation	5.7	0.5	6.2
Public Safety	11.0	0.6	11.6
Housing	4.6	4.8	9.4
Health	4.4	0.3	4.7
Economic and Environmental Services	18.0	9.2	27.3
Planning and Development	4.9	1.3	6.3
Road Transport	12.5	7.8	20.3
Environmental Protection	0.6	0.1	0.7
Trading Services	105.5	11.3	116.8
Electricity	65.2	5.1	70.2
Water	24.5	3.1	27.6
Waste Water Management	6.9	2.7	9.6
Waste Management	9.0	0.4	9.4
Other	1.2	0.5	1.7
Subtotal / Total	182.5	30.3	212.8

Note: Preliminary figures

For instance, if operational spending on water amounts to R 24.5 billion in the base year (FY 2016/17), a simulated fiscal impact of R 1 billion in year 1 (2017/18) would reflect an increase of one billion Rand in water OpEX for the year. Likewise, a fiscal impact of R 30 billion by year 10 (2026/27) would reflect a projected increase of water spending of 30 billion Rand for that year vis-à-vis the base year (in other words, annual projected operational spending of R 54.5 billion).

Note that in reality, the municipal spending and revenue collections that take place in the base year does not truly reflect a comprehensive baseline, as reflected in Table 3.1. It is important to note that some urban spending programs (e.g., urban housing programs, MetroRail, and so on) are not necessarily contained in the budget of metropolitan municipalities, but rather, are funded directly

by national and provincial departments. This will be discussed in greater detail in Sections 8 and 9.

Furthermore, whereas it is reasonable to expect that operational expenditures in year t+1 would be the same as in year t if nothing changes, this assumption does not necessarily hold on the capital side of the budget. For instance, if there would be no further change in the population in the year t+1—in which case urban population growth were to end—capital spending for new in-migration and expansion in Year 1 and all subsequent years could be assumed to drop to zero. In contrast, it would not be unreasonable to assume that the replacement, rehabilitation and backlog-eradication efforts of existing capital stock will continue at a constant rate into the future.²⁰ As such, conceptually, the level of capital spending in the base year should be lowered

²⁰ A contrast should be drawn here between the RUIM and the MSFM. Whereas the MSFM prepares estimates of the required investment to eliminate backlogs in infrastructure rehabilitation and replacement, the RUIM simply takes the amount of spending on rehabilitation, replacement and backlog eradication in aggregate as being determined by local officials (as the balance between total capital spending and spending on new infrastructure projects).

to only reflect capital spending on the replacement of existing capital infrastructure.

Note further that, in contrast to the presentation of a medium-term expenditure framework (MTEF), the results of the simulation model are presented in constant 2016/17 rand. As such, the model abstracts away from inflation over time.

The overall fiscal impact of urbanization and the integration of the urban space economy. This section presents a brief discussion of the overall simulated fiscal

impact of urbanization trends and the integration of the urban space economy over time. Details for each of the six specific areas of urbanization and urban policy are discussed in greater detail in the subsequent sections (Sections 4-9). It should be noted that the current section merely intends to give an overview of the overall scale and composition fiscal impacts as a preface to the discussion of the individual components and simulations contained in the RUIIM model. Afterward, Section 10 will engage in further analysis of the overall simulation results. Emerging insights and take-aways are discussed in Section 11.

Table 3.2. The Net Fiscal Impact on Public Sector Finances of Urbanization and Integration of the Urban Space Economy in South Africa (R billions)

Year	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Scenario 1 (Positive)										
1. The impact of urban growth	-15.17	-12.38	-9.35	-6.03	-2.43	1.50	5.78	10.44	15.50	21.02
2. The impact of indigent in-migration	-3.62	-4.02	-4.42	-4.83	-5.24	-5.66	-6.08	-6.50	-6.93	-7.36
3. The impact of the urban poor	4.37	4.46	4.55	4.64	4.73	4.83	4.92	5.02	5.12	5.22
4. The impact of unfunded mandates	-1.42	-1.45	-1.48	-1.51	-1.54	-1.57	-1.60	-1.63	-1.67	-1.70
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	-0.23	-0.30	-0.45	-0.60	-0.76	-0.91	-1.07	-1.23	-1.39	-1.55
Scenario 1 (Positive)	-16.07	-13.69	-11.15	-8.34	-5.23	-1.81	1.96	6.10	10.64	15.63
Scenario 2 (Medium)										
1. The impact of urban growth	-9.87	-7.68	-5.35	-2.86	-0.22	2.59	5.59	8.77	12.16	15.76
2. The impact of indigent in-migration	-7.23	-8.10	-8.99	-9.90	-10.83	-11.77	-12.73	-13.71	-14.71	-15.74
3. The impact of the urban poor	-4.37	-4.46	-4.55	-4.64	-4.73	-4.83	-4.92	-5.02	-5.12	-5.22
4. The impact of unfunded mandates	-2.85	-2.90	-2.96	-3.02	-3.08	-3.14	-3.21	-3.27	-3.33	-3.40
5. The impact of inclusive housing effects	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09
6. The impact of inclusive transportation efforts	-6.76	-7.24	-7.74	-8.26	-8.80	-9.36	-9.95	-10.55	-11.19	-11.84
Scenario 2 (Medium)	-31.17	-30.48	-29.68	-28.77	-27.75	-26.59	-25.31	-23.87	-22.29	-20.53
Scenario 3 (Negative)										
1. The impact of urban growth	-4.57	-3.05	-1.47	0.17	1.88	3.66	5.52	7.45	9.46	11.55
2. The impact of indigent in-migration	-10.85	-12.27	-13.72	-15.23	-16.77	-18.37	-20.01	-21.70	-23.44	-25.23
3. The impact of the urban poor	-9.54	-9.73	-9.92	-10.12	-10.32	-10.53	-10.74	-10.96	-11.18	-11.40
4. The impact of unfunded mandates	-5.69	-5.81	-5.92	-6.04	-6.16	-6.28	-6.41	-6.54	-6.67	-6.80
5. The impact of inclusive housing effects	-10.38	-10.38	-10.38	-10.38	-10.38	-10.38	-10.38	-10.38	-10.38	-10.38
6. The impact of inclusive transportation efforts	-13.30	-14.19	-15.07	-16.00	-16.99	-18.05	-19.18	-20.38	-21.66	-23.02
Scenario 3 (Negative)	-54.32	-55.42	-56.48	-57.59	-58.74	-59.94	-61.19	-62.50	-63.86	-65.28

Table 3.3. The Net Fiscal Impact on Local Government Finances of Urbanization and Integration of the Urban Space Economy in South Africa (R billions)

Year	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Scenario 1 (Positive)										
1. The impact of urban growth	-15.12	-12.29	-9.20	-5.84	-2.18	1.81	6.14	10.86	15.99	21.56
2. The impact of indigent in-migration	-0.19	-0.36	-0.52	-0.69	-0.85	-1.02	-1.20	-1.37	-1.54	-1.72
3. The impact of the urban poor	4.37	4.46	4.55	4.64	4.73	4.83	4.92	5.02	5.12	5.22
4. The impact of unfunded mandates	-1.42	-1.45	-1.48	-1.51	-1.54	-1.57	-1.60	-1.63	-1.67	-1.70
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	-0.44	-0.49	-0.60	-0.70	-0.81	-0.92	-1.03	-1.14	-1.25	-1.36
Scenario 1 (Positive)	-12.81	-10.13	-7.25	-4.10	-0.65	3.12	7.24	11.74	16.65	22.00
Scenario 2 (Medium)										
1. The impact of urban growth	-9.84	-7.62	-5.25	-2.73	-0.06	2.79	5.82	9.04	12.47	16.11
2. The impact of indigent in-migration	-0.38	-0.71	-1.05	-1.39	-1.75	-2.10	-2.47	-2.84	-3.22	-3.60
3. The impact of the urban poor	-4.37	-4.46	-4.55	-4.64	-4.73	-4.83	-4.92	-5.02	-5.12	-5.22
4. The impact of unfunded mandates	-2.85	-2.90	-2.96	-3.02	-3.08	-3.14	-3.21	-3.27	-3.33	-3.40
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	-2.30	-2.64	-2.98	-3.35	-3.72	-4.11	-4.52	-4.94	-5.38	-5.83
Scenario 2 (Medium)	-19.75	-18.33	-16.80	-15.13	-13.33	-11.39	-9.29	-7.03	-4.59	-1.96
Scenario 3 (Negative)										
1. The impact of urban growth	-4.55	-3.02	-1.42	0.24	1.96	3.76	5.63	7.58	9.61	11.72
2. The impact of indigent in-migration	-0.58	-1.08	-1.59	-2.13	-2.67	-3.24	-3.82	-4.42	-5.03	-5.67
3. The impact of the urban poor	-4.77	-4.86	-4.96	-5.06	-5.16	-5.27	-5.37	-5.48	-5.59	-5.70
4. The impact of unfunded mandates	-5.69	-5.81	-5.92	-6.04	-6.16	-6.28	-6.41	-6.54	-6.67	-6.80
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	-4.17	-4.79	-5.39	-6.04	-6.73	-7.47	-8.25	-9.08	-9.97	-10.92
Scenario 3 (Negative)	-19.76	-19.56	-19.30	-19.03	-18.77	-18.49	-18.22	-17.94	-17.66	-17.37

Table 3.2 and Table 3.3 present an overview of the overall fiscal impact of urbanization and the integration of the urban space economy for each of the three scenarios defined in Section 2 (fiscally positive; fiscally medium; fiscally negative) for each of the six simulations. Table 3.2 reflects the net fiscal impact on public finances as a whole, whereas Table 3.3 reflects the net fiscal impact on urban municipal-level urban finances (i.e., after taking into account intergovernmental fiscal transfers received from other government spheres).

For the purpose of this analysis, the net fiscal impact on overall public finances for each year is computed as the projected increase in own source revenues minus the projected increase in operating expenditures and

capital expenditures (OpEx and CapEx). Similarly, the net fiscal impact on local government finances is computed as the projected increase in own source revenues *plus intergovernmental fiscal transfers (grants)*, minus the projected increase in operating expenditures and capital expenditures (OpEx and CapEx) for each year.

Results reflect the aggregation of finances for all eight metropolitan municipalities and are presented in billions of Rand. As such, a positive number means an increase in urban fiscal space vis-à-vis the base year (i.e., simulated revenue increases exceed simulated expenditures increases), whereas negative figures reflect a decrease in net urban fiscal space vis-à-vis the base year (2016/17).

The reader should once again be reminded about the limitations of the methodology: simulations models are not—nor are they intended to be—accurate predictors of what will happen in the future. Simulation models—including the RSA Urbanization Impact Model (RUIM)—relies (often by necessity) on simplifying assumptions that are often unrealistic or difficult to justify. However, the RUIM model does allow us to deepen our understanding of the relative impact of model parameters on urban fiscal space by considering different aspects of urbanization and by simulating the fiscal impact of different scenarios. Hence, in reviewing the model, it is unnecessary to judge whether the assumptions underlying the model are an inaccurate reflection of reality: they almost certainly are.²¹ Instead, the question is whether (and the extent to which) the simplifying assumptions (or parameter estimates or guestimates) have a material impact on the nature of the underlying fiscal relationships and/or on the model's projected fiscal outcomes.

If we consider the scenarios 'en bloc' for Simulations 1-6, we see what we would expect to see: the overall (public sector) net fiscal incidence for Scenario 1 reflects a relatively positive fiscal scenario, with Scenarios 2 and 3 reflecting incrementally less fiscally positive outcomes.²²

When the full net fiscal incidence is considered (across all government levels, as is done in Table 3.2), the net fiscal gaps under the three different scenarios are 16.1, 31.2 and 54.3 billion Rand in Year 1, respectively. Based on the specific assumptions introduced for each of the simulations (and on the projected distribution of the fiscal impact between different government spheres), the projections for Year 1 (2016/17) reflect a net fiscal gap for local governments of 12.8, 19.7 and 19.8 billion Rand, respectively (Table 3.3).

The fiscal impact of urbanization is not negative over the long run under each scenario. By Year 10 (2026/27), Scenario 1 results in a positive net fiscal space for the public sector of 15.63 billion Rand, meaning that over time the projected increase in urban revenues outpaces the projected increase in urban expenditures (Table 3.2). After taking into account the fact that local government will also receive an increase in grants under different policy scenarios, the net fiscal impact (or the gain in fiscal space) on urban local governments under Scenario 1 for Year 10 is R 22.0 billion (Table 3.3).

In contrast, by Year 10, Scenarios 2 and 3 show a net fiscal gap of 20.5 and 65.3 billion Rand for the public sector as a

whole (Table 3.2). The overall fiscal impact on urban local governments by Year 10 is less severe: -2.0 billion, and -17.4 billion for Scenarios 2 and 3, respectively (Table 3.3).

It is worth noting that the different scenarios reflect different trends over time. Scenario 1 (reflecting relatively positive assumptions) shows an initial fiscal gap for local governments that over time develops into positive fiscal space. Scenario 2 shows a fiscal gap that declines in size over time.²³ In contrast, the overall fiscal gap in Scenario 3 increases over the time period under consideration.

The results from the three different scenarios thus give an important indication of the sustainability of urban public finances in South Africa under different circumstances. Relative to the current urban fiscal picture, Scenarios 1 and 2 appear fiscally sustainable, as the initial fiscal gap contracts over time (and indeed, in the most positive scenario, results in an annual fiscal surplus in the out-years). In these more optimistic scenarios, annual fiscal gaps fall in the range of 10-15 percent of the current urban budget, which is a gap that can be relatively easily overcome (for instance, through short-term borrowing or other mechanisms) without destabilizing urban public finances.

However, the finding that urban finances in South Africa are fiscally sustainable is not an absolute conclusion. Scenario 3 reflects a situation in which low growth, higher fiscal burdens, and the recurrent implications of investments result in a fiscally unsustainable trajectory. While this "perfect storm" is not necessarily very likely to occur, it would—if it were to come to pass—structurally upset the fiscal balance in the realm of urban public finances. As such, it is important not to discount this scenario, and it will be important to ensure that this fiscal scenario does not arise.

Another important observation—which is explored in greater detail in Section 4—is that in the longer run (5-10 years), the impact of urban growth on fiscal space—in all scenarios—seems to consistently turn positive. In other words: over time, the revenue gains from urban growth are consistently projected to exceed the (recurrent and capital) costs associated with urban (population and economic) growth.²⁴ In contrast, virtually all other aspects of urbanization that have been incorporated into the RUIM model (perhaps unsurprisingly) impose a negative net fiscal impact on urban public finances.

²¹ As noted, for each of the six different areas of urbanization and urban policy, the underlying parameters and assumptions are discussed in the subsequent sections.

²² The reader is reminded that Scenario 1 for each of the six simulations is not necessarily the most likely scenario, or that there are any ties between the different simulations. As such, considering Scenario 1 'en bloc' merely suggests that we are considering the impact of the most positive fiscal scenario possible.

²³ This appears to be due to the share of the fiscal impact that is borne by national government through the grant system, as Scenario 2 in Table 3.2 shows a gradual worsening of the overall fiscal gap over time.

²⁴ Of course, this crucially depends on the various underlying assumptions, which are further discussed in Section 4.

4. The impact of urban growth

Urban growth—both in terms of an increase in (non-indigent) urban residents as well as in terms of economic growth—is likely to have important fiscal and spatial impacts. New residents and business will put additional demands on urban infrastructure and services, but will also be a source of additional revenues. The locational choices of new residents and businesses may also have an impact on urban space. In the RSA Urbanization Impact Model (RUIM), the primary source of urban growth is modeled to be in-migration of residents and businesses into urban areas from non-urban areas.

Unless otherwise noted, as a simplifying assumption, it is assumed that economic value-added in metropolitan areas is proportionate to the number of the non-indigent residents.²⁵

4.1 Main driver of the urbanization pattern/element

- In the RUIM, the main driver of urban growth is the increase of non-indigent residents into metropolitan (urban) areas. As part of Simulation 1, the model considers the increase in the number of non-indigent residents/households to result from a combination of in-migration of non-indigent households as well as from as a result of upward socio-economic mobility of existing urban residents, or natural population growth.
- Based on census data, the urban / metropolitan population for 2016 is projected to be 22.85 million residents. [Assumption D1].
- Consistent with the definition of indigent or poor urban households used by SACN (2015), a household is defined to be poor when their annual income is below R38,200 annually. Assuming constant household size across income groups, the total non-indigent urban (metropolitan) population for the base year (2016/17) is estimated to be 12,004,000 (52.53% of projected metropolitan population). [Assumptions D1/D2/D5]

- NT/PDG (2015) projects a long-term overall 2% population growth rate for metropolitan areas. This is in line with the 2001-2011 inter-census population growth estimates. In the absence of detailed data on migration and growth rates for poor and non-poor residents, it is assumed that both population groups (poor and non-poor) grow at the same 2% annual rate in order to determine marginal CapEx per new non-poor resident.²⁶ [Assumption D3]
- The three simulated scenarios project non-indigent population growth based on 3, 2 and 1 percent annual growth rates, respectively.²⁷ The non-indigent population increase over the ten year simulation period is projected on a compounding basis. [Assumption D6]
- Non-indigent residents are assumed to live in market-based housing. However, these residents consume municipal trading services (electricity, water and sanitation; and so on) as well as other local public services. These residents also pay municipal revenues.

4.2 Variables and parameters

- Demographic and socio-economic figures are extracted from Census sources and Non-Fiscal Municipal Census 2016 (published 2017).
- Relevant expenditure and revenue figures for 2016/17 are extracted from National Treasury sources (Section 71 reports).

4.3 OpEx Impact Simulation

- OpEx spending patterns (as well as CapEx) spending patterns are based on 2016/17 actual aggregate spending patterns for all metropolitan municipalities. [Assumption F1]
- As new (non-poor) urban residents are assumed to stay urban residents after their arrival, the increase in municipal recurrent expenditures (OpEx) associated with urban growth are modeled to generally increase in proportion to **cumulative** number of new non-poor urban residents over the simulation period (as further detailed below).

²⁵ As such, indigent residents are not assumed to contribute to production in the formal economy, nor are they expected to contribute to municipal own source revenue. Therefore, all municipal revenue generated is paid by non-indigent residents and businesses. It is understood that the relationship between urban production and the demographic and socio-economic composition of urban areas is more complex, and in fact, varies between different urban areas.

²⁶ This is a relatively critical assumption; the concern about the absence of necessary demographic data to arrive at more nuanced estimates was already flagged in Box 2.1. As noted, the MSFM assumes a relatively high indigent population growth rate and a relatively low non-indigent growth rate, which appears to be inconsistent with the observation that (net) indigent population growth has been close to zero. For the purpose of the simulation model, we have cautiously assumed an equal growth rate for both indigent and non-indigent population groups. If anything, this should have the impact of over-estimating the number of additional indigent residents to be served.

²⁷ As initial simulations indicated that urban growth on net has a positive net fiscal impact, faster urban growth is associated with a positive fiscal scenario (i.e., Scenario 1).

- There is limited data breaking down the operational costs of serving (indigent and non-indigent) residents, versus the cost of serving local businesses. The limited availability of systematic fiscal data in this regard does not allow for the modelling of local businesses as a separate sector in more detailed manner. The model assumes that 33% of OpEx is dedicated to the non-residential (or productive) sector (i.e., business, retail, manufacturing, etc.). The remainder, 67%, is assumed to be dedicated to the residential sector, which includes poor and non-poor households/residents. [Assumption F2].
- The model assumes that recurrent spending per capita (i.e., OpEx per person) for higher-income (non-indigent) residents exceeds recurrent spending per capita for lower-income (indigent) residents at a factor/ratio of 1.66. In other words, the operational cost to serve a non-indigent resident is assumed to be 1.66 greater than an indigent resident. [Assumption F3]
- The model considers recurrent expenditures on Governance and Administration as a fixed cost (non-variable with population size). All other categories of recurrent expenditures are considered to be split 70% variable cost and 30% fixed cost: hence, average variable recurrent municipal spending (or average variable cost, AVC) for non-poor residents is R 5,562 per resident.²⁸
- Constant marginal costs are assumed. [Assumption F12]. In other words, the recurrent cost of servicing an additional resident is the same—and not higher or lower—than servicing an existing resident. As such, the Marginal Cost (the additional recurrent cost per new non-indigent resident) is estimated to be equal to AVC (R 5,562).
- In the RUIIM model, the recurrent cost of serving businesses is proportionate to the operating expenditures per person for non-indigent residents. Serving the non-residential sector (i.e., providing recurrent services to the business sector for an additional business employee -proportionate to non-poor residents) costs R 4,231 per additional employee). Therefore, the total additional operational expenditures per non-poor resident is R 9,792 (combining the additional operating expenditures for non-poor residents plus the additional operating expenditures for the non-residential sector).
- The recurrent cost of service delivery is not expected to have a major spatial element: the recurrent cost of delivering local public services to residents is likely to be different across space, but these variations are not expected to be consistently correlated with distance from the urban core or other spatial patterns (e.g., peri-urban areas/townships versus CBD or secondary urban centers).²⁹

4.4 CapEx Impact Simulation

- Capital expenditures currently being made by municipalities fall into one of several categories, including backlog eradication; municipal infrastructure expansion (driven by economic and population growth); and infrastructure renewal (rehabilitation and replacement of existing infrastructure).
- The model assumes that 2/3 (66.6%) of actual urban capital expenditures spending are directed towards urban infrastructure expansion, as opposed to backlog and renewal [Assumption F7]. This assumes an (expected) bias in favor of new infrastructure (and therefore, urban areas are deferring backlog and replacement investments), as infrastructure expansion accounts for only 53% of capital expenditure needs as per NT/PDG (2015).
- Similar to the assumption made for OpEx, the model assumes that 25% of capital spending (CapEx) benefits the non-residential sector. The remaining 75% of CapEx is directed at residential capital improvements for poor and non-poor households. [Assumption F2].
- Similar to the assumption made for OpEx, the model assumes capital spending per capita (i.e., CapEx per person) for non-poor (non-indigent) residents exceeds capital spending per capita for poor residents **at a factor/ratio of 1.2**. [Assumptions F4]. In other words, the capital outlay made to serve a non-indigent resident is expected to be 20% greater than the capital outlay an indigent resident.
- Also as before, the capital cost of serving the non-residential sector (i.e., the productive/business sector) are assumed to be proportionate to the number of non-indigent residents.
- The model assumes that the additional infrastructure requirement and CapEx associated with a new resident (and/or a new business) is a **one-time outlay** (e.g., connecting to electricity, water, sewer, and extending road). Therefore the model's annual capital expenditure estimate for accommodating population growth is based ONLY on annual population increase (i.e., not based on the compounding population increase).
- Since municipal infrastructure expansion for non-indigent residents is focused on new non-indigent households, the additional capital cost per new non-indigent resident is estimated to be a function of the non-indigent population growth rate (estimated at 2% for the base year) [Assumption D3]. Capital outlay per new non-indigent resident (including capital outlay for business sector) is projected to be R 35,982. The capital outlay per new non-indigent resident—including the associated capital outlay for the business sector—is projected to be R 57,009.

²⁸ An analysis of Cape Town's OpEx for water, solid waste, sanitation, electricity, roads and storm water conducted by PDG shows that 34% of sectoral costs are fixed and not dependent on population growth.

²⁹ An analysis of Cape Town's OpEx for water, solid waste, sanitation, electricity, roads and storm water conducted by PDG shows that 34% of sectoral costs are fixed and not dependent on population growth.

- The capital cost of service delivery infrastructure may vary across urban space. However, these variations are often site-specific and not necessarily linear with distance from CBD. All else equal, the capital cost of delivering local public services to residents in different urban spatial settings (e.g., peri-urban areas/townships versus CBD or secondary urban centers) are not expected to be vastly different on average. While there are factors that make such infrastructure more expensive closer to the CBD, other factors tend to increase the cost of capital infrastructure per resident further away from the CBD.

4.5 Revenue Impact Simulation

- As a result of (non-indigent) urban growth, urban revenue growth is expected to take place as a result of three mechanisms: (1) new (non-indigent) residents and businesses will pay municipal revenues (taxes and fees) on an ongoing basis; (2) through their developer, some new residents and businesses will pay a one-time development impact fee or charge to (partially) offset the cost of get connected to the infrastructure network; and (3) property and land value increases will occur due to economic growth, resulting—all else equal—in an increase in property rate collections from all (non-indigent) urban residents.
- First, the marginal own source revenue (OSR) increase from new (non-indigent) residents is projected to equal the cumulative increase in the non-indigent population multiplied by marginal OSR collections per person (where marginal revenue is expected to equal average revenue). The model assumes that indigent households/residents do not pay any local OSR revenues, and that therefore all local revenues are paid in proportion to the number of non-indigent households. [Assumption F5].
- Of course, OSR revenues are not exclusively generated from (non-poor) residents, but also from local businesses. There are limited consistent data available that break down local revenues (taxes and charges for municipal utilities/services) between residential and business customers.³⁰ It is therefore assumed that only non-indigent residents generate business value, so that business OSR collections

are proportionate to the number of non-indigent residents. The resulting increase in recurrent OSR (taxes plus recurrent fees and charges) per non-indigent resident equals R 13,162 per (non-poor) person per year.

- Second, development charges are modeled to be collected as a one-time charge in proportion to the annual increase in non-indigent population. Again, proportionality is assumed between business growth and growth in the number of non-indigent residents. In addition, in order to compute the marginal expenditures per new resident, it is assumed that the existing non-indigent population growth rate was 2% in the base year [Assumption D3]. Based on reported public contributions and donations in the amount of R 1.5 billion for FY 2016/17, the per capita development charge calculated per new non-indigent (taxpaying) urban resident is R 6,328.³¹
- Third, urban revenue is expected to increase as a result of overall economic growth and property and land value increase associated with an increase in the economically productive urban population.³² The RUIM model assumes the overall urban economic growth rate to be proportionate to the growth rate of non-indigent urban households. Based on existing estimates cited by NT/PDG (2015), the model assumes that property values are responsive to urban economic growth: for every 1% increase in economic activity, a 3% increase in property values (and hence, property rates) is expected.³³ [Assumption F10]
- It is expected that all non-indigent residents pay property rates.³⁴ The current property rate payment equals R 3,099 per non-indigent urban resident for the base year (2016/17), which includes payments made by non-indigent residential taxpayers (households) and non-residential taxpayers (businesses). Increases in property valuations are expected to increase property rate payments on a cumulative basis for all non-indigent residents (i.e., both existing as well as new urban residents) for the entire simulation period.
- The impact of urban growth—transmitted through increased property values—on urban revenues—as modeled in this component—is only expected to take place through property rates, which is the main general-purpose municipal revenue source in urban areas. Any revenue impact at the national level is left for future consideration.

³⁰ Evidence suggests that with respect to user charges, on average, 56% of user revenue in urban areas is from residential customers (with 2% being contributed by low income households) and 44% of user revenue being paid by non-residential customers. The revenue share of non-residential sector is expected to vary considerably across different metropolitan municipalities.

³¹ Given that development impact fees are often paid in-kind, the reported (on-budget) public contributions and donations are likely an underestimate of actual development charges. Informal estimates suggest that actual development charges—when monetary and in-kind contributions are combined—may be as high as R 3 billion per year. This would suggest a doubling of (in-kind and monetary) revenue from development charges. The qualitative conclusions of the RUIM model do not change when such a multiplier is introduced in the simulation.

³² See National Treasury/PDG (2015: p 12-15) for a more extensive discussion on the projection of GVA increases over time and on the impact of urban economic growth on urban finances.

³³ It is further assumed that urban leaders do not make any policy changes and leave effective property tax rates constant. In reality, urban political leaders may be slow to update tax valuation roles, thereby effectively reducing effective property tax rates.

³⁴ Again, for the purpose of the RUIM model, business payment of property rates is expected to be proportional to (and included in the payment of) non-indigent residents.

4.6 Grant Impact Simulation

- In the current LGES allocation formula, the Institutional Component (I) is the only element of the formula that is influenced by total population (and/or the number of non-indigent residents). It is assumed that no other major recurrent (conditional) grants funds services to non-indigent / non-poor urban residents. [Assumption F9].
- The aggregate amount for the I Component for the baseline year 2016/17 is estimated to be R 3 billion, resulting in a per capita allocation of R 131. The model assumes that funding for the I Component of the LGES will be increased over time relative to the urban population (i.e., per capita allocation will stay constant). [Assumption F8].

4.7 Simulation: results and analysis

The simulation results for the fiscal impact of urban (residential and economic) growth are presented in Table 4.1. These results reflect the parameters and assumptions noted above.

Table 4.1 The Fiscal and Spatial Impact of: (Non-Indigent) Urban Growth

R Billions	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Year	0	1	2	3	4	5	6	7	8	9	10
Scenario 1 (Positive)											
OpEx Impact		3.53	7.16	10.90	14.75	18.72	22.81	27.02	31.36	35.82	40.43
CapEx Impact		20.53	21.15	21.78	22.43	23.11	23.80	24.51	25.25	26.01	26.79
Revenue Impact		8.89	15.92	23.33	31.15	39.40	48.11	57.32	67.05	77.34	88.23
Net Fiscal Impact (Overall)		-15.17	-12.38	-9.35	-6.03	-2.43	1.50	5.78	10.44	15.50	21.02
Grant Impact		0.05	0.10	0.15	0.20	0.25	0.31	0.36	0.42	0.48	0.54
Net Fiscal Impact (LG)		-15.12	-12.29	-9.20	-5.84	-2.18	1.81	6.14	10.86	15.99	21.56
Scenario 2 (Medium)											
OpEx Impact		2.35	4.75	7.19	9.69	12.23	14.83	17.48	20.18	22.93	25.74
CapEx Impact		13.69	13.96	14.24	14.52	14.82	15.11	15.41	15.72	16.04	16.36
Revenue Impact		6.17	11.03	16.09	21.35	26.83	32.53	38.48	44.67	51.13	57.86
Net Fiscal Impact (Overall)		-9.87	-7.68	-5.35	-2.86	-0.22	2.59	5.59	8.77	12.16	15.76
Grant Impact		0.03	0.06	0.10	0.13	0.16	0.20	0.23	0.27	0.31	0.35
Net Fiscal Impact (LG)		-9.84	-7.62	-5.25	-2.73	-0.06	2.79	5.82	9.04	12.47	16.11
Scenario 3 (Negative)											
OpEx Impact		1.18	2.36	3.56	4.77	6.00	7.23	8.48	9.74	11.01	12.30
CapEx Impact		6.84	6.91	6.98	7.05	7.12	7.19	7.26	7.34	7.41	7.48
Revenue Impact		3.45	6.22	9.07	11.99	15.00	18.09	21.26	24.53	27.88	31.33
Net Fiscal Impact (Overall)		-4.57	-3.05	-1.47	0.17	1.88	3.66	5.52	7.45	9.46	11.55
Grant Impact		0.02	0.03	0.05	0.06	0.08	0.10	0.11	0.13	0.15	0.16
Net Fiscal Impact (LG)		-4.55	-3.02	-1.42	0.24	1.96	3.76	5.63	7.58	9.61	11.72

The simulation results presented in Table 4.1 suggest that there are considerable capital and recurrent costs associated with the increase in non-indigent residents and the associated increase in economic activity in urban areas in South Africa. Under all three scenarios, during the initial years of the period under consideration, the increase in CapEx dominates the increase in recurrent service delivery costs (operating expenditures) associated with the increase in urban population. However, over time, the increase in recurrent cost of servicing the increased urban population starts to dominate.

Although the local revenue impact of urban growth starts out moderate, its impact is considerable over time in each of the three scenarios.³⁵ Given the assumptions underlying urban revenue growth in the model, the more-than-proportionate upward trend of urban own source revenues is due to the cumulative impact of population growth, as well as due to the impact of urban growth on property and land values (and hence, property rates).

Although in the short run the increase in revenues is not adequate to offset the increase in expenditures associated with urban growth in initial years, the revenue increase exceeds the cost increase by the second half of the simulation period (in some cases, substantially). Given that urban growth is the main dimension of urbanization that potentially has a net positive impact on urban fiscal space, it would be important to carefully consider the buoyancy and elasticity of urban revenue sources.

An important implication or insight from this simulation is that in order to ensure continued urban growth, in the short run, urban local governments will have to invest in capital infrastructure for non-indigent residents and for non-residential customers (i.e., the productive/business sector). Failure to make such investments could jeopardize continued urban economic growth.³⁶

4.8 Spatial Impact Expectation

- Based on existing location patterns and the spatial structure of urban areas in South Africa, urban growth—as a result of an increase in non-indigent residents and businesses into urban areas—by itself is not likely to result in a more inclusive spatial form. In fact, the spatial impact of urban growth (unless mitigated by targeted interventions) may even be negative, with non-indigent population growth and growth in the productive sector perpetuating existing patterns and thereby worsening the existing spatial mismatch and causing further urban sprawl.³⁷ As such, optimistically, the expectation for non-indigent urban growth on urban space is “none” or “negative”.

5. The impact of indigent in-migration

Various patterns of spatial mismatch exist in South Africa, including the mismatch between where people live and where job opportunities exist (Shilpi, Xu, Behal, and Blankespoor, 2016). Given these patterns of spatial mismatch, we expect high migration in South Africa, particularly for black Africans in search of economic opportunity. Indeed, the early 1990s witnesses a large movement of people, including migration from homelands to the country’s major metropolitan areas (and particularly towards the urban centers in Gauteng). While low-income (poor or indigent) people or households are generally less mobile than their wealthier counterparts, they represent the larger share of the total number of migrants within South Africa. Although this migration slowed down somewhat during early 2000s, the rate of migration seems to have picked up again in recent years.

For the purpose of this simulation, the terms “indigent in-migration” refers to the net change (increase) in the number of indigent urban residents. As noted in Section 2 (Box 2.3), it is unclear whether the net figure accurately reflects the true number of indigent in-migrants into urban areas, or whether the actual number of indigent in-migrants is larger, with the net increase being reduced by social and economic mobility of low-income households into the higher-income category. It is further somewhat unclear the extent to which the decreasing urban poverty rate over time is a function of better social policy.

A complicating factor associated with the analysis of indigent urban in-migration is the fact that much of the movements of indigent residents are informal in nature and difficult to detect through formal statistics. Many in-migrants may stay only temporarily or part-time in urban areas, or co-locate with (extended) family with housing arrangements that are fluid and informal in nature (“couch surfing”; backyard shacks, etc.). As such, the number and the exact relationship between new indigent urban population and the formal urban systems (e.g., the increase in service delivery demands required to serve them) may be harder to estimate than the fiscal patterns associated with more formal, non-indigent residential growth (Box 5.1).

³⁵ Note that the current model excludes the impact of urban growth on national-level government revenues.

³⁶ As discussed, different urban areas are on different economic and demographic trajectories. This recommendation cannot be super-imposed in a blanket manner on all individual urban jurisdictions.

³⁷ It is not impossible to influence the residential location choice of non-indigent households or the location choice of business through public sector interventions. However, many factors go into such location decisions. Efforts to improve spatial planning are likely to improve the inclusiveness of urban areas in South Africa. In the presence of strong locational preferences, however, (both in the residential sphere, as well as in the productive sector), it is unlikely that local fiscal incentives will substantially reshape the urban form in the near future.

Box 5.1 Changes in the number of urban indigent residents over time

As noted in Box 2.3, the state of knowledge with regard to urban demographic and socio-economic mobility is incomplete. This is particularly true with regard to the mobility of indigent households, and the extent (and nature) of social-economic mobility once they arrive in urban areas. In nominal terms, there was only a slight net increase in the number of indigent urban households in South Africa from 2001-11. It is quite possible, however, that this pattern hides steady in-migration or indigent households, which may be offset by social mobility of indigent households who have resided in the urban area for a longer period of time.

This issue will not be resolved in the context of the current model. As such, the RUIIM model focuses on the net increase in indigent residents. It is therefore assumed that as existing indigent households climb the socio-economic ladder, they move up the housing ladder as well and make space for newcomers (i.e., the capital impact of indigent newcomers is based on the net change in indigent residents, rather than on the gross influx of indigent residents).

5.1. Main driver of the urbanization pattern/element

- In the RUIIM, the main driver of the urbanization of indigent residents is the increase/influx of indigent urban residents. The simulation considers the total (net) growth in the number of indigent residents.
- Based on census data, the total urban / metropolitan population for 2016 is projected to be 22.8 million residents.[Assumption D1]
- Based on SACN income definition of indigent or poor urban households (annual income below R 38,200), the total non-indigent urban (metropolitan) population for the base year (2016/17) is estimated to be 10,849,000 (47.47% of the projected metropolitan population). [Assumptions D1/D2/D5]
- The inter-census (2001-2011) population growth rate for urban areas is 2.32% per year. NT/PDG (2015) projects a long-term overall 2% population growth rate for metropolitan areas. The three simulated scenarios project indigent population growth based on 1, 2 and 3 percent annual growth rates, respectively. This is the net migration rate (e.g., increase/inflow of indigent in-migrants, net of the decrease/outflow of indigent residents). The indigent population increase over the ten year simulation period is projected on a compounding basis. [Assumption D6]
- As further discussed and analyzed in Section 8, indigent residents are assumed to live in subsidized or informal housing. The fiscal impact of public housing expenditures is not considered in the current simulation.

This simulation considers that municipal trading services (electricity, water and sanitation; and so on) as well as other local public services are provided to new indigent residents. Indigent residents are not assumed to pay any municipal revenues (whether property rates or user charges).

5.2 Variables and parameters

- The variables and parameters used rely heavily on those already defined for the simulations for urban (non-indigent) growth.
- Demographic and socio-economic figures are extracted from Census sources and Non-Fiscal Municipal Census 2016 (published 2017).
- Relevant expenditure and revenue figures for 2016/17 are extracted from National Treasury sources (Section 71 reports).

5.3 OpEx Impact Simulation

- New indigent residents are assumed to stay after arrival (note: the growth rate is considered the growth rate net of out-migration). As such, the increase in municipal recurrent expenditures (OpEx) associated with growth of the urban indigent population is modeled to increase in proportion to **cumulative** number of new indigent residents over the simulation period.
- As noted in Section 4, the model assumes recurrent spending per capita (i.e., OpEx per person) for higher-income (non-indigent) residents to exceed recurrent spending per capita for indigent residents **at a factor/ratio of 1.66**. [Assumption F3]
- The simulation considers recurrent expenditures on Governance and Administration as a fixed cost (non-variable with population size). All other categories of recurrent expenditures are considered variable cost. Constant marginal costs are assumed. In other words, the recurrent cost of servicing an additional (indigent) resident is the same—and not higher or lower—than servicing an existing (indigent) resident. As such, the Marginal Cost per indigent resident (the additional recurrent cost per new indigent resident) is estimated to be equal to AVC (R 3,350).
- The recurrent cost of service delivery is not expected to have a major consistent spatial element: the recurrent cost of delivering local public services to residents is not expected to vary vastly in a predictable manner across urban space.

5.4 CapEx Impact Simulation

- Similar to Simulation 1, capital expenditures currently being made by municipalities fall into one of several categories, including backlog eradication; municipal infrastructure expansion (driven by economic and population growth); and infrastructure renewal (rehabilitation and replacement of existing infrastructure). The model continues to assume that

2/3 (66.6%) of actual urban capital expenditures spending are directed towards urban infrastructure expansion, as opposed to backlog and renewal [Assumption F7]. The model further assumes that 25% of capital spending (CapEx) benefits the non-residential sector. The remaining 75% of CapEx is projected to be directed at residential capital improvements for poor and non-poor households. Also as before, the capital costs of serving the non-residential sector (i.e., the productive sector) are assumed to be proportionate to the number of non-indigent residents (and therefore, will not influence capital costs in Simulation 2).[Assumption F2]

- Consistent with Simulation 1, Simulation 2 further assumes capital spending per capita (i.e., CapEx per person) for higher-income (non-indigent) residents exceeds capital spending per capita for indigent residents **at a factor/ratio of 1.2**. [Assumption F4]
- The model assumes that the additional infrastructure requirement and CapEx associated with a new resident (and/or a new business) is a **one-time outlay** (e.g., connecting to electricity, water, sewer, and extending road) and therefore the model’s annual capex estimate for accommodating population growth is based ONLY on annual population increase (i.e., not based on the compounding population increase).
- Section 8 simulates the additional cost incurred for construction and/or providing subsidized housing opportunities. The current CapEx impact simulation focuses on the accompanying municipal infrastructure required to connect the newly provided housing opportunity to the municipal network (including both water and sewer connections, as well as road connections).
- Based on the assumption that municipal infrastructure expansion is focused on new, incoming indigent households, the Marginal Cost (the additional capital cost per new non-indigent resident) is estimated to be a function of indigent capital costs and indigent population growth (estimated at 2%) [Assumption D3]. Capital outlays per new indigent resident are projected to be R 29,985.
- The capital cost of service delivery is not expected to have a major consistent spatial element.

5.5 Revenue Impact Simulation

- The model assumes that indigent households/residents do not pay any local OSR revenues, and that therefore all local revenues are paid in proportion to the number of non-indigent households. [Assumption F5]

5.6 Grant Impact Simulation

- Based on the aggregate amount of “Transfers recognized – operational” as reported by the eight metro municipalities on the Section 71 report, minus the projected I-Component of the LGES, it is estimated that the total operational grant for indigent basic services in metropolitan municipalities equals R 1,864 per indigent resident. [Assumption F9;F11]
- Based on the aggregate amount of “Transfers recognized – capital” as reported by the metro municipalities on the Section 71 report, total capital grants amount to R 12.89 billion during the base year,
 - It is assumed the 50% of capital grants is directed towards pro-poor indigent/in-migrant infrastructure development.³⁸ [Assumption F6]
 - Total capital grants targeted for indigent / in-migrant residents are estimated to be on average, R 594 per indigent resident, or R 29,698 per additional indigent resident (based on a 2% indigent growth rate in 2016/17).³⁹ [Assumption F9/F11/D4]

5.7 Simulation: results and analysis

The simulation results for the fiscal impact of indigent in-migration are presented in Table 5.1. These simulation results reflect the parameters and assumptions noted above.

³⁸ This means that the majority of funding conceptually targeted at indigent households is actually “diverted” towards general (not specifically pro-poor) infrastructure.

³⁹ An alternative (perhaps more realistic) scenario—not further modeled here—is that capital grants are more or less static in nominal or real terms, and do not vary with changes in the number of indigent urban residents.

Table 5.1 The Fiscal and Spatial Impact of: Indigent In-migrants

R Billion	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Year	0	1	2	3	4	5	6	7	8	9	10
Scenario 1 (Positive)											
OpEx Impact		0.36	0.73	1.10	1.48	1.85	2.24	2.62	3.01	3.41	3.80
CapEx Impact		3.25	3.29	3.32	3.35	3.39	3.42	3.45	3.49	3.52	3.56
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-3.62	-4.02	-4.42	-4.83	-5.24	-5.66	-6.08	-6.50	-6.93	-7.36
Grant Impact		3.42	3.66	3.90	4.14	4.38	4.63	4.88	5.13	5.38	5.64
Net Fiscal Impact (LG)		-0.19	-0.36	-0.52	-0.69	-0.85	-1.02	-1.20	-1.37	-1.54	-1.72
Scenario 2 (Medium)											
OpEx Impact		0.73	1.47	2.22	3.00	3.78	4.59	5.40	6.24	7.09	7.96
CapEx Impact		6.51	6.64	6.77	6.90	7.04	7.18	7.33	7.47	7.62	7.78
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-7.23	-8.10	-8.99	-9.90	-10.83	-11.77	-12.73	-13.71	-14.71	-15.74
Grant Impact		6.85	7.39	7.94	8.51	9.08	9.67	10.26	10.87	11.50	12.13
Net Fiscal Impact (LG)		-0.38	-0.71	-1.05	-1.39	-1.75	-2.10	-2.47	-2.84	-3.22	-3.60
Scenario 3 (Negative)											
OpEx Impact		1.09	2.21	3.37	4.56	5.79	7.05	8.36	9.70	11.08	12.50
CapEx Impact		9.76	10.05	10.35	10.66	10.98	11.31	11.65	12.00	12.36	12.73
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-10.85	-12.27	-13.72	-15.23	-16.77	-18.37	-20.01	-21.70	-23.44	-25.23
Grant Impact		10.27	11.19	12.13	13.10	14.10	15.13	16.19	17.28	18.41	19.57
Net Fiscal Impact (LG)		-0.58	-1.08	-1.59	-2.13	-2.67	-3.24	-3.82	-4.42	-5.03	-5.67

The first observation with regard to the urbanization of poor residents and households is that the overall fiscal impact on public sector finances of indigent in-migration is quite considerable, particularly at higher indigent population growth rates.⁴⁰

Second, based on the “revealed preferences” approach of projecting future urban (recurrent and capital) expenditures, it is expected that indigent population growth will impact not only capital spending, but also recurrent spending requirements: by Year 10, the increase in operational service delivery spending equals or exceeds the additional capital spending required to absorb the increase in the indigent urban population.

A third relevant observation is that the simulation suggests that over two-thirds of the fiscal impact on indigent in-migration is expected to be borne by the

national government through the intergovernmental fiscal transfer system, rather than by urban local governments. However, this is based on the assumption that the LGES as well as capital grants will be responsive over time to the influx of indigent residents into urban areas, which is not necessarily the case.

An important disclaimer should be made that the bulk of urban infrastructure and services provided to new indigent residents are only relevant to indigent residents who are formally housed. As such, the de facto cost driver associated with indigent in-migration is not the rate of in-migration itself (which is beyond the direct control of the public sector), but rather, the rate at which new indigent residents are provided with formal housing (which is within the control of the public sector, as discussed in Section 8).

⁴⁰ Instead of considering the total indigent population growth rate, it is possible to consider only indigent in-migration which is formally housed, as this is the subset of in-migrants who benefit from urban infrastructure and services.

5.8 Spatial Impact Expectation

- The spatial distribution of indigent in-migration is generally driven by non-fiscal factors.
- Indigent in-migration tends to occur largely at the urban periphery and in townships. Residential patterns are driven by the availability of formal and informal housing opportunities (the location of family members; locations suitable for land invasions; the location of RDP housing and/or the location of other transitional / low-cost / informal housing opportunities).
- These tendencies may promote densification of townships and other peri-urban settlements within the context of a polycentric—rather than monocentric—urban model.

6. The impact of the (existing) urban poor

Ensuring equity, inclusive access to urban space and the equitable delivery of (urban) public services are extremely important social and political considerations in post-apartheid South Africa. This is true at the national level, as well as at the provincial and local levels.

The national system of intergovernmental (fiscal) relations in South Africa aims to ensure a high degree of fiscal autonomy for local governments, while at the same time ensuring equity and inclusive access to local services. As part of the design of the intergovernmental (fiscal) systems in South Africa, the formula-based approach with which the LGES has been distributed for close to the past two decades intends to provide an implicit subsidy for the provision of basic services to indigent residents, ensuring that municipalities are able to provide indigent households with a basic set of trading services free of charge. Estimates differ with the regard to the extent to which the targeted funding provided by the LGES covers the cost of providing these basic services (Box 6.1). While on one hand many local governments provide free or reduced-cost trading services to low-income households more widely than what is required, on the other hand, not all eligible poor households / residents at the local level receive the basic services free of charge for which they are eligible.

Box 6.1 Estimating the extent to which LGES covers recurrent service provision to indigent residents

The cost of providing public services to low-income households varies widely between metros. Detailed cost studies are rare (e.g., COGTA 2010; FFC/SALGA 2015). Most, if not all, metros are unable to tell with any degree of certainty what it costs them to provide services to a low income household.

There are very different approaches in the metros to the package of Free Basic Services provided, the number of households provided with these services and the resultant revenue costs of free services (SACN, 2013). The way that municipalities allocate Equitable Share between their services varies widely and the amount of ES per indigent household that urban local governments receive also varies.

There are considerable variations in different estimates regarding the extent to which the Local Government Equitable Shares (LGES) transfer covers the cost of recurrent service provision to indigent residents. For instance, estimates prepared for the 2015 MSFM suggest that the LGES only covers 30% of current service provision costs to low income households. However, other estimates prepared by PDG—which analyzes the cost of Free Basic Services versus the LGES in 5 metros—indicates that LGES covers a far higher portion. Such variations can be explained in part on whether the denominator in the analysis is total pro-poor local government spending per indigent resident, or merely total spending on free basic services for indigent residents.

More granular analysis suggests that LGES allocations are (more than) sufficient to cover the revenue cost of free services (including property rates rebates and exemptions) in Johannesburg and the three smaller metros; but not necessarily sufficient to cover the revenue cost of these services in Cape Town, Ekurhuleni, eThekweni and Tshwane.

The RUIIM model does not assume a specific ratio by which the LGES covers indigent recurrent expenditures. Instead, the model estimates the incremental operating cost of providing services to indigent residents (R 3,350 per resident) as well as the amount of LGES received by urban local governments per (indigent) resident (R 2,141). This suggests that the LGES covers 63.9% of the cost of recurrent services provided to indigent residents, with the remainder of the cost being borne by municipalities through (a) cross-subsidization of tariffs and (b) redistribution funded by general municipal revenue sources (e.g., property rates).

In this context, it should be noted that the RUIIM model reflects a broad approach to the cost associated with providing services to the urban poor, as the estimates include not only specific services which municipalities are required to provide to indigent households, but rather, these estimates broadly reflect all municipal services provided to the urban poor.

Although the public sector tends to act on this policy goal in an uneven, inconsistent and often inefficient manner, there is often considerable social and political pressure for the public sector to pursue equitable and inclusive services. This is as true at the local level as it is at the national level.

As was noted in the introductory section of this paper, beyond the existing levels of pro-poor spending implied by existing national legislation, local political leaders may choose to engage in various redistributive activities and/or may self-impose certain service delivery norms to pursue greater equity between poor and non-poor residents that implies greater redistribution. For instance, there may be a degree of political pressure for local public infrastructure and services to be provided beyond the mandated service delivery level. For instance, whereas local governments are not required to provide paved roads in low-income areas that meet the same standards as in higher-income neighborhoods, there is often a local political desire to be “fair”. Similarly, there may be local

political pressure to serve lower-income urban areas with the same level of community services as higher-income areas. These pro-poor local spending choices are illustrative of the ones considered in the current simulation.

As a combination of the social/political pressures at both government levels, local governments spend a not-insignificant share of their budget on urban infrastructure and services to the urban poor. Simulation 3 considers the fiscal impact of pro-poor policies for the existing urban poor on urban finances.⁴¹ These local spending choices should be distinguished from the unfunded mandates discussed in the following section, as in these cases no mandate is actually imposed by a higher government level.

6.1 Main driver of the urbanization pattern/element

The fiscal impact on the urban poor contained in Simulation 3 depends on two main elements: the level of pro-poor urban services that local governments (LG) choose to provide, and the degree to which national government (NG) agrees to fund this fiscal burden through the intergovernmental fiscal mechanism. The three scenarios modeled by the RUIIM model are reflected in the table below:

	LG pro-poor services provided	NG grant level provided
Scenario 1	Moderate reduction (-10%)	No change
Scenario 2	Moderate increase (+10%)	No change
Scenario 3	Increase (+20%)	Grant increase equal to 50% of increased LG spending

6.2 Variables and parameters

- The variables and parameters used rely heavily on those already defined for Simulations 1 and 2 for urban (non-indigent and indigent) growth.
- Demographic and socio-economic figures are extracted from Census sources and Non-Fiscal Municipal Census 2016 (published 2017). The simulation uses the “medium” indigent population growth projection for the ten-year period (based on

2% growth in indigent residents per year). It should be noted that this simulation scenario does not look at the additional cost of in-migrating urban poor (which is already included in Simulation 2). Instead, Simulation 3 considers the impact of different policy stances on the urban poor (by local and national governments), given the projected number of urban poor each year.

- Relevant expenditure and revenue figures for 2016/17 are extracted from National Treasury sources (Section 71 reports).

⁴¹ There are concerns that the pressures for local governments to spend efficiently and equitably are increasing overshadowed by local political and institutional capture. For instance, see Olver (2016).

6.3 OpEx Impact Simulation

- As far as local levels of service provision, under the assumptions specified in Simulations 1 and 2, urban local governments currently spend R 3,350 on recurrent services per indigent resident, whereas they receive only R 2,141 per indigent resident in recurrent grants.⁴²
- The following three scenarios are simulated:
 - Scenario 1: Local governments provide somewhat fewer pro-poor services per resident (-10%):** Under Scenario 1, the model assumes that local governments reduce their pro-poor spending by 10%. As opposed to the current spending level of R 3,350 per indigent resident, this decrease results in R 3,015 spending on recurrent services per indigent resident and R 540 capital spending per indigent resident.
 - Scenario 2: Local governments provide somewhat greater pro-poor services (+10%):** R 3,685 spending on recurrent services per indigent resident and R 660 capital spending per indigent resident.
 - Scenario 3: Local governments provide greater pro-poor services (+20%):** R 4,020 spending on recurrent services per indigent resident and R 792 capital spending per indigent resident.
- Note (again) that the simulation model will simulate the fiscal impact, which is the difference (i.e., increase, decrease, or zero) between the current spending pattern and the projected spending pattern.

6.4 CapEx Impact Simulation

- The level of capital spending on indigent capital infrastructure—and its funding—is not necessarily as straightforward or clear as operating expenditures.
- In Simulation 2, indigent capital spending was assumed to be targeted at new in-migrant indigent residents.⁴³ For simulation 3, as a simplification, we simply consider that this capital spending is divided equally among all indigent residents (i.e., not strictly to new indigent residents or indigent in-migrants).
- See the discussion in Section 6.3 for the simulated impact on capital expenditures.
- Based on the assumptions noted above, capital spending per indigent resident equals R 600 per resident.

6.5 Revenue Impact Simulation

- Indigent residents are generally not expected to pay local revenues. This simulation does not alter that assumption. For instance, this simulation does not suggest poor residents would have to start paying property rates or user fees. As a result, there is no impact on municipal revenues.

6.6 Grant Impact Simulation

- As for the national levels of grant funding in support of pro-poor services, Scenarios 1 and 2 simulate no change in (recurrent and capital) grant funding for pro-poor services.
- Scenario 3 reflects a projected increase in grant funding levels per indigent resident equal to 50% of the increase in pro-poor (operational plus capital) local spending undertaken by local governments.
- Again, it should be noted that the simulation model will simulate the fiscal impact, which is the difference (i.e., increase, decrease, or zero) between the current spending pattern and the projected spending pattern.

6.7 Simulation: results and analysis

The simulation results for the fiscal impact of the (existing) urban poor are presented in Table 6.1. These simulation results reflect the parameters and assumptions noted above.

⁴² The LGES grant amount per indigent resident includes the Institutional portion of the LGES, which is assumed to increase on a per capita basis over time (i.e., in proportion to the number of non-indigent plus indigent residents).

⁴³ Indigent capital spending was determined by (a) excluding one-third of capital spending for backlog and infrastructure renewal; (b) excluding non-resident capital spending (assumed to be 25% of the remaining capital spending); and (c) by dividing the remaining residential capital spending between indigent and non-indigent residents on the assumption that the relative infrastructure cost of an average non-indigent resident is 120% of a typical indigent resident.

Table 6.1 The Fiscal and Spatial Impact of: The Existing Urban Poor

R Billion	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Year	0	1	2	3	4	5	6	7	8	9	10
Scenario 1 (Positive)											
OpEx Impact		-3.71	-3.78	-3.86	-3.93	-4.01	-4.09	-4.18	-4.26	-4.34	-4.43
CapEx Impact		-0.66	-0.68	-0.69	-0.70	-0.72	-0.73	-0.75	-0.76	-0.78	-0.79
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		4.37	4.46	4.55	4.64	4.73	4.83	4.92	5.02	5.12	5.22
Grant Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (LG)		4.37	4.46	4.55	4.64	4.73	4.83	4.92	5.02	5.12	5.22
Scenario 2 (Medium)											
OpEx Impact		3.71	3.78	3.86	3.93	4.01	4.09	4.18	4.26	4.34	4.43
CapEx Impact		0.66	0.68	0.69	0.70	0.72	0.73	0.75	0.76	0.78	0.79
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-4.37	-4.46	-4.55	-4.64	-4.73	-4.83	-4.92	-5.02	-5.12	-5.22
Grant Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (LG)		-4.37	-4.46	-4.55	-4.64	-4.73	-4.83	-4.92	-5.02	-5.12	-5.22
Scenario 3 (Negative)											
OpEx Impact		7.41	7.56	7.71	7.87	8.03	8.19	8.35	8.52	8.69	8.86
CapEx Impact		2.12	2.17	2.21	2.25	2.30	2.34	2.39	2.44	2.49	2.54
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-9.54	-9.73	-9.92	-10.12	-10.32	-10.53	-10.74	-10.96	-11.18	-11.40
Grant Impact		4.77	4.86	4.96	5.06	5.16	5.27	5.37	5.48	5.59	5.70
Net Fiscal Impact (LG)		-4.77	-4.86	-4.96	-5.06	-5.16	-5.27	-5.37	-5.48	-5.59	-5.70

Under the first two scenarios, the overall impact of potential spending increases on pro-poor urban services is relatively minor. In the case of the most extreme example (reflecting a 20% increase in pro-poor spending per urban resident), the annual impact on urban fiscal space is more considerable: R 11.40 billion per year over the ten-year period. If the national government would bear half of this fiscal burden, the cost to urban local governments for providing greater pro-poor services would only be R 5.7 billion.

6.8 Spatial Impact Expectation

- To the extent that changes in the social and political attitudes towards providing local/urban services for the poor might result in changes in access to urban services, it is possible that long-term migration patterns for indigent residents may be impacted. However, in the context of the partial-equilibrium approach followed by the RUIM model, there is no reason to expect that there would be a spatial impact on the location choices of existing residents as a result of pro-poor urban finance policies.

7. The impact of unfunded mandates

What if national government imposed certain service delivery standards for local government services without providing specific compensation through the grant system? The introduction of specific service delivery standards without compensation would constitute an imposition “unfunded” mandates. Such unfunded mandates would infringe on the fiscal space available to urban local governments to fund other urban priorities.

As already noted previously, the fiscal burden of unfunded mandates should be distinguished from self-imposed pro-poor service delivery initiatives or “mandates”. Unfunded mandates should be understood to be service delivery mandates or requirements imposed by a higher level government for which no (or grossly inadequate) funding sources are provided. Redistributive spending or other programs that are implemented based on local political initiative have been included in the previous section’s discussion of pro-poor local spending.

7.1 Main driver of the urbanization pattern/element

It is difficult to estimate the fiscal impact of unfunded mandates, especially when it is not clear exactly what functional mandates and standards may or may not be imposed on urban local governments. Generally, however, one can approach the costing of unfunded mandates based on two approaches: a technical costing approach or a “mark-up” costing approach.

In a technical costing approach, the cost of delivering a specific local service—say library services—is costed out based on the service delivery norms associated with delivering that service (e.g., the number of librarians, the number of books to be purchased, operating costs of a library, as well as capital costs).⁴⁴ The fiscal impact of the mandate would then be calculated as the total computed service delivery cost minus the resources already spent by the local government on the relevant service.

Unfunded mandates can also be costed using a (more general) “mark-up” costing approach. This approach assumes that the minimum service delivery standards that

the national government seeks to impose can be related to existing municipal spending levels (per resident or client). For instance, we could formulate the assumption that a minimum service delivery standard for libraries would require local governments to spend, say, 125% or 150% of the current average per capita municipal spending level for that service. Or, alternatively, if we believe that metro municipalities are currently providing an adequate level of library services to their non-poor residents (in line with a minimum service delivery standard to be imposed), we could assume that municipalities would be required to spend the same average per-person amount on library services for poor residents as they currently do for non-poor residents.

For simulation purposes, we will use the latter, more general “marking-up” approach to costing unfunded mandates. In doing so, we will posit three scenarios for unfunded mandates which will be quantified by the question: how much would it cost if indigent residents had to be provided the same level of urban services as non-indigent residents? This assumes that the average spending level for non-indigent urban residents reflects the *de facto* cost of the minimum service delivery standard.

Simulation 4 of the RUIIM model (focusing on unfunded mandates) considers Community and Public Safety services, as this functional category includes community and social services; sport and recreation; public safety; housing-related services; and local health services.⁴⁵ Scenario 3 reflects the introduction of an unfunded mandate or requirement that all urban residents are provided with Community and Public Safety Services equivalent to 100% of the current non-indigent per-person spending level. This means that under Scenario 3, local governments are expected to fill 100% of the gap between the existing service level provided to indigent residents and non-indigent residents.⁴⁶ As this is assumed to be an unfunded mandate imposed by the national government, we do not expect to see any changes in intergovernmental fiscal transfers to compensate local governments for this mandate or requirement.

Scenarios 1 and 2 reflect the introduction of a slightly less imposing unfunded mandate: Scenarios 1 and 2 project the fiscal impact of a mandate or requirement that urban local governments fill 25% and 50% of the service-delivery / spending gap that exists between indigent and non-indigent urban residents with regard to Community

⁴⁴ One of the more pertinent examples of unfunded mandates is posed by the norms and standards for local public library and information services envisaged by the South African Public Library and Information Services (Arts and Culture, 2013). According to the norms and standards envisaged by the Bill, provinces and municipalities across South Africa would collectively operate 4,170 libraries, whereas currently 2762 public libraries exist. In addition the total capital cost of the backlog of R 16.2 billion, municipalities would face an additional R. 2.3 billion in annual operating costs to operate these additional facilities. Note that these estimates reflect the cost for all local governments in South Africa –not only metro municipalities.

⁴⁵ Note that housing-related services do not include nationally or provincially-provided public housing services. Also note that local utility services (access to electricity, water, sanitation, and solid waste services) are not included here, as these are considered trade services.

⁴⁶ Recall that the simulation model assumes a 1.66-to-1 ratio with respect to operational spending per resident for all local services for non-indigent versus indigent residents, including Community-and-Safety spending.

and Public Safety services. It should be noted that each of these three scenarios—including the lowest scenario—would still reflect a major imposition of unfunded mandates on urban local governments.

7.2 Variables and parameters

- The number of non-indigent and indigent urban residents is computed as defined in Simulations 1-3. Similar to simulation 3 (dealing with services to the existing urban poor), Simulation 4 uses the “medium” indigent population growth projection for the ten-year period (based on 2% growth in indigent residents per year).
- Relevant expenditure and revenue figures for 2016/17 are extracted from National Treasury sources (Section 71 reports).

7.3 OpEx Impact Simulation

- Consistent with previous simulations, Simulation 4 assumes that recurrent spending per capita (i.e., OpEx per person) for higher-income (non-indigent) residents exceeds recurrent spending per capita for indigent residents **at a factor/ratio of 1.66**. [Assumption F3]. This same ratio is applied across the different operational spending categories (by function).
- It is assumed that local governments would not reduce spending for non-indigent households in response to the introduction of unfunded mandates / minimum service delivery standards (even if the way in which the minimum service delivery standards are defined here could potential allow for that).
- Under Scenario 1, urban local governments would be required to increase their (assumed) recurrent spending on Community and Safety Services from R 634 per indigent resident by R 104.7 in order to ensure the mandate that each resident received services equivalent to at least 62.5% of the non-indigent spending norm of R 1053 (which would be R 739 per urban resident).
- Under Scenario 2, urban local governments would be required to increase their recurrent spending on Community and Safety Services from R 634 to R 844 for each indigent resident.
- Scenario 3 would reflect an increase in recurrent spending from R 634 per indigent resident to R 1053 per indigent resident in order to ensure that the relevant unfunded mandate/minimum service delivery standard/per-client spending threshold is met.

7.4 CapEx Impact Simulation

- If properly implemented, unfunded mandates (by way of clearly defined minimum service delivery standards) are likely to impact both recurrent as well as capital expenditures. During the initial introduction of such standards, they may in fact disproportionately impact capital spending, as municipalities are required to construct the infrastructure necessary to achieve the higher service delivery standards. For the purposes of the simulation, however, the simulation projects increases in capital expenditures following the same mark-up amounts as defined for the recurrent (operational) spending increases.
- Consistent with previous simulations, Simulation 4 assumes that capital spending per capita (i.e., CapEx per person) for higher-income (non-indigent) residents exceeds capital spending per capita for indigent residents **at a factor/ratio of 1.2**. [Assumption F3/F4]. This same ratio is applied across the different capital spending categories (by function).
- In line with the three scenarios, the increase in capital (infrastructure) spending associated with each of the three scenarios is R 23.9, R 47.8 and R 95.6 per (indigent) resident, respectively.

7.5 Revenue Impact Simulation

- Since Simulation 4 deals with unfunded mandates, there is no reason to expect an increase in own source revenue collections associated with any of the (simulated) unfunded mandates / minimum service delivery requirements being imposed. Due the partial equilibrium nature of the model, the model does not seek to project whether or not (or the extent to which) local governments would increase local revenue collections as a result of the greater expenditure burden.

7.6 Grant Impact Simulation

- Since Simulation 4 deals with unfunded mandates, there should not be an increase in grant funding associated with any of the (simulated) minimum service delivery requirements being imposed.

⁴⁴ One of the more pertinent examples of unfunded mandates is posed by the norms and standards for local public library and information services envisaged by the South African Public Library and Information Services (Arts and Culture, 2013). According to the norms and standards envisaged by the Bill, provinces and municipalities across South Africa would collectively operate 4,170 libraries, whereas currently 2762 public libraries exist. In addition the total capital cost of the backlog of R 16.2 billion, municipalities would face an additional R. 2.3 billion in annual operating costs to operate these additional facilities. Note that these estimates reflect the cost for all local governments in South Africa –not only metro municipalities.

7.7 Simulation: results and analysis

The simulation results for the fiscal impact of unfunded mandates are presented in Table 7.1. These simulation results reflect the parameters and assumptions noted above.

Table 7.1 The Fiscal and Spatial Impact of: Unfunded Mandates

R Billions	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Year	0	1	2	3	4	5	6	7	8	9	10
Scenario 1 (Positive)											
OpEx Impact		1.16	1.18	1.21	1.23	1.25	1.28	1.30	1.33	1.36	1.38
CapEx Impact		0.26	0.27	0.28	0.28	0.29	0.29	0.30	0.30	0.31	0.32
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-1.42	-1.45	-1.48	-1.51	-1.54	-1.57	-1.60	-1.63	-1.67	-1.70
Grant Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (LG)		-1.42	-1.45	-1.48	-1.51	-1.54	-1.57	-1.60	-1.63	-1.67	-1.70
Scenario 2 (Medium)											
OpEx Impact		2.32	2.36	2.41	2.46	2.51	2.56	2.61	2.66	2.71	2.77
CapEx Impact		0.53	0.54	0.55	0.56	0.57	0.58	0.60	0.61	0.62	0.63
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-2.85	-2.90	-2.96	-3.02	-3.08	-3.14	-3.21	-3.27	-3.33	-3.40
Grant Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (LG)		-2.85	-2.90	-2.96	-3.02	-3.08	-3.14	-3.21	-3.27	-3.33	-3.40
Scenario 3 (Negative)											
OpEx Impact		4.63	4.73	4.82	4.92	5.02	5.12	5.22	5.32	5.43	5.54
CapEx Impact		1.06	1.08	1.10	1.12	1.15	1.17	1.19	1.22	1.24	1.26
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-5.69	-5.81	-5.92	-6.04	-6.16	-6.28	-6.41	-6.54	-6.67	-6.80
Grant Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (LG)		-5.69	-5.81	-5.92	-6.04	-6.16	-6.28	-6.41	-6.54	-6.67	-6.80

The overall fiscal impact on local governments of the imposition of unfunded mandates is not dissimilar in scale to the changes in the pro-poor orientation of urban services modeled in Simulation 3 (Section 6). However, the fiscal impact of unfunded mandates rests solely with urban local governments, as—by definition—the national government does not bear any of the fiscal impact of unfunded mandates.

7.8 Spatial Impact Expectation

- The imposition of unfunded mandates by itself is not expected to have any major spatial impact.
- Depending on the exact nature of how the unfunded mandates are formulated, it is possible that the mandates would encourage lower-income residents to remain in townships and in peri-urban locations, as it is likely that urban services would disproportionately improve in these locations.

8. The impact of inclusive housing efforts

The conventional wisdom in South Africa is that the country's urban areas have an unnatural, non-inclusive and inefficient spatial form, and that policy interventions are required to shape them in accordance with the model of a typical or "ordinary" (i.e., monocentric) city (Turok 2012; 2-16). These efforts run counter to the current practice in the area of human settlements policy, where a focus on mega housing projects results in public housing being constructed on the urban fringe where land is relatively available and space is sufficient for the development of large-scale projects.

The fifth dimension of the RSA Urbanization Impact Model incorporates the simulation results for efforts to increase the inclusive nature of urban space through housing interventions. These housing costs are analyzed in detail as part of the stand-alone Housing and Urbanization Intervention Strategy (HUIS) Model (Gardner and Graham, 2017).

8.1 Overview of projected investments in housing

The Housing and Urbanization Intervention Strategy (HUIS) Model considers five housing types in urban areas: (a) market housing delivery; (b) gap subsidized housing (e.g., FLISPs); (c) subsidized rental housing; (d) subsidized ownership housing (e.g., RDP/BNG housing); and (e) informal housing. Each of these housing types varies with regard to their ownership nature, density and subsidy cost. Market housing is fully delivered by the private sector, and therefore does not receive any direct support by the public sector. Similarly, informal housing does not receive any direct public support, and thus is not expected to have a direct fiscal impact.

Table 8.1 presents the housing delivery and mix associated with each of the three simulated scenarios, ranging from "business as usual" (Scenario 1) and a mid-density scenario (Scenario 2) to a high-density, high-delivery scenario (Scenario 3). The HUIS model assumes that low-income (and mid-income) households which are unable to be accommodated in the subsidized segments of the housing market end up being housed in informal circumstances (such as backyard rooms, shacks, or informal settlement).

As is the case for the other simulations, the fiscal implications of the three scenarios depend considerably on the assumptions upon which the scenarios are constructed. In the case of the HUIS model, Scenario 1 is specified as a "business as usual" scenario, and therefore, approximates the current level of housing spending.⁴⁷ Under this scenario, a large share of low and medium income households end up in informal housing, as the formal housing market does not provide an adequate quantity of supply for the relevant income segment: 48% of new low income households and 76% of medium income households are projected to be housed in informal circumstances (backyard rooms, shacks, informal settlement). This is due to the inability of these households to access subsidized BNG or FLISP accommodations.

⁴⁷ It should be noted that spending on the relevant housing programs is captured in the RUIM model as recurrent (operating) spending. This is due to the fact that any capital housing stock funded by the subsidies is transferred to residents, and—as such—does not result in any capital accumulation for the public sector.

Table 8.1: Housing scenarios

		Subsidy Quantum (R billions)	Housing Units
1	Scenario 1: Business As Usual	8.40	41,546
	Gap Subsidized Housing	1.21	3,369
	Subsidized Rental Housing	1.28	3,074
	Subsidized Ownership Housing	5.92	35,103
2	Scenario 2: Mid Density	8.49	41,546
	Gap Subsidized Housing	1.21	3,369
	Subsidized Rental Housing	1.38	3,074
	Subsidized Ownership Housing	5.90	35,103
3	Scenario 3: High Density High Delivery	18.78	74,889
	Gap Subsidized Housing	5.43	15,160
	Subsidized Rental Housing	5.12	10,585
	Subsidized Ownership Housing	8.23	49,144

Source: Gardner and Graham (2017): Annex 5.

The second housing scenario is premised on the same delivery of units per intervention, but modestly changes the density types within each intervention in the housing mix. For instance, under this scenario, it is projected that the plurality (40%) of BNG housing is constructed in medium density areas, as opposed to 20% under the first scenario. As a result, only a modest cost increase is projected under the second scenario. The third scenario reflects a considerable increase not only in the density of housing units, but also, a considerable increase in their number.

It should be noted that the current simulation only considers the additional spending on public housing, as the cost of the related network infrastructure associated with additional indigent households is already simulated as part of Simulation 2 (the impact on indigent in-migration).

8.2 Simulation: results and analysis

Table 8.1 (next page) presents the simulated fiscal impact of the three different housing scenarios. As Scenario 1 is assumed to be the “business as usual” scenario over time, it is expected that this is the baseline spending pattern (and therefore, neither increases nor decreases fiscal space): as such, the deviation from the baseline is zero. In contrast, Scenarios 2 and 3 show increased public housing spending vis-à-vis the first scenario.

As the construction and subsidy of public housing is ultimately financed by national and provincial governments—rather than by the municipal level—the simulations assume the full additional housing expense is funded by “grants”. The spending itself is reflected in the model as recurrent spending (rather than capital spending), as any resulting housing stock is transferred to individual households, and the public sector experiences no increase in its capital stock.

Table 8.1 The Fiscal Impact of: Inclusive Housing Policies (Housing Densification)

R Billion	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Year	0	1	2	3	4	5	6	7	8	9	10
Scenario 1 (Positive)											
OpEx Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CapEx Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		0.00									
Grant Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (LG)		0.00									
Scenario 2 (Medium)											
OpEx Impact		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
CapEx Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-0.09									
Grant Impact		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Net Fiscal Impact (LG)		0.00									
Scenario 3 (Negative)											
OpEx Impact		10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38
CapEx Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Revenue Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Fiscal Impact (Overall)		-10.38									
Grant Impact		10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38
Net Fiscal Impact (LG)		0.00									

8.3 Spatial Impact Expectation

In relative terms, the total number of housing units being funded (fully or partially) each year under the various scenarios presented in Table 8.1 is extremely small.

The number of poor and non-poor urban households in South Africa is estimated to be 7.2 million. Policy scenarios range from the “business as usual scenario” which creates or subsidizes slightly more than 41,000 housing units per annum, to the expensive “high density,

high delivery” strategy, which produces slightly under 75,000 housing units per year. Naturally, each policy scenario will have different spatial impacts.⁴⁸

Under the “business as usual” scenario, fewer than half a million houses would be constructed or subsidized over a ten-year period.⁴⁹ Inherent in this first scenario, however, is the assumption that the vast majority of new or publicly-supported housing units would be located on the urban periphery outside the urban core, thus doing little—if anything—to improve inclusive access to urban amenities or to reduce spatial mismatch with respect to employment opportunities for the urban poor.

⁴⁸ Due to the partial equilibrium nature of the RUIIM model, the model is not set up to consider whether the location of these additional housing units would bear spatially-differentiated costs in terms of housing-related services, or whether the location of this additional housing units would require additional transportation costs. However, given that this housing is targeted at indigent urban residents (whom are unlikely to be formally employed, and are unlikely to be able to afford cars or public transit), it is unlikely that there will be major additional expenses or revenues associated with such marginal locational choices in the immediate future.

⁴⁹ Note that additional housing opportunities are not strictly cumulative over time, as FLISP-subsidizes housing units need to be provided with a subsidy each year and do not accumulate any additional capital stock.

Similarly, a mega-projects strategy (“low density, high delivery”) would be among the least unaffordable of the (politically-acceptable) high-delivery housing strategy options, but—since mega-projects can only be implemented to scale at or beyond the existing urban fringe—this approach would most likely exacerbate the problems of de facto residential segregation, spatial mismatch and spatial exclusion.

If a “high density, high delivery” strategy were pursued, the HUIS model estimates that approximately 600,000 additional housing units would be produced over a ten-year period, with the majority of these housing being located closer to the urban core, thus improving accessibility for poor urban residents.⁵⁰ While this is not a non-trivial amount of additional housing opportunities being generated in line with the country’s human settlement policies, the total required investment of an addition 100 billion Rand would result in a shift of around 8 percent of the urban housing stock, while the location of the vast majority of housing opportunities (92%) remains unchanged. While this computation should not be understood to be an implicit policy recommendation against pursuing such a high-density, high-delivery strategy, these numbers do underscore that changes in urban form come at a price and require long-term policy commitments.⁵¹

9. The impact of inclusive public transport efforts

Although South Africa’s apartheid legacy has shaped the dispersed, low-density spatial form of its urban areas, the challenges or social-economic and racial segregation and spatial mismatch are by no means unique to the country.

In urban areas around the world, urban space and urban transportation are co-dependent, mutually influencing each other in often complex and dynamic ways (Cervero, ND). Public transportation is vital to the economic growth,

inclusiveness and well-being of cities, particularly in a context where many households do not own automobiles. As such, the final area of urbanization to be investigated by the RUIM model is the potential impact of inclusive public transportation systems to achieve a more inclusive urban spatial form.

9.1 Main driver of the urbanization pattern/element

The variety of institutional arrangements associated with metropolitan public transport in South Africa requires an examination of several road-based modes (including conventional bus services, municipal bus services, bus rapid transit, and minibus taxi services), and two rail-based modes (Metrorail and Gautrain).⁵² For the purposes of the RUIM model, the main drivers of the impact of public transportation on inclusiveness and urban form are the extent of the two main public transportation networks: bus and rail.

The extent of the public transportation network—for bus and rail services, respectively—will be captured by an index that tracks investments of additional capital units into the bus and rail infrastructure networks, respectively. For convenience, one could conceive of a “capital unit” as the capital cost necessary to operate a generic bus route.⁵³ Thus, capital investments might cause the public transportation network to expand by 2%. In the case of a bus system, this might be equivalent to the expansion of the bus fleet by 2%, or an increase in the total number of bus routes by 2%; or some alternative metric signifying the increase in the size of the public transportation network by 2%.

A second driver of public transportation finance, not unrelated to the extent of the public transportation network (for both bus and rail), is the fare coverage ratio, which can be defined as the ratio of fare revenues (and other operating revenues, such as advertising revenues) and operating costs. Based on the experience of Cape Town, the fare coverage ratio is currently around 38.2%. The fare coverage ratio for MetroRail is currently estimated to be around 30.8%. The average fare coverage ratio (for bus and train combined) is 36%.

⁵⁰ It should be noted that ongoing work under the Urbanization Review suggests that employment opportunities are not concentrated at the urban core. Instead, analysis of commuting patterns suggest that the hub-and-spoke nature of public transportation systems require public transit commuters to travel to the urban center in order to reach destinations along other spokes of the urban transit system.

⁵¹ A potentially much more important driver in shaping urban form will be the location of future private sector housing. Indeed, to the extent that higher income households and businesses are settling in denser development nodes near the urban core, densification is being achieved in this housing segment without public sector intervention. Similarly, the future housing choices of poor urban households will equally have an important impact on future urban form and spatial inclusion: as the incomes of poor households rise, will they choose to locate in more accessible (presumably higher density) transportation corridors, or will rising incomes result in these households purchasing an automobile and opting for low-density housing locations away from the urban core? Such a discussion falls beyond the scope of the current analysis.

⁵² For a more complete description of the financing of public transportation in South Africa, see: *Expenditure and Performance Review of South Africa’s Public Transport and Infrastructure System (2014)*.

⁵³ In the case of buses, this “capital unit” not only constitutes the cost of purchasing the bus, but also the average cost of related infrastructure such as bus stops, dedicated bus lanes, and other capital costs. In the case of urban rail, the capital cost could be envisioned as the investment necessary to operate another mile of train route.

Fare coverage is expected to be closely related to the extent of the public transportation network. On the assumption that urban local governments will first invest in the public transportation lines and corridors with the highest utilization and cost recovery, economists would expect the marginal fare coverage ratio to decline as the public transportation network expands. In contrast, transportation engineers would expect the opposite to happen: as a result of network effects, ridership and occupancy might increase as the network expands and provides access to a larger share of the urban area. Thus, as the number of transportation lines (or the frequency of service) increase, it is possible for average ridership per bus/train (as measured by the seat occupancy rate) to either increase or decline. In addition, fare collection per seat might either increase or decline as the public transportation network expands and increasingly marginal public transportation lines are added.

Consistent with the rest of the model, three scenarios are estimated. The first scenario simulates an annual expansion of the public transportation network at 2% per year: in other words, the extent of the public transportation network (e.g., the number of buses or bus routes; the number of rail lines or rail miles; or a similar measure of the extent of the public transportation network) is projected to expand 2 percent each year. As already noted, this does not necessarily mean, however, that total ridership will expand proportionally, as ridership (and more generally, fare coverage) may either be subject to diminishing marginal returns, or converse, may increase due to network effects. In the case of Scenario 1, we assume that the fare coverage ratio increases from 36% (the current fare coverage ratio for bus and rail combined) to 40% over the ten-year period.⁵⁴

Scenario 2 simulates an annual expansion of the public transportation network at 4% per year. Due to the more rapid expansion of the network, however, the model assumes that—unlike Scenario 1—the fare coverage ratio will not increase; instead, fare coverage will remain steady at 36% over the simulation period.

Scenario 3 simulates an even more rapid expansion of the public transportation network at 6% per year. Given the rapid expansion of the network, however, the model assumes that the fare coverage ratio will gradually decline from 36% in Year 1 to 32% in Year 10.

It should be noted that it is beyond the scope of the RUIIM model to assess the full economic impact of different urban transportation options. The model focuses on the fiscal impact (i.e., the impact on public

expenditures, revenues and grants) associated with the various policy options; it does not quantify the potential economic impacts or externality benefits of different public transportation interventions, such as reductions in congestion costs, benefits associated with reductions in pollution, or the social or economic benefits associated with a more inclusive spatial form. Instead, such estimates are left for future sector-specific analyses.⁵⁵

9.2 Variables and parameters

- Simulation 6 of the RUIIM model—dealing with urban public transportation—simulates the fiscal impact of changes in urban bus systems and urban rail systems, respectively.
- The simulation of urban bus transportation finances (expenditures, revenues and grants) is based largely on the experiences of the City of Cape Town, which has an advanced public transportation plan, and for which relatively detailed expenditure and revenue figures are available. For instance, urban bus services are modeled based on urban transportation services provided by Golden Arrow Bus Services (GABS).⁵⁶ Figures for Cape Town are generally inflated by a factor of 5.45%, based on its relative population (compared to the total population of metropolitan municipalities) in order to impute total amounts for all urban areas.
- The simulation of urban rail transportation finances is based on expenditure and revenue figures for MetroRail.⁵⁷
- The simulation of public transportation costs uses 2016/17 as the baseline year.

9.3 OpEx Impact Simulation

- Operating expenditure projections for public transportation combine operating expenditure projections for bus and rail. For 2016/17, operating costs for urban bus systems were projected to be R 12.5 billion (inflated based on the Cape Town experience), whereas operating expenditures for MetroRail for the same year equaled R 5.5 billion.
- The operating expenditures for bus and rail networks are assumed to be proportionate to the size of respective public transportation network. In other words, a 2 percent (cumulative) increase in the size of the public transportation network is expected to increase the operating cost by 2 percent, and so on.

⁵⁴ This is more or less in line with current fare coverage projections.

⁵⁵ It should be noted that to the extent that the increase in public transit ridership is projected to be relatively minor vis-à-vis automobile-based transportation in the three scenarios, the impact on congestion, pollution and spatial mismatch are likely to be minor as well.

⁵⁶ Note that MyCiti bus rapid transit is not included in the basis for the simulations.

⁵⁷ A more detailed description of data sources and parameter will be provided in the final draft of this report.

9.4 CapEx Impact Simulation

- Capital expenditure projections for public transportation separately consider capital expenditure projections for bus and rail.
- For 2016/17, capital expenditure for urban bus systems were R 4.25 billion (inflated based on the Cape Town experience). Based on anecdotal evidence, it is assumed that for the base year, 80% of capital expenditures for urban buses are assumed to fund network expansion (versus 20% for capital replacement).
- Operating expenditures for MetroRail for the same year equaled R 14.5 billion. In contrast to the assumption made for urban buses, 20% of capital expenditures for urban rail are assumed to fund network expansion (versus 80% for capital replacement). This latter assumption is based on the fact that MetroRail is undergoing a program of capital replacement after many years of neglecting its rolling stock.
- The capital investment in network expansion is expected to result in a net increase in the public transportation network of 2%, for urban bus networks and urban rail, respectively. The marginal cost of public transportation network expansion is expected to be constant (i.e., the cost of expanding the network 4% is expected to be twice the cost of expanding the network by 2%, and so on).
- Expenditures on capital replacement are expected to remain constant over time from the base year.

9.5 Revenue Impact Simulation

- Urban public transit revenues are expected to expand as public transportation networks expand. As already noted, the operating costs of public transportation are expected to change proportionately with the size of the public transportation network. This means that as the public transportation network increases, all else equal, fare revenue is expected to increase.⁵⁸
- However, as noted in Section 9.2 above, fare revenues (including other operating revenues, such as advertising revenues) are not expected to necessarily change in proportion to network size: a diminishing marginal return on ridership and fare collection is assumed when the public transport system expands rapidly.
- The projected change in public transportation revenue collections (for urban buses and urban rail) is computed as the projected increase in operating

expenditures (as defined in Section 9.3), multiplied by the projected fare coverage ratio for each scenario (as described in Section 9.2).

- It bears repeating that an important assumption is that the fare coverage ratio (fare revenue as a percentage of operating expenditures) may either decrease or increase over time and as the urban transportation network expands (based on the argument of diminishing marginal returns or network effect. This assumption may be a matter of debate. The decline in the fare coverage ratio is projected to be gradual over time as capital increases over time.⁵⁹ The decrease in fare coverage ratio was incorporated into Scenario 3 in line with the model's intent for the third scenario to have a (relatively) negative fiscal impact.

9.6 Grant Impact Simulation

- Urban bus systems are generally operated by municipalities or by municipally-owned companies. Although the national government is funding urban public transportation based on the Public Transportation Network Grant (which can be used for either recurrent or capital purposes), the model assumes that 50% of additional CapEx is funded by national government through a dedicated capital grant.⁶⁰ On the recurrent side, no change is projected in the operating grant funding provided, so that any gap on the operating side of the budget has to be fully funded by the municipality.
- In contrast to many other urban services, MetroRail is not provided or funded by municipal governments, but rather, by the national government. For the sake of the RUIM model, however, MetroRail is modeled as if it were a local entity which is fully funded from grants. In other words, urban rail CapEx is projected to be fully funded from "grants" (i.e., the national capital budget), while the operational spending gap (OpEx minus fare revenues, discussed below) is also fully funded by "grants" from the national budget.

9.7 Simulation: results and analysis

The simulation results for the fiscal impact of urban transport policies are presented in Table 9.1. These simulation results reflect the parameters and assumptions noted above.

⁵⁸ In the model, the impact on public transportation on urban property rate collections and other revenues is deemed negligible.

⁵⁹ For convenience, the decrease in the fare coverage ratio is expected to take place in a linear manner over the ten year period under consideration.

⁶⁰ The Public Transport Network Grant (PTNG) is an amalgamation of the previous Public Transport Infrastructure Grant and the Public Transport Network Operations Grant (PTNOG), which in turn were formed out of the Public Transport Infrastructure and Systems Grant.

Table 9.1 The Fiscal Impact of: Inclusive Public Transportation Policies

R Billion	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Year	0	1	2	3	4	5	6	7	8	9	10
Scenario 1 (Positive)											
OpEx Impact		0.36	0.73	1.10	1.49	1.88	2.28	2.68	3.10	3.52	3.95
CapEx Impact		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Revenue Impact		0.13	0.43	0.65	0.88	1.12	1.36	1.61	1.87	2.13	2.40
Net Fiscal Impact (Overall)		-0.23	-0.30	-0.45	-0.60	-0.76	-0.91	-1.07	-1.23	-1.39	-1.55
Grant Impact		-0.21	-0.19	-0.15	-0.10	-0.05	0.00	0.04	0.09	0.14	0.19
Net Fiscal Impact (LG)		-0.44	-0.49	-0.60	-0.70	-0.81	-0.92	-1.03	-1.14	-1.25	-1.36
Scenario 2 (Medium)											
OpEx Impact		0.72	1.47	2.25	3.06	3.91	4.79	5.70	6.65	7.64	8.66
CapEx Impact		6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30
Revenue Impact		0.26	0.53	0.81	1.10	1.41	1.72	2.05	2.40	2.75	3.12
Net Fiscal Impact (Overall)		-6.76	-7.24	-7.74	-8.26	-8.80	-9.36	-9.95	-10.55	-11.19	-11.84
Grant Impact		4.46	4.61	4.76	4.92	5.08	5.25	5.43	5.62	5.81	6.01
Net Fiscal Impact (LG)		-2.30	-2.64	-2.98	-3.35	-3.72	-4.11	-4.52	-4.94	-5.38	-5.83
Scenario 3 (Negative)											
OpEx Impact		1.08	2.23	3.45	4.74	6.10	7.55	9.09	10.71	12.44	14.27
CapEx Impact		12.60	12.60	12.60	12.60	12.60	12.60	12.60	12.60	12.60	12.60
Revenue Impact		0.39	0.64	0.98	1.34	1.71	2.11	2.51	2.94	3.38	3.85
Net Fiscal Impact (Overall)		-13.30	-14.19	-15.07	-16.00	-16.99	-18.05	-19.18	-20.38	-21.66	-23.02
Grant Impact		9.13	9.40	9.67	9.96	10.26	10.58	10.93	11.29	11.68	12.10
Net Fiscal Impact (LG)		-4.17	-4.79	-5.39	-6.04	-6.73	-7.46	-8.25	-9.08	-9.97	-10.92

The simulations suggest that expanding public transportation networks has an important impact on operating expenditures. Even when investments in urban public transportation systems are moderate, the cumulative impact of such investments on operating costs can rise fairly quickly, with increases in annual operating costs outpacing annual capital costs after 8 or 9 years. When efforts are made to rapidly increase urban public transportation systems, the net fiscal burden on the public sector as a whole is quite considerable, and has the potential threaten the long-run fiscal balance of metropolitan municipalities (even if a relatively sizeable portion of the additional CapEx costs are funded nationally).

A contributing factor to the challenge of fiscal sustainability is the fact that—more likely than not—expansion of the public transportation network will result

in reduce ridership per unit (bus or train), and therefore, that fare coverage is likely to decrease over time. While total fare revenues are projected to increase over time as the network expands, the share of operating expenditures that is covered from these revenues is likely to decline.

9.8 Spatial Impact Expectation

- Compared to the other simulations, the public transportation model allows some more precise expectations to be generated with regard to the spatial impact of the interventions. Based on the extrapolation from Cape Town's experience, urban bus networks in South Africa might have an annual daily ridership of 770,000 riders per day. This is likely a high-end estimate, and most likely does not take into account unique riders (as those relying on urban

buses are likely to use the bus at least twice in one day). This reflects at most 3.5% of the total urban population.⁶¹

- Under the most expansive (and least fiscally sustainable) expansion of public transportation network, the urban bus network is expected to increase to almost double over a ten-year period. As an absolute upper-bound estimate (assuming a constant marginal propensity to use public transportation—which is as an unlikely scenario), then, an additional 2.5% of the urban population might convert from being unserved or lacking inclusive access (or from a suboptimal mode of urban transportation) to using urban public bus services. This means that, even under this most excessively positive scenario, 88% of all urban residents are not using public transportation on any given day, and are most likely unaffected in their locational choices as a result of the urban bus network. Under more realistic assumptions (e.g., Scenario 1 or 2), it is likely that the increase in urban bus ridership might only increase by 1-2 percentage points of the urban population, therefore have only a minimal—if any—impact on the overall urban spatial form and the inclusiveness of access.

10. Further analysis of the fiscal impact of urbanization and the integration of the urban space economy

Sections 4 through 9 deal with the nitty-gritty of the different simulations in the RSA Urbanization Impact Model (RUIM), which risks losing track of the “big picture”. Hence we come back to the big picture here, with a slightly different lens than what was presented in the initial overview in Section 3.

10.1 Revisiting the overall fiscal impact of the simulated scenarios

Following the three sets of scenarios defined in Section 2 (a fiscally benign scenario, a fiscally medium scenario and a fiscally negative scenario), Tables 10.1 and 10.2 summarize the projected increases and/or decreases in operating expenditures and capital expenditures, respectively, over the project period for each of the six simulations.

⁶¹ The 2013 National Household Travel Survey suggests that approximately 12.5% of workers in metropolitan areas use train (9.2%) or bus (6.3%). Train (1.1%) and bus (5.1%) combined only represent 6.2% of the main mode of transportation for reaching educational institutions (across urban and rural areas).

Table 10.1 The Fiscal Project of Urbanization and Integration of the Urban Space Economy in South Africa on Operating Expenditures (R billions)

Year	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Scenario 1 (Positive)										
1. The impact of urban growth	3.53	7.16	10.90	14.75	18.72	22.81	27.02	31.36	35.82	40.43
2. The impact of indigent in-migration	0.36	0.73	1.10	1.48	1.85	2.24	2.62	3.01	3.41	3.80
3. The impact of the urban poor	-3.71	-3.78	-3.86	-3.93	-4.01	-4.09	-4.18	-4.26	-4.34	-4.43
4. The impact of unfunded mandates	1.16	1.18	1.21	1.23	1.25	1.28	1.30	1.33	1.36	1.38
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	0.36	0.73	1.10	1.49	1.88	2.28	2.68	3.10	3.52	3.95
Scenario 1 (Positive)	1.70	6.02	10.45	15.01	19.69	24.51	29.45	34.54	39.76	45.13
Scenario 2 (Medium)										
1. The impact of urban growth	2.35	4.75	7.19	9.69	12.23	14.83	17.48	20.18	22.93	25.74
2. The impact of indigent in-migration	0.73	1.47	2.22	3.00	3.78	4.59	5.40	6.24	7.09	7.96
3. The impact of the urban poor	3.71	3.78	3.86	3.93	4.01	4.09	4.18	4.26	4.34	4.43
4. The impact of unfunded mandates	2.32	2.36	2.41	2.46	2.51	2.56	2.61	2.66	2.71	2.77
5. The impact of inclusive housing effects	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6. The impact of inclusive transportation efforts	0.72	1.47	2.25	3.06	3.91	4.79	5.70	6.65	7.64	8.66
Scenario 2 (Medium)	9.91	13.92	18.03	22.23	26.53	30.94	35.45	40.07	44.81	49.65
Scenario 3 (Negative)										
1. The impact of urban growth	1.18	2.36	3.56	4.77	6.00	7.23	8.48	9.74	11.01	12.30
2. The impact of indigent in-migration	1.09	2.21	3.37	4.56	5.79	7.05	8.36	9.70	11.08	12.50
3. The impact of the urban poor	7.41	7.56	7.71	7.87	8.03	8.19	8.35	8.52	8.69	8.86
4. The impact of unfunded mandates	4.63	4.73	4.82	4.92	5.02	5.12	5.22	5.32	5.43	5.54
5. The impact of inclusive housing effects	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38
6. The impact of inclusive transportation efforts	1.80	2.23	3.45	4.74	6.10	7.55	9.09	10.71	12.44	14.27
Scenario 3 (Negative)	25.77	29.47	33.29	37.23	41.31	45.51	49.87	54.37	59.02	63.84

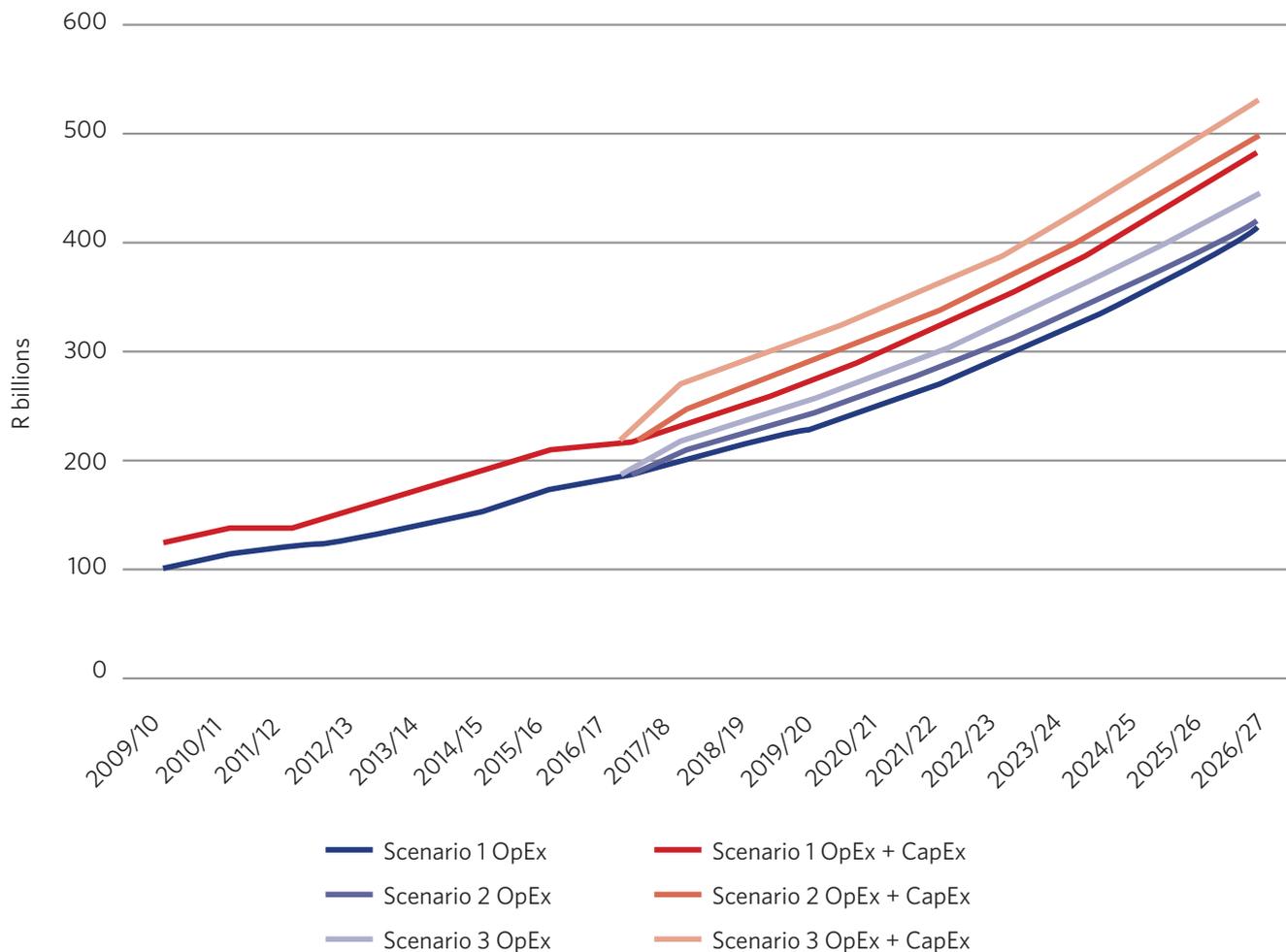
Table 10.2 The Fiscal Project of Urbanization and Integration of the Urban Space Economy in South Africa on Capital Expenditures (R billions)

Year	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Scenario 1 (Positive)										
1. The impact of urban growth	20.53	21.15	21.78	22.43	23.11	23.80	24.51	25.25	26.01	26.79
2. The impact of indigent in-migration	3.25	3.29	3.32	3.35	3.39	3.42	3.45	3.49	3.52	3.56
3. The impact of the urban poor	-0.66	-0.68	-0.69	-0.70	-0.72	-0.73	-0.75	-0.76	-0.78	-0.79
4. The impact of unfunded mandates	0.26	0.27	0.28	0.28	0.29	0.29	0.30	0.30	0.31	0.32
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scenario 1 (Positive)	23.38	24.02	24.68	25.36	26.06	26.78	27.52	28.28	29.06	29.87
Scenario 2 (Medium)										
1. The impact of urban growth	13.69	13.96	14.24	14.52	14.82	15.11	15.41	15.72	16.04	16.36
2. The impact of indigent in-migration	6.51	6.64	6.77	6.90	7.04	7.18	7.33	7.47	7.62	7.78
3. The impact of the urban poor	0.66	0.68	0.69	0.70	0.72	0.73	0.75	0.76	0.78	0.79
4. The impact of unfunded mandates	0.53	0.54	0.55	0.56	0.57	0.58	0.60	0.61	0.62	0.63
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30
Scenario 2 (Medium)	27.69	28.11	28.55	29.00	29.45	29.91	30.38	30.87	31.36	31.86
Scenario 3 (Negative)										
1. The impact of urban growth	6.84	6.91	6.98	7.05	7.12	7.19	7.26	7.34	7.41	7.48
2. The impact of indigent in-migration	9.76	10.05	10.35	10.66	10.98	11.31	11.65	12.00	12.36	12.73
3. The impact of the urban poor	2.12	2.17	2.21	2.25	2.30	2.34	2.39	2.44	2.49	2.54
4. The impact of unfunded mandates	1.06	1.08	1.10	1.12	1.15	1.17	1.19	1.22	1.24	1.26
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	12.60	12.60	12.60	12.60	12.60	12.60	12.60	12.60	12.60	12.60
Scenario 3 (Negative)	32.39	32.81	33.25	33.69	34.15	34.62	35.10	35.60	36.10	36.62

Figure 10.1 and Table 10.4 present the aggregate projected expenditures (OpEx and CapEx) associated with each of these three scenarios over the entire simulation period. In contrast with the previous tables (which are presented

in constant prices), the figure and table below present the projected expenditures in nominal terms, based on a projected inflation rate of 6 percent.⁶²

Figure 10.1 RUIM Model Simulations: Projected Nominal Expenditures by Scenario, 2017/18 -2026/27



⁶² For consistency with nominal municipal spending in previous years, the projections in this section are presented in nominal terms, based on a 6% inflation rate which was assumed from 2016/17 forward. Projected expenditures were based on expenditures in the baseline year (2016/17), adjusted for the incremental change in OpEx and CapEx simulated by RUIM for the simulation period across all six simulations. Fixed annual CapEx spending for the base year (excluding 'elective CapEx' spending) was assumed to be R 10.1 billion. It should be noted that the simulated expenditure increases over time include both municipal expenditures as well as non-municipal urban expenditures.

Table 10.3 RUIM Model Simulations: Projected Nominal Expenditures by Scenario, 2017/18 -2026/27

	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Scenario 1											
OpEx	182.5	195.3	211.8	229.8	249.4	270.6	293.7	318.7	346.0	375.6	407.7
CapEx	30.3	35.5	38.4	41.5	44.8	48.4	52.4	56.6	61.2	66.2	71.6
Total	212.8	230.8	250.2	271.3	294.2	319.0	346.0	375.3	407.2	441.8	479.3
Scenario 2											
OpEx	182.5	204.0	220.7	238.9	258.5	279.8	302.8	327.8	354.8	384.1	415.8
CapEx	30.3	40.1	43.0	46.1	49.4	53.0	56.8	60.9	65.3	70.1	75.2
Total	212.8	244.1	263.7	284.9	307.9	332.7	359.6	388.7	420.1	454.2	491.0
Scenario 3											
OpEx	182.5	220.8	238.2	257.0	277.4	299.5	323.5	349.4	377.6	408.1	441.2
CapEx	30.3	45.1	48.2	51.7	55.3	59.3	63.5	68.0	72.9	78.1	83.7
Total	212.8	265.9	286.4	308.7	332.8	358.8	387.0	417.4	450.4	486.2	524.9

Source: Computations based on RUIM model simulations.

Looking at projected urban expenditures in this manner provides us with several key insights. First, Scenarios 1 and 2 seem to continue the incremental expenditure trend of the past and—as was noted in Section 3—are fiscally sustainable, as any annual fiscal gap declines over time.⁶³ Even though Scenario 3 seems to present a relatively moderate increase in urban spending versus the other two scenarios, this scenario is not fiscally sustainable, as the resultant annual fiscal gap would continue to grow over time.

The figure and the table(s) above reveal that the main difference between the three scenarios by Year 10 is not so much the difference in capital expenditures. Instead, it appears the main distinction between the scenarios appears to be increasing fiscal pressure from recurrent expenditures, which largely reflects the recurrent implications of capital investments made in earlier years.

For instance, over a 10 year period, the construction or provision of 75,000 additional public housing units per year (rather than 41,000 housing units) has a considerable cumulative impact on the number of indigent residents to be served by municipal authorities. While the incremental cost for implementing such a “high density, high delivery” public housing scenario is projected to be around 10.4 billion Rand extra per year (Section 8), the additional cost for complementary infrastructure and recurrent cost of additional municipal services for a fast-growing indigent population can be up to 17.8 billion Rand

extra per year by FY 2026/27 (as noted in Section 2). Approximately half of this additional spending is projected to be in the form of additional recurrent services to poor households.

Similarly, aggressive investment in inclusive public transportation—defined in the model as expansion of the urban public transportation network at 6% per year—is expected not only to have an important impact on capital expenditures, but on recurrent expenditures as well, as the increase in the cost of operating the expanded public transportation system is expected to exceed the projected increase in fare revenues. Indeed, the ramped-up investment in public transportation is projected to result in an increased commitment of operating expenditures of R 10.3 billion per year by 2026/27.

10.2 The impact on public finances versus the impact on municipal finances

The projected increases in urban expenditures over the next ten years are expected to be quite considerable: taken together, Tables 10.1 and 10.2 suggest that projected expenditure increases (in constant prices) could amount to R 75-100 billion per year by Year 10 under the various scenarios. To a large extent, however, the simulations expect that much of this increase in urban spending

⁶³ Although in some instances Scenario 1 reflects the “business as usual” scenario, for some of the Simulations, Scenario 2 is more likely to be the more likely scenario.

will be absorbed by the national government, through the provision of intergovernmental fiscal transfers or grants.⁶⁴ Table 10.4 provides an overview of projected grant increases, suggesting that as much as 50% of the increased urban expenditures could be offset by increased grants (under Scenario 3).

In practice, this raises two questions: first, how much of the fiscal burden of increased urban spending will the national government actually bear, and second, how will urban local governments respond to the increase in their fiscal burden?

Table 10.4 The Fiscal Project of Urbanization and Integration of the Urban Space Economy in South Africa on Grants (R billions)

Year	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Scenario 1 (Positive)										
1. The impact of urban growth	0.05	0.10	0.15	0.20	0.25	0.31	0.36	0.42	0.48	0.54
2. The impact of indigent in-migration	3.42	3.66	3.90	4.14	4.38	4.63	4.88	5.13	5.38	5.64
3. The impact of the urban poor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. The impact of unfunded mandates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. The impact of inclusive housing effects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. The impact of inclusive transportation efforts	-0.21	-0.19	-0.15	-0.10	-0.05	0.00	0.04	0.09	0.14	0.19
Scenario 1 (Positive)	3.26	3.56	3.90	4.24	4.58	4.93	5.28	5.64	6.00	6.37
Scenario 2 (Medium)										
1. The impact of urban growth	0.03	0.06	0.10	0.13	0.16	0.20	0.23	0.27	0.31	0.35
2. The impact of indigent in-migration	6.85	7.39	7.94	8.51	9.08	9.67	10.26	10.87	11.50	12.13
3. The impact of the urban poor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. The impact of unfunded mandates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. The impact of inclusive housing effects	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
6. The impact of inclusive transportation efforts	4.46	4.61	4.76	4.92	5.08	5.25	5.43	5.62	5.81	6.01
Scenario 2 (Medium)	11.43	12.15	12.88	13.64	14.41	15.21	16.02	16.85	17.70	18.57
Scenario 3 (Negative)										
1. The impact of urban growth	0.02	0.03	0.05	0.06	0.08	0.10	0.11	0.13	0.15	0.16
2. The impact of indigent in-migration	10.27	11.19	12.13	13.10	14.10	15.13	16.19	17.28	18.41	19.57
3. The impact of the urban poor	4.77	4.86	4.96	5.06	5.16	5.27	5.37	5.48	5.59	5.70
4. The impact of unfunded mandates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. The impact of inclusive housing effects	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38
6. The impact of inclusive transportation efforts	9.13	9.40	9.67	9.96	10.26	10.58	10.93	11.29	11.68	12.10
Scenario 3 (Negative)	34.56	35.86	37.19	38.56	39.98	41.45	42.98	44.56	46.20	47.91

⁶⁴ It should be noted that in the RUIM model, the concept of "grants" includes not only intergovernmental fiscal transfers to urban local governments, but also budgetary allocations to urban services that are delivered directly by national or provincial entities. For instance, budgetary subsidies to MetroRail are considered as "grants" in the context of the current model.

In response to the first issue—how much of the fiscal burden of increased urban spending will the national government actually bear through increases in grants—there are seemingly two opposing forces at play. On one hand, the national government has a strong demonstrated commitment to the equitable provision of public services, including a strong commitment to a pro-poor grant system. On the other hand, however, the medium term budgetary framework is pessimistic about national fiscal space over the medium term, and implies that urban spending programs should be tailored more carefully to achieve greater value-for-money rather than counting on a wholesale expansion of urban spending to achieve urban policy objectives.⁶⁵ In light of the tightening fiscal constraints at the national level, it might be prudent to reconsider the relatively optimistic assumptions included in the RUIM model regarding the willingness (or rather, the ability) of national government to support subnational poverty reduction and spatial inclusion efforts through the grant system.⁶⁶

A second pertinent question is how urban local governments themselves will respond to the projected cumulative increase in urban spending from a variety of different sources, particularly to the extent that grants fall short in covering this fiscal gap?

A partial answer to this question is that urban growth is expected to generate a fiscal surplus that can be dedicated to urban spending in other policy areas (Section 4). However, under Scenarios 2 and 3, the projected revenue gain is inadequate to cover the projected expenditure increases. As such, municipalities have the option of choosing a less-costly combination of urban policy options; raising revenues further through tax rate increases; or through borrowing for capital expenditures.

Although the partial-equilibrium nature of the fiscal impact model does not conclusively resolve this issue, it is likely that municipalities in general will choose to continue their current (generally conservative) fiscal stance by moderating urban expenditures within their

resource constraint.⁶⁷ As such, this will most likely involve resistance by finance officials (at all government levels) to costly new expenditure programs and, to some extent, continued (implicit or explicit) rationing of unfunded or underfunded local services. This proposition may be politically easier to accept to the extent that the newly proposed urban expenditure programs do not necessarily offer an attractive cost-benefit proposition for urban taxpayers, nor do they seem to offer an effective solution for the externalities or social ills that they seek to address.

10.3 Revisiting the robustness of the RUIM model

As a closing note, it is important to revisit and reiterate the fiscal impact model's considerable limitations. It should be noted that simulation models such as RUIM are not intended—nor should they be expected to be—accurate predictors of what will happen in the future. They do not provide an 'answer' in terms of creating certainty. However, a good simulation model should deepen understanding and inform decision making, as such models provide an opportunity to test different scenarios in order to deepen understanding of the relative impact of model parameters on a result.

With these limitations noted, it should also be noted that the outcomes of the RUIM model appear to be relatively robust. For instance, its expenditure projections fall within the same order of magnitude as the estimates generated by the Municipal Services Financial Model (NT/PDG, 2015).⁶⁸ Similarly, the model's simulation outcomes appear to be relatively robust with regard to key parameter changes.⁶⁹

One other point that should be reiterated is that the RUIM model presents a model of aggregate urban public finance in South Africa, thus glossing over large variances between individual urban jurisdictions. Given the considerable differences among metro municipalities

⁶⁵ *The National Treasury's MTBPS 2017 states (p. 4-5): "This period of revenue buoyancy appears to have run its course. The National Treasury projects a revenue shortfall of R50.8 billion in 2017/18. Lower revenue this year carries forward, and gross tax revenue is projected to fall short of the 2017 Budget estimates by R69.3 billion in 2018/19 and R89.4 billion in 2019/20. This reflects slowing economic growth, but may also suggest a profound shift in the relationship between economic growth and tax collection in the years ahead." With respect to urban services, the MTBPS states that "Over the medium term, the focus [for spending on community development] remains on **balancing resources** to respond to water, sanitation and electrification infrastructure needs in rural areas, and improving public transport services and access to shelter in urban areas." (p. 40). Similarly, "[t]o ensure that municipal public transport systems are sustainable, government aims to provide **greater differentiation** in the norms and standards of services and infrastructure. This includes **moderating** public transport service levels in smaller cities to ensure quality services that are **affordable**". (p. 40). Furthermore, the "National Treasury and the Department of Human Settlements will review spending on urban informal settlement upgrading, with a view to changing the grant system to enable increased investment in on-site upgrading." (p. 44) (Emphasis added by author).*

⁶⁶ *To the extent that urban areas are engines of national economic growth, reducing their funding could potentially have negative implications for national revenues.*

⁶⁷ *It should be noted that urban local governments already engage in considerable cross-subsidization of local services to the urban poor, reducing the likelihood of additional local tax increases and further cross-subsidization.*

⁶⁸ *According to NT/PDG (2015), the average projected infrastructure investment need is R43 billion per annum. The report noted that, on average, metros are budgeting to spend R27.5 billion per annum (in 2014 Rands) over the MTREF period, which is 64% of the projected need.*

⁶⁹ *For instance, in line with expectations, doubling the cost ratios for urban infrastructure and services for the urban non-poor versus the urban poor structure has significant implications on the projected fiscal impact of the various simulations. However, the model's qualitative conclusions remain the same.*

in terms of economic, fiscal, social and demographic conditions, the conclusions of the RUIM model cannot be transferred or applied to the situation in each individual urban area without further consideration.

11. Emerging findings and insights

The development of the RSA Urbanization Impact Model is unique, in that it provides objective projections of the expenditure and revenue impacts of different urbanization trends and policies. In doing so, it provides a big-picture look at urban finances in South Africa and the fiscal sustainability of various policy alternatives over the next ten years.

As noted at the outset of this paper, the initial premise for this study is the widely held notion that a vicious cycle has emerged in South Africa by which costly urban infrastructure and urban service subsidies are being provided to households and firms to mitigate the costs of an inherited, spatially inefficient urban structure. The conventional wisdom holds that the spatial structure of South Africa cities is economically inefficient, social exclusive, and fiscally expensive. Through the RUIM model, this background paper explores whether capital investments in a more efficient and inclusive urban form would be sustainable, or whether the recurrent implications of investments in inclusive urban public transportation and more inclusive public housing solutions would result in fiscally unsustainable outcomes.

The fiscal impact simulations give rise to a number of emerging findings and insights. While some of the findings yielded by the RUIM model confirm the existing state of knowledge with regard to urban finances in South Africa, other findings reflect emerging or under-emphasized insights into urbanization processes and urban finances in South Africa.

11.1 Overall fiscal sustainability of urban finances

The results from the three different scenarios simulated by the RUIM model give an indication of the sustainability of urban public finances in South Africa under different circumstances. The simulations suggest that urban finances in South Africa are generally on sustainable footing. This conclusion is consistent with the earlier finding that there is no danger of an imminent urban fiscal crisis (Boex and Karger-Lerchl, 2017).

Out of the three scenarios, the fiscally “worst-case” simulation scenario, however, reflects a situation in which low growth, higher fiscal burdens, and the recurrent implications of investments contribute to a fiscally

unsustainable trajectory. This is again consistent with the finding that urban local governments are subject to a range of forces that create upward pressure on local government spending (Boex and Karger-Lerchl, 2017). While no single urban function by itself threatens the sustainability of urban finances, the combined impact of different urbanization patterns and policy decisions could potentially pose a long-term cumulative fiscal risk. While such a “perfect storm” is not necessarily likely, local governments as well as National Treasury will want to take steps to avoid this situation from arising.

11.2 The importance of urban growth and related capital investments

Although there are several aspects of urbanization that impose a burden on urban fiscal space, urban growth is the only one aspect of urbanization that has the potential to generate considerable net fiscal space. In order to ensure urban fiscal sustainability, it will be critical to ensure continued growth of the non-residential (business or productive) sector in urban areas as well as growth of the high-income residential sector.

In this light, the finding that urban areas currently only dedicate around 25% of their capital investment funding in support of the non-residential (business) sector is disconcerting. While urban growth results in a positive net fiscal impact in the long run, realization of this growth is premised on the necessary investments being made in the meantime.

How to fund these added capital investments is an important urban finance concern. Urban local governments seem uninterested in increasing the burden on local taxpayers to fund such added investments—either directly from own source revenues, or indirectly through the repayment of greater debt—as higher-income households are already providing considerable cross-subsidization of services to the urban poor. All financing modalities—including borrowing, but also reform of the grant system and/or revenue sharing should be considered.

11.3 The relative sustainability of pro-poor urban finances

Ensuring a more equitable society—among others, by providing free housing and housing-related services to (existing and new) indigent urban residents—has been, and continues to be, an important political priority in the two decades since the end of apartheid.

The simulations suggest that the marginal fiscal impact of pro-poor urban policies—even when we combine the impact of services for new and existing indigent residents, as well as unfunded mandates—is relatively

sustainable under the more likely scenarios. The most costly intervention to the public sector in this area would be the rapid expansion of public housing programs, which would not only cause an increase in the requirement for network infrastructure (electricity, water, roads, and so on), but would also increase the financial requirement for providing recurrent services to indigent households. Although there are still gaps between actual service delivery levels and the service delivery commitments made with regard to the urban poor, there is considerable cross-subsidization of pro-poor services at the municipal level and little evidence to substantiate the concern that “urban budgets are balanced on the backs of the urban poor.”

To the extent that there is a belief among national-level policy makers that urban local government are not engaging in “sufficient” redistribution or pro-poor service delivery (in line with municipal governments’ constitutional responsibility to ensure equitable delivery of services), it would be prudent to revisit (and possibly revise upward) the degree to which the LGES funds municipal governments to provide municipal services to indigent households, possibly even reaching beyond the narrow range of trading services currently taken into account in the calculation of the LGES allocations. Doing so would reduce the need for local cross-subsidization of municipal services to the poor, which would free up own source revenues which could be redirected towards other functions, such as infrastructure development in support of urban growth.

A trend that appears to have received relatively little attention is the fact that urban poverty has seen a drastic decline in South Africa since 2001. If urban poverty reduction continues at the current pace, urban poverty will be all but eliminated in South Africa in one generation. Although the exact dynamics of urban poverty reduction are not fully clear, the available evidence suggests that urban spaces in South Africa—concerns about the inefficiency and inequities of their spatial form notwithstanding—have performed as a highly effective catalyst for upward social and economic mobility.

11.4 The limitations of inclusive housing and transportation interventions

Much attention has been paid in recent years to the potential of inclusive housing and transportation interventions to reshape South Africa’s urban spatial forms in order to reducing the inefficiencies and inequities associated with the current low density spatial form and the associated spatial mismatch. Despite the tight fiscal space at the national level, the MTBPS continues

to highlight the need to “plans to reconfigure the urban landscape, which remains dominated by inefficient and inequitable patterns of settlement.” (National Treasury, 2017: 4).

The simulations prepared with the RUIIM model suggest that—if seriously pursued— inclusive housing and transportation interventions have the potential to become quite expensive, absorb considerable fiscal space and contribute considerably to the risk of fiscal unsustainability. Such interventions are likely to have only a limited impact on urban form, as even under optimistic scenarios, the number of people whose locational decisions would be impacted by such programs— compared to the total urban population—is relatively limited in the short- to medium term.⁷⁰

With regard to the delivery of public housing, there are competing policy objectives at play. On one hand, there is considerable political pressure to provide free housing to all qualifying residents. This requires large scale housing developments, which can only be achieved through the implementation of mega-projects at the urban fringe. On the other hand, the development of such large scale housing projects at the urban fringe would worsen—rather than improve—the density of urban space and would most likely reduce the inclusive access of poor residents. The simulations suggest that delivering housing opportunities is already fiscally expensive; achieving densification at the same time would only further increase the cost of providing urban housing and reduce fiscal sustainability. However, nuanced housing approaches that result in greater inclusion and integration of the urban poor into the urban space economy don’t necessarily align with political economy pressures within the sector to deliver large numbers of housing units.

Similarly, urban public transport interventions—as they are currently being pursued—are unlikely to contribute substantially to reducing spatial mismatch or to changing the urban spatial form. Indeed, with regard to fiscal risk, investments in urban public transportation present a potential “triple whammy”, where fiscal space is reduced by (i) increased capital investment in public transit, (ii) the resulting increase in operating expenditures, while (iii) the expansion of public transport networks may also cause a reduction in fare revenues. The fiscal risk is particularly great if the use of public transportation by the urban poor is path dependent and if the current dearth of public transportation options is causing the emerging urban middle class to switch to cars (and in so doing, opt out of public transportation for future years).

⁷⁰ It was noted in Section 8 that the locational decision of no more than 8% of urban households would be directly impacted by a “high-density, high-volume” approach to urban housing over the span of decade. Likewise, the analysis in Section 9 concludes that under the more realistic scenarios, it is likely that the increase in urban bus ridership might only increase by 1-2 percentage points of the urban population, therefore having only a minimal—if any—impact on the overall urban spatial form and the inclusiveness of access.

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ANNEX. DETAILS ON SPECIFIC ASSUMPTIONS

DEMOGRAPHIC MODELING ISSUES / ASSUMPTIONS

	QUESTION / ISSUE / ASSUMPTION	DISCUSSION OF OPTIONS / SOLUTION
D1	What is the best estimate for the number of residents in the eight metropolitan municipalities in 2016 (base year)?	Based on Census 2011, there were 20,731,918 metro residents in 2011. Based on the 2001-2011 inter-census growth rate for these metros (2.3251% per year), we estimate a total urban population of 22,853,016 urban residents.
D2	What is the share of urban residents that is "poor" versus "non-poor"?	<p>The main fiscal distinction for urban residents to be considered "poor" or "non-poor" (or more precisely: indigent versus non-indigent) is whether they pay local taxes/fees, and whether they are entitled to free urban services based on indigent policies.</p> <p>SACN (2015) notes that income bands 0 to 4 (households with incomes below R38,200 per year - based on Census 2011) make up around 53.2% of all city households. Most of these households should not be liable for any municipal taxes and service charges in terms of the indigent policies of the cities, provided they manage to keep within specified consumption limits.</p> <p>Assumption D5 suggests that, on average, indigent households in metropolitan areas have 2.7 individuals, whereas an average metropolitan non-indigent household has 3.4 individuals.</p> <p>The estimate number of poor urban residents is estimated based on Assumption D1, based on the share of urban households considered poor/indigent based on this income definition and average household size.</p> <p>As a result, the estimated share of the population that is indigent (rather than the share of households) is 47.47 %.</p>

	QUESTION / ISSUE / ASSUMPTION	DISCUSSION OF OPTIONS / SOLUTION
D3	What is the current/estimated population growth rate for non-indigent residents into metropolitan areas?	<p>It is assumed that the share of indigent and non-indigent residents in 2016 is the same as in 2011. In other words, it is assumed that both population groups grew at the average growth rate based on the 2001-2011 inter-census population growth rate for metros (2.3251% per year).</p> <p>The net growth rate for non-indigent residents in metropolitan areas for the base year is assumed to be 2%. This percentage determines the marginal CapEx requirement per new non-indigent household, as well as the level of development impact fees per new household.</p> <p>Available census data (2001-2011) implies that the net growth rate for indigent households is closer to 1% per year, whereas the net non-indigent growth rate is closer to 10%. As such, the assumptions made about relative population growth are quite conservative.</p>
D4	What is the current/estimated population growth rate for indigent residents into metropolitan areas?	<p>It is assumed that the share of indigent and non-indigent residents in 2016 is the same as in 2011. In other words, it is assumed that both population groups grew at the average growth rate based on the 2001-2011 inter-census population growth rate for metros (2.3251% per year).</p> <p>In the absence of detailed data, the growth rate for indigent residents in metropolitan areas has been set at 2%. This percentage determines the marginal CapEx requirement per new indigent household.</p> <p>See Assumption D4 for further clarification.</p>
D5	What is the average household size for each income class (or at least: by poor and non-poor)?	Census estimates suggest that, on average, indigent households in metropolitan areas have 2.7 individuals, whereas an average metropolitan non-indigent household has 3.4 individuals.
D6	For Simulation 1 and Simulation 2, the model's scenarios are projecting annual population growth rates (for non-poor and poor residents, respectively) of 1,2 and 3 percent annually .	As noted, annual growth rates of 1,2 and 3 percent represent a conservative but reasonable set of residential growth expectation for the three scenarios for poor and non-poor residents, respectively.

FISCAL MODELING ISSUES / ASSUMPTIONS

	QUESTION / ISSUE / ASSUMPTION	DISCUSSION OF OPTIONS / SOLUTION
F1	What are the most recent expenditure and revenue data available for the base year?	Preliminary financial (Section 71) reports for 2016/17 were available and used for the model.
F2	<p>Given the limited data availability, how can the non-residential (i.e., business or productive) sector best be modeled in terms of expenditures and revenues?</p> <p>Generally, it is assumed that business activity is proportionate to size in non-poor population. This means that increases in non-residential expenditures and revenues over time are proportionate to size in non-poor population (for OpEx, CapEx as well as revenues).</p>	<p>Background analysis prepared by PDG suggests that the non-residential sector (in aggregate across all metropolitan municipalities) benefits from approximately 33% of operational spending.</p> <p>Furthermore, calculations from the MSFM suggest that approximately 25% of capital expenditures is directed towards the non-residential sector (although this excludes public transportation, municipal administration and similar expenditures).</p> <p>On the revenue side, the same basic assumption is imposed that business revenues are proportionate to the size (and increase) in the non-poor population. Since we assume that poor residents do not pay local revenues, there is no need in the model to separate business revenue from non-poor local revenue payments.</p>

	QUESTION / ISSUE / ASSUMPTION	DISCUSSION OF OPTIONS / SOLUTION
F3	The cost ratio for recurrent service provision (OpEx) for non-poor residents versus poor residents is set at 1.66.	This parameter estimate is based on the cost of providing trade services to poor versus non-poor residents for the eight metropolitan municipalities combined.
F4	The cost ratio for capital infrastructure provision (CapEx) to non-poor versus poor residents is set at 1:1.2.	The MSFM estimates the CapEx spending ratio for low-to-high income households at 1:1, as the MSFM projects ideal spend, not actual. This is likely to overestimate the actual capital spending for low-income capex, as (a) cost specifications are likely to be lower for lower-income housing investments, and (b) there are likely to be greater backlogs and/or a degree of under-investment in infrastructure specifically targeted for poor households. Changing this cost ratio parameter (e.g., to 0.5:1.2; reflecting a situation in which only half of the indigent residents are formally housed, requiring capital investment) does not qualitatively change the outcome of the model.
F5	The model assumes that indigent households/residents do not pay any local OSR revenues, and that therefore all local revenues are paid in proportion to the number of non-indigent households.	In reality, estimates suggest that 2% of local revenues is contributed by low-income households/residents.
F6	The capital grant share that is directed towards indigent/in-migrant infrastructure is assumed to be 50%.	
F7	The model assumes that 2/3 (66.6%) of actual urban capital expenditures spending are directed towards urban infrastructure expansion, as opposed to backlog and renewal	This assumption is a reasonable estimate, in line with the work done by NT/PDG (2015).
F8	The aggregate amount for the I Component for the baseline year 2016/17 is estimated to be R 3 billion.	
F9	The model assumes that no other major recurrent operational conditional grants exist that fund services to non-indigent / non-poor urban residents.	
F10	Based on existing estimates cited by NT/PDG (2015), the model assumes that property values are quite responsive to urban economic growth: for every 1% increase in economic activity, a 3% increase in property values (and hence, property rates) is expected.	In response, property values are expected to increase $n+2$ % annually, where n is the non-indigent population growth rate. (Note: property value increases were not estimated as $3*n$ % annually).
F11	It is assumed that no other major capital conditional grants are provided to fund services/ infrastructure to indigent / poor urban residents.	
F12	The model assumes AVC=MC for poor as well as non-poor residents, for operational.	General and administrative expenditures, as well as 30% of each of the other spending categories are taken as fixed costs (based on PDG estimates).

This is one of nine background papers prepared as part of the South African Urbanisation Review (UR), which was commissioned by the Cities Support Programme (CSP) of the National Treasury to inform national policy and the Integrated Urban Development Framework (IUDF) on options for enhancing spatial integration. The other background papers and the overall report ('Managing Urbanisation to Achieve Inclusive Growth') is available from the CSP website.

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