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Re-examining the multidimensional poverty index of South Africa

by

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DECLARATION

I declare that *"Re-examining the multidimensional poverty index of South Africa"* is my own work, that it has not been submitted for any degree or examination in any university, and that all the sources that I have used or quoted have been indicated and acknowledged by complete references.

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Date: 3 May 2021

ABSTRACT

Poverty remains one of the main socio-economic issues in South Africa and is more prevalent amongst black African females, children aged below 18 years, and rural residents with low levels of education. Many local studies focused on money-metric measures in determining poverty levels but few studies examined factors other than income that are also important to multidimensional non-income welfare. Therefore, this study re-examined the extent of multidimensional poverty in South Africa with the derivation of a Multidimensional Poverty Index (MPI) by considering certain dimensions and indicators that have been ignored in previous studies, such as isolation, vulnerability, voicelessness and powerlessness.

Using the General Household Survey (GHS) 2018 data, this study adopted two methods to derive the MPI: Method [A] included the above-mentioned additional dimensions and indicators whereas method [B] only included the indicators from the three commonly considered dimensions (education, health and living standards). Focusing on the results from method [A], the descriptive results indicated deprivations were most profound for unemployed African females living in rural areas in Eastern Cape and Limpopo. These deprivations were the highest in the transport asset, sanitation type, refuse removal frequency, water and receipt of post/mail indicators. Furthermore, the econometric analysis found that unemployed Coloured males residing in rural areas in Eastern Cape, KwaZulu-Natal and Gauteng were significantly more likely to be MPI poor.

The findings also indicated the overall MPI increased as additional dimensions and indicators are added to the method. The increase mainly emanated from the intensity of poverty, as the headcount values were lower. However, the contributions across personal characteristics, dimensions and indicators varied. Furthermore, the newly added dimension (isolation and vulnerability) suggests relatively high deprivations, as well as the indicator receipt of post or mail, has the second-highest deprivation score. It was also found that the education dimension's contribution to multidimensional poverty significantly decreased as additional dimensions and indicators were added to derive the MPI. Lastly, contrary to previous studies, Gauteng was one of the provinces associated with greater MPI poverty likelihood.

KEYWORDS: Multidimensional poverty, MPI, non-income welfare, South Africa

JEL: J30, J32

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Shinice Jackson

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

AsgiSA	Accelerated and Shared Growth Initiative for South Africa
CBN	Cost-of-basic needs
CS	Community Survey
CPI	Composite Poverty Index
FA	Factor Analysis
FEI	Food-energy intake
FPL	Food poverty line
GEAR	Growth, Employment and Redistribution
GHS	General Household Survey
HDR	Human Development Report
HPI	Human Poverty Index
ICTs	Information and Communication Technologies
IPL	International Poverty Line
LBPL	Lower-bound Poverty Line
LFS	Labour Force Survey
MCA	Multiple correspondence Analysis
MDG	Millennium Development Goal
MPI	Multidimensional Poverty Index
NDP	National Development plan
NGOs	Non-Governmental Organisation
NIDS	National Income Dynamic Survey
OHS	October Household Survey
PSLSD	Project for Statistics on Living Standards and Development
QoL	Quality of Life
RDP	Reconstruction and Development Programme
SAMPI	South African Multidimensional Poverty Index
SDG	Sustainable Development Goals
StatsSA	Statistics South Africa
TFR	Total Fuzzy and Relative approach
UBPL	Upper-bound poverty Line
UNDP	United Nations Development Programme
WASH	Water, Sanitation and Hygiene

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

1.1 Background and rationale

Alleviating poverty and inequality remains one of the most important socio-economic goals the government faces in South Africa. Therefore, prioritising the reduction of poverty and inequality is essential to the post-apartheid government. This initiative is reflected in the implementation of numerous economic policies and new legislative acts since the advent of democracy, such as the Reconstruction and Development Programme (RDP) of 1994 (Mushongera, Zikhali and Ngwenya, 2017), the Growth, Employment and Redistribution (GEAR) strategy adopted in 1996 (Department of Finance, 1996) and the Accelerated and Shared Growth Initiative for South Africa (AsgiSA) introduced in 2006 (Republic of South Africa, 2008). Also, the National Development Plan 2030 (NDP) aims to reduce poverty, achieve full employment, provide decent work and improve the living standards of South African citizens (National Planning Commission, 2011).

Measurement of poverty is necessary to keep poor people on the agenda, identify poor people so that appropriate interventions can be targeted, monitor and evaluate projects and policy interventions aimed at poor people, and evaluate the effectiveness of institutions whose goal is to help poor people, according to the World Bank Handbook on Poverty and Inequality (Haughton and Khandker, 2009:1). Also, to have a deeper understanding whether the government is on track to end extreme poverty, progress must be measured regularly. By measuring poverty, government learn which poverty reduction strategies work and which do not (World Bank, 2021).

According to Statistics South Africa (StatsSA), poverty levels declined during the 2006-2011 period but rose again in 2015 (StatsSA, 2017). In 2015, more than half of the population still suffered poverty based on the poverty line measurement (StatsSA, 2017; Francis and Webster, 2019). During the 2006-2015 period, poverty was more prevalent amongst black African females, children aged below 18 years, rural residents, those living in the Eastern Cape and Limpopo provinces, as well as individuals with low levels of education (StatsSA, 2017).

Although income is important in measuring poverty, the human development approach has long argued that it has limitations that necessitate more direct measures. The Human Poverty

Index (HPI) was first published in the United Nations Development Programme's flagship Human Development Report (UNDP HDR) in 1997, and it measured various deprivations in critical dimensions of human development, such as illiteracy and lack of access to clean water. The HPI had limited utility, according to UNDP experts, because it integrated average deprivation levels for each component and so could not be linked to any particular group of individuals. The UNDP HDR decided to develop a new international measure of poverty in its 20th anniversary year: the Multidimensional Poverty Index (MPI), which directly analyses the combination of deprivations that each household faces (Alkire and Santos, 2010).

Many local empirical studies analysed poverty using the money-metric approach. However, factors other than income is important to welfare (Rogan, 2016). In recent years, some local studies made use of the non-money-metric approach more specifically by adopting the Multidimensional Poverty Index (MPI) method. The MPI approach measures the incidence and intensity of poverty, that is, this approach not only determines the proportion of poor population but also investigates the extent of poverty (Santos and Alkire, 2011).

The global MPI consists of three dimensions and 10 indicators, with the most common non-money-metric dimensions being health, education and living standards, whereas the commonly included indicators include child mortality, years of schooling and sanitation (Alkire, Conconi, Seth and Vaz, 2014). However, given the flexibility of the MPI approach (to be explained later), it is possible to add other dimensions and indicators, yet this has hardly been the case in the recent local empirical studies. Therefore, the General Household Survey (GHS) will be used in the proposed study to include the rarely considered dimensions and indicators to re-examine the extent of MPI in South Africa.

1.2 Objectives of the study

The main research objective of this study is to use the GHS data to re-examine the extent of multidimensional poverty in South Africa. The more specific objectives are as follows:

- Conduct descriptive statistics to examine multidimensional poverty.
- Compare multidimensional poverty by various characteristics, such as gender, age, population group, educational attainment, province and area type.

- Distinguish the key dimensions and indicators accounting for multidimensional poverty, after including numerous indicators that were hardly included in the recent local empirical studies.
- Conduct multivariate econometric analysis to determine the impact of various personal- and household-level characteristics on multidimensional poverty likelihood.

1.3 Outline of the study

The remainder of the study is structured in the following manner: Chapter Two examines the conceptual and theoretical framework. More specifically, the chapter reviews the key definitions of poverty and different measurements of poverty, as well as past local and international empirical studies. Chapter Three discusses methodology and data, focusing on how the MPI approach is revised to measure the proportion and intensity of poverty, as well as the use of the GHS data conducted by StatsSA. Chapter Four presents the empirical findings, before Chapter Five concludes the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter will discuss poverty, mainly focusing on multidimensional poverty. It consists of four sections: Section 2.2 defines the key concepts (in particular poverty, poverty line and multidimensional poverty). In section 2.3, the theoretical framework analyses the views of poverty employed by different economic schools of thought. Section 2.4 provides a review of past empirical studies conducted on multidimensional poverty. This section first reviews studies that utilise the Multidimensional Poverty Index (MPI) approach, highlighting the dimensions and indicators. Secondly, it reviews studies on multidimensional poverty using other approaches. Section 2.5 concludes the literature review, indicates the research gap of this study and specifies dimensions that have been excluded in previous studies.

2.2 Definition of key concepts

2.2.1 Defining Poverty

Someone is defined as poor if he/she is unable to meet the minimum basic needs of goods and services considered reasonable in society (Goulden and D'Arcy, 2014). According to the World Bank (2001), the existing traditional view of poverty not only considers low income and consumption but also encompasses material deprivation such as low educational attainment and health. In addition, the notion of poverty may be broadened to include vulnerability and exposure to voicelessness and powerlessness.

Hence, poverty incorporates both monetary and non-monetary aspects. The former dimension, measured monetarily (by a money-metric poverty line), is defined as a shortfall in the family or personal income that falls below a minimum threshold (Kwadzo, 2015). Other than the common non-monetary dimensions, rarely used dimensions such as vulnerability are defined as the threat of being poor, which is related to both the likelihood of suffering poverty in the future and the severity thereof (Gallardo, 2020). The voicelessness and powerlessness of people limit their choices, and these people do not have the ability to make themselves heard or to influence or control what happens to them (International Monetary Fund, 2000).

Another important non-money-metric poverty dimension is isolation, which includes, amongst others, inadequate access to roads and basic services, long travel distances to visit

health institutions, place of work, and access to potable water, from where one resides (Bird, Mckay, and Shinyeka, 2007). Therefore, one is considered poor when he/she is unable to survive in the short term and participate in society as a full citizen (National Treasury, 2007).

Objective poverty versus subjective poverty

Given the multidimensional aspect of poverty, it could be measured objectively or subjectively (Jansen, Moses, Mujuta and Yu, 2015). The former measurement compares per capita expenditure or per capita income to a monetary threshold, which is known as the objective poverty line. There are usually two methods to determine the poverty line, namely the cost of basic needs (CBN) and food energy intake (FEI) approach.

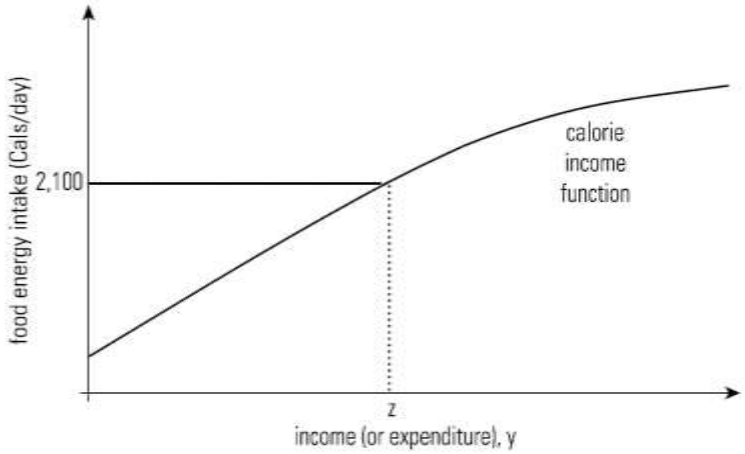
The CBN poverty line is computed by adding the cost of non-food consumption to the cost of a food consumption basket that satisfies the food energy intake criteria (Wodon, 1997). To guarantee that the poverty line serves basic requirements, a consumption package is calculated that satisfies the dietary demand of 2 100 calories per day, and the cost of this bundle is calculated using a diet that represents the eating habits of households living near the poverty line (those in the lowest or second-lowest wage quintiles, or people who consume between 2 000 and 2 100 calories, for example). This food consumption may be denoted by Z^F. The non-food component is then added (there is no reliable method for calculating the non-food portion) and denoted by Z^{NF}. As a result, the basic needs poverty line would be $z^{BN} = Z^F + Z^{NF}$, which means that the basic needs poverty line represents the set of food and non-food products (Haughton and Khandker, 2009).

The FEI method is set by the level of consumption expenditure or income, sufficient enough to meet a predetermined food energy requirement (Baye, 2005; Wodon, 1997). Similarly, to the CBN method, the amount of food adequate to meet the energy intake threshold of 2 100 calories is estimated. This method does not require any information on the price of goods consumed. A calorie income function may be used to calculate the poverty line of spending given a certain amount of sufficient food energy consumption (Haughton and Khandker, 2009).

The calorie income function represented in Figure 2.1 is derived by plotting food energy intake (vertical axis) against income or expenditure (horizontal axis). As income or

expenditure rises, food energy intake rises. However, the rate at which the food energy intake increases is less than the rate income increase. Thus, the poverty line may be determined by point z in the figure below, that meets the minimum nutritional requirement of 2 100 calories.

Figure 2.1: Calorie Income Function



Source: Haughton and Khandker (2009:55).

As far as subjective poverty is concerned, those who are not objectively poor may feel poor based on the individuals' or households' self-perceptions of their economic position in life (Mahmood, Yu, and Klasen, 2019). Individuals could be asked to determine a poverty line to determine the extent of poverty. This subjective poverty line is the personal estimation of the minimum income needed to purchase essential goods (Haughton and Khandker, 2009). However, subjective poverty may not necessarily only be measured by a poverty line estimated by income, another method would be to consider other aspects that influence human well-being (Jansen *et al.*, 2015).

Absolute poverty versus relative poverty

Absolute poverty requires a minimum standard of living based on a person's physiological need for water, clothing, and shelter (Falkingham and Namazie, 2002). To measure those who are absolutely poor, a set poverty line is used. If the individuals or households fall below this poverty line, they are then considered to be absolutely poor. Absolute poverty can also be measured using non-monetary factors such as food and healthcare (Suich, 2012). Therefore, absolute poverty is considered a severe deprivation (Mowafi and Khawaja, 2005).

Poverty is considered to be relative when it is measured beyond the physiological needs and is accepted as a general standard of living in a specific society at a specific time (Falkingham and Namazie, 2002). This approach examines poverty in the context of inequality within society and does not necessarily reflect on mortality or acute suffering (Mowafi and Khawaja, 2005). Relative poverty is concerned with the status of each individual or household in comparison to the status of individuals, households in the community, or other social groups (Suich, 2012).

2.2.2 Poverty Line

A poverty line is the minimum expenditure or income needed by someone to fulfil his or her basic needs (Haughton and Khandker, 2009) and is used as a threshold in determining poverty levels in the country. It is an important tool in determining those who are considered poor and may be used to implement programmes that could combat poverty. The international poverty line (IPL) set at US$1.90 per day counts someone as poor if they live on or below this poverty threshold. However, there are concerns that the IPL value may be too low due to necessities of life being greater now than previously. Thus, the World Bank now reports on two higher value poverty lines: US$3.20 and US$5.50 per day, to complement and not replace the US$1.90 international poverty line (World Bank, 2018b).

In the South African context, StatsSA (2019) reported on three inflation-adjusted poverty lines for 2019, namely the food poverty line (FPL), the lower-bound poverty line (LBPL), and the upper-bound poverty line (UBPL). The FPL is determined by an estimated amount of money that is needed to meet the minimum daily energy intake. Whereas the LBPL is derived by adding the food poverty line and the average amount of non-food items of households whose total expenditure is equal to the food poverty line. Similarly, the UBPL adds the food poverty line and the average amount of non-food items of households whose food expenditure is equal to the food poverty line. The values associated with these poverty lines are R561, R810 and R1 227 (per capita and per month), respectively (Statistics South Africa, 2019).

Absolute poverty line versus relative poverty line

Woolard and Leibbrandt (1999) apply the common definition of the absolute poverty line as the estimated cost of basic essentials that need to be met. It is a fixed cut-off point that is applied to all potential resource distribution (Foster, 1998). On the contrary, a relative

poverty line is based on the view of the standard of living for the distribution, such as the mean, median, or a quintile that defines the cut-off as some percentage of this standard. For example, the income level that cuts off the poorest 20% or 40% of the population in the national income distribution (Woolard & Leibbrandt, 1999).

2.2.3 Multidimensional Poverty

Multidimensional poverty goes beyond monetary measures; it incorporates comprehensive non-monetary dimensions that capture the multidimensionality of poverty (World Bank, 2018a). For instance, access to water, sanitation, education, health and food contributes significantly to the welfare of households. Money-metric measures fail to take into account the value of these services and the cost is often much higher than reflected in households expenditure on these items (Mushongera, Zikhali and Ngwenya, 2017). Thus, a multidimensional poverty index can be derived to determine if an individual is multidimensionally poor. The global MPI utilises the Alkire-Foster method, and this method is based on a counting approach that analyses both the proportion and the intensity of poor people. Furthermore, the most common non-monetary dimensions for the MPI include health, education, and standard of living (Alkire, Chatterjee, Conconi, Seth and Vaz, 2014).

In addition to the MPI method, there is a wide range of statistical methods that can be used to derive a multidimensional non-income index, consisting of several non-money-metric indicators. Such as the Principal Component Analysis (PCA) method, Multiple Correspondence Analysis (MCA), Factor Analysis (FA), and the MPI approach. Two studies by Bhorat, Naidoo and Van der Westhuizen (2006) as well as Bhorat and Van der Westhuizen (2013) adopted the FA approach, whereas Bhorat, Stanwix and Yu (2014) made use of the PCA method. Ntsalaze and Ikhide (2018) explored whether additional indicators are important by applying the MCA method to their study. Lastly, only a few studies adopted the MPI approach, amongst others Rogan (2016), Fransman and Yu (2019), and Finn, Leibbrandt and Woolard (2013).

2.3 Theoretical framework

2.3.1 Classical Theory

Classical theory assumptions include the beliefs that markets self-regulate; if market forces are left to themselves, equilibrium would be quickly restored (Greenwald and Stiglitz, 1987). As a result, government interference is viewed as a cause of economic inefficiency, as it

creates conditions that are misaligned between poor people and society as a whole, welfare programmes are perceived as a potential cause for or reinforcement of poverty through welfare dependence. According to this theory, poor motivation or productivity, as well as non-participation in markets, are the outcome of individuals' conscious decisions, since they have an active role in defining their own economic and social well-being (Davis and Sanchez-Martinez, 2014). Different approaches within the classical theory follow.

Behavioural/Decision-making theory

People should be held responsible for suffering poverty due to the poor decisions they made, the ramifications of having a poor work ethic and low education results in poverty. Despite the available options, decisions are made that prohibit them from accessing economic resources, thereby risking ending up in poverty (Davis and Sanchez-martinez, 2014). Poverty may affect the behaviour of people, either by making the poor desperate or leaving them vulnerable. Thus, it results in the difficult decisions that have to be made, which deplete behavioural control (Spears, 2010).

The sub-culture of poverty

The term sub-culture was first created by Oscar Lewis in 1961 and 1966, based on the assumption that the poor and rich individuals have different values and beliefs. It is argued that some people become poor because they learn certain psychological behaviours associated with poverty, such as not learning how to plan for the future, not studying, and spending money unwisely (Sameti, Esfahani and Haghigi, 2012). It is also linked to the inability to accumulate private and social assets (Davis and Sanchez-Martinez2014). In addition, Bradshaw (2006) points out that the culture of poverty is a sub-culture of poor people who reside in the ghetto (poor regions); these people have common beliefs and values that are independent of the culture of the main society. Poverty is passed down from generation to generation along family lines, where deprivations are treated as being a residual personnel or family phenomenon rather than a society-wide structural problem (Davis and Sanchez-martinez, 2014). Lewis also states that once children reach the age of six or seven years, they are already captivated by the attitudes and values of their sub-culture, making it difficult for them to take opportunities that could change their condition (Bradshaw, 2006).

2.3.2 Neoclassical Theory

In a market-based competitive economic system, neoclassical theory emphasizes the significance of unequal beginning endowments of talents, skills, and capital in generating poverty (Davis and Sanchez-Martinez, 2014).

Human capital theory

Human capital is defined as the skills, education, health and training of individuals (Becker, 1962). It embodies capital because it is the source of future earnings or satisfaction, and it is human because these skills or education are an integral part of man (Schultz, 1972). According to Awan, Iqbal and Waqas (2011), several studies have shown that investment in education creates opportunities for the poor to escape poverty by increasing their abilities and productivity. Thus, being more productive, efficient and better skilled open the door to more opportunities and choices, assisting in acquiring a good job and hence increasing income levels. The concept of poverty has generally been viewed in terms of low income or low levels of material wealth. However, the lack of opportunities, vulnerability and deprivation of basic capabilities such as health and education have recently also been considered as other aspects of poverty; so, it is indeed a multi-dimensional phenomenon (Arif and Bilquees, 2011).

Health and Demographics

Health and demographic factors are important components of an individual's human capital stock, and it is via this channel that they indirectly impact the chance of poverty occurrence (Davis and Sanchez-Martinez, 2014). People's health status has a comparable effect on poverty as their set of skills in that poor health, like poor skills, indicate a reduced possibility of obtaining employment (or being able to work at all) and therefore a higher risk of ending up poor (Reinstadler and Ray, 2010). Similarly, if age is a significant predictor of unemployment, it might be considered a component of poverty. Those age groups who are more sensitive to unemployment are also more likely to fall into or re-enter poverty (Davis and Sanchez-Martinez, 2014).

2.3.3 Keynesian/Liberal theory

Keynesians strongly believed in government intervention to stimulate the economy. The increase in government expenditure could increase growth and economic development in the hopes of alleviating poverty (Davis and Sanchez-Martinez, 2014).

Unemployment and poverty

Unemployment is not only considered as an economic issue but also highlighted as a serious social problem because as unemployment probability increases, the income of family's decreases simultaneously (Kiaušienė, 2015). The unemployment effect is found to be significant as it slows down wage increases and reduces government revenue. In addition, it harms people's mental and physical health as well as provokes poverty (Šileika and Bekerytė, 2013). Individuals without an income are at greater risk of ending up in poverty, whereas employment plays a vital role in preventing the occurrence of poverty. Movements in and out of poverty have consequences on those who are at most harmed by poverty (Davis and Sanchez-Martinez, 2014). The regional unemployment rate has direct and indirect effects on poverty. An increase in total unemployment raises the chance of individual unemployment and on the wage bargaining power of the employed (Reinstadler, 2010).

2.3.4 Marxist/Radical theory

Marxist claim poverty is caused by capitalism. The private ownership of capital goods used in the production to sell in a free market. Workers are paid at a low cost than their value-added and threatened by unemployment (while the employers benefit from major profits). This dysfunction in the market can only be alleviated by strict regulations imposed by the state such as minimum wage (Davis and Sanchez-Martinez, 2014). The operations of capitalist produce approximately a permanent underclass of unemployed, resulting in poverty (Peet, 1975). The radical theory suggests that the distribution of individual income will be affected by the level of class they fall in (Johnson and Mason, 2012).

Minimum wages

Minimum wage stands for the lowest legal wage set by bargaining councils that employers can pay their employees (Statistics South Africa, 2000). Minimum wage is implemented to prevent workers with the lowest income from falling into poverty (Davis and Sanchez-martinez, 2014). That is, the primary motive behind minimum wage is to increase the income of poor families and subsequently reduce poverty likelihood (Neumark and Wascher, 2002).

Poverty and the environment

Negative environmental externalities are commonly caused by the higher-income groups, whereas low-income groups located in or nearby polluted areas are more likely to be affected

by these externalities. Health conditions deteriorate, which in turn undermine the production levels of the workers, thereby putting their income level at risk. A drop in income may result in poverty (Davis and Sanchez-Martinez, 2014).

2.3.5 Sen's Capability approach

The multidimensional approaches to quality of life and deprivation are strongly related to the underlying intuitions conveyed by the ideas of functionings and capabilities (Schokkaert, 2008). There are compelling reasons to think of poverty as a lack of fundamental capabilities rather than just a lack of money. Premature mortality, severe malnutrition, persistent illness, widespread illiteracy, and other failures can all be indicators of a lack of basic capabilities (Sen, 1999). Poverty, rather than poor income, could be viewed as a lack of capabilities that restricts one's ability to do something. In this perspective, poverty is defined as a failure of capability - people's inability to experience vital beings and activities that are fundamental to human life (Conconi and Viollaz, 2017).

The capabilities approach evaluates people's well-being in terms of their functionings and capabilities, which are described as an individual's actual and potential activities, as well as their state of being (Kuklys and Robeyns, 2004). According to Kuklys and Robeeynes (2004), Sen defines functionings as a person's success, or what he or she is able to do or be. Encompassing an individual's activities and state of being, such as good health, enough shelter, mobility, and education. Capability is a derived concept that represents the many functions he or she might possibly perform, as well as the individual's choice to select between different ways of living. The concept is inherently multidimensional (Conconi and Viollaz, 2017).

2.3.6 Vulnerability theory

According to Fineman's vulnerability theory, all humans are vulnerable and prone to dependence, and the state has a responsibility to mitigate, alleviate, and compensate for that vulnerability. Fineman claims that the state must give equitable access to society institutions that provide social goods such as healthcare, employment, and security in order to fulfil its commitment to respond to human vulnerability (Kohn, 2014).

2.4 Dimensions of poverty

Isolation

Isolation refers to being peripheral and cut off. Poor individuals can be geographically isolated by living in a "remote" region; isolated in communication by a lack of connections and knowledge, such as the inability to read; isolated by a lack of access to social services and markets; and isolated by a lack of social and economic supports (Chambers, 1995). According to Samuel, Alkire, Zavaleta, Mills, and Hammock (2017), Sen draws on Adam Smith's insight that the inability to freely connect with others is a deprivation that relates to the importance of participating in communal life.

Vulnerability

Vulnerability is a term used by poor households to describe a state that includes both exposure to serious risks and defencelessness against deprivation (Kamanou and Morduch, 2002). Chambers (1989) refers vulnerability to being exposed to unforeseen events and stress, as well as having difficulties dealing with them. Vulnerability includes two aspects: an external side of risks, shocks, and stress to which an individual or family is exposed, and an internal side of defencelessness, which refers to a lack of resources to deal without suffering irreversible loss (e.g., Physically weaker, monetarily poor, socially reliant, humiliated, or mentally damaged).

Powerlessness and Voicelessness

Poor people's lives are characterised by a lack of power and a lack of voice, which limit their options and determine the quality of their relationships with employers, markets, the government, and even non-profit groups (NGOs) (Narayan, 2000). As it is less tangible, this dimension is regarded more difficult to measure.

2.5 Review of past empirical studies

This section reviews multidimensional poverty using different approaches and will be divided into two sub-sections. Section 2.4.1 thus examine local studies that use the MPI method, and section 2.4.2 review local studies that use other methods such as the MCA, FA, and Fuzzy Sets approach.

2.5.1 Studies using the MPI approach

Finn, Leibbrandt and Woolard (2013) derived a multidimensional poverty index (MPI) to assess trends in multidimensional poverty in South Africa over the post-apartheid period. The MPI comprised of nine indicators across three dimensions (education, health, and standard of living) was examined by province, race, and area type using the Project for Statistics on Living Standards and Development (PSLSD) and National Income Dynamic Study (NIDS) data for the period of 1993 and 2010-2011. Results for 1993 indicated water, sanitation, and electricity in which the MPI poor were most deprived, whereas in 2010 sanitation and water had the highest deprivation followed by assets. In general, there was a significant decrease in MPI from 1993 to 2010 also the average distance from the multidimensional poverty line across all dimensions also fell over the period.

Statistics South Africa (2014) developed a Multidimensional Poverty Index for South Africa (SAMPI) focusing on the provincial level, utilising the 2001 and 2011 census data. The SAMPI consisted of four dimensions (Health, education, living standards and economic activity) and 11 indicators. The results indicated an improvement in MPI poverty over time, however, the main contributors to multidimensional poverty regarding indicators results from unemployment, years of schooling and heating. The results also show that, for both years, the standard of living dimension contributed almost 50% to MPI poverty. Furthermore, it was found that results at the provincial level varied; however, the Eastern Cape, KwaZulu-Natal Limpopo and North West provinces were associated with the highest MPI scores.

Frame, De Lannoy and Leibbrandt (2016) derived a multidimensional poverty index for youths between the ages 15 to 24 years. The authors used the 2011 Census data and computed a youth MPI that included 11 indicators from four dimensions (education, health, living environment and economic opportunities) in total. The empirical findings indicated a highly unequal spatial distribution of youth multidimensional poverty. The results also suggested three indicators had the largest contributors to the youth MPI, namely educational attainment, adult household employment and individuals who were not in education, employment, or training.

Rogan (2016) measured the gender poverty gap in post-apartheid South Africa by applying the multidimensional approach and used the 2008 NIDS data to conduct analysis. The MPI for this study included three dimensions (education, health and standard of living) and a total

of nine indicators. For females, the observational results revealed that child mortality and education, accompanied by a shortage of sanitation and clean water, were the factors that contributed the most to multidimensional poverty in South Africa. Nutrition, on the other hand, accounted for the greater proportion of MPI in men, followed by inadequate sanitation, water, electricity and safe cooking fuels. However, the major disparities in deprivation between men and women were the somewhat lower contribution to child mortality and the comparatively greater contribution to adult households' lack of access to education.

Mushongera, Zikhali and Ngwenya (2017) addressed the shortcomings of money-metric poverty measures by utilising and adapting the multidimensional poverty index method for the Gauteng province of South Africa, by including nine indicators from four dimensions (standard of living, food security, economic activity, and education). The study utilised the 2011 and 2013 Quality of Life (QoL) Survey data to examine the spatial configuration of multidimensional poverty within Gauteng. The empirical findings indicated that areas with low levels of economic activity exhibited high levels of multidimensional poverty. Also, the multidimensional poverty index for Gauteng was low but varied markedly by municipality and ward, as well income groups.

Omotoso and Koch (2017) developed a multidimensional poverty index for children specifically between the ages of zero and 17 years to assess changes in child poverty over time in post-apartheid South Africa, utilising the 2002 and 2014 GHS data to conduct the analysis. The child MPI was composed of 18 indicators across four dimensions: education, health, living conditions and economic activity. It was found that child poverty decreased over time; however, the results also showed that economic activity followed by living conditions, health, and education had the largest contribution to the overall child MPI. As a result, in both years, the proportion of children who were disadvantaged in at least one-third of any of the weighted measures remained high.

The Ebenezer and Abbyssinia (2018) study empirically investigated the effect of income diversification on household welfare in Eastern Cape. The study utilised the 2014 GHS data to conduct analysis. The authors modified the MPI to profile the poverty status of households and then used a Tobit regression model to determine the effect of livelihood diversification and household socioeconomic characteristics on household multidimensional poverty. The MPI consisted of 13 indicators from three dimensions (health, education and standard of

living). Descriptive analyses indicated that the majority of households who were considered poor or severely poor had household heads with low educational attainment and they were located in the rural areas of the province. The Tobit regression results showed that livelihood diversification did not significantly influence household poverty in the province.

Fransman and Yu (2019) derived a multidimensional poverty index for South Africa. Along with Census 2001 and 2011 data, the authors also used the Community Survey (CS) 2007 and 2016 data to examine how non-money metric multidimensional poverty has changed over time. The study adapted the global MPI to include 12 indicators from four dimensions (health, education, the standard of living, and economic activity) before examining the MPI poor by gender, population groups, and geographical areas, particularly concentrated on results by district council and province. The authors found a sustained but significant reduction in MPI poverty, although this is true, the indicators that contributed the most to MPI poverty were unemployment, years of education and disabilities. Also, the findings have revealed a steady decline in multidimensional poverty for African females living in rural areas in provinces like Eastern Cape and Kwazulu-Natal, with District Councils in the Western Cape (for example, the Cape Winelands, the City of Cape Town, the Overberg, and the West Coast, for example) contributing the least to MPI and the highest in KwaZulu-Natal (uMzinyathi, Harry Gwala, and uMkhanyakude) and the Eastern Cape (such as Alfred Nzo and OR Tambo).

2.5.2 Studies using other approaches

Bhorat, Van der Westhuizen and Yu (2014) estimated the extent to which non-income welfare has improved since democracy. The study utilized four data sets to investigate the delivery of public assets to the poor namely the 1993 PSLSD, 1999 October Household Survey (OHS), as well as 2005 and 2011 GHS. The Factor Analysis (FA) method was used to derive a public asset index at a household level, which includes seven public asset variables (dwelling type, roof material of dwelling, wall material of the dwelling, main source of drinking water, main source for cooking, main energy source for lighting, and type of sanitation facility). The empirical findings indicated a steady increase in access to public assets over the 18 years. Thus, households had more access to decent roof material, wall material of high quality, piped water, a flush or chemical toilet, and electricity for lighting and cooking. However, formal dwelling decreased between the period of 1995 and 2005 from 74.2 percent to 69.8 percent.

Burger, Van der Berg, Van der Walt and Yu (2017) looked at the long-term geographical and ethnic aspects of poverty and deprivation in South Africa in order to evaluate the country's post-apartheid growth. The authors applied the Fuzzy and Relative approach (TFR) to generate a poverty index centred around nine dimensions of deprivation (education, employment, dwelling type, overcrowding, proximity to electricity, water, telephone, sanitation, and refuse collection) and analysed 1996, 2001 and 2011 census data, as well as the Community Survey (CS) of 2007.

The results indicated a decrease in deprivation levels across all nine provinces of South Africa, where three of the poorest provinces surpassed the mean improvement in the poverty index (Eastern Cape, Limpopo and Free State). The least and most deprived provinces Western Cape and Eastern Cape deprivation levels dropped between the period of 1996 and 2011 from 0.21 to 0.17 and 0.62 to 0.44, respectively. In addition, rural poverty was found to more extensive in Eastern Cape, KwaZulu-Natal, and Limpopo. Furthermore, a few dimensions within provinces, such as employment in most provinces, have not improved over time (Western Cape, Northern Cape, Free State, KwaZulu-Natal, Gauteng, and Mpumalanga), also dwellings (Western Cape) and refuse collection (Northern Cape). However, the telephone dimension showed the largest improvement. Lastly, deprivation diminished for both Black and White groups, but the Black individuals suffered a greater proportion of deprivation.

The study by Ntsalaze and Ikhide (2018) sought to determine if the additional indicators (over-indebtedness and unemployment) are important in multidimensional poverty and whether they are true poverty indicators. Using 2012 NIDS results, Multiple Correspondence Analysis (MCA) was used to classify statistically significant additional dimensions. The study assessed 12 indicators from five dimensions namely; education, health living standards, economic activity, and financial commitments. The authors concluded economic status (lack of employment) and financial commitment (over-indebtedness) contributed relatively high values to the Composite Poverty Index.

Katumba, Cheruiyot and Mushongera (2019) analysed spatial changes in the concentration of poverty based on two existing multidimensional poverty indexes (computed Gauteng MPIs data for 2013 and 2015) for the Gauteng province. Furthermore, the study applied three

spatial statistical techniques to identify and evaluate spatial directional trends in poverty across Gauteng. The results showed that multidimensional poverty was prevalent in surrounding areas of the province, more specifically the western and southern parts of the province. However, there were pockets of poverty that were observed inwards that lied adjacent to affluent areas. Further analysis indicates both multidimensional indices exhibited statistically significant clustering patterns, with a majority of the wards in the core of the province being rich and poor clusters in the neighbourhood.

2.6 Conclusion

Past local studies have mostly used monetary metrics to analyse poverty, which is described as a lack of basic needs caused by persistently low income levels. However, the literature reviewed indicates that a few local studies examined poverty using non-monetary measures, such as the Multidimensional Poverty Index (MPI). The MPI method shows that many other factors contribute to individual's quality of living, such as education, health, and the standard of living of people.

The research gap has been identified in the literature reviewed, of the few local studies that utilised the MPI approach, and the most common dimensions are education, health, the standard of living and economic activity. However, other dimensions such as isolation, vulnerability, powerlessness and voicelessness are completely ignored in these past empirical studies. This study, therefore, intends to add dimensions and indicators that are hardly used to strengthen the knowledge of multidimensional poverty in South Africa. In addition, the study intends to compare the multidimensional poverty of various characteristics (gender, race, age, population group, educational attainment and area type). Furthermore, the multivariate econometric analysis will be used to determine the impact of various personal- and household-level characteristics on multidimensional poverty likelihood.

CHAPTER THREE: METHODOLOGY AND DATA

3.1 Introduction

This chapter outlines the methodology and data employed in this study. Section 3.2 provides an overview and explanations of the MPI method derived by Alkire and Foster. Furthermore, it discusses the MPI by deriving a method [A] and method [B]. Section 3.3 provides an overview of the GHS data before section 3.4 concludes the chapter.

3.2 Methods

Alkire and Foster first proposed the MPI strategy as a way to measure poverty in 2011 (Alkire and Foster, 2011). The Global MPI was created to assess acute poverty and the severity of poverty by assessing the deprivations that people face at the same time (Alkire, 2008).

3.2.1 Original MPI

The global MPI, which has three dimensions: health, education, and living standards, is shown in Table 3.1 below, a total of 10 indicators consist within these dimensions (Fransman and Yu, 2019). The health dimension accounts for nutrition and child mortality; the education dimension includes years of schooling and school attendance; and lastly, the living standards dimension consists of the cooking fuel, water, sanitation, electricity, floor material and asset ownership indicators (Alkire, Jindra, Aguilar, Seth, and Vaz, 2015; Santos and Alkire, 2011).

A method of this kind necessitates a deprivation cut-off z_i for each indicator, which is described as a certain degree of satisfaction. Thus, the i-th person is considered to be deprived if the individual's achievement is less than the deprivation cut-off in a specific indicator x_i, that is, if $x_i < z_i$. Following the deprivation cut-offs, each dimension is assigned an equal weighting of 1/3, as well as each indicator within each dimension is also evenly weighted. Therefore, each indicator within in the education and health dimension will be weighted 1/6 (1/3 ÷ 2, since there are two indicators in both dimensions) and each indicator within the standard of living dimension receives 1/18 (1/3 ÷ 6) weight. The authors note that the sum of the weights should equal to 1, that is, $\sum_{i=1}^{d} W_i = 1$ where indicator i weight as W_i (Santos and Alkire, 2011).

Table 3.1: Original dimensions and indicators in the MPI approach

Dimension	Indicator	Deprivation cut-off	Weight
Education	Years of Schooling	No household member has completed five years of schooling	1/6
	School attendance	Any school-age child is not attending school	1/6
Health	Child mortality	Any child has died in the family	1/6
	Nutrition	Any adult or child for whom there is nutritional information is malnourished	1/6
Living Standards	Electricity	There is no electricity	1/18
	Drinking Water	Does not have access to clean drinking water or clean water is more than 30 minutes walking distance from home (roundtrip)	1/18
	Sanitation	lacks adequate sanitation or if their toilet is shared	1/18
	Flooring	Deprived if the household has a dirt, sand or dung floor	1/18
	Cooking Fuel	Deprived if the household cooks with wood, charcoal or dung	1/18
	Asset Ownership	Does not own more than one of: radio, TV, telephone, bicycle, motorcycle, or refrigerator; and does not own a car or tractor	1/18

Source: Santos and Alkire (2011).

Once the indicators and weights have been chosen, the poverty cut-off is determined to identify the poor, derived by two cut-off points. The first cut-off point, the deprivation score, is denoted by C_i and means the sum of each deprivation multiplied by its weights, that is, $C_i = W_1 I_1 + W_2 I_2 + \ldots\ldots\ldots + W_d I_d$, where $I_i = 1$ if the person is deprived in indicator i and $I_i = 0$ if a person is not deprived in any indicator. The second cut off identifies the multidimensional poor, known as the poverty cut-off, noted with K (where K = 1/3), is the proportion of (weighted) deprivations that an individual must have in order to be considered poor. Thus, whether an individual's deprivation score is equal to or higher than the poverty cut-off, he or she is considered poor, $C_i \geq K$. To be considered MPI poor, the individual deprivation score has to be greater than or equal to 1/3. Deprivation scores below the poverty cut-off are replaced with zero, this is known as censoring in poverty measurement. The censored deprivation score is denoted by $C_i(K)$ to differentiate it from the original deprivation score. That is, when $C_i \geq K$, then $C_i(K) = C_i$ but if $C_i < K$, then $C_i(K) = 0$.

To derive the MPI, two key pieces of information are required. The first component measures the proportion or incidence of people who experience multiple deprivations, known as the multidimensional headcount ratio (*H*) where $H = \frac{q}{n}$, where q represents the number of people who are identified as multidimensional poor and n the total population. The second component of the MPI determines the average deprivation score of the multidimensional poor people, known as the intensity of poverty denoted by *A*, where $A = \frac{\sum_{i=1}^{n} c_i\,(K)}{q}$, $C_i(K)$ is the censored deprivation score of individuals and q the number of people who are multidimensional poor. Thus, the MPI is the product of both the multidimensional headcount ratio (*H*) and the intensity of poverty (*A*), that is, $MPI = H \times A$ (Santos and Alkire, 2011).

3.2.2 Revised MPI – method [A]

As reviewed in the previous chapter, in the South African context, StatsSA developed a South African Multidimensional Poverty Index (SAMPI) by adapting dimensions, indicators, and cut-off values from the global MPI. Due to the flexibility of the Alkire and Foster MPI method, this study will derive an MPI for South Africa by including indicators from seven dimensions, namely, education, health, standard of living: conditions of dwelling, standard of living: access to facilities and services, standard of living: asset ownership, economic activity, as well as isolation and vulnerability (see Table 3.2). Two of the original dimensions (education and health) remain unchanged in the revised MPI. However, the standard of living dimension is now separated into three different dimensions. Whilst some recent studies finally included the economic activity dimension, isolation and vulnerability remains the key dimension that was ignored in many past empirical studies. As a result, this approach – to be referred to as method [A] for the remainder of the study, involves drastic changes in the inclusion of dimensions and indicators, deprivation cut-offs as well as weights.

The dimensions are equally weighted, each receiving a weighting of 1/7, and indicators within each dimension are also equally weighted. Thus, each indicator within in the education and economic activity dimension receives 1/14 (1/7÷ 2) weighting; each indicator in the health and living standards – access to facilities and services and standard of living – asset ownership dimension receives 1/28 (1/9 ÷ 4) weighting and the indicators within the standard of living – conditions of dwelling and isolation and vulnerability receives a weighting of 1/35 (1/7 ÷ 5). As mention in section 3.2.1, the sum of weights equal to 1, that is, $\sum_{i=1}^{d} W_i = 1$.

Table 3.2: Dimensions, indicators, deprivation cut-offs and weights for the MPI – Method [A]

Dimension	Indicator	Deprivation cut-off	Weight
Education	#1: Years of schooling	No Household member aged 15 years or above has completed 7 years of schooling	1/14
	#2: School attendance	At least one child between the ages of 7 to 15 years is not attending an educational institution	1/14
Health	#3: Disability	At least one household member is disabled	1/28
	#4: Health Worker	At least one household member was ill in the past three months but could not seek medical care due to inability to pay for health care services, distance to health care facilities and other socio-economic reasons	1/28
	#5: Adult food hunger	Often or always experienced it in the past 12 months	1/28
	#6: Child food hunger	Often or always experienced it in the past 12 months	1/28
Standard of living-conditions of dwelling	#7: Dwelling Type	Living in an informal shack/ traditional dwelling/ caravan/ tent/ other	1/35
	#8: Roof material	Does not use standard materials such as corrugated iron, asbestos and tiles	1/35
	#9: Wall material	Does not use standard materials such as bricks, cement and tiles	1/35
	#10: Floor material	Does not have finished floor such as polished wood, vinyl strips, ceramic tiles, cement and carpet	1/35
	#11: Overcrowding	More than two persons per room	1/35
Standard of living-access to facilities and services	#12: Fuel for cooking	Using paraffin / wood/ coal/ dung/ other/ none	1/28
	#13: Water	There is no piped water in the dwelling or on stand	1/28
	#14: Sanitation type	No access to a flush toilet	1/28
	#15: Refuse removal frequency	Refuse is removed less than once a week or there is no concrete refuse removal system	1/28

Table 3.2: Continued

Dimension	Indicator	Deprivation cut-off	Weight
Standard of living-asset ownership	#16: Operational assets	Does not own more than one of the following: radio, television, washing machine, fridge	1/28
	#17: Communication assets	Does not own at least one of the following: landline, telephone, cellular telephone, computer, internet connection in the household	1/28
	#18: Transport assets	Does not own at least one motor vehicle in working condition	1/28
	#19: Financial assets	Does not own at least one of the following: bank account, investment account, pension/provident fund, informal savings	1/28
Economic activity	#20: Unemployment	All household members aged 15 to 65 years are unemployed	1/14
	#21: Job search	At least one household member aged 15 to 65 years did not try to find work or start a business in the last four weeks due to illness, disability, lack of available transport or no money to pay for transport	1/14
Isolation and vulnerability	#22: Distance from the nearest water source	At least 200m form the dwelling	1/35
	#23: Distance from the nearest sanitation facility	At least 200m form the dwelling	1/35
	#24: Receipt of post/mail	Not delivered to the dwelling , post box or private bag	1/35
	#25: Time taken to the health institution normally visited	At least 30 minutes	1/35
	#26: Time taken to the workplace	At least employed household member takes 1hour or more to get to the workplace	1/35

Source: Adapted from Santos and Alkire (2011:6).

Education

The education dimension comprises of two indicators, namely years of schooling and school attendance, which are largely unchanged from Alkire and Foster's initial MPI. As stated by Alkire and Santos (2011), both indicators are imperfect proxies as these indicators fail to capture the level of knowledge attained, skills, or the quality of schooling. However, years of schooling and school attendance are both robust indicators and provide the best estimate of household education within households.

This study employs the deprivation cut-offs from the Fransman and Yu (2019) study for both indicators. The authors apply the years of schooling deprivation cut-off to family members aged 15 and up who have completed seven years of schooling rather than five. Fransman and Yu (as cited in Schindler, 2005:14) and Barker (2015:223) state that since illiteracy applies to a standard of education that is less than seven years long; it is more applicable in the South African sense and it refers to all people who have not completed Grade 7.

The school attendance indicator deprivation cut-off originally focused on any school-aged child that was not attending school in Grades 1 to 8. The cut-off point is altered to children between the age of 7 to 15 years who did not attend an educational institution, and now also includes learners in grade 9, as most learners in grade 8 are 14 years of age.

Health

The original MPI health indicator in the Alkire and Foster methodology consists of both child mortality and nutrition. With regards to the nutrition indicator, an adult is considered to be undernourished if his/her Body Mass Index (BMI) is less than 18.5 and if a child is underweight. Unfortunately, the GHS does not capture information on the height and weight of members in the household; however, the survey does capture information on food security. Therefore, for this study, it is not possible to include the malnutrition indicator.

Since household data usually lacks equivalent health indicators for all members of the household, the revised methodology is altered to include disability, health worker, adult food hunger, and child food hunger. This study utilises the disability indicator adapted by Fransman and Yu (2019) which stipulates a household being deprived if at least one member is disabled (i.e. having difficulty in seeing, hearing, walking, remembering and concentrating,

self-care, or communicating). Isar, Ross, Ahmad, Ahmad and Pervaiz also include this indicator in their 2020 study.

The health worker indicator is defined by the reasons why a person did not seek medical help when they were sick, such as the cost, distance, and other socioeconomic factors (Fransman and Yu, 2019). Similarly, Mohanty, Rasul, Mahapatra, Choudhury, Tuladhar and Halmgren (2018) included health care as an indicator, a household is deprived in this indicator if health care is not affordable or had to borrow money to get health care. The last two indicators of the health dimension, adult food hunger and child food hunger (The 2017 Omotoso and Koch study also included food hunger as an indicator in their study) focused on whether an adult or child experienced going hungry because there was not enough food. Often, child and food hunger is categorised under the term food security as in the Mushongera, Zikhali and Ngwenya (2017) study where at least one household member had to skip a meal. However, the GHS explicitly asks questions on child food hunger and adult food hunger and is therefore included in the revised MPI of this study.

Standard of living – conditions of dwelling

Originally, in the Alkire and Foster methodology, the standard of living dimension consists of three standard MDG indicators, two non-MDG indicators, and the last indicator relates to the ownership of consumer goods. More specifically, the indicators included are electricity, drinking water, sanitation, flooring, cooking fuel and asset ownership. However, this study made a few alternations to the living of standard dimension by dividing the dimension into three different categories (conditions of dwelling, access to facilities and services, and asset ownership), each with its indicators.

The original MPI's standard of living was based solely on the flooring material, while this analysis takes into account other factors such as dwelling type, roof material, wall material, and overcrowding. A household is deprived in the conditions of dwelling dimension if: the dwelling type is a caravan/ informal shack /traditional dwelling/ tent/other; the roof is not constructed of typical materials like corrugated iron, asbestos, or tiles; the wall material does not consist of bricks, cement, and tiles; and a household is deprived in the overcrowding indicator when more than two people occupy a room. In comparison to the original deprivation cut-off of the floor material indicator, this study rather focuses on the finished floor such as polished wood, vinyl strips, ceramic tiles, cement, and carpet.

Recent local and international studies also include these indicators: Omotoso and Koch (2017) included all four of these indicators whereas Astuti, Firmansyah and Widodo (2018) only considered the roof and wall material indicators in their MPI. Also, dwelling type and overcrowding were incorporated in the Mushongera *et al*. 2017 (labelled as housing) study as well as Fransman and Yu's 2019 study. Lastly, under this dimension, the dwelling type was included in the following studies: Ebenezer and Abbyssinia (2018), Frame, De Lannoy and Leibbrandt (2016) as well as Mohanty et al (2018).

Standard of living – access to facilities and services

Regarding the fuel for cooking indicator, when compared to the original methodology, the deprivation cut-off is expanded to include paraffin, none or other in addition to wood, coal, and dung. Whereas the water indicator deprivation cut-off is narrowed down to if no water has been piped in the house or on the stand from the original cut-off that includes piped water, public tap, borehole or pump, protected well, protected spring or rainwater and is within 30 minutes walking distance. The sanitation type indicator accounts for households who do not have access to flush water. Lastly, an additional indicator is added to the revised MPI, namely refuse removal frequency, which was also contained in Omotoso and Koch (2017) as well as Fransman and Yu (0219). Thus, the household is deprived in this measure if refuse is removed less than once a week or if there is no concrete refuse collection scheme.

Standard of living – asset ownership

Originally, in the Alkire and Foster MPI, the asset indicator is condensed into one deprivation cut-off (including radio, TV, telephone, bike, motorbike, refrigerator, car, or tractor). The GHS has several questions regarding assets, and for this reason, the asset ownership is divided into four different indicators. Firstly, the operational assets indicator deprivation cut-off accounts for households who do not have one of the following assets: radio, television, washing machine or fridge. The second indicator comprised of communication assets embodies a landline, telephone, cellular telephone, computer, internet connection in the household and included in the Mushongera *et al*. (2017), Arndt, Mahrt, Hussain and Tarp (2018) as well as Ozughalu and Ogwumike (2019) studies (the latter two studies labeled this indicator simply as communication). The household is deprived if it fails to acquire one of these assets.

The third indicator considers whether the household has a vehicle in working condition, if not, the household is deprived in this indicator. However, the Iwasaki and Gi-Laitly (2013) study combined communication and transport assets into one indicator. Lastly, the financial indicator considers whether the household has a bank account, investment account, pension/provident fund, or informal savings either individually or jointly. A recent 2018 study by Mahapatra, Bhattacharya, Atmavilas and Saggurti included financial security as an indicator and its components include savings account, savings or investment.

Economic activity

The original MPI does not take economic activity into account; however, unemployment remains one of the major socio-economic issues that South Africa faces reaching the highest record of 30.1 percent in the first quarter of 2020 (Stats SA, 2020). Therefore, including the unemployment measure in the economic activity dimension is important. This study uses the narrow definition of unemployment and those between the ages of 15 to 65 years are considered to be defined as unemployed. Thus, if all individuals of working age are unemployed, the household would be deprived. The economic activity dimension and the unemployment indicator has been recently discussed and included in many local studies, such as Mushongera et al. (2017), Omotoso and Koch (2017), Ntsalaze and Ikhide (2018), Stats SA (2014), Frame et al. (2016) as well as Fransman and Yu (2019).

Lastly, the job search indicator considers reasons as to why at least one member of the household did not make an effort to find work, possibly due to being ill, being disabled, lack of available transport, or not by any means able to pay for the transport. This indicator was included in the Noble and Wright (2012) study to derive the economic deprivation domain indicator.

Isolation and vulnerability

As mentioned in section 2.2.1, Gallardo (2020) states that vulnerability is understood as the threat to future poverty which relates to both the likelihood of suffering poverty and the severity thereof. In addition, being isolated and not being able to participate in society as a full citizen contributes to poverty (National Treasury, 2007). For this reason, it is important to add isolation and vulnerability as a dimension to the revised MPI. This dimension consists of five indicators: distance from the nearest water source (discussed in the Nadeem, Cheo and Shaoaan 2018 study as an indicator in the derived water poverty index), distance from the

nearest sanitation facility, receipt of post/mail, time taken to the health institution normally visited and time taken to the workplace. The individual would be deprived if distance to the nearest water source and sanitation facility is at least 200 m from the dwelling, if mail is not delivered to the dwellings post box or private box, if it takes more than 30 minutes to get to a health institution and lastly if an employed person takes one hour and more to get to the workplace.

3.2.3 Revised MPI – method [B]

The second adapted method [B] for this study retains the original Alkire and Santos three dimensions (education, health and standard of living) by including 12 indicators (compared to 26 indicators from seven dimensions in method [A]). Firstly, the education dimension consists of the same two indicators which are years of schooling and school attendance. The second dimension (health) adopts the same indicators as in method [A] that is, disability, health worker, adult food hunger, and child food hunger. Lastly, the third standard of living dimension is adapted to comprise six indicators namely, drinking water, sanitation, flooring, cooking fuel, operational assets, and transport. Table 3.3 summarises this approach.

Similarly, to the Alkire and Foster deprivation cut-offs, each dimension is weighted equally as 1/3, also each indicator within each dimension is weighted equally. Thus, each indicator in the education dimension receive a weighting of 1/6 (1/3 ÷ 2), the health dimension indicators each receive 1/12 (1/3 ÷ 4) weighting and lastly, each indicator within the standard of living dimension receive a weighting of 1/18 (1/3 ÷ 6). As previously mentioned in 3.2.1 and 3.2.2, the sum of the weights equal to 1 ($\sum_{i=1}^{d} W_i = 1$).

Table 3.3: Dimensions, indicators, deprivation cut-offs and weights for the MPI – Method [B]

Dimension	Indicator	Deprivation cut-off	Weight
Education	[I]: Years of schooling	No Household member aged 15 years or above has completed 7 years of schooling	1/6
	[II]: School attendance	At least one child between the ages of 7 to 15 years is not attending an educational institution	1/6

Table 3.3: Continued

Dimension	Indicator	Deprivation cut-off	Weight
Health	[III]: Disability	At least one household member is disabled	1/12
	[IV]: Health Worker	At least one household member was ill in the past three months but could not seek medical care due to inability to pay for health care services, distance to health care facilities and other socio-economic reasons	1/12
	[V]: Adult food hunger	Often or always experienced it in the past 12 months	1/12
	[VI]: Child food hunger	Often or always experienced it in the past 12 months	1/12
Living Standards	[VII]: Drinking Water	There is no piped water in the dwelling or on stand	1/18
	[VIII]: Sanitation	No access to a flush toilet	1/18
	[IX]: Flooring	Does not have finished floor such as polished wood, vinyl strips, ceramic tiles, cement and carpet	1/18
	[X]: Cooking Fuel	Using paraffin / wood/ coal/ dung/ other/ none	1/18
	[XI]: Operational assets	Does not own more than one of the following: radio, television, washing machine, fridge	1/18
	[XII]: Transport assets	Does not own at least one motor vehicle in working condition	1/18

Source: Adapted from Santos and Alkire (2011:6).

3.2.4 Decomposition of the MPI

The MPI contains large amounts of information and it is imperative to break down the composition of poverty in greater detail. Thus, the MPI may be analysed by decomposing population sub-groups or by dimensions and indicators (Santos and Alkire, 2011).

Decomposing MPI by population sub-groups

It is possible to decompose the MPI by population sub-groups relevant to the study, such as gender, age, population group, educational attainment, province, and area type.

Formally, the first step is to decompose the MPI of the country:

$$MPI_{COUNTRY} = \sum_{i=1}^{i} \frac{n_i}{n} \times MPI_i$$

For each sub-group, the total population in the i-th sub-group (n_i) is divide by the total population (n) and then multiplied by the MPI of the i-th sub-group MPI_i. The total number of sub-groups is summed to give the MPI for the country.

The contribution of each subgroup to overall poverty can then be calculated using the following formula:

Contribution of the i-th sub-group to the overall MPI = $\frac{\frac{n_i}{n} * MPI_i}{MPI_{COUNTRY}} * 100$

Decomposing MPI by dimensions and indicators

To derive the country's MPI, compute the censored headcount ratio for each indicator by adding the vulnerable and deprived in that indicator and divide by the total population. To obtain the country's MPI, compute the weighted sum of the censored headcount ratio. The formula given formally as:

$$MPI_{COUNTRY} = \sum_{i=1}^{k} w_i \times CH_i, \text{ where}$$

i = the i-th indicator

k = the total numbers of indicators

w_i = weight of the i-th indicator

CH_I = the censored headcount ratio of the i-th indicator

The contribution of the i-th indicator to the overall MPI = $\frac{w_{iCH_i}}{MPI_{COUNTRY}} \times 100$

3.3 Data

The GHS is conducted and collated by StatsSA. Before the GHS was introduced in 2002, the 1993-1999 October Household Surveys (OHSs) and 2000-2001 Labour Force Surveys (LFSs) captured some non-money-metric welfare information, before being taken over by the GHS. In fact, such information is captured much more comprehensively with the introduction of the GHS.

The GHS primarily includes non-income welfare data from six categories: education, health, and social progress, housing, household access to resources and facilities as well as agriculture. More specifically, the GHS asked comprehensive questions on non-money metric dimensions such as the standard of living (conditions of dwelling and access to facilities and

services), isolation, and vulnerability that were not specifically asked in other surveys and censuses.

The target population for this type of survey is all private households in all nine provinces in South Africa and residents in workers' hostels (Statistics South Africa, 2018). The GHS survey is designed to assist in the development of indicators such as living standards and service delivery. In particular, the average household size, literacy, patterns of home ownership, access to water and sanitation facilities, access to social welfare services, use and access to transport as well as access and service delivery related to healthcare facilities and education institution (Statistics South Africa, 2018).

3.4 Limitations

In this study, only the 2018 GHS data will be analysed to derive two 'new' MPI's, before examining changes in multidimensional non-income welfare, by various personal characteristics. For method [A], all 26 indicators were only asked in both 2017 and 2018 GHS, thus it is pointless to conduct a short two-year 'trend' analysis of MPI with method [A]. For this reason, the study will focus solely on the 2018 data to analyse and compare the results derived from the innovative method [A] with the results derived from method [B], to investigate if the profile of the MPI poor, as well as the key dimensions and indicators contributing most to multidimensional poverty have changed significantly between methods [A] and [B].

3.5 Conclusion

This chapter started off by presenting an overview of the MPI method, first discussing the original MPI method followed by an adapted MPI, method [A] and method [B]. Thus, the GHS 2018 data will be used to analyse multidimensional poverty in South Africa by various characteristics, i.e., gender, race, province, employment status, and geographical area.

CHAPTER FOUR: EMPIRICAL FINDINGS

4.1 Introduction

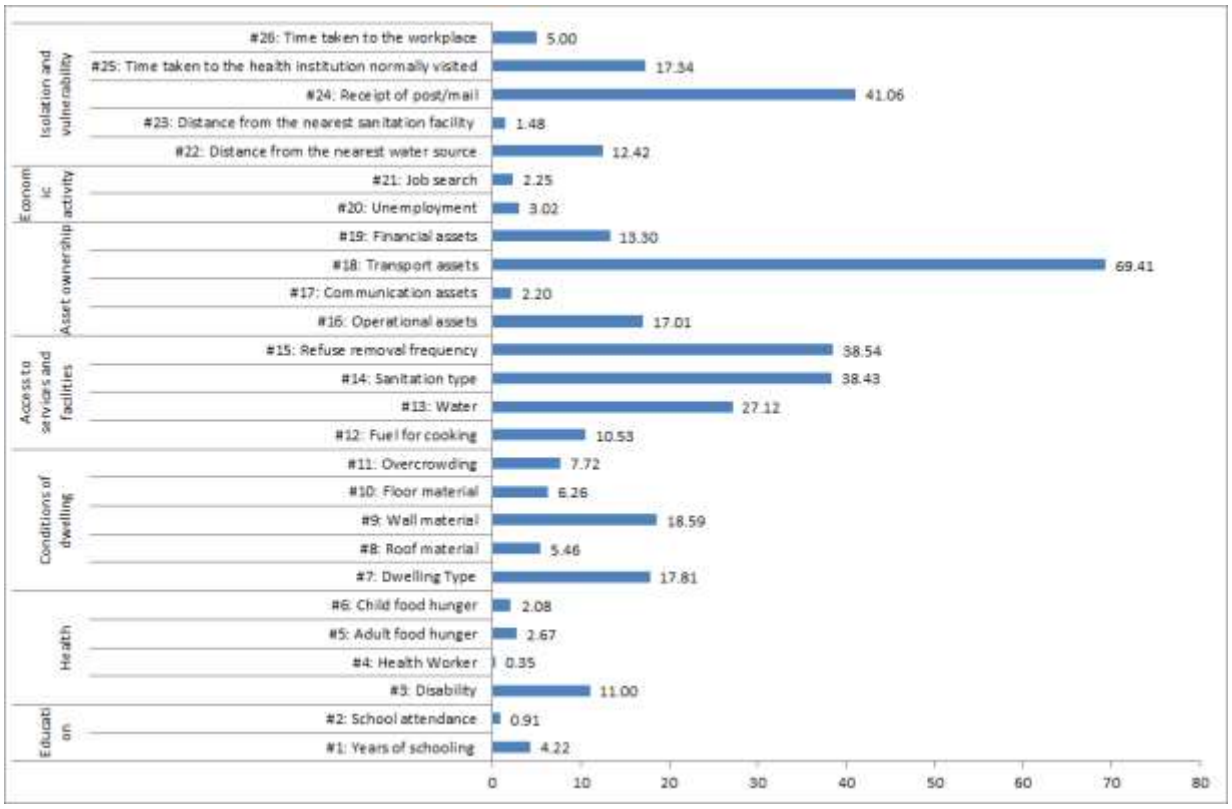
This chapter presents the empirical findings on multidimensional poverty in South Africa. Section 4.2 examines the proportion of population deprived in each indicator, while section 4.3 investigates multidimensional poverty by decomposing dimensions and indicators and compares differences in results between two methods. Section 4.4 profiles MPI poverty. Section 4.5 conducts probit analysis to determine the impact of various personal- and household-level characteristics on multidimensional poverty likelihood, before section 4.6 concludes this chapter.

4.2 Proportion of population deprived in each indicator

Focusing on method [A], Figure 4.1 depicts the percentage of the population of South Africa that is deprived within each indicator. The indicators with higher deprivation proportions mainly come from the three standard of living dimensions namely, conditions of dwelling, access to service and facilities, as well as asset ownership. A large proportion of the population is more deprived in the transport asset indicator (nearly 70%), followed by the receipt of post or mail (41.06%), refuse removal frequency (38.54%), sanitation type (38.43%), and water (27.12%). The sanitation type results concur with that of Fransman and Yu (2019) who found that a high proportion of the population lacked sufficient sanitation (nearly 40%). Furthermore, it can be seen that the second-highest deprivation proportion emanates from the newly added isolation and vulnerability dimension.

Table 4.1 displays the proportions of the population who are deprived in each indicator by various demographic characteristics, namely gender, race, employment status, area type, and province. From the table, in comparison to males, females are more deprived in all except three indicators (health worker, distance from the nearest sanitation facility, and time taken to the workplace) with the highest proportion of deprivation at 83.2% in the transport asset indicator. Also, deprivation in indicators under the services and facilities, and the newly added isolation and vulnerability dimensions are more prominent for females than males.

Figure 4.1: The proportion (%) of overall population deprived in each indicator



Source: Own calculations using the GHS 2018 data.

With regard to results by race, it can be seen that the African population has a greater share of deprivation in almost all indicators in comparison to the White population. For example, five of the 26 indicators with high proportions stand out in the African race group namely, transport asset (78.1%), receipt of post or mail (48.1%), sanitation type (46.7%), refuse removal frequency (45.8%), and water (32.3%). Whereas the white race group have much lower proportions, 5.2%, 6.9%, 0.6%, 7.4% and 6.0 %, respectively. When focusing on the economic activity dimension, both indicators that is, unemployment (3.6%) and job search (2.4%) have higher proportions for the African race group. Furthermore, the newly added isolation and vulnerability dimension highlight three indicators with higher deprivations namely, distance from the nearest water source (15%), time taken to the health institution normally visited (19.5%), and as previously mentioned the receipt of post or mail.

Results concerning the employment status show that unemployed people and inactive individuals have a larger share of deprivation compared to those who are employed. This is expected since the lack of employment leads to low or no income and therefore individuals are unable to afford basic necessities. The unemployed are mostly deprived in the transport

asset indicator (89.8%), receipt of post or mail (45.1%), sanitation type (44.6%), refuse removal frequency (41.1%), and unemployment (36.4%). In addition, the inactive contribution to poverty mainly results from the transport asset (80.4%), sanitation type (53.5%), refuse removal frequency (52.6%), receipt of post or mail (48.9%), and water (37.2%). However, this does not imply the employed are not deprived, for instance, the employed have relatively high deprivations in some indicators, such as the transport asset, nearly 60% of the employed do not own at least one motor vehicle in working condition. This could be due to wages or salaries that are not adequate for basic necessities.

Furthermore, the rural areas are more deprived in 21 indicators in comparison to those in the urban areas. It is estimated 90.4% of those residing in rural areas are highly deprived in the refuse removal indicator followed by sanitation type (89.4%), transport asset (84.4%), receipt of post/mail (77.9%), and water (60.8%). On the other hand, the rural areas are less deprived in the following indicators: unemployment (2.8%), communication assets (2.6%), school attendance (1.2%), distance from the nearest sanitation facility (1.1%), and least deprived in the health worker indicator (0.3%). It is interesting that 61.6% of the population residing in the urban areas lack transport as it is considered to be of crucial importance to urban areas (Iwasaki and El-Laithy, 2013).

Lastly, deprivations are profound in the Eastern Cape and Limpopo provinces and least in the Western Cape and Gauteng provinces. Firstly, the Eastern Cape is highly deprived in the following indicators: transport asset (82.6%), receipt of post or mail (59.6%), refuse removal frequency (54.9%), sanitation type (56.6%), and water (55.0%). Secondly, indicators with the high deprivation proportions in the Limpopo provinces are refuse removal frequency (82.3%), transport asset (79.9%), sanitation type (77.8%), receipt of post/mail (76.4%) and water (54.7%). Even though the Western Cape is least deprived amongst the other eight provinces, 53.7% of the population do not own at least one working motor vehicle and also have high proportions in the wall material (18.8%), dwelling type (17.6%), receipt of post or mail (16.8%), and disability (10.3%) indicators.

Table 4.1: The proportion (%) of population deprived in each indicator by personal characteristics

		Education		Health				Conditions of dwelling					Services and facilities			
		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
Gender	Male	4.1	0.8	9.3	0.4	2.1	1.5	17.6	5.1	18.2	5.8	7.6	8.5	22.5	31.5	32.7
	Female	4.4	1.1	13.0	0.3	3.3	2.7	18.0	5.9	19.1	6.8	7.8	12.9	32.6	46.7	45.5
Race	African	4.8	0.9	11.3	0.3	2.9	2.3	20.8	5.6	21.5	6.2	8.7	12.7	32.3	46.7	45.8
	Coloured	2.2	1.8	11.7	0.8	3.1	2.0	9.6	3.0	10.7	6.6	7.2	1.8	3.8	4.1	7.0
	Indian	2.8	0.0	7.6	0.1	0.9	0.1	2.9	9.5	3.5	3.0	0.6	0.5	1.7	2.1	4.7
	White	1.0	0.2	8.5	0.4	0.4	0.5	0.3	5.4	1.3	7.6	0.1	0.1	6.0	0.6	7.4
Labour market status	Employed	3.0	0.8	7.0	0.3	1.6	1.4	17.3	5.0	18.1	5.4	8.0	6.8	20.1	28.0	29.2
	Unemployed	3.2	1.5	10.2	0.4	7.7	4.7	26.9	4.5	27.1	7.4	9.1	14.4	31.2	44.6	41.1
	Inactive	6.4	0.9	17.5	0.4	3.3	2.6	16.5	6.3	17.5	7.4	7.0	15.6	37.2	53.5	52.6
Area type	Urban	2.7	0.8	9.3	0.4	2.3	1.8	15.2	4.7	16.0	4.9	8.6	4.1	9.6	11.9	11.5
	Rural	7.2	1.2	14.2	0.3	3.3	2.6	22.7	6.9	23.6	9.0	6.0	22.9	60.8	89.4	90.4
Province	Western Cape	1.8	1.3	10.3	0.5	4.0	2.2	17.6	3.3	18.8	7.8	9.3	1.4	9.0	5.4	9.1
	Eastern Cape	6.9	2.0	12.5	0.1	0.8	0.5	30.5	7.8	33.0	13.8	6.1	11.3	55.0	56.6	59.1
	Northern Cape	5.4	1.8	19.9	0.2	4.4	2.0	13.2	0.8	15.5	6.7	8.0	3.7	17.4	25.0	32.7
	Free State	4.7	0.7	10.0	0.8	4.7	3.4	17.1	2.0	17.7	4.3	8.7	6.3	11.4	26.2	22.8
	KwaZulu-Natal	4.3	0.9	12.0	0.2	4.1	3.4	22.0	8.0	22.9	8.7	7.2	14.4	36.7	57.7	54.9
	North West	6.2	1.5	16.2	0.7	3.1	2.5	16.9	1.7	18.1	4.5	10.0	8.9	38.4	51.6	42.6
	Gauteng	2.6	0.3	8.1	0.4	1.9	1.8	16.4	7.0	16.3	4.5	9.8	5.5	7.2	9.9	9.3
	Mpumalanga	5.1	1.1	11.8	0.3	3.0	2.5	11.8	2.5	12.3	2.5	3.8	14.7	27.6	61.1	64.7
	Limpopo	5.8	0.1	10.6	0.1	0.5	0.6	6.7	4.0	7.2	1.8	4.0	27.4	54.7	77.8	82.3

Table 4.1: Continued

		Asset ownership				Economic activity		Isolation and vulnerability				
		#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26
Gender	Male	15.2	2.0	57.9	11.0	2.3	1.7	9.8	1.6	36.7	15.7	6.6
	Female	19.2	2.4	83.2	16.1	3.9	2.9	15.5	1.3	46.2	19.4	3.1
Race	African	19.9	2.1	78.1	15.2	3.6	2.4	15.0	1.5	48.1	19.5	4.9
	Coloured	7.2	5.4	58.3	9.7	1.3	2.2	1.0	1.2	13.0	8.1	5.0
	Indian	2.7	0.8	18.8	2.9	0.3	1.1	0.9	1.6	9.9	7.2	4.3
	White	1.2	0.1	5.2	0.5	0.2	0.7	1.4	2.1	6.9	7.4	6.3
Labour market status	Employed	13.9	1.3	59.4	7.1	0.0	1.2	7.9	1.5	35.5	13.9	8.9
	Unemployed	25.0	2.7	89.8	22.3	36.4	1.9	13.7	2.0	45.1	18.1	0.0
	Inactive	20.0	3.5	80.4	21.0	0.0	3.9	19.3	1.4	48.9	22.6	0.0
Area type	Urban	11.7	2.0	61.6	9.7	3.1	1.9	3.2	1.7	21.9	9.7	6.1
	Rural	27.1	2.6	84.4	20.3	2.8	2.9	30.2	1.1	77.9	32.1	2.8
Province	Western Cape	8.3	3.4	53.7	6.2	2.0	2.5	2.7	1.3	16.8	6.4	7.0
	Eastern Cape	27.8	4.5	82.6	21.5	1.5	1.5	20.7	1.4	59.6	21.4	0.6
	Northern Cape	14.2	7.7	70.1	15.9	3.2	2.7	4.8	0.8	22.9	14.7	0.9
	Free State	12.9	3.3	75.4	12.4	4.6	1.5	3.2	1.3	16.8	17.5	2.6
	KwaZulu-Natal	19.8	1.8	77.2	14.6	3.3	4.2	24.5	0.8	57.9	24.3	3.1
	North West	17.4	3.1	74.7	22.2	4.0	2.0	13.6	0.8	40.2	24.6	2.9
	Gauteng	11.9	0.8	58.0	9.3	3.2	1.7	2.2	2.6	20.2	9.2	9.4
	Mpumalanga	18.9	0.7	71.4	13.5	5.0	1.9	11.0	1.7	56.9	24.9	5.1
	Limpopo	24.5	1.8	79.9	14.4	1.7	1.2	25.2	0.6	76.4	23.1	2.8

Source: Own calculations using the GHS 2018 data.

In conclusion, Table 4.1 above presents the proportions of the poor in each indicator by various personal characteristics. These results are in alignment with that of Omotoso and Koch (2017), individuals who are African, female, not employed, residing in rural areas in provinces like the Eastern Cape and Limpopo are associated with greater deprivations. Predominately in the transport asset, receipt of post or mail, sanitation type, refuse removal frequency, and water indicators. Lastly, it is clear dimensions and indicators virtually ignored in past studies such as the isolation and vulnerability dimension contributes relatively to multidimensional poverty, especially the receipt of the post or mail indicator.

4.3 Profiling multidimensional poverty in South Africa

4.3.1 MPI by sub-groups

Table 4.2 below compares MPI estimates for both methods [A] and [B] by gender, race, labour status, area type, and province. The table also presents information on the incidence of poverty (H) and the intensity of poverty (A). Overall, additional dimensions and indicators added in method [A] increases multidimensional poverty slightly from 0.0208 in method [B] to 0.0230 in method [A]. Similarly, the headcount ratio slightly increased from 0.0521 to 0.0582 while the intensity of poverty is slightly higher in method [B] (0.3987) compared to method [A] (0.3941).

When examining multidimensional poverty for both methods, MPI is higher for females; however, the intensity of poverty is greater for males in method [B]. For results by race, MPI is higher for Africans for both methods, in particular, the headcount ratio was much higher for Africans at 0.07 in method [A] and 0.06 in method [B]. Results concerning the labour market status indicate MPI estimates are greater for the unemployed at 0.05 in method [A] and the inactive at 0.03 in method [B].

While results regarding area type clearly show MPI estimates are more pronounced for the rural areas for both methods, that is, 0.05 in method [A] and method [B]. Also, for both methods the headcount ratio is greater at 0.13 and 0.12 in method [A] and method [B], respectively. Lastly, when looking at multidimensional poverty amongst provinces, both methods indicate Eastern Cape to have the highest MPI estimates at 0.06 and 0.05, respectively. Whereas, the Western Cape has the lowest MPI estimates and therefore is the least deprived province, as well as the headcount ratios, are the lowest at 0.01 in both methods.

Table 4.2: MPI by sub-groups in the two methods

		2018 - Method [A]			2018 - Method [B]		
		H	A	MPI	H	A	MPI
All	All	0.0582	0.3941	0.0230	0.0521	0.3987	0.0208
Gender	Male	0.0465	0.3931	0.0183	0.0404	0.4029	0.0163
	Female	0.0723	0.3949	0.0285	0.0660	0.3956	0.0261
Race	African	0.0702	0.3938	0.0277	0.0623	0.3976	0.0248
	Coloured	0.0106	0.4175	0.0044	0.0144	0.4362	0.0063
	Indian	0.0019	0.3965	0.0008	0.0010	0.3333	0.0003
	White	0.0016	0.3883	0.0006	0.0012	0.4753	0.0006
Labour	Employed	0.0279	0.3894	0.0109	0.0293	0.4016	0.0118
	Unemployed	0.1290	0.3967	0.0512	0.0691	0.3991	0.0276
	Inactive	0.0896	0.3956	0.0355	0.0841	0.3969	0.0334
Area type	Urban	0.0205	0.3907	0.0080	0.0185	0.3991	0.0074
	Rural	0.1307	0.3952	0.0517	0.1165	0.3985	0.0464
Province	Western Cape	0.0129	0.3882	0.0050	0.0103	0.3820	0.0039
	Eastern Cape	0.1391	0.3983	0.0554	0.1129	0.4006	0.0452
	Northern Cape	0.0224	0.4071	0.0091	0.0466	0.4133	0.0193
	Free State	0.0311	0.3906	0.0122	0.0400	0.4082	0.0163
	KwaZulu-Natal	0.1043	0.3936	0.0410	0.0763	0.3945	0.0301
	North West	0.0650	0.4111	0.0267	0.0805	0.4218	0.0340
	Gauteng	0.0229	0.3837	0.0088	0.0165	0.3813	0.0063
	Mpumalanga	0.0503	0.4030	0.0203	0.0638	0.4083	0.0260
	Limpopo	0.0518	0.3771	0.0195	0.0614	0.3862	0.0237

Source: Own calculations using the GHS 2018 data.

4.3.2 MPI decomposition by sub-groups

Table 4.3 presents estimates of the extent to which each sub-group contributes to overall poverty and compares method [A] to method [B]. In 2018, more than half of the population consisted of males (55%); however, female contribution to multidimensional poverty is greater in both methods (56.70% and 57.31%, in method [A] and method [B], respectively). Furthermore, the African race group's contribution to multidimensional poverty is extremely

high, 98.05% in method [A] and 97.15% in method [B]. This is expected since the African race group accounted for just over 80% of the population in 2018.

Table 4.3: MPI decomposition by gender, race, labour, area type and province

		2018 - Method [A]			2018 - Method [B]		
		MPI	Population (%)	Contribution (%)	MPI	Population (%)	Contribution (%)
All	All	0.0230	100.00	100.00	0.0208	100.00	100.00
Gender	Male	0.0183	54.40	43.30	0.0163	54.40	42.69
	Female	0.0285	45.60	56.70	0.0261	45.60	57.31
Race	African	0.0277	81.38	98.05	0.0248	81.38	97.15
	Coloured	0.0044	8.59	1.66	0.0063	8.59	2.60
	Indian	0.0008	2.31	0.08	0.0003	2.31	0.04
	White	0.0006	7.72	0.21	0.0006	7.72	0.21
Labour	Employed	0.0109	56.13	26.57	0.0118	56.13	31.80
	Unemployed	0.0512	8.29	18.49	0.0276	8.29	11.01
	Inactive	0.0355	35.57	54.95	0.0334	35.57	57.19
Area type	Urban	0.0080	65.76	22.93	0.0074	65.76	23.40
	Rural	0.0517	34.24	77.07	0.0464	34.25	76.60
Province	Western Cape	0.0050	11.10	2.41	0.0039	11.10	2.11
	Eastern Cape	0.0554	10.69	25.79	0.0452	10.69	23.29
	Northern Cape	0.0091	2.20	0.88	0.0193	2.20	2.04
	Free State	0.0122	5.24	2.77	0.0163	5.24	4.12
	KwaZulu-Natal	0.0410	19.31	34.52	0.0301	19.31	27.98
	North West	0.0267	6.75	7.86	0.0340	6.75	11.04
	Gauteng	0.0088	26.82	10.28	0.0063	26.82	8.11
	Mpumalanga	0.0203	7.95	7.02	0.0260	7.95	9.97
	Limpopo	0.0195	9.94	8.46	0.0237	9.94	11.34

Source: Own calculations using the GHS 2018 data.

As for the labour status, more than half of the population was employed in 2018, yet in both methods, the contribution to multidimensional poverty is higher than that of the unemployed. Furthermore, the inactive contribution to MPI poverty is greater in comparison to the

unemployed at 54.95% in method [A] and 57.19% in method [B]. With regards to the area type, 65% of the population reside in the urban area; however, those residing in the rural area MPI contribution accounted for more than three quarters in both methods. Lastly, provinces with the highest contributions to MPI poverty in method [A] are KwaZulu-Natal, Eastern Cape, and Gauteng, while KwaZulu-Natal, Eastern Cape, and Limpopo were associated with the highest MPI estimates in method [B].

Overall, the results of Tables 4.2 and 4.3 show that MPI poverty is higher among unemployed African females in rural areas of the Eastern Cape and Kwazulu-Natal. The results are consistent with the findings of Omotoso and Koch (2017) and Fransman and Yu (2019). Furthermore, additional dimensions and indicators in method [A] increase overall MPI poverty; however, contributions vary across personal characteristics between the two methods.

4.3.3 MPI decomposition by dimension and indicator

The MPI may be decomposed by dimensions and indicators to examine the extent of each dimension and indicator contribution to multidimensional poverty. Tables 4.4 and 4.5 summarise estimates from method [A], consisting of seven dimensions and 26 indicators. As outlined in Table 4.4, dimensions contributing most to overall poverty were by services and facilities dimension (31.4%) while asset ownership followed in second contributing (22.1%), followed by conditions of the dwelling (17.0%) and isolation and vulnerability dimension (15.1%). On the other hand, dimensions contributing least to MPI poverty include education (6.0%), health (4.3%), and lastly economic activity (4.0%).

Table 4.4: MPI decomposition by dimension – Method [A]

Dimension	Weight (%)	Contribution (%)
Education	14.3	6.0
Health	14.3	4.3
Dwelling	14.3	17.0
Services/Facilities	14.3	31.4
Asset ownership	14.3	22.1
Economic activity	14.3	4.0
Isolation/Vulnerability	14.3	15.1
	100.0	100.0

Source: Own calculations using the GHS 2018 data.

Table 4.5 outlines the contributions of each indicator to multidimensional poverty for method [A]. From the table, the transport indicator contributes most to MPI poverty (9%), followed by sanitation, refuse removal, and water (8.8%, 8.6% and 8.3%, respectively). The findings resonate with that of Finn, Leibbrandt and Woolard (2013), Stoeffler, Alwang, Mills and Taruvinga (2016), Ferandp, Kumara, Dharmadasa and Samaraweera (2019) and Batana (2013) that the asset indicator is one of the highest contributors to multidimensional poverty. While indicators under the isolation and vulnerability dimension namely, the post and mail contribute 6.8%. On the other hand, the distance to the nearest sanitation facility (distance sanitation indicator) and the time taken to the place (time work indicator) have the least contributions to MPI poverty (both 0.2%).

Table 4.5: MPI decomposition by indictor – Method [A]

	Indicator	Weight (%)	Contribution (%)
Education	#1: Years of schooling	7.1	5.1
	#2: School attendance	7.1	0.9
Health	#3: Disability	3.6	2.0
	#4: Health Worker	3.6	0.1
	#5: Adult food hunger	3.6	1.3
	#6: Child food hunger	3.6	1.0
Dwelling	#7: Dwelling Type	2.9	5.5
	#8: Roof material	2.9	1.7
	#9: Wall material	2.9	5.7
	#10: Floor material	2.9	2.7
	#11: Overcrowding	2.9	1.3
Services / Facilities	#12: Fuel for cooking	3.6	5.7
	#13: Water	3.6	8.3
	#14: Sanitation type	3.6	8.8
	#15: Refuse removal frequency	3.6	8.6

Table 4.5: Continued

	Indicator	Weight (%)	Contribution (%)
Asset ownership	#16: Operational assets	3.6	7.0
	#17: Communication assets	3.6	1.2
	#18: Transport assets	3.6	9.0
	#19: Financial assets	3.6	5.1
Economic activity	#20: Unemployment	7.1	2.2
	#21: Job search	7.1	1.8
Isolation / Vulnerability	#22: Distance from the nearest water source	2.9	4.3
	#23: Distance from the nearest sanitation facility	2.9	0.2
	#24: Receipt of post/mail	2.9	6.8
	#25: Time taken to the health institution	2.9	3.6
	#26: Time taken to the workplace	2.9	0.2
		100.0	100.0

Source: Own calculations using GHS 2018 data.

Tables 4.6 and 4.7 moves on to present the results from method [B], which consists of three common dimensions and 12 indicators, each with equal weighting. With regards to the contribution of each dimension, Table 4.6 indicates the standard of living dimension contributes the most to MPI poverty (59.3%), followed by education with a 26.1% contribution and finally, health contributing 14.6% to poverty.

Table 4.6: MPI decomposition by dimension – Method [B]

Dimension	Weight (%)	Contribution (%)
Education	33.3	26.1
Health	33.3	14.6
Living standards	33.3	59.3
	100.0	100.0

Source: Own calculations using GHS 2018 data.

Comparing methods by dimension, results indicate the contribution of the education dimension is much lower after adding additional dimensions (6.0% for method [A] and 26.1% for method [B]). Although the result is similar to the findings of Finn, Leibbrandt and

Woolard (2013), the authors state the decrease does not imply education is not important to poverty alleviation, rather the focus should be on improving the quality of education. Also, the contribution of health dimension for method [A] is much lower at 4.3% compared to method [B] at 14.6%.

Furthermore, the original MPI standard of living dimension in method [B], contributes 59.3% to multidimensional poverty. Although, in method [A] this dimension is divided into three standard of living dimensions, each subcategorised as conditions of dwelling, access to services and facilities, and asset ownership. The combined contribution of standard of living is higher (70.5% = 17.0% + 31.4% + 22.1%) than in method [B]. These findings are in alignment with that of Statistics South Africa (2014), Frame, De Lannoy and Leibbrandt (2016), and Omotoso and Koch (2017) that the standard of living dimension contributes most to MPI poverty. Lastly, the recently introduced isolation and vulnerability dimension, which has been overlooked in previous research, contributes 15.1 % to multidimensional poverty.

From Table 4.7 below, it can be seen that the years of schooling indicator contributes most to poverty in method [B] (21.9%), a similar finding is observed in the study of Batana (2013). While most of the indicators comprised under the living standards dimension contribute to poverty. Such as, the transport asset indicator contributes 13.8% to poverty while sanitation contribution follows with 12.9% and water 11.3%.

When examining contributions of additional indicators, the overall contributions declined as more indicators were added. In particular, the years of schooling indicator has the greatest drop in contribution to poverty at 5.1% in method [A] from 21.9% in method [B]. Following this is the transport asset indicator, contribution decreased from 13.8% to 9.0% (method [B] and method [A], respectively). Also, the contribution of the sanitation indicator is lower in method [A] at 8.8%.

Table 4.7: MPI decomposition by indictor – Method [B]

	Indicator	Weight (%)	Contribution (%)
Education	[I]: Years of schooling	16.7	21.9
	[II]: School attendance	16.7	4.2
Health	[III]: Disability	8.3	5.4
	[IV]: Health Worker	8.3	0.2
	[V]: Adult food hunger	8.3	4.8
	[VI]: Child food hunger	8.3	4.1
Living standards	[VII]: Drinking Water	5.6	11.3
	[VIII]: Sanitation	5.6	12.9
	[IX]: Flooring	5.6	4.5
	[X]: Cooking Fuel	5.6	7.3
	[XI]: Operational assets	5.6	9.5
	[XII]: Transport assets	5.6	13.8
		100.0	100.0

Source: Own calculations using the GHS 2018 data.

4.4 Profile of MPI poor

Table 4.8 below shows the profiles of MPI poor and compares gender, race groups, labour status, area type, and provinces between method [A] and method [B]. The profile for the MPI poor is very similar in both methods however, in some instances, there are slight increases shown in the contributions in method [A]. For method [A], females represent 56.59% gender share of MPI poor and 57.76% in method [B], whereas males contributed just over 40% in both methods. With regards to race groups, the MPI poor is predominantly African (more than 95% racial share in both methods) while the White population has the least contribution of only 0.22% and 0.18% in methods [A] and method [B], respectively.

Similar results are shown for both methods concerning the area type, the rural area contributing roughly three quarters to poverty, whereas the urban area only contributing approximately 23%. Finally, for method [A], the province with the highest contributions to poverty is KwaZulu-Natal (34.57%), followed by Eastern Cape contributing 25.52%, and Gauteng contributing 10.56%. Whereas in method [B], the highest contributors to poverty are KwaZulu-Natal, Eastern Cape, and Limpopo with estimates of 28.28%, 23.18% and 11.71%, respectively. Furthermore, results derived by method [B] are consistent with that of Omotoso and Koch (2017) and Fransman and Yu (2019) that African females living in rural areas in KwaZulu-Natal, Eastern Cape, and Limpopo contribute most to MPI poverty.

Table 4.8: Profile of MPI poor by gender, race, labour, area type and province

		Method [A]	Method [B]
Gender	Male	43.41	42.24
	Female	56.59	57.76
		100.00	100.00
Race	African	98.14	97.40
	Coloured	1.57	2.37
	Indian	0.08	0.05
	White	0.22	0.18
		100.00	100.00
Labour market status	Employed	26.89	31.56
	Unemployed	18.37	11.00
	Inactive	54.74	57.44
		100.00	100.00
Area type	Urban	23.13	23.37
	Rural	76.87	76.63
		100.00	100.00
Province	Western Cape	2.45	2.20
	Eastern Cape	25.52	23.18
	Northern Cape	0.85	1.97
	Free State	2.80	4.02
	KwaZulu-Natal	34.57	28.28
	North West	7.53	10.44
	Gauteng	10.56	8.48
	Mpumalanga	6.87	9.73
	Limpopo	8.84	11.71
		100.00	100.00

Source: Own calculations using GHS 2018 data.

4.5 Econometric analysis

The purpose of this section is to investigate personal characteristics influencing the likelihood of an individual being multidimensionally poor by analysing probit regressions for method [A] and method [B]. In addition, the study aims to determine the impact additional dimensions and indicators (added in method [A]) have on the probability of an individual being multidimensionally poor.

Table 4.9 results depict two probit regressions on multidimensional poverty for method [A] and method [B]. For regression [B], the probit reveals that females have a 0.35% higher probability of multidimensional poverty than males; however, this finding is statistically insignificant. The positive and statistically significant marginal effects for the race group indicate Africans and Coloureds are more likely to be MPI poor compared to the White population group; however, Coloureds are 7.5% more likely to be MPI poor than the African race group. Looking at the labour market status, the results demonstrate unemployed individuals are more likely to be multidimensionally poor. Furthermore, individuals living in rural areas in the Eastern Cape, North West, and Northern Cape provinces are significantly more likely to be MPI poor. Lastly, additional members in the household appear to be irrelevant to the likelihood of an individual being MPI poor, however statistically significant to the regression.

Results for regression [A] reveal males are significantly less likely to be MPI poor than females. Again, the race group exhibit Africans and Coloureds are significantly more likely than Whites to be multidimensionally disadvantaged. Even though Coloureds have a greater likelihood of MPI poverty than Africans, after controlling method [A] to add additional dimensions and indicators, the marginal effects declined from 11.67% in regression [B] to 7.59% in regression [A]. Furthermore, as in regression [B], the labour market status results reveal unemployed people are significantly more likely than inactive individuals to be MPI poor. Looking at area type and province, results show living in rural areas in the Eastern Cape and KwaZulu-Natal increase the probability of being MPI poor. As well as residing in the Gauteng province, however, this finding is statistically insignificant. Also, the household size variable indicates that the presence of additional members significantly decreases the likelihood of MPI poverty.

Table 4.9: Probit regressions on the multidimensional poverty likelihood

	Regression [A]		Regression [B]	
Independent variables	Marginal effects	*x*-bar	Marginal effects	*x*-bar
Gender: Female	-0.0012	0.4560	0.0035	0.4560
Race: African	0.0417***	0.8138	0.0417***	0.8138
Race: Coloured	0.0759***	0.0859	0.1167***	0.0859
Race: Indian	-0.0023	0.0231	-0.0068	0.0231
Labour market status: Employed	-0.0258***	0.5613	-0.0215***	0.5613
Labour market status: Unemployed	0.0341***	0.0829	0.0004	0.0829
Area type: Rural	0.0768***	0.3425	0.0632***	0.3425
Province: Eastern Cape	0.0424***	0.1069	0.0460***	0.1069
Province: Northern Cape	-0.0102	0.0220	0.0281**	0.0220
Province: Free State	-0.0027	0.0524	0.0219**	0.0524
Province: KwaZulu-Natal	0.0245***	0.1931	0.0263***	0.1931
Province: North West	0.0010	0.0675	0.0285***	0.0675
Province: Gauteng	0.0061	0.2682	0.0073	0.2682
Province: Mpumalanga	-0.0128*	0.0795	0.0098	0.0795
Province: Limpopo	-0.0174***	0.0994	-0.0031	0.0994
Household size	-0.0038***	4.7686	-0.0041***	4.7686
Number of observations	21 225		21 225	
Observation probability	0.0582		0.0521	
Predicted probability at x-bar	0.0286		0.0274	
Prob > Chi-squared	0.0000		0.0000	
Pseudo R-squared	0.1850		0.1506	

*** Significant at 1% ** Significant at 5% * Significant at 10%

Source: Own calculations using GHS 2018 data.

Reference categories: Gender – male; race – white; labour market status – inactive; area type – urban; province – Western Cape

Table A.1 (see Appendix) regressions include education years and education years squared to both probits. The results demonstrate similar findings in both regressions; however slight differences in race group and provinces prevail. Regression [A] now indicates the African race group is most likely to be MPI poor. Results concerning province differ in regression [B] where KwaZulu-Natal instead of Northern Cape (as in regression [B] in Table 4.9) indicate greater MPI likelihood. Furthermore, education exhibits a negative non-linear (concave) relationship with the likelihood of MPI poverty; indicating the probability of being MPI poor significantly decreases for each additional year of education, in both regressions, and such a decrease happens at an increasing rate as educational attainment improves further.[1]

4.6 Conclusion

This chapter examined personal- and household-level characteristics on multidimensional poverty in South Africa using the MPI approach. First, descriptive statistics were analysed by investigating the proportions of deprivations in each indictor. Second, the study examined MPI by subgroups and decomposed dimensions and indicators. Third, the profile of multidimensional poor was examined. Lastly, the likelihood of multidimensional poverty was determined by employing probit regressions.

In general, the descriptive results for the two methods have similar findings. Those that are multidimensionally poor are more likely to be: African, females, unemployed, living in rural areas in Eastern Cape, Kwa-Zulu Natal, and Limpopo. However, this is somewhat different for the probit results, regression [B] indicating Coloured, female, unemployed living in rural areas in the Eastern Cape, Northern Cape, and North West are most likely to be MPI poor. Whereas regression [A] shows Coloured males unemployed residing in rural areas in the Eastern Cape, KwaZulu-Natal and Gauteng are more likely to be MPI poor.

Furthermore, the three dimensions' part of the standard of living dimension (that is the conditions of dwelling, access to services and facilities, and lastly asset ownership) contribute relevantly to overall MPI poverty as well as the new isolation and vulnerability dimension. Lastly, five indicators contributing most to multidimensional poverty are the transport asset, sanitation type, water, refuse removal, and receipt of post or mail. The probability of MPI

[1] Possible correlation may exist between education years and MPI status, since the years of education variable is already included as an indicator in the poverty index. Therefore, regression results from Table A.1 should be interpreted with great caution.

poverty generally decreased as additional dimensions and indicators were added to method [A], except for labour market status.

Overall, MPI increases after additional dimensions and indicators are added to the method however, contributions vary across personal characteristics, dimensions and indicators. Also, gender MPI poverty is greater for males. Though the race results are contrary to the expectation that Africans are more likely to be MPI poor, the findings in the study suggest Coloureds are most likely to be multidimensionally poor than Africans. However, adding additional dimensions, indicators and extra variables (education and education squared) increases the likelihood of the African population being MPI poor. Furthermore, the newly added indicator, that is, the receipt of post or mail has the second-highest proportion deprivation score. Lastly, the province results contradict previous studies (Statistics South Africa (2014) as well as Frame, De Lannoy and Leibbrandt (2016)) that suggest the Gauteng province is less likely to be MPI poor.

CHAPTER FIVE: CONCLUSION

5.1 Introduction

Many South African studies examined poverty using money-metric measures. However, there are only a few local studies that focus on multidimensional poverty by adopting the MPI method. Poverty reduction remains one of the most important goals government is determined to combat however, to achieve this goal, it is also important to determine the extent and severity of poverty. Thus, using the MPI approach and GHS data from 2018, South Africa's multidimensional poverty was re-examined in this report. Given the flexibility of the method, the study adapted the method to add additional dimensions and indicators to measure the incidence (proportion of the population experiencing several deprivations) and intensity of poverty (the mean percentage of people who suffer from deprivations). The study also decomposed dimensions and indicators to compare differences in method [A] and method [B], upon including indicators from dimensions that were overlooked in past studies in method [A].

5.2 Review of findings

This study's empirical findings showed that additional dimensions and indicators added to method [A] slightly increased overall MPI poverty. The increase in poverty is mainly found in the intensity of poverty in both methods, as the headcount ratios are much lower. Reviewing the proportions of the population in each indicator, results revealed unemployed African females living in rural areas in Eastern Cape and Limpopo are most deprived, predominantly in the transport asset, refuse removal, sanitation type, water and the receipt of post/mail indicators.

Analysing dimensions and indicators extensively for both methods show similar results, however, there are slight differences in estimates. Firstly, the standard of living dimension contributed more than half to poverty in method [B]. Similarly, results for method [A] indicate the standard of living dimension also contributes more to poverty, in particular, access to services and facilities followed by asset ownership and dwelling type. Furthermore, the isolation and vulnerability dimension is the fourth highest contributor to MPI poverty, exceeding the health and economic activity dimensions' contributions to poverty. Secondly, the education MPI contribution significantly declined as additional dimensions and indicators were added to the method.

In general, the contributions of each indicator between the two methods declined, the most significant decline is seen in the years of schooling indicator. Thus, examining indicators across personal characteristics reveals five top indicators contributing to MPI poverty. For method [B] that is, years of schooling, sanitation, drinking water, transport asset, and operational asset, respectively. For method [A], the top five indicators are transport asset, sanitation type, refuse removal frequency, water, and receipt of post or mail. Therefore, the isolation and vulnerability dimension and the receipt of post or mail indicator are relevant within the context of the study.

In view of the probit regressions, there are slight differences in the results between the two methods. Regression [B] findings indicate Coloured females unemployed living in rural areas in the Eastern Cape, Northern Cape and North West are most likely to be MPI poor. After adding additional dimensions and indicators to method [A], regression [A] results indicate Coloured Males unemployed residing in rural areas in the Eastern Cape, KwaZulu-Natal, and Gauteng are more likely to be MPI poor (even though the Gauteng result is statistically insignificant). Lastly, the household size was significantly associated with lower probabilities of MPI poverty in both methods.

5.3 Conclusion and policy recommendations

In brief, the repercussions of apartheid resulted in excessive levels of poverty and inequality in both rural and urban areas (Nnadozie, 2013). It is particularly noticeable among female Africans living in rural areas of South Africa. Hence, the post-apartheid government has since aimed to redress the issue of poverty and inequality amongst population groups and geographical areas through various policies and programs, as well as improving the overall standard of living of people. As indicated by the empirical results employed in this study, access to water, sanitation, refuse removal frequency, transport assets, and the receipt of post or mail were found to be the top drivers of overall MPI poverty. Thus, much reform still has to occur regarding these poverty indicators.

With regards to the standard of living of people, policies and programs implemented aim to address the issue of access to services and facilities, such as inadequate access to clean water and sanitation. For instance, SDG 6 and MDG 7 focus on sustainable access to clean water and sanitation for all (Morton, Pencheon and Squires, 2017; Onda, Labuglio and Bartram,

2012). However, communities in South Africa still use the bucket system for sanitation (Nhamo, Nnemachena and Nhamo, 2019). Therefore, assessing water supply, sanitation and Hygiene (WASH) is vital in leaving no one behind and more tools are needed to diagnose WASH access of vulnerable groups (Ezbakhe, Gine-Garriga and Perez-Foguet, 2019). Policies should not only be targeted at delivering services but also at improving the quality of services to the poor. It is important that facilities such as garbage collection and sanitation will help to restore dignity, prevent disease, and alleviate misery and inconvenience (Burger, Van der Berg, Van der Walt and Yu, 2017).

Fourie (2006) suggests policies should not only focus on increasing the quantity of infrastructure but rather on the quality of infrastructure in South Africa. The funds budgeted for infrastructure investment should be used for improving existing stock instead of creating new infrastructure that will only require maintenance in the future. However, the improvements and upgrading of infrastructure should mainly focus on rural areas. The importance of maintenance and expansion of infrastructure is vital to economic activity (Perkins, Fedderke and Luiz, 2005).

As for asset ownership, the lack of not owning a vehicle can be viewed as a barrier to finding and maintaining employment for low-income households, since public transport is rare if any in rural areas (Goldberg, 2001). Few people own cars in rural areas, they utilise other means of transport services provided by informal services such as trucks, rural taxis, motorcycles, bicycles, tricycles, animal-drawn carts, and pack animals to commute to villages and markets (Starkey and Hine, 2014). According to Johnson, Currie and Stanley (2010), car ownership can be expensive for low-income households and cause significant financial stress on the poor. The rural transport strategy merely concentrates on improving rural transport infrastructure, public transport and non-motorised transport (Department of Transport, 2007). Therefore, policies should support car ownership for the poor by providing funds or grants to purchase a ‘starter car’ which temporarily helps individuals get to work until they can save and purchase a more reliable vehicle (Goldberg, 2001).

After examining the isolation and vulnerability dimension, it is clear that this dimension has an impact on the likelihood of MPI poverty, particularly for people in rural areas that are mostly deprived of many basic services (such as access to water and sanitation that is more 200 metres from the dwelling, for example). In addition, the results in this study indicated the

receipt of post or mail indicator contributed most to MPI poverty under this dimension. Previously, mail was sent to rural areas through PO boxes; nowadays, people no longer choose to go to a post office or postal point to collect mail, preferring instead to have it sent to their home like any other street delivery.

Furthermore, the shortage of postal facilities to households was found to be due to a lack of homes with formal addresses, mainly in rural areas and informal settlements. As a result, the government mandated address extension initiative sought to provide structured addresses for all households around the country, which included the Post Office expanding delivery service to rural areas. While the addressing expansion project was a success, certain areas remain unfinished and therefore require further development (Rossouw and Kgope, 2007).

Equally important, the social value of postal services extends beyond the economic benefits provided by its delivery operations, it connects family and friends (Morrissey, 2020). Technology is changing the way people communicate and interact (Department of Telecommunications and Postal Services, 2016). As more people become comfortable with online shopping, parcel and business-to-consumer mail/packages are increasing (Department of Communications, 2013). Thus, plans from the post office include launching an online e-commerce platform that focuses on small and medium enterprises in rural areas (Dumasi, 2020). Also, The Information and communication technologies (ICTs) policy facilitates inclusive socio-economic transformation in South Africa. It includes a wide range of technologies such as computing and information technologies, telecommunications technology, the internet, and also traditional means for communication such as postal deliveries (Department of Telecommunications and Postal Services, 2016).

The empirical results in this study indicate economic activity and education contribute least to MPI poverty; however, these two dimensions remain important in reducing poverty. With regards to education, similar to other studies, years of schooling have improved, yet there has been little success in the quality of education (Van der Berg, 2007). Despite the post-apartheid government increasing expenditure on education and increasing resources, this has done little to improve the learners' educational performances (Van der Berg et al, 2011). The high unequal learning of children with poor socio-economic backgrounds gives rise to poor performance early on in learning, and learners fall behind in the education system (Spaull and Kotzé, 2015). Spaull (2013) suggests that there is still much more improvement needed in

teaching and learning in classrooms. The quality of education is important if not more important than the years of schooling as it affects individuals earning capacity, thus improving Black education is crucial in reducing racial earnings (Van der Berg, 2007).

Finally, with regard to economic activity, South Africa's unemployment rate increased to a record of 32.5% in the fourth quarter of 2020 (Omarjee, 2021). Statistics South Africa (2020) states that unemployment is still concentrated amongst the young black Africans. Policies regarding employment should target young African women in rural areas. Bhorat (2012) suggested a transport subsidy that allows job seekers to travel the distance to find employment. Also, the discouraged work seekers should be considered as it is an important indicator in determining South Africa's unemployment. On the other hand, South Africa is experiencing a scarcity of high-skilled workers directly related to its race-based policies enacted during apartheid. There is a demand in the service sector for highly skilled employees, so the manufacturing sector is struggling to compete with these skills-intensive industries for workers (Bhorat, Lilenstein, Oosthuizen and Thornton, 2020).

Mamba and Isabirye (2015) created a structure to help direct ICTs' commitment to rural development. The authors suggest that user engagement and sustainability will enhance ICTs, and private sector involvement is often needed to maintain facilities and equipment. ICTs adoption and usage that is effective will help underserved rural communities grow. Furthermore, the government should promote social cohesion as it aims to reduce inequalities and socioeconomic disparities in society. Chipkin and Ngqulunga (2008) and Easterly, Ritzen and Woolcock (2007) consider social cohesion as an effective bond between citizens, as it is needed to build trust, confidence and patience between government and citizens to implement reforms. Thus, in order to build a cohesive society in South Africa, reducing poverty, inequalities, social divisions, and exclusions should be given more prominence (David, Guilbert, Hino, Leibbrandt, Potgieter and Shifa, 2018).

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APPENDIX

Table A.1: Probit regressions on the multidimensional poverty likelihood, after including education years and education years squared as additional independent variables

	Regression [A]		Regression [B]	
Independent variables	Marginal effects	*x*-bar	Marginal effects	*x*-bar
Gender: Female	-0.0011	0.4570	0.0018	0.4570
Race: African	0.0221***	0.8130	0.0208***	0.8130
Race: Coloured	0.0142	0.0864	0.1042***	0.0864
Race: Indian	-0.0126	0.0229	0.0060	0.0229
Labour market status: Employed	-0.0056**	0.5594	0.0014	0.5594
Labour market status: Unemployed	0.0542***	0.0834	0.0143***	0.0834
Area type: Rural	0.0480***	0.3432	0.0226***	0.3432
Province: Eastern Cape	0.0319***	0.1084	0.0238***	0.1084
Province: Northern Cape	-0.0095	0.0223	0.0103*	0.0223
Province: Free State	-0.0062	0.0526	0.0060	0.0526
Province: KwaZulu-Natal	0.0181**	0.1939	0.0125**	0.1939
Province: North West	-0.0015	0.0667	0.0115**	0.0667
Province: Gauteng	0.0063	0.2654	0.0036	0.2654
Province: Mpumalanga	-0.0118**	0.0800	0.0014	0.0800
Province: Limpopo	-0.0127**	0.0989	-0.0020	0.0989
Household size	-0.0040***	4.7581	-0.0028***	4.7581
Education years	-0.0005	8.9929	-0.0007	8.9929
Education years squared	-0.0003***	99.5441	-0.0003***	99.5441
Number of observations	20 884		20 884	
Observation probability	0.0586		0.0516	
Predicted probability at x-bar	0.0202		0.0107	
Prob > Chi-squared	0.0000		0.0000	
Pseudo R-squared	0.2420		0.2675	

*** Significant at 1% ** Significant at 5% * Significant at 10%

Source: Own calculations using GHS 2018 data.

Reference categories: Gender – male; race – white; labour market status – inactive; area type – urban; province – Western Cape