A micro-spatial analysis multidimensional poverty in Gauteng province – South Africa Evidence from quality of life survey data

Darlington Mushongera, Precious Zikhali and Phindile Ngwenya

Abstract

Analyses of poverty in South Africa have generally focused on money-metric measures and tend to be pitched at either national or provincial levels. These unidimensional approaches, though important, are narrow and provide little information on the many dimensions of poverty that poor people experience. National level analyses also mask the poverty dynamics that prevail at the micro level. As a result, these studies are of limited use to local government where policy implementation occurs and where information about the poor is desperately needed. The key limiting factor has been the nature of available datasets which do not permit spatial disaggregation to local or lower levels. While National Census data allow for lower level spatial disaggregation, the ten-year gap between censuses limits government planning capabilities. The availability of three recent and unique Quality of Life Survey (QoL) datasets from the Gauteng City-Region Observatory (GCRO) presents an opportunity to undertake a multidimensional poverty analysis for Gauteng at three geo-scales: provincial, local and ward levels. We develop a Multidimensional Poverty Index (MPI) for Gauteng for 2011 and 2013 using the Alkire-Foster mmethod. Overall, the MPI for Gauteng is low but varies markedly by municipality and by ward. The MPI is revealed to be strongly correlated with income poverty. Not only are income poor households more likely to be multidimensionally poor, they also suffer from higher intensities of poverty. Multidimensional poverty tends to be highest in areas that have low economic activity and are located on the edges of the province. However, pockets of multidimensional poverty exist even in better performing municipalities. More in-depth analyses of developmental challenges at much more localised levels are needed to assist local government to devise policies that channel investments into lagging areas and avoid using approaches that are indifferent to the heterogeneities that exist across local geographical spaces.

Keywords: Multidimensional poverty, headcount ratio, poverty intensity, Quality of Life Survey, Gauteng

1 Introduction

In spite of major policy and legislative interventions enacted since 1994, reducing poverty and inequality remains one of the major challenges facing the South African government. The first post-apartheid government prioritised the reduction of poverty and inequality and this is reflected in several policies and legislative enactments, in particular the Reconstruction and Development Programme (RDP) of 1994 (Republic of South Africa (RSA), 1994: 7). Twenty years on, reducing poverty and inequality along with unemployment are still major objectives of government, occupying a central place in the National Development Plan (NDP) 2030, published in November 2011.

In addition to pursuing economic growth as a broad measure for alleviating poverty and lowering inequality, the South African government also uses the budget to pursue these goals through the social wage[1] (RSA, 2013; Statistics South Africa (Stats SA), 2014a). The social wage – which constituted around 60 percent of total government spending in 2013 – provides the poor, the previously disadvantaged, and marginalised communities access to basic services under the Free Basic Services Programme (FBS) and other social protection initiatives (RSA, 2013). Free basic services include subsidised access to electricity, water, sanitation, and refuse removal. Social protection comprises social grants. Social spending on primary healthcare, education, enhancing access to productive assets by the poor (e.g. housing and land), and job creation through the Expanded Public Works Programme (EPWP) also form part of the social wage.

Initiatives to reduce poverty and inequality are also high on the agenda of the current Gauteng Provincial Government (GPG). In 2014, GPG adopted the Multi-Pillar Programme for Radical Transformation for Gauteng. One of the ten pillars currently included in the programme is Accelerated Social Transformation

[1] Social wage refers to monetary and in-kind support given to vulnerable households. Four components make up the social wage in South Africa (i) housing and community amenities; (ii) health; (iii) education; and (iv) social protection. The first three replace or subsidise day-to-day expenses for housing, education and health thereby reducing the cost of living. The fourth is income paid directly to vulnerable groups.

(AST)[2] and poverty reduction forms part of this sub-programme (GPG, 2014a). In addition to the AST, GPG launched the Ntirhisano (*working together*) Service Delivery War Room Strategy (NSDWR). This strategy aims at establishing a cohesive and integrated network of service response structures that connect all levels of administration from provincial down to ward level. The strategy also aims at creating a shift in how people's needs are identified, responded to and resolved (GPG, 2014b). A public complaints and response system and a household profiling system were put in place during 2014 and community-based field workers were deployed to monitor service delivery at local level (GPG, 2014b). These initiatives are indicative of the commitment by the leadership of GPG to accelerate social transformation and deal with the various aspects that define poverty at the local level. A strategy for ensuring that the various local municipalities and other development agencies work in tandem was drawn up as a way of avoiding duplication of efforts. GPG also took advantage of existing partnerships with research institutions, in particular GCRO, in pursuance of the ward profiling process. This ward profiling process enables the identification of areas that are lagging behind in terms of infrastructure provision and ensure that development initiatives target needy communities.

2. Poverty measurement

In order to effectively address poverty in the manner envisaged by GPG, accurate, reliable and timely information at the local scale is essential. Local level analyses are also important for evaluating the impact of government poverty reduction programmes. Since Sen's (1976)[3] seminal work on measuring poverty, significant advances have been made towards finding an appropriate measure of poverty and social wellbeing. However, reliance on a single measure of poverty is problematic because it limits policy-makers' understanding given that poverty takes different forms beyond just income. As can be expected, the choice of the poverty measure has direct bearing on how poverty is understood and consequently influences how it is analysed and the type of policies that are prescribed to address it (Alkire and Foster, 2011). In general, therefore, poverty measurement methodologies can have tremendous practical and policy relevance (Alkire and Foster, 2011).

The need for a multidimensional approach to poverty is widely shared as a guide to the search for an adequate indicator of poverty (Anand and Sen, 1997). As (Sen, 2000:9) rightly observed:

> "Human lives are battered and diminished in all kinds of different ways, and the first task, seen in this perspective, is to acknowledge that deprivations of very different kinds have to be accommodated within a general overarching framework."

Based on Sen's observation, it is clear that the multidimensional measurement of poverty is essential from both practical and policy perspectives. Several attempts have been made to do this, notably Anand and Sen (1997); Atkinson (2003); Bourguignon and Chakravarty (2003); Kakwani and Silber (2008); and Thorbecke (2008). The conception of poverty as being multidimensional also forms the basis for the Human Development Index (HDI) and the Millennium Development Goals (MDGs).

Traditionally, poverty analyses across the world have favoured the money-metric measures that utilise mainly income data and a given threshold. Using this unidimensional approach, all individuals or households that fall below a specified minimum income threshold (the poverty line) are deemed poor. A numerical poverty measure is used to determine the overall level of poverty across the entire population relative to the given poverty line (Alkire and Foster, 2011).[4] In spite of the contestations in the setting of

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[2] A Gauteng programme aimed at raising the living standards of all the people in the province through provision of quality of education and healthcare, social protection to the vulnerable in particular women and children and eradication of poverty and building social cohesion and social solidarity.

[3] This work proposed a new measure of poverty, which avoided some of the shortcomings of preceding measures. An axiomatic approach was used to derive the poverty measure and the conception of welfare in the axiom set is ordinal. Given the limited information requirement, the new measure is practically useful.

the threshold amount, the general appeal for money-metric approaches is that income is an important component of household welfare. It facilitates access to a wide range of other items that are essential to life, e.g. food, clothing, schooling, household assets, and so on. However, money-metric measures of poverty are often criticised for limiting comparisons across countries (or surveys) given that survey designs vary across countries. Money-metric measures often fail to capture the value of services that are typically not transacted on the market even though these services form a significant part of the broader multidimensional aspects of poverty. For instance, access to water, sanitation, education, health, and food contribute significantly to household welfare and the costs are often much higher than reflected in household expenditures on these items.

In South Africa, numerous analyses of poverty and inequality have been conducted, e.g. Seekings and Nattrass (2005); Woolard and Leibbrandt (2006); Bhorat et al. (2007); Leibbrandt et al. (2010); Leibbrandt and Levinsohn (2011); Ngepah (2011); Tregenna (2011); Sekhampu (2013); and Stats SA (2014a). The majority of the literature on levels of poverty and inequality in post-apartheid South Africa is based on either national or provincial population surveys. Key national datasets used, either alone or in combination, include the Income and Expenditure Surveys (IES), the October Household Surveys (OHS), the Quarterly Labour Force Surveys (QLFS), and National Census. A number of sub-national surveys have also been undertaken at sub-provincial regions notably the KwaZulu-Natal Income Dynamics Study (KIDS) and the Cape Area Panel Study. Detailed but succinct summaries of findings from these earliest studies are given in Noble et al. (2006).

Some of these studies have applied a range of poverty lines to assess the incidence, intensity and severity of poverty, e.g. Woolard and Leibbrandt (2001); Martins (2003); and Hoogeveen and Özler (2006). Each of these lines is set at different levels based on particular assumptions. However, the use of money-metric measures in South Africa not only present a mixed view of changes in wellbeing since 1994 but also vary markedly with non-money-metric approaches showing an increase in welfare (Schiel, undated). For example, Bhorat et al. (2009) showed that in South Africa people's access to public assets such as formal housing, piped water, electricity for lighting and cooking, as well as certain private assets such as radios and televisions, increased remarkably after 1994, particularly among the previously disadvantaged groups. Using a range of socio-economic and demographic indicators in 21 nodes across South Africa that are known for their high levels of poverty, Everatt (2009) also showed that after 1994 poverty levels improved significantly in the 21 nodes, although challenges do still exist. As such, unidimensional measures tend to underestimate both levels of and changes in welfare. However, it is possible for there to be a situation where income poverty is falling while non-income poverty is rising.

Apart from being predominantly unidimensional and money-metric, most studies on poverty in South Africa have a shortcoming that renders their findings less relevant at subnational levels such as provinces and local municipalities. The shortcoming is that they tend to be aimed at a national level owing to the nature of available datasets that constrain analysis of poverty at sub-national level. Alternative approaches are therefore needed to complement the money-metric measures as well as to focus attention on poverty dynamics at subnational and localised levels (the spatial dimension). In South Africa, there is a strong correlation between apartheid geography and the socio-economy of the country. Apartheid South Africa was characterised by acute state driven structural imbalances that prejudiced mainly the African population. These imbalances have persisted well into the post-apartheid period raising questions about the efficacy of current government policies, approaches to poverty reduction, and the targeting mechanisms.

[4] For a concise history and the use of unidimensional measures see Alkire and Foster (2011).

Although poverty reduction is high on the policy agenda of GPG, limited information exists on the nature, depth and severity of the various dimensions of poverty at the localized level to enable government to craft appropriate and effective policy interventions at that level.

Accordingly, this paper deepens our understanding of poverty at sub-provincial level in South Africa by exploring changes in non-monetary measures of poverty and wellbeing between 2009 and 2013 using Gauteng province as a case study. Specifically, the paper: (i) expands the analysis of poverty by adopting a multidimensional approach which focuses on non-money-metric aspects of poverty; and (ii) examines the spatial configuration of multidimensional poverty within Gauteng. The analysis is made possible by the availability of three datasets from GCRO's QoL Surveys that focus exclusively on Gauteng. These datasets permit a more nuanced analysis of poverty as a result of their emphasis on aspects that directly affect people's wellbeing. In addition, the datasets permit analysis down to the ward level. Such level of analysis is not possible when using official datasets such as the General Household Surveys (GHS), IES, and QLFS among others, which allow only for national and provincial level analyses. Given that the mandate for service delivery in South Africa falls directly on the local sphere of government, these national surveys have limited value to policy-makers at the local level. This paper aims to address this shortcoming by computing not just a MPI, but also showing the spatial variations in multidimensional poverty across Gauteng's geographical localities. The findings of this study are intended to inform the poverty reduction initiatives for AST under Gauteng's Multi-Pillar Programme introduced in 2014.[5]

The rest of the paper is organised as follows: Section 3 situates Gauteng within the broader national geographical and socio-economic context. In Section 4, a multidimensional approach to poverty analysis is discussed. The data used in the analysis are presented in Section 5, while Section 6 outlines the Alkire-Foster methodology. Results are presented in Section 7, followed by a discussion in Section 8, and conclusion in Section 9.

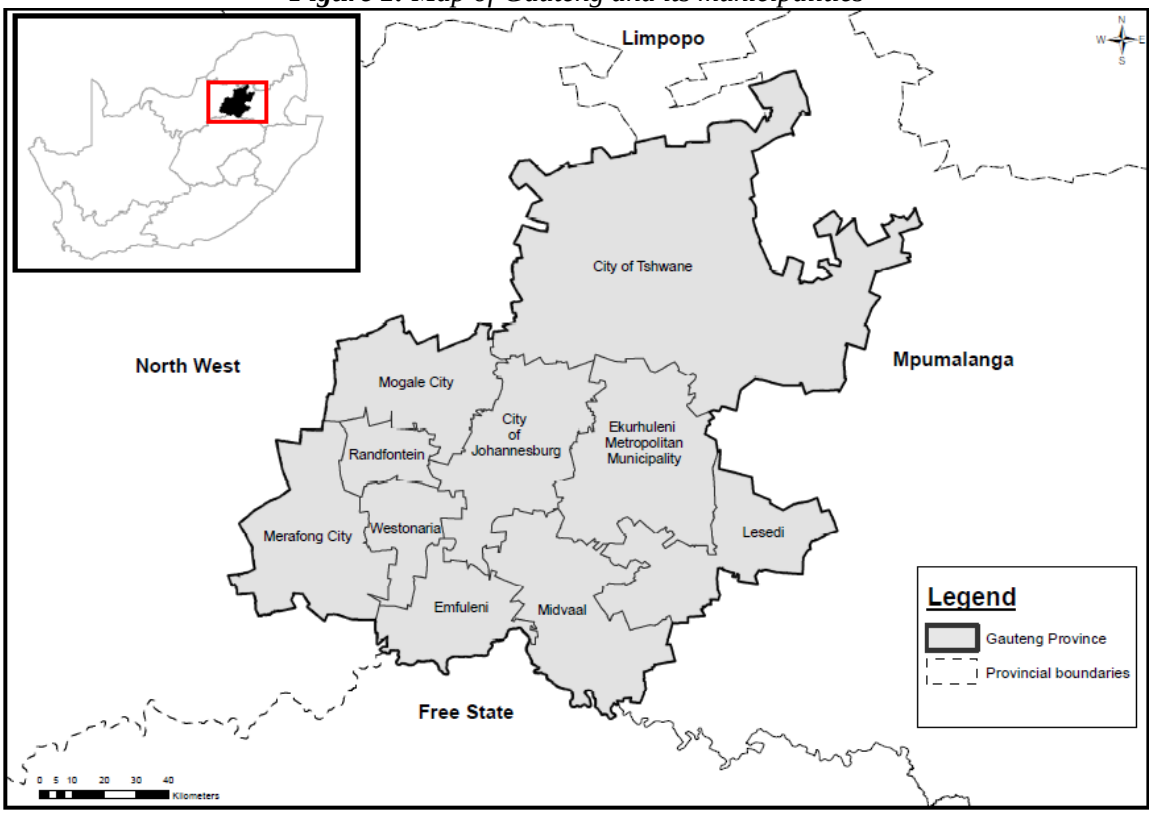
3. Gauteng province: An overview

3.1 Location and size

Gauteng is one of South Africa's nine provinces and is centrally located in the northern part of the country (Figure 1). It shares its border with four other provinces namely Limpopo to the north, Mpumalanga to the east, the Free State to the south, and North West to the west. The province sits at the centre of major transportation routes in the country. It is relatively small in physical size stretching an estimated 18 182 km^2 or just over 1 percent of South Africa's total land area. Gauteng is comprised of ten local municipalities, three of which are some of the largest metropolitan cities in the country by population and by economic activity. These are City of Johannesburg (CoJ) which is the financial capital, City of Tshwane (CoT) which is also commonly known as Pretoria and serves as the administrative capital, and Ekurhuleni Metropolitan Municipality (EMM) which is a major industrial hub and home to the well-known OR Tambo International Airport. Figure 1 shows the map of Gauteng and its ten local municipalities. Gauteng is largely an urban province and its origin dates back to the discovery of gold in the late 19th century and subsequent gold mining activities of the early to mid-20th century. The scale of gold mining was so large that it attracted a lot of investment from across the world and the demand for both skilled and unskilled labour was very high. Within the space of a century, Gauteng had evolved into a very large urban landscape characterised by a wide diversity of cultures and socio-economic disparities. Ironically, despite being a "place of gold", Gauteng has some of the most underdeveloped communities in the country and levels of inequality are very high.

[5] The Premier for Gauteng province, Mr. David Makhura, stressed during the State of Province Address that the province was adopting evidence-based planning.

Figure 1: *Map of Gauteng and its municipalities*

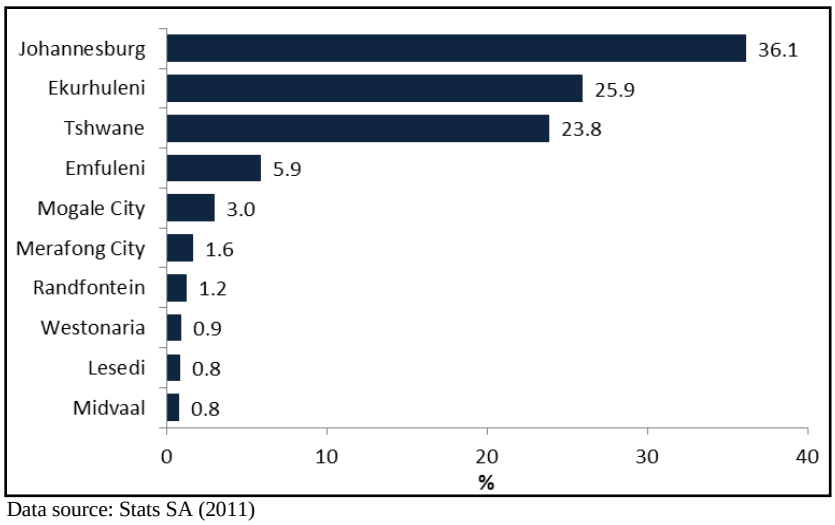


Source: GCRO GIS Maps

3.2 Demography

Although physically smaller than any other province, Gauteng is the most populous province in the country with an estimated population of over 12 million (Stats SA, 2011). It is therefore close in size to metropolitan Los Angeles, which has an estimated 12.9 million people in an area of 14 764 km^2, and metropolitan Paris with 11.7 million people in a region of 12 012 km^2 (GCRO, 2012). National Census 2011 showed that 23.1 percent of South Africa's population live in Gauteng. Projecting forward at current annual average population growth rates Gauteng may have as many as 15.6 million people by 2020, at which point it would house 26.5 percent of the country's population (GCRO, 2012). Figure 2 shows that more than 85 percent of Gauteng's population is located in the three metropolitan municipalities. Although all municipalities are predominantly African, there is a higher concentration of Africans in areas with low economic activity. Examples include Westonaria, Merafong City and Emfuleni where the African population constitutes 92 percent, 87 percent and 86 percent respectively. Low economic activity is associated with limited access to employment and income-generating activities. Under apartheid, Africans were also forced to live in overcrowded and underserviced townships where high levels of deprivation are often found. The legacy of this segregation remains visible in present-day Gauteng.

Figure 2: *Population distribution in Gauteng*



Data source: Stats SA (2011)

Table 1 shows population distribution by race based on data from National Census 2011. As the table indicates, 78 percent of Gauteng's population is African. Given such a skewed population distribution and the policy of separate development pursued by the apartheid government, poverty and inequality trends correlate highly with race. This is also a distinctive feature of development in South Africa generally.

Table 1: *Population distribution by race and by municipality, (percent)*

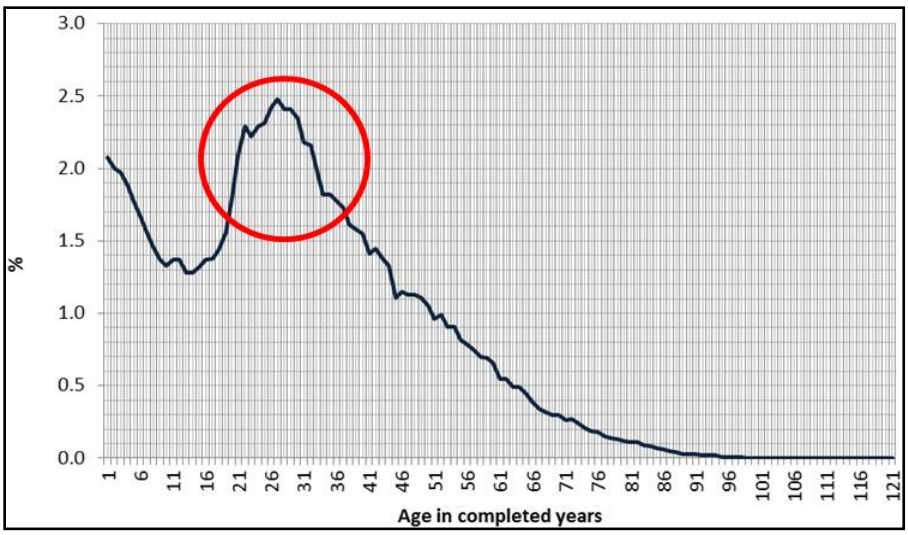
	African	Coloured	Indian/ Asian	White
Emfuleni	86	1	1	12
Midvaal	59	2	1	39
Lesedi	78	1	1	20
Mogale City	76	1	2	21
Randfontein	70	10	0	20
Westonaria	92	1	0	7
Merafong City	87	1	0	12
Ekurhuleni	79	3	2	16
Johannesburg	77	6	5	12
Tshwane	76	2	2	20
Total	**78**	**3**	**3**	**16**

Data source: Stats SA (2011)

While population statistics at regional level are critical, it is usually at the household level where local government interest lies because the rollout of service delivery (i.e. water and electricity supply, waste removal, housing provision, etc.) depends on the number of households in a given municipality. National Census 2011 revealed that there are 3.9 million households in Gauteng (24.4 percent of total households nationally), having increased by nearly 1.2 million since the Census of 2001.

Apart from natural population increase, Gauteng also attracts a large number of people from other provinces, neighbouring countries and elsewhere. The majority, particularly those from other provinces, are largely poor young people looking for economic opportunities that Gauteng is assumed to offer (Landau and Gindrey, 2008).

Figure 3: *Population age distribution for Gauteng*



Source: Authors, using data source: Quantec

As shown in Figure 3, there is a very large population in the 16-36 year old cohort, which can only be explained by the high rate of migration into the province. As a result, Gauteng faces huge challenges related to unemployment, migration, pressure on service delivery and urbanisation more generally. Municipalities in Gauteng are therefore under extreme pressure to maintain and improve existing levels of service delivery while extending services to cater for the growing population and the rapid rate of urbanisation.

3.3 Access to basic services

National Census 2011 shows that access to formal housing and basic services such as water, sanitation and electricity has improved significantly over the last ten years. On average, about 75 percent of households across Gauteng now live in formal dwellings, 92 percent have access to water in their dwelling or yard, 92 percent have access to a flush or chemical toilet, 88 percent have refuse collection by their municipality once a week, and 90 percent use electricity for lighting. Access to telephone and cellular communication rose phenomenally from 59.2 percent in 2002 to 96.3 percent in 2012 (Stats SA, 2014b). Although overall service delivery appears to have increased, the picture is not uniform across Gauteng municipalities with places such as Westonaria, Merafong City and Midvaal still lagging behind in certain respects. As will be shown later, the picture again changes when analysis is taken to a much lower level, i.e. the ward. Here we notice pockets of poverty in well-off municipalities such as Johannesburg, Tshwane and Ekurhuleni.

Despite the increase in access, there is a growing trend not just of service delivery protests but also of dissatisfaction with local government by members of the community in Gauteng. During the 2013 QoL Survey all ten municipalities recorded dissatisfaction rates of 46 percent and above compared to only three municipalities in 2009. This disjuncture between access and levels of satisfaction with government requires in-depth analysis and a more robust method of analysing poverty, as well as locating the major 'hot spots' in the province where levels of access to basic services is lacking. Knowledge of the dimensions of poverty and their spatial distribution is essential for government to design appropriate policy interventions and target the right people. It is clear that all municipalities need to improve the quality of services beyond the RDP Level 1 standards that were set in 1994 as an interim measure. There is growing evidence that communities are seeking more decent forms of sanitation than the provision of chemical toilets, for example.

3.4 Poverty, inequality and unemployment

With an income Gini of 0.69, South Africa is among the countries with very high levels of income inequality (Triegaardt, 2006; Tregenna and Tsela, 2012; World Bank, 2012). Such levels of income inequality are more acute in urban environments, and Gauteng is no exception. High income inequality coupled with high levels of deprivation and a large population exerts pressure on government to deliver services. Municipalities are also hard-pressed to assist the poor and indigent members of society who cannot afford to pay for services. Spatial data from the GCRO's 2013 QoL Survey indicate that income inequality is very high in the three metropolitan areas of Johannesburg (income Gini of 0.74), Ekurhuleni (0.77) and Tshwane (0.72). In a country like South Africa with low levels of social cohesion (GCRO, 2012), high-income inequality is a potential source of socio-economic tension and extreme incidences of violence such as xenophobia.

In spite of the existence of a large industrial base, Gauteng faces a high unemployment rate of 25.5 percent as of the second quarter of 2014. Although the unemployment rate was lower than the national average (36 percent), Gauteng faces a more serious problem given the size of its population (the 25.5 percent unemployment rate translates to about 1.8 million people who are unemployed). Table 2 shows that unemployment rates increased in all municipalities between 2008 and 2013. Although the unemployment rate is generally high across all municipalities, it is particularly worse for places like Ekurhuleni (27.8 percent for 2013), Merafong City (28.4 percent), Emfuleni (39.2 percent) and Westonaria (42 percent). Only Tshwane and Mogale City have unemployment rates of less than 23 percent.

Table 2: *Unemployment rates by municipality*

	2008	2009	2010	2011	2012	2013
Tshwane	19.3	20.6	23.2	23.2	22.6	21.2
Mogale City	18.5	22.0	24.6	24.5	23.6	22.0
Randfontein	19.8	23.2	25.6	25.6	24.8	23.4
Lesedi	21.6	25.1	27.5	27.1	26.1	24.4
Johannesburg	21.3	24.3	27.3	27.4	26.6	25.4
Midvaal	17.0	21.4	25.5	26.8	26.8	25.6
Ekurhuleni	23.4	27.3	29.9	30.3	29.4	27.8
Merafong City	18.6	23.8	28.8	30.5	29.5	28.4
Emfuleni	33.3	38.1	41.1	41.8	41.0	39.2
Westonaria	29.1	38.9	40.7	41.1	41.4	42.0
Gauteng	**21.9**	**25.0**	**27.7**	**27.9**	**27.1**	**25.7**

Data source: Quantec

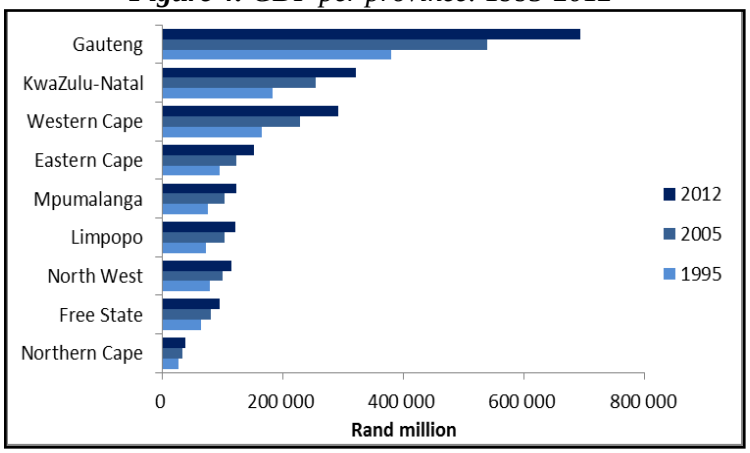
Linked to unemployment, Gauteng has a significant proportion of households without a single source of income. The households also face challenges when they try to get on to the government indigent register in order to receive social grant support. During Census 2011, 17 percent of Gauteng households reported that they did not have any income – of these 87 percent were African. With 3.9 million households and an average household size of 4.2, it means that approximately 2.7 million people in Gauteng face deep poverty due to lack of income.

3.5 Economy

It is ironic that Gauteng faces problems of poverty and unemployment when it has a very large and diverse economy. As shown in Figure 4, the gross domestic product (GDP) for Gauteng far exceeds that of other provinces, a trend that has been maintained over the last 20 years. For example, in 2012 alone Gauteng contributed 35 percent to total GDP for South Africa. In real terms, Gauteng's GDP has

increased from R379 249 million to R693 530 million between 1995 and 2012 (an increase of 83 percent). In spite of its large population, per capita GDP is also much higher compared to other provinces and it increased significantly from R46 115 in 1995 to R55 565 in 2012 (an increase of 20 percent). However, given the high levels of inequality, the massive wealth generated in Gauteng is only enjoyed by a smaller proportion of the population. As Piketty's works suggests, the more income is generated, the wider the gap between the rich and the poor (Moore, 2014).

Figure 4: *GDP per province: 1995-2012*



Source: Authors
Data source: Quantec

The bulk of Gauteng's wealth is generated in the three metropolitan areas as shown in Table 3. Approximately 90 percent of total provincial wealth comes from the three metropolitan cities of Johannesburg, Tshwane and Ekurhuleni. Table 3 shows that GDP as measured by Gross Value Added (GVA) is highest in the metro areas for the three years 2009, 2011 and 2013. In other Gauteng municipalities such as Randfontein, Midvaal, Westonaria, Lesedi and Merafong City economic activity has either become stagnant or has declined considerably as shown by the almost insignificant levels of output. The result is that people in economically low areas are forced to travel long distances to either work, to search for jobs and/or conduct business.

Table 3: *GVA by municipality at constant 2005 prices*

	2009		**2011**		**2013**	
	R millions	**% of total**	**R millions**	**% of total**	**R millions**	**% of total**
Merafong City	141	0	155	0	160	0
Lesedi	2 557	0	2 842	0	2 997	0
Westonaria	3 165	1	3 178	1	2 931	0
Midvaal	3 955	1	4 276	1	4 442	1
Randfontein	5 328	1	5 659	1	5 880	1
Mogale City	14 995	3	16 343	3	17 151	3
Emfuleni	20 350	4	21 798	4	22 512	4
Ekurhuleni	138 901	25	149 601	25	156 398	25
Tshwane	152 000	27	163 337	27	171 242	27
Johannesburg	216 949	39	233 762	39	246 346	39
Gauteng	**558 341**	**100**	**600 951**	**100**	**630 060**	**100**

Data source: Quantec

4. MPI: An alternative approach

The Living Condition Survey (LCS) of 2008/09 was the first survey designed by Stats SA with the specific objective of measuring poverty. The LCS emerged from earlier attempts by government to find a suitable measure of poverty. These attempts include: (i) the Key Indicators of Poverty in South Africa, 1995; (ii) Participative Poverty Assessment – South Africa Report, 1998; (iii) Poverty and Inequality Report, 1998 (Studies in Poverty and Inequality Institute (SPII), 2013); (iv) the Taylor Committee on the State of Poverty in South Africa, 2002 (Taylor, 2002); and (v) Towards an Anti-Poverty Strategy for South Africa, 2008 (RSA, 2008)[6]. In 2012, South Africa published a set of three national poverty lines for use in assessing poverty in the country (Stats SA, 2014). These lines were labelled with the following threshold amounts: (i) the food poverty line (FPL) – R305; (i) lower-bound poverty line (LBPL) – R416; and (ii) upper-bound poverty line (UBPL) – R577. In the same year the three poverty lines were applied to the 2008/9 LCS. Despite using the three poverty lines, the Stats SA poverty profiles based on the 2008/9 LCS data were largely unidimensional even though thresholds are set in such a way as to relate to specific baskets of goods and services. However, having an income equivalent to any of the three thresholds does not imply access and hence made various incorrect assumptions about what happens in reality. For example, the prices of goods and services are not uniform across the different municipalities.

1.1 The multidimensional approach to poverty analysis

Although money-metric approaches to poverty analysis are desirable on the basis of objectivity, reliance on a single dimension of poverty is problematic. The approaches assume the existence of markets and as such they fail to account for missing markets. Important outcomes such as education, health, water and sanitation improve people's wellbeing but are not typically transacted wholly on the market. On the other hand, poverty is a complex concept and conventional measures do not capture comprehensively what the concept entails. The MPI is one of the latest attempts at finding alternative approaches to complement the money-metric approach of measuring poverty as well as providing policy-makers with adequate information on the levels and dimensions of deprivation that people suffer. The increase in non-monetary data relevant to poverty has widened the scope for conducting MPI type analyses of poverty. Such data include the GCRO QoL Survey data.

Across the world, a number of researchers and organisations have adopted the multidimensional framework to poverty analysis. These include work on the Human Development Index (HDI) by the United Nations Development Programme (UNDP)[7] and the Global Multidimensional Poverty Index by the Oxford Poverty and Human Development Initiative (OPHI).[8] In the case of South Africa, a key study that used a multidimensional approach to poverty analysis was the Provincial Indices of Multiple Deprivation for South Africa (PIMD) developed using Census 2001 data (Noble et al., 2006). Thirteen indicators spread across five domains of deprivation were used in the analysis.[9]

In 2008, the presidency commissioned the Southern Africa Labour and Development Research Unit (SALDRU) to implement the National Income Dynamics Study (NIDS). NIDS was the first national panel survey designed with the specific objective of tracking not only poverty but also changes in household income over time. Finn and Leibbrandt (2013) compiled the MPI transition matrices for South Africans using the NIDS data and compared changes in the poverty profile of respondents across the three survey waves of 2008, 2010, and 2012. Although NIDS data have everything it takes to comprehensively analyse poverty, it is a national panel survey and it is not possible even to conduct provincial level analysis. The usefulness of findings from NIDS to policy-makers at local level is therefore limited.

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[6] This study used a poverty line based on monthly household expenditure of R800. It acknowledged the absence of more rigorous statistics but the figure used equated to the lowest international poverty line of a dollar a day at the time.

[7] http://hdr.undp.org/en/content/human-development-index-hdi

[8] http://www.ophi.org.uk/multidimensional-poverty-index/

[9] The five domains used were: (i) income and material deprivation; (ii) employment deprivation; (iii) health deprivation; (iv) education deprivation; and (v) living environment deprivation.

The most recent multidimensional poverty analysis is the South African Multidimensional Poverty Index (SAMPI) conducted by Stats SA during 2013/14. The SAMPI uses 2001 and 2011 Census data and the analysis drills down to ward level. While the SAMPI was designed along the lines of the Global MPI, it was adapted for the South African context and thus does differ in a few respects (Stats SA, 2014c).

The analysis done in this paper is an addition to the growing body of literature on multidimensional poverty analysis. It develops a Multidimensional Poverty Index for Gauteng (GMPI) using the Alkire-Foster method (Alkire and Foster, 2011). The GMPI provides comparison over a six-year period, 2009-2013, and therefore allows us to track changes in multidimensional poverty over much shorter periods. Consequently we are able to assess the susceptibility of households to shocks in the economy as well as test the responsiveness of government and the impact of their interventions. Uniquely, the GMPI further breaks down the analysis by income groups to capture and compare poverty dynamics across the different income groups. The contribution of each indicator to GMPI is also assessed thereby providing information on the indicators in which households are mostly deprived.

Alkire and Foster (2011) outline a number of desirable properties associated with the MPI methodology and put forward proposals that make multidimensional poverty analyses useful to policy-makers and practitioners. These include: (i) its comprehensiveness – as it takes into account the various types of deprivations that people face, it allows for the compilation of comprehensive poverty profiles; (ii) openness – there is no limit to the number of dimensions or indicators that can be used; (iii) flexibility – the choice of dimensions and indicators can be adapted to suit the available data; (iv) decomposability – the MPI is a weighted average of a number of subgroup poverty levels, hence each subgroup can be analysed both independently and as an aggregate; (v) replication invariance – poverty is measured relative to population size, facilitating comparisons across different population sizes; (vi) symmetry – the measure of poverty is not affected by a switch in achievements between people, this way, the MPI does not overemphasise one group of people over another; and (vii) uses ordinal data – unlike unidimensional measures, the MPI accommodates ordinal data, i.e. ranked preferences – it is therefore possible to aggregate across dimensions without losing critical information about the dimensions and indicators (Alkire and Foster, 2011). The Alkire-Foster method is based on a concept of poverty as multiple deprivations that are simultaneously experienced. This means that persons confronted by a broad range of deprivations are considered poor, while those with limited breadth of deprivation may not necessarily be poor (Alkire and Foster, 2011). Alkire and Foster apply a censoring process, which limits consideration to the deprivations of the poor. As a result, the method is sensitive to the joint distribution of deprivations, a characteristic that is suppressed in unidimensional measures. It combines both the headcount poverty (the proportion of people that are poor) and the intensity (the average percentage of dimensions for which the poor are deprived).

It is important to note that while the terms deprivation and poverty are often used interchangeably, they are conceptually different. Deprivation refers to lack of access to specific services and thus alludes to people's needs not being met. Poverty, on the other hand, refers to the extent to which resources constrain people's capability to meet those needs. Though not complete, there is an overlap between the two concepts. Deprivation is expected to have a direct bearing on poverty, and *vice versa*. Examples of indicators that are used to gauge deprivation include water and sanitation, energy, housing, and schooling, all of which pertain to public service delivery. While it can be argued that there is no guarantee that providing these services would lift people from poverty, it is true that their provision improves their lives and could enable them to become more active in identifying and pursuing opportunities that create resources and eventually reduce poverty. The indicators used in this paper reflect a mix of the two concepts. This is because data limitations do not allow us to disentangle lack of resources to access services from lack of access because the relevant authorities have not put in place the infrastructure to support provision of that particular service. For instance, it is not possible to establish whether a

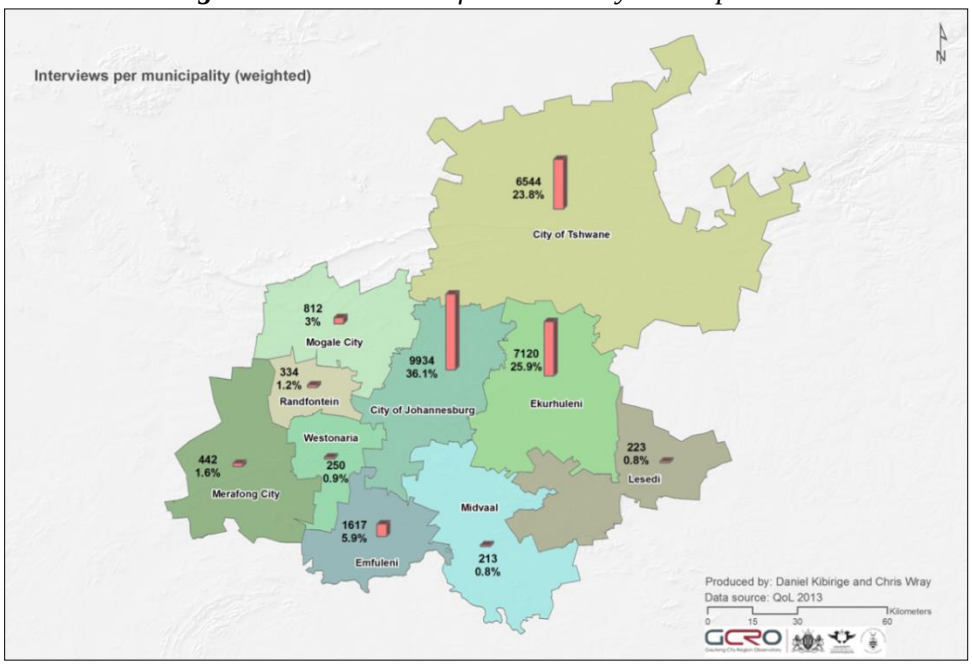
household has no access to electricity because they cannot pay for a connection or because the relevant public authority has not provided the infrastructure. Yet, for indicators such as food security, lack of resources would clearly be relevant. Technically, the term deprivation is used here to refer to a condition where a household falls short of a given threshold (cut-off) in a particular indicator.

5. Data

This paper utilises GCRO QoL data for 2011 and 2013. GCRO QoL Surveys are conducted biannually and are deliberately designed to focus solely on Gauteng. Given this unique focus on Gauteng, QoL Surveys are an important information source for all municipalities in the province that are interested in understanding the impact of service delivery efforts on communities as well as people's perceptions to governance in general. A key feature of QoL data is that each variable can be disaggregated to ward level. In addition, the QoL Surveys have been designed to ask specific questions about quality of life not often included in many national surveys. As such the GCRO QoL Survey is best suited to a multidimensional approach to poverty analysis with potential to drill down to small local areas.

The sample size for QoL was 17 289 respondents in 2011, and 27 490 respondents in 2013. This makes the GCRO QoL Survey the largest single living conditions survey of its kind in the country. The 2013 QoL Survey is particularly important for this analysis for several reasons. Firstly, the sample size is fairly large. Secondly, there was more emphasis on the metropolitan areas of Johannesburg, Tshwane and Ekurhuleni to allow for more nuanced analysis because this is where the bulk of Gauteng's population is located. Figure 5 shows the distribution of interviews across the ten local municipal areas of Gauteng. City of Johannesburg had the largest proportion of interviews (36.1 percent) followed by Ekurhuleni (25.9 percent) and Tshwane (23.8 percent). The least was Lesedi where the population is very low.

Figure 5: *Distribution of interviews by municipalities*



Source: GCRO GIS Maps
Data: GCRO QoL Survey for 2013

Thirdly, the data are ward representative and therefore a fairly accurate picture of sub-place level characteristics can be generated. Fourthly, the 508 wards in Gauteng (which were used as the Population Sampling Units (PSUs)) were further broken down into Small Area Layers (SALs) permitting a balanced sample distribution across each ward. Probability Proportional to Size (PPS) sampling was used to

determine the distribution of population in each SAL and every fifth stand was selected for interview. In cases where there were multiple dwellings on a single stand, random sampling was used to select a household for the interview. Fifthly, the data were geo-coded so that respondents can be located within a 50m radius of their dwelling. This is useful in cases where further analysis about the respondents is required in which neighbourhood characteristics matter and we used that to generate maps for our results. Finally, the 2013 final dataset was reweighted to reflect the Census 2011 figures due to low response rates in certain categories of particular variables. As such the QoL data reflect the actual population distribution by race, sex and other biometric characteristics.

QoL Surveys are conducted with the head of household if present, or any member who is 18 years or older and is present at the time of the interview. It was assumed that responses from these individuals correctly represent the characteristics of the household and that of other household members. Although this may prejudice the results, the prejudice is negligible because the survey focuses on factual aspects about the household and where opinion is required, it is that of the respondent.

6. Methodology

Estimation of the MPI is based on the 'counting' methodology developed by Alkire and Foster (2008, 2011).[10] The advantage of the Alkire-Foster method is that it is flexible, allowing for the inclusion of any number of dimensions. Another advantage is that the method follows a counting approach in its determination of the multidimensionally poor, which is a suitable approach for dealing with dimensions of an ordinal nature. This method also employs a more rigorous way of identifying the poor – it uses the counting approach to identify the poor, and then 'adjusts' the resultant poverty finding with measures of the breadth and depth of that poverty finding.

The method begins by identifying the poor ($\rho_k(y_i;z)$) using a two-stage cut-off process, i.e. indicators cut-off (z_j) and poverty cut-off (k). A set of indicator dimensions d is identified that are considered essential for human wellbeing. These are the basis for identifying deprivation. Weights are assigned to the different indicator dimensions, and the weighting scheme can vary. In the ensuing analysis, nested weights were used, where the dimensions were classified into four broad partitions. Each partition was assigned equal weighting $\left(\frac{1}{4}\right)$, containing nested indicator dimensions. Eleven indicators are considered in this paper, partitioned into four broad dimensions: standard of living; food security; economic activity; and education. With $T = 4$ denoting the number of broad dimensions, the dimension specific weight is

$$w_j^d = \frac{1}{T} \cdot \frac{1}{d} \quad \text{.....(1)}$$

using equal weighting[11]. Firstly the deprivation cut-off for each indicator dimension selected is defined. This cut-off point is a normative minimum level that household *i* needs to achieve in order for them not to be defined as deprived. The set of deprivation cut-offs, sometimes called poverty lines, is represented by a vector, $z = (z_1, z_2, \ldots. z_d)$. A household is then defined as deprived if its achievement is less than the cut-off, i.e. $y_{ij} \langle z_j$. The second step is to choose *k*, the number of deprivations that a household must experience in order for them to be considered multidimensionally poor. The choice of *k* is such that $1 \le k \le d$ so that poverty is neither defined as being deprived in only one indicator $(k = 1)$ nor is it defined as being

[10] See Appendix for illustration.

[11] For example, for the *Housing-adjusted Standard of living* dimension**,** the weight is calculated as: $\left(\frac{1}{4}\right) * \left(\frac{1}{7}\right) = \frac{1}{28}$.

deprived in all indicators $(k = d)$. k can be chosen normatively, either based on previous studies or based on what society would consider reasonable. In such instances, k can take on a real number, such as $k = 2$. It can also be chosen to reflect a country's or province's specific policy goal. In this analysis $k = 33.3\%$ was used, to focus on the multidimensionally bottom $\frac{1}{3}$ of the population. A household is multidimensionally poor if the weighted indicators of which it is deprived sum up to at least 33.3 percent, i.e. if they are deprived in at least a third of the weighted indicators used in the calculation of the MPI. The count of the weighted number of deprivations in which the household is deprived is represented by c_i such that if $c_i \geq k$ then that household is considered poor. So the two-stage identification process is represented by

$$q = \sum w_i \rho_k(y_i; z) \quad \text{.....(2)}$$

where q is the number of poor households;
$w_i = s_i h_i$ is the weight factor, which is a product of the sample weight s_i and the household size h_i;
ρ_k is the identification of households;
$y_i = (y_{i1}, y_{i2}, ..., y_{id})$ is household *i's* achievements across d indicator dimensions;
$z = (z_1, z_2, ..., z_d)$ is a vector of poverty lines, made of a collection of thresholds below which a household is considered poor.

This is then used to estimate the poverty headcount ratio:

$$H = \frac{q}{n}, \quad \text{.....(3)}$$

where *q* is the number of poor, and *n* is the total population. However *H* on its own violates two of the properties of a multidimensional index. First, it is not dimensionally monotonous, meaning that it is not sensitive to the number of dimensions that a poor person is deprived in. Dimensional monotonicity means that if a household becomes newly deprived in another dimension, overall poverty should increase. *H* is also not decomposable, which means that it is not possible to breakdown *H* to show the contribution of each dimension to poverty. Therefore an adjustment factor for H is necessary, to correct for these weaknesses. The adjustment factor, A is estimated as

$$A = \frac{1}{qd} \sum_{i=1}^{n} w_i c_i^* \quad \text{.....(4)}$$

and c_i^* are the counted deprivations for households achieving $c_i \geq k$.

It can thus be said that the MPI is based on the *dimension adjusted headcount ratio* because it is a product of two main components:

$$MPI = H \times A \quad \text{.....(5)}$$

where *H* is the poverty headcount ratio, and *A* is the number of deprivations that a poor person suffers. *A* is a measure of the intensity of poverty.

6.1 Choice of indicators

Four broad dimensions are considered in this paper: standard of living; food security; economic activity; and education. The choice of dimensions, indicators and deprivation cut-off points to include in the GMPI, was guided by: (i) Stats SA's SAMPI analysis of 2014 (Stats SA, 2014b); (ii) relevance of indicators to Gauteng; and (iii) data limitations in the QoL Survey. Food, water, sanitation, energy, and housing are considered basic needs for humans. In South Africa, large segments of the population were previously subjected to conditions that made it extremely difficult, if not impossible to access basic services. Therefore the condition of the basic need that has to do with the standard of living becomes important. Post-1994, the democratic government has tried to fill that gap by providing housing, but also stipulating that access to water and sanitation services and electricity are basic human rights for everyone. There are still wide gaps when it comes to such provisions: many households live in shacks and many communities protest that they still do not have access to piped water and that they do not benefit from services provided by their municipalities. These indicators have been included in the analysis to get a sense of the magnitude of backlogs in service delivery. This would serve as valuable input to policies on human settlements.

Two indicators on communication were selected, i.e. ownership of cell phones and television sets. This is an indicator of asset ownership, and therefore a proxy for household wealth. Although health is an important dimension for policy in South Africa, it could not be used in the analysis because of data limitations as the QoL Survey does not collect data on health. Instead, food security – another important policy dimension – was used. The analysis expanded the *dwelling type* as another dimension under the broader *standard of living* category to include ownership and overcrowding as poverty measures. Table 6 shows the broad dimensions as well as nested indicator dimensions used in this analysis, the deprivation cut-offs and the weights attached to each indicator. Overall, 11 indicators across four dimensions were used to compile the GMPI.

Table 6: *Dimensions, indicators and deprivation cut-offs for the GMPI*

Dimension	Indicator	Deprivation cut-off	Weights
Standard of living	Housing	Household dwelling is a shack (informal dwelling - both in backyard and not in backyard)	1/28
	Housing	Overcrowded: 2 persons per room	1/28
	Water	No access to piped water in dwelling or in yard	1/28
	Sanitation	No access to a flush toilet	1/28
	Energy	No access to electricity for lighting	1/28
	Communication	Household has no cell phone	1/28
	Communication	Household has no television set	1/28
Food security	Food	At least one household member had to skip a meal	1/8
	Food	Household did not have enough money to feed children	1/8
Economic activity	Unemployment	No-one in the household is employed	1/4
Education	Years of school attendance	Respondent has five or less years of schooling	1/4

Source: Authors

7. Results

This section presents the findings from our analysis and is structured in a way that answers the following questions sequentially.

- What proportion of Gauteng households is deprived per indicator, i.e. the proportion that falls below a specific deprivation cut-off?

- How does the proportion of Gauteng households that is deprived per indicator vary across income groups?
- How does the proportion of Gauteng households that is deprived per indicator vary across municipalities?
- How does the MPI vary spatially?

○ **What proportion of Gauteng households is deprived per indicator?**

Table 7 provides an overview of the proportion of Gauteng households that are deprived in each of the MPI indicators specified in Table 6.

Table 7: *Proportion of household falling below the deprivation cut-off*

	2011	**2013**
Standard of living	***%***	%
Household dwelling is a shack (informal dwelling)	9.9	14.4
Overcrowded: more than 2 persons per room	25.2	17.3
No access to piped water	8.3	8.7
No access to a flush toilet	10.0	10.9
No access to electricity	10.4	7.3
Household has no cellular phone	6.9	8.2
Household has no television set	11.7	14.3
Economic activity		
No-one in the household is employed	38.0	27.4
Food security		
At least one household member had to skip a meal	20.3	14.3
Household did not have enough money to feed children	17.8	10.9
Education		
Respondent has five or less years of schooling	6.9	3.9

Source: Authors
Data source: GCRO Quality of Life Surveys for 2011 and 2013

In 2013, 14.4 percent of households lived in informal dwellings – loosely referred to as shacks – a 4.5 percentage point rise compared to 9.9 percent in 2011. Living in shacks is directly linked to poverty because typically it is poor households that opt for such forms of accommodation due to affordability concerns. Yet, living in a shack could also trap a household in poverty because service delivery infrastructure in these areas is more often poor, lacking, or difficult to provide. The increase in the proportion of households living in shacks suggests that access to housing remains a significant challenge for many households in Gauteng. The majority of poor migrants from other provinces also find themselves living in shacks because they are much more affordable.

Using the standard of more than two persons per room, 17.3 percent of the Gauteng population was defined as being overcrowded in 2013. This followed a 7.8 percentage points decrease from 25.2 percent in 2011. Individuals living under overcrowded conditions often suffer from poor health and education outcomes (Leventhal and Newman, 2010; Lund et al., 2011). As a result, overcrowding is often viewed as a good indicator of persistent poverty because it is less susceptible to fluctuations compared to other measures of poverty.

In 27.4 percent of households none of their members were employed. This followed a marked improvement from 38 percent in 2011. This is consistent with the challenges of unemployment that the country as a whole is currently battling with. The encouraging news is that this indicator recorded the

fastest decline between 2011 and 2013. The other encouraging statistic is the relatively low incidence of households with no access to electricity, which was 7.3 percent in 2013.

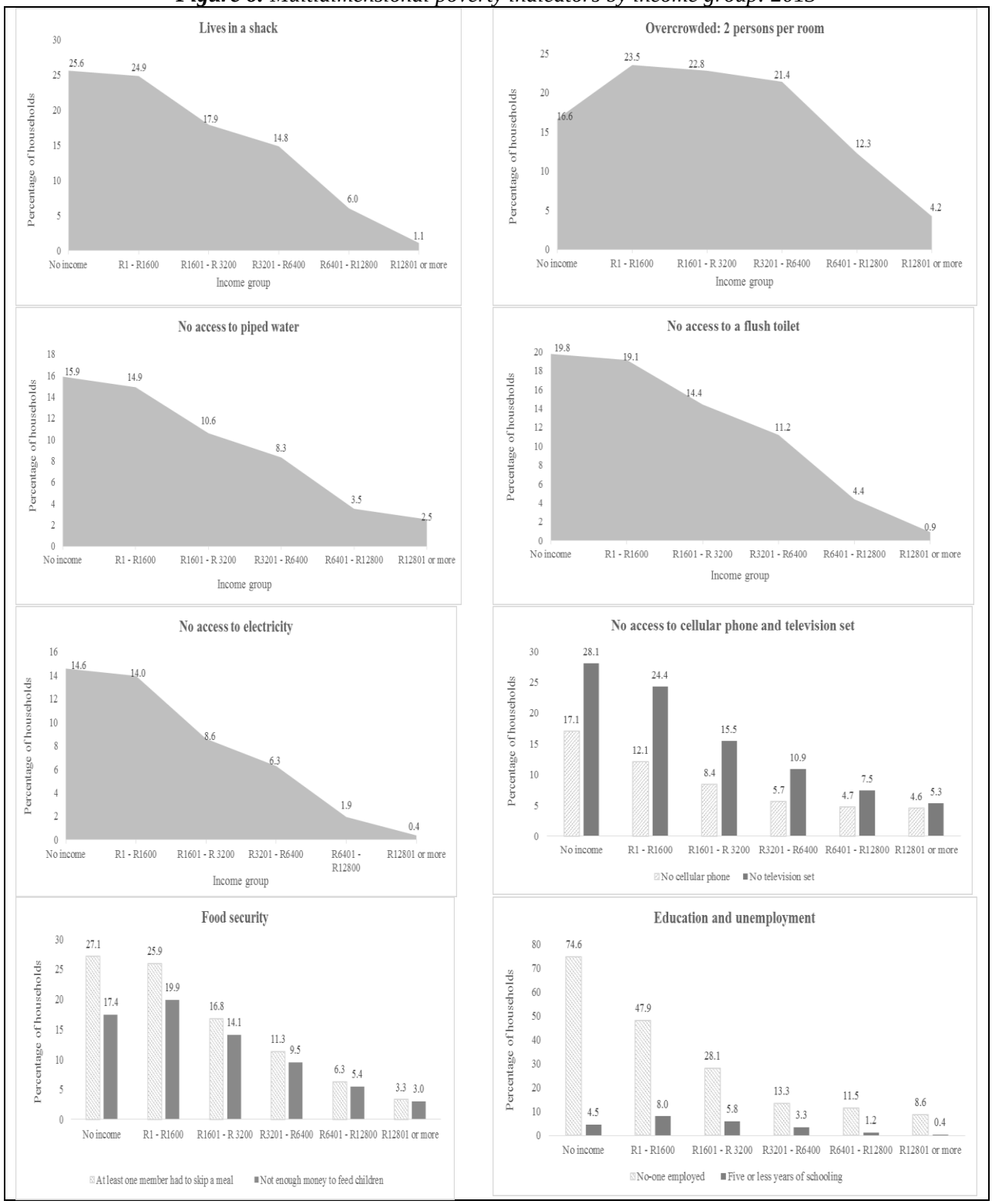
The food security cluster also registered improvements between 2011 and 2013. The proportion of households for which at least one household member had to skip a meal fell by 6 percentage points from 20.3 to 14.3 percent. While 17.8 percent had, at some point in the year prior to the survey, not had enough money to feed children in 2011, this had declined to 10.9 percent in 2013. The province has improved in the education indicator as there has been a reduction in the respondents with less than five years of schooling.

Overall, Table 7 suggests difficulty when it comes to provision of basic services as reflected in the standard of living indicators. All indicators in this category recorded an increase between 2011 and 2013 with the exception of the proportion of households living in overcrowded conditions using the standard of more than two persons per room as well as the proportion of households with no access to electricity. Access to housing continues to be a challenge and there is no evidence of improvements in access to piped water and flush toilets.

- **How does the proportion of Gauteng households that is deprived per indicator vary across income groups?**

An interesting policy question is how multidimensional deprivation varies across income groups. In addition to other indicators of wellbeing, the QoL Surveys collected information on household income. The variable is an interval variable with equal and constant distances between values. An adjustment to the original intervals was made, resulting in six categories of income groups, one of which captured households with no income. The aim is to show how deprivation levels vary by income.

Figure 6: *Multidimensional poverty indicators by income group: 2013*



Source: Authors
Data source: GCRO 2013 QoL Survey, 2013

Figure 6 provides insights into this with a focus on 2013. Widespread disparities in the multidimensional poverty indicators are revealed, with poorer households exhibiting higher incidences of deprivation. The indicator that has the highest disparity is one that captures whether any of the members are employed. While 74.6 percent of households with no income had none of their members employed, the corresponding figure for households with an income of more than R12 801 per month was only 8.6 percent. A similar story holds with respect to the remainder of the indicators: the proportions of the deprived decline with income and the same pattern holds for both 2011 and 2013. For example, at 25.6 percent, the proportion of households living in a shack amongst households with no income was close to 24 times more than the corresponding proportion among the top income group which stood at 1.1 percent. This is equivalent to a gap of around 24.6 percentage points.

In sum, the analysis by income group underscores income poverty as a catalyst for other multidimensional aspects of poverty in Gauteng. It is important to emphasise that the relationship could be bi-directional in nature: while lack of income could trap households in multidimensional poverty, multidimensional poverty can also limit household opportunities for generating income. For instance, having no access to electricity could be a constraint to starting certain types of businesses.

- **How does the proportion of Gauteng households that is deprived per indicator vary across municipalities?**

Notable differences prevail in multidimensional deprivation across municipalities. Using 2013 to illustrate these differences, Westonaria is clearly the worst affected when it comes to multidimensional deprivation.[12] In 2013, this municipality had the highest proportion of those affected in all indicators except four: having none of the members employed, both food security indicators, and education. A total of 29.7 percent of Westonaria residents lived in a shack in 2013, 15.3 percentage points higher than the Gauteng average of 14.4 percent (see Table 7). Randfontein households are hardest hit when it comes to unemployment as 34.6 percent of households had none of its members working. Emfuleni is the worst affected in terms of both food security indicators used in the analysis, having the highest proportion of households in which a member had to skip a meal (26.1 percent) and in which there were no adequate resources to feed children (18.9 percent). Lesedi lags behind with respect to education.

[12] Table A1 in the Appendix presents the results for 2011.

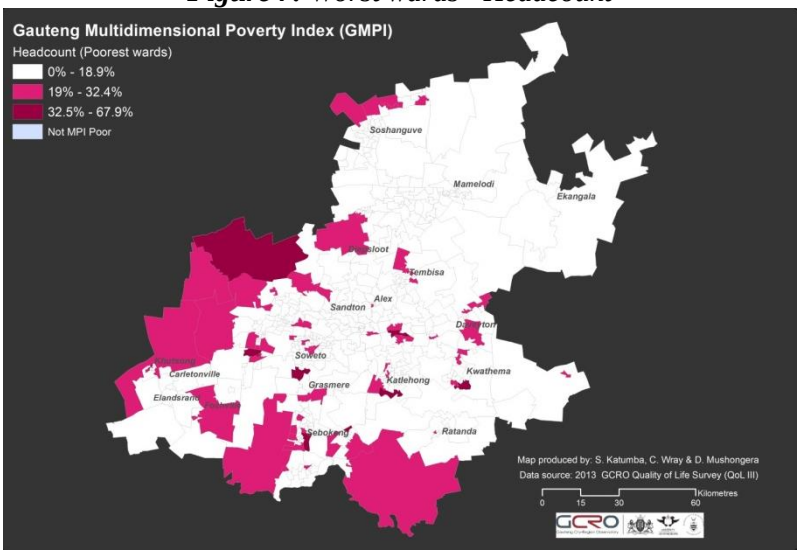
Table 8: *Multidimensional poverty indicators by municipality: 2013*

Indicator	Emfuleni	Midvaal	Lesedi	Mogale City	Randfontein	Westonaria	Merafong City	Ekurhuleni	City of Joburg	City of Tshwane
Lives in a shack	10.4	14.4	9.6	17.8	13.3	29.7	18.9	16.1	13.5	13.6
Overcrowded: 2 persons per room	13.5	12.7	12.4	16.7	20.3	24.1	19.0	16.3	22.2	11.9
No access to piped water	6.9	21.3	11.5	14.7	14.9	27.6	15.5	9.3	6.8	8.8
No access to a flush toilet	6.6	22.4	5.5	12.1	11.3	29.8	14.3	8.9	7.9	17.5
No electricity	4.4	15.6	6.4	9.6	11.7	25.8	11.2	9.3	5.9	6.1
No cell phone	6.8	10.6	17.6	5.5	6.7	5.5	7.0	15.6	5.7	4.8
No television	10.9	22.1	8.5	15.2	15.7	30.2	18.6	16.0	11.2	17.0
No-one employed	30.8	20.1	26.3	29.1	34.6	29.8	28.3	30.3	24.8	26.8
A member skipped a meal	26.1	21.4	12.6	14.6	18.1	19.6	14.4	16.4	13.1	10.7
Not enough money to feed children	18.9	18.2	9.6	10.2	13.1	12.0	10.3	12.9	9.8	8.3
Five or less years of schooling	5.8	6.9	7.9	3.2	3.7	4.9	6.6	3.7	3.1	4.4

Source: Authors
Data source: GCRO QoL Survey for 2013

Figures 7 to 9 show a mapping of wards that fell in the worst two categories in each of the three measures.

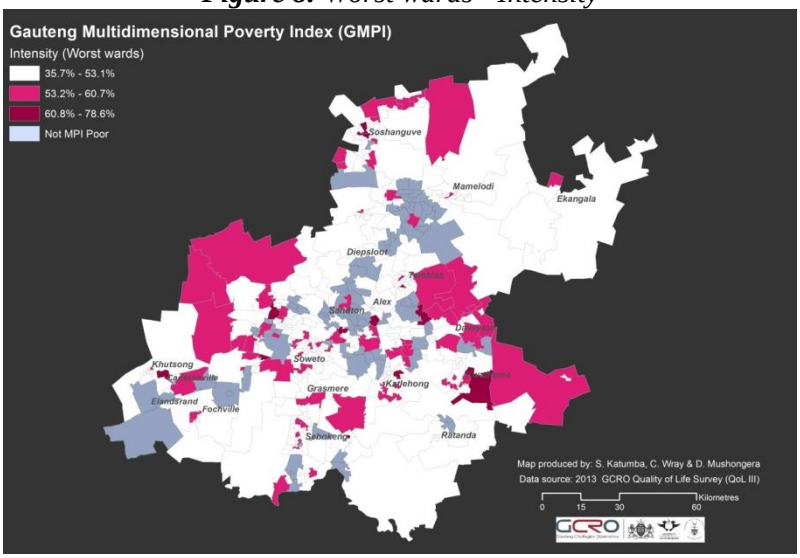
Figure 7: *Worst wards - Headcount*



Source: Authors/GCRO GIS Maps
Data source: GCRO

For example, Figure 7 shows headcount, and generally wards that have high headcount are located on the edges of the province, mainly the south and western parts. However, there are pockets in the central part of the province where headcount was high. Interestingly, although certain wards have high headcount, the intensity is not as high, as shown in Figure 8.

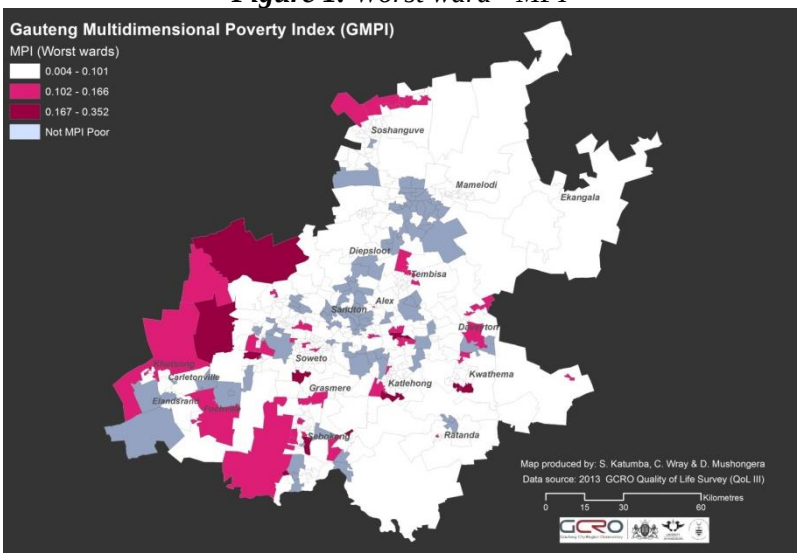
Figure 8: *Worst wards - Intensity*



Source: Authors/GCRO GIS Maps
Data source: GCRO

Other wards had lower headcount but very high intensity. This means that for the few MPI poor households that exist in those wards, the extent of poverty is high, i.e. they are deprived in several indicators. Such wards are concentrated along the gold reef running centrally from east to west and some are in the northern part of the province.

Figure 1: *Worst ward - MPI*



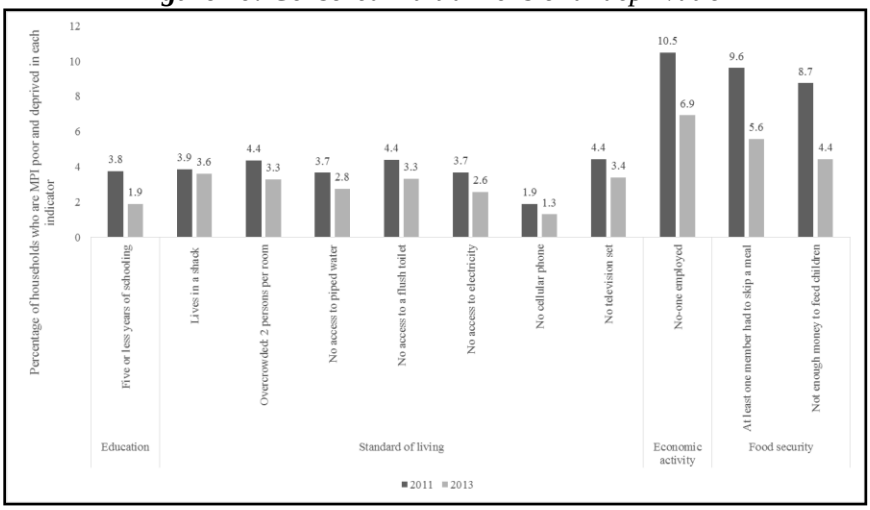
Source: Authors/GCRO GIS Maps
Data source: GCRO

In terms of the overall MPI, the worst areas are to the west and south west of the province and pockets in Johannesburg and Ekurhuleni as shown Figure 9. Overall, this mapping shows that: (i) being located further away from the three metro regions (e.g. City of Johannesburg, Tshwane and Ekurhuleni) where economic activities are concentrated clearly presents disadvantages to these outlying areas; and (ii) pockets of poverty within the metro areas continue to exist with little or no improvements at all.

7.2 Decomposition of the MPI

Figure 10 reports the censored headcount ratios, i.e. the proportion of Gauteng households that are poor and deprived in each indicator. The poor made gains in MPI poverty between 2011 and 2013, although the picture is not as clear-cut for Gauteng as a region. Considering changes between 2011 and 2013, the percentage of households who were MPI poor and deprived in each indicator fell for all indicators.

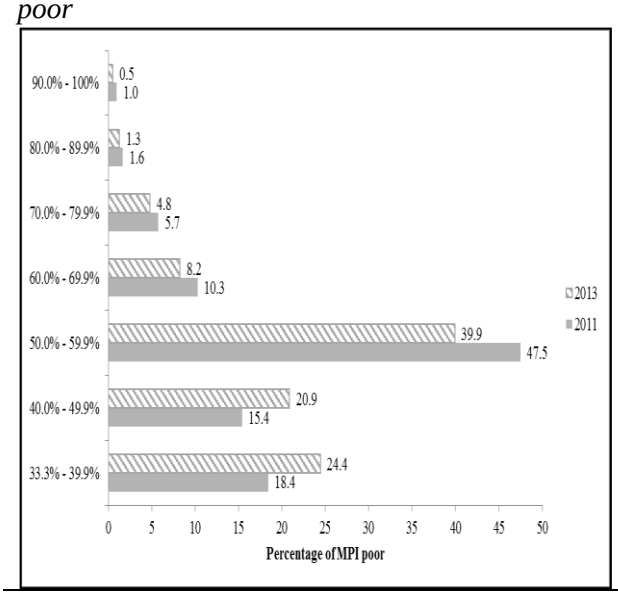
Figure 10: *Censored multidimensional deprivation*



Source: Authors
Data source: GCRO QoL Survey2013

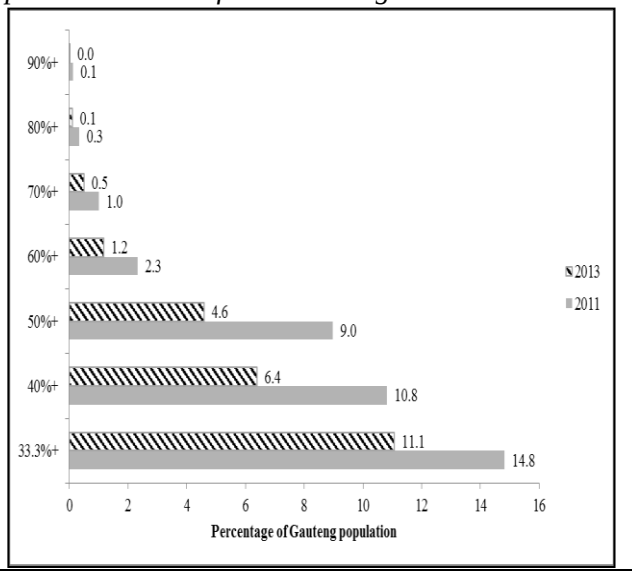
Figure 11 decomposes the MPI poor according to the intensity of their deprivation. For instance, the share of the MPI poor whose intensities were greater than 33.3 percent but less than 40 percent increased from 18.4 percent in 2011 to 24.4 percent in 2013. Figure 12 presents the proportion of the whole Gauteng population that is poor in the specified percentage of indicators or more. For instance, 4.6 percent of Gauteng households were deprived in 50 percent or more weighted indicators in 2013. These are considered to suffer from severe MPI poverty.

Figure 11: *Intensity of deprivation amongst the poor*



Source: Authors
Data source: GCRO QoL Surveys for 2011 and 2013

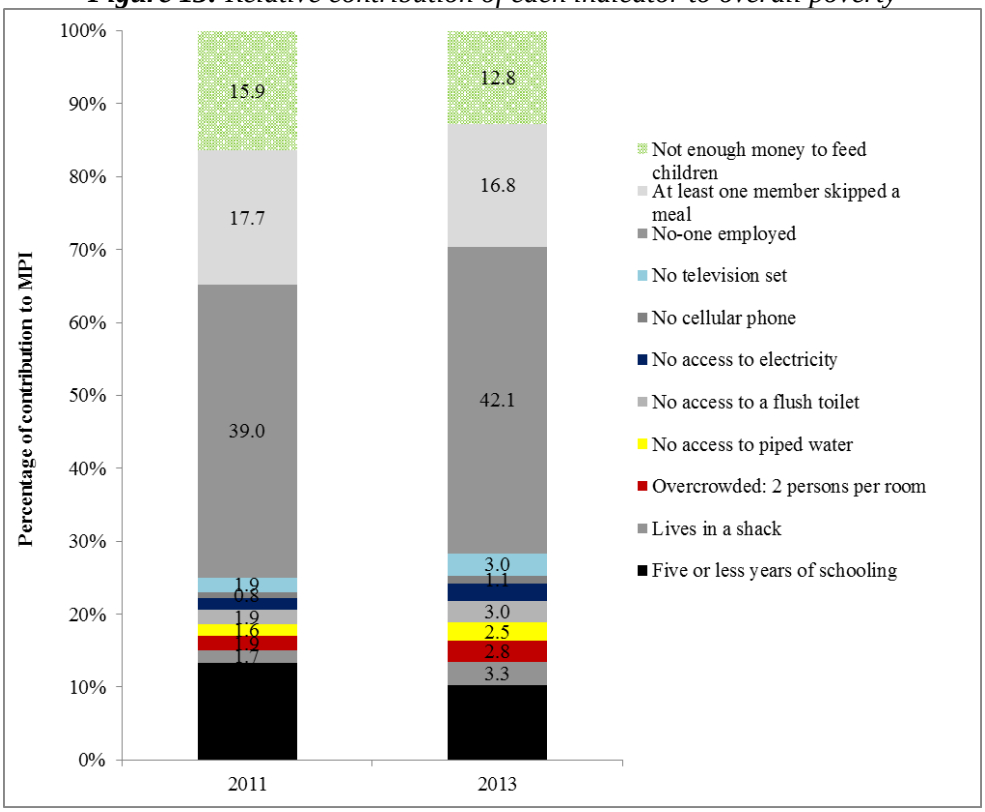
Figure 12: *Percentage of households deprived in X percent or more of the MPI weighted indicators*



Source: Authors
Data source: GCRO QoL Surveys for 2011 and 2013

Figure 13 highlights the percentage contribution of each indicator to the overall MPI. Having all household members not working is by far the largest contributor to the overall MPI, contributing 42.1 percent in 2013 and 39 percent in 2011. Thus although this indicator recorded the fastest decline between 2011 and 2013 as reflected in Table 7, its relative contribution to the overall MPI during this period increased. Having to skip a meal due to inadequate resources registered the second highest contribution, followed by inadequate resources to feed children, at 16.8 percent and 12.8 percent in 2013, respectively.

Figure 13: *Relative contribution of each indicator to overall poverty*



Source: Authors
Data source: GCRO QoL Surveys for 2011 and 2013

8. Discussion

Gauteng is the richest province in South Africa and judging from the per capita GDP it has a wealth base capable of sustaining its population on decent standards of living. However, the distribution of income is highly skewed spatially, and as reflected by the high Gini wealth is concentrated in the hands of a few individuals. Spatially, wealth is concentrated in the three metropolitan areas of Johannesburg, Tshwane and Ekurhuleni. The metropolitan areas also offer better opportunities of employment due to proximity and the existence of very large formal and informal economies compared to outlying areas.

Since 1994, South Africa has made efforts to address poverty and inequality through various policies and programmes. The main aim of these policies has been redressing the imbalances and injustices created by apartheid. The local sphere of government in South Africa is constitutionally mandated to provide and maintain basic services especially water, sanitation and electricity. A national policy on indigency was introduced to serve as a safety net to cushion those families that are too poor to afford the cost of basic services. The indigence policy came into being after government realised that levels of deprivation are too high for particular households and in most cases households lack a source of income. Local municipalities are required to raise funds to support this particular group of people in order to avoid extreme deprivation. However, some municipalities, especially those in outlying areas of the province, do not have a wide tax base to raise sufficient revenue to support indigent households. This means that access to free basic services varies across municipalities. Although social grants offer complementary support to such households, these are often inadequate to lift indigent households out of poverty. Other services, such as education, lie within the realm of the provincial government. In Gauteng, for example, the provincial department of education works to ensure that enrolments are high, the throughput rate is increased,

facilities are adequate, and that school attendance is high through school nutrition and learner transport programmes. However, the quality of education is still an area of great concern.
Despite these bold measures during the last 20 years, the results of this study show that challenges remain. By combining the dimensions upon which a household is deprived, the MPI method used in this paper does not reveal a consistent improvement between 2011 and 2013. Some dimensions improved while others worsened. For example, the number of households living in shack dwellings rose between 2011 and 2013, along with a slight increase of 2.1 percentage points in the people with no access to piped water as well as access to flush toilets. However, the number of households with no members working decreased drastically from 38 percent in 2011 to 27.4 percent in 2013. There has been an improvement in education as the proportion of those with less than five years of schooling is declining. As more people gain access to education, future prospects for better standards of living are positive as long as the throughput rate is kept high and the economy generates enough jobs to accommodate new entrants into the job market. Our data show that municipalities with low economic activity such as Westonaria, Randfontein, Midvaal and Lesedi have high MPI values.

A focus on poverty dynamics at much localised levels using the 2013 data showed that headcount MPI is generally high in previously disadvantaged south and south-western high-density locations: Diepsloot, Alexandra, Tembisa and parts of Ekurhuleni. Where multidimensional poverty exists, the degree is high. Intensity of poverty is highest in Ekurhuleni (3 wards), Johannesburg (2 wards), Mogale City, Merafong City and Emfuleni (1 ward each). Most of these areas are associated with informal settlements, overcrowding and backyard buildings. Where housing conditions are poor, service delivery is difficult and opportunities for employment are limited.

8.1 New initiatives

The provincial government has taken bold steps to eradicate the social, economic and spatial legacy of apartheid and colonialism. Current initiatives by the Premier for Gauteng to revitalise township economies could go a long way in increasing opportunities for township dwellers and those in informal settlements that are by their very nature difficult to serve from a service delivery point of view. Economic activity and food security are also much worse in these areas. Together with asset ownership and schooling, these dimensions are the main drivers of poverty in the province (Figure 13). The provincial government unveiled a ten-pillar programme to transform Gauteng's socio-economy and all departments were called upon to respond to the challenges of poverty and inequality. This has been reflected in the budgets, for example, in its 2014/15 budget the Gauteng member of the executive council (MEC) for education stated that the education budget was designed to contribute to poverty alleviation and lowering of inequality and unemployment through skills development, school infrastructure development to accommodate more learners, teacher provision and support, and prioritisation of early childhood development.[13]

Although education, health and infrastructure featured strongly in previous budgets, the 2014/15 Gauteng Provincial Budget emphasises these issues even more and aspects such as job creation, road and schooling infrastructure, and support to small, medium and micro-sized enterprises (SMMEs) were highlighted. Food security was also highlighted as a measure for alleviating poverty given the growing number of orphans and child-headed households in the province. As much as R146.3 million was allocated to Child and Youth Care Centers for the 2014/15 financial year to help address the problem of orphans and child headed households considering the high level of vulnerability that these groups experience.[14] Such

[13] 2014/15 MTEF Budget Speech - Vote 5: Education by Mr Panyaza Lesufi, MEC for Education Gauteng Legislature - 31 July 2014.
[14] The 2014/15 Provincial Budget, Gauteng Provincial Legislature, 4 March 2014.

households are less likely to afford a decent lifestyle in the absence of substantial support from government.

In education, the need for quality education was emphasised and supported with a large budget that is structured to cater for no-fee-paying schools. As noted earlier, access to education increases potential for other opportunities, such as employment, that could lift people out of poverty. This could open up access to other services that contribute to better quality of life.

9. Conclusion

This paper contributes to deepened understanding of poverty at the local levels in South Africa by exploring changes in non-money-metric measures of poverty and wellbeing between 2011 and 2013 using the Gauteng province as a case study. It uses two recent datasets generated by the GCRO QoL Surveys to: (i) expand the analysis of poverty by computing a MPI for Gauteng; and (ii) examine the spatial configuration of multidimensional poverty within the province.

Multidimensional poverty is found to be correlated with income poverty: not only are households that are income poor more likely to be multidimensionally poor, they suffer from higher intensities of poverty. Further, the study highlights the interconnectedness between infrastructural development and socio-economic indicators. Specifically, being deprived in one poverty indicator is associated with a higher likelihood of being deprived in other indicators.

Generally, the urban space economy of Gauteng derives from apartheid geography and the history of mining activity. Our findings indicate that there is path dependency and that due to the legacy of apartheid infrastructural imbalances still prevail. Spatially, multidimensional poverty tends to be highest in areas that have low economic activity and happen to be located at the edges of the province. These include, among others, Westonaria and Merafong City. There appears to be a disadvantage in being further away from the three metro regions (i.e. City of Johannesburg, Tshwane and Ekurhuleni) where economic activities are concentrated. This is a policy challenge given the finding that the unemployment indicator is the largest contributor to the overall MPI. Although the incidence of households with none of its members working recorded the fastest decline between 2009 and 2013, the relative contribution of this indicator to the overall MPI increased during this period. This raises questions about the ability of current investment patterns to create jobs and subsequently foster socio-economic development in outlying areas.

Multidimensional poverty is, however, not restricted to areas at the edges of the province and even in the highest performing three metro regions pockets of severe multidimensional poverty prevail. Clear examples include Alexandra, Diepsloot and Tembisa. This is indicative of high infrastructural inequalities within these metro regions, suggesting the need for local municipalities to devise policies that channel investments into lagging areas. Revitalising township economies can unlock the potential of these areas to contribute to multidimensional poverty reduction in the province.

The study also highlights that the role of mining in socio-economic development is not clear-cut. For example, Westonaria has high multidimensional poverty rates despite its heavy reliance on mining activities. It is, therefore, not apparent that mining contributes to socio-economic development in Westonaria.

In sum, the foregoing analysis underscores the heterogeneity of communities and suggests that more in-depth analysis of developmental challenges at localised levels is needed to improve the effectiveness of evidence-based planning. This way, government is able to customise interventions that take into account these heterogeneities and continually improve targeting of policy interventions. In addition, given that the different indicators of multidimensional poverty are related to services whose provision falls under the

mandate of different spheres of government, an integrated approach to service delivery is key to reducing multidimensional poverty in Gauteng.

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Appendix A: Multidimensional poverty indicators by municipality: 2011

Table A1: *Multidimensional poverty indicators by municipality: 2011*

	Emfuleni	Midvaal	Lesedi	Mogale City	Randfontein	Westonaria	Merafong City	Ekurhuleni	City of Joburg	City of Tshwane
Lives in a shack	4.8	5.7	8.9	15.7	10.5	31.1	17.2	9.3	10.1	9.4
Overcrowded at 2 persons per room	20.6	17.9	16.8	22.7	21.6	21.8	21.5	27.4	28.0	21.3
No access to piped water	4.5	20.1	7.4	18.6	14.1	36.7	17.1	7.4	7.4	7.5
No access to a flush toilet	3.7	13.2	13.0	19.1	12.2	37.2	16.7	7.2	8.7	13.4
No electricity	15.2	20.1	24.5	19.2	15.1	34.9	19.7	10.2	9.0	6.9
No cell phone	7.0	10.1	9.0	10.7	6.6	8.3	10.5	7.2	6.4	6.1
No television	8.5	15.2	16.8	21.3	10.8	31.5	20.1	13.2	9.9	10.2
No-one employed	41.3	36.5	37.9	28.5	31.1	37.7	32.7	42.7	32.8	41.9
A member skipped a meal	18.8	13.8	23.7	19.9	17.2	16.6	14.3	27.7	19.3	15.1
Not enough money to feed children	20.2	14.7	21.3	20.3	14.4	13.2	13.0	24.1	16.7	12.4
Five or less years of schooling	8.8	10.1	13.5	9.4	8.1	10.5	11.6	5.5	7.0	6.4

Source: Authors

Data source: GCRO QoL Survey for 2013

Appendix B: Summary of MPI methodology

Figure 14: *Calculating the poverty measures*