



# **Essays on Poverty Dynamics in South Africa**

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## **DEDICATION**

I dedicate this work to my lovely boys, Christian, Soyama and Alunamda. I hope they will follow my footstep in terms of academic progress. You have my support.

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## ABBREVIATIONS

AsgiSA	Accelerated and Shared Growth Initiative for South Africa
DoW	Department of Women
FAO	Food Agriculture Organisation
FGT	Foster Green and Thorbecke
FPL	Food Poverty Line
GEAR	Growth, Employment and Redistribution Strategy
GHS	General Household Survey
HDDS	Household Dietary Diversity Score
HFCS	Household Food Consumption Score
LBPL	Lower Bound Poverty Line
MNL	Multinomial logit model
MPI	Multidimensional Poverty Index
OLS	Ordinary Least Square
RDP	Reconstruction and Development Programme
UPBL	Upper Bound Poverty Line
VEP	Vulnerability as Expected Poverty
VER	Vulnerability to Risk
WLS	Weighted Least Square

## CHAPTER ONE: BACKGROUND AND INTRODUCTION

This thesis consists of four development economics articles focusing on poverty dynamics in South Africa.

To begin with, poverty has been a problem, especially for sub-Saharan countries. The United Nations General Assembly introduced the Millennium Development Goals with the hope of eradicating poverty by 2015, however to date; it seems poverty has almost doubled in a number of countries in the sub-Saharan region. Previously the poverty line was set at 1 US dollar and later on revised to be at 2 US dollar per day. While these poverty estimates have helped countries in targeting poverty, many critics have come along in the poverty discourse. The major problem being that poverty estimates are problematic, hence, making it hard for developing countries to fight poverty.

The first article in this thesis focuses on the effects of culture on poverty reduction efforts in South Africa. Culture plays a huge role in the household decision-making process, as a result, it can determine if whether the household falls into a poverty trap or falls out of poverty. Central to our contribution, we take a different stance in the poverty discourse by discarding the claim that poverty is a market failure that can be remedied by a well-functioning market. This view is held by a various organisation such as the World Bank and International Monetary Fund. We problematize poverty on the basis to which it was created not necessarily wholly driven by racial disparities. To understand the poverty discourse, one must look into the system to which it was established.

Furthermore, our analysis of poverty aims to explore the cultural influence on poverty. Numerous poverty studies have neglected this component, which we find to be a major contributor to poverty in a number of African states. Social norms are one of the cultural component, which influences household decision-making. Boyden and Crivello (2012) point out that cultural norm and values, as well as, patriarchal values and tradition practises determine the outcomes of certain families in poverty. We extend this analysis by focusing on poverty in South Africa. Given that, South Africa has vast homelands and traditional areas, which were an outcome of the apartheid system, to date these areas are some of the poorest. We regress the components

(indicators) using the Ordinary Least Square (OLS) and the Weighted Ordinary Least Square (WOLS) methods to identify the determinants of poverty. The findings of the study reveal that the indicators; Health, Education, Standard of living, Economic activity and Energy do influence poverty largely. Similarly, gender and geographic location of a household have an impact on its poverty status.

The second article focuses on vulnerability to poverty. It gives a detailed description of how households have moved in between poverty lines from 2012 -2015. The period is chosen because it was four years after the global crisis and the SA economy was on a growth trend. One of the major points is that vulnerability is a broad concept that involves a number of factors. Previous studies have used structural models to estimate vulnerability, the study uses a multinomial logit model where probability and ratios are assigned to estimate the likelihood of households being vulnerable or poor. The article also discusses poverty index measures such as the FGT. It provides a detailed assessment of poverty dynamics in South Africa and how inequality has also contributed to the status quo.

Pro-poor curves are estimated in order to identify poverty and vulnerability by population groups and geographic location. Likewise, vulnerability to poverty is explored by gender as well. The article finds varying factors which have contributed to the lack of improvement in poverty reduction efforts. Our contribution to literature is to extend lessons from both empirical and theoretical work on vulnerability and poverty using national survey data. Our methodology combines numerous surveys to estimate the likelihood of households to be poor. The findings point that income distribution is skewed to urban areas, with households living in traditional or tribal areas regarded as the poorest and vulnerable to poverty. In other words, most households fall in the food poverty line or the upper bound poverty line, with a few falling in the lower bound poverty line.

The third article investigates poverty and drug-related crime. The focus is to understand if there is causality between these two. Crime is one of the most pressing issues affecting people, with recent statistics pointing an increase in drug abuse amongst the youth. Therefore, the study estimates variables that are linked to crime, poverty and inequality using time series data from 2004 to 2015. This article

contributes to the literature by examining the link between drug-related crime and poverty. To the best of our knowledge, this is a first attempt to study this relationship in South Africa. We focus on South Africa as it represents a unique case among African countries. Firstly, the country is ranked top in terms of crime rates in the world, with murder rates of 34 deaths per 100000 individuals, yet assaults were nearly 300 per 100000 (South Africa Police Service, 2016). While positive strides have been made in reducing poverty, the Gini index remains stubbornly high at over 0.50, pointing out that inequality has increased. Consequently, this article provides a detailed analysis using crime statistics in South Africa. One of the countries regarded as crime-infested by The Institute of Economic and Peace (2014). An Auto Regressive Dynamic Lag (ARDL) model is estimated to test the contribution of variables to crime and poverty. We find the link between crime and poverty strong in the short run, and steady but weak in the long run.

The last article investigates government grants, food security and household dietary diversity in one the poorest province in South Africa. Food security is one of the challenges facing a number of African countries. Empirically, our contribution is to shed light on possible determinants of food security in poor districts in the rural areas by introducing a previous untested variable, food consumption score. We estimate the determinants of food security by using a probit model. There have been relatively few studies on food security in rural South Africa that explicitly focus on this variable. Numerous studies that have been conducted largely focused on urban areas, with estimates on farm and demographic variables.

A number of South African households rely on the informal food economy for everyday food needs. However, little research has been done in assessing the food security status of the poorest province in South Africa, where there is an informal agricultural economy. Findings from the Household Dietary Diversity Score (HDDS) reveal that 61 per cent of the households had lower dietary diversity and were consuming at least 3 food groups; namely, pulses, milk and cereals. Results from the Household Food Consumption Score (HFCS), however, show that the majority of the households had adequate levels of food consumption. The binary model reveals that age, household income, access to credit, and gender are statistically significant in influencing

household food security status in the study area. Therefore, efforts should be directed in helping rural households to reduce incidences of food insecurity.

## **1.1 DEFINITIONS OF POVERTY**

In order to have a balanced approach to defining poverty, this study explores how poverty definitions differ from analytical perspectives. In basic terms, poverty is a lack of necessities like shelter, food, safety, health care and other things deemed needed by a society or an individual. Necessities differ according to one's needs since they are not uniform. Sen (1999) points out that needs are relative to what is possible and based on the social definition.

Given that poverty has many connotations, it is imperative that numerous viewpoints are considered. The JRF (2013) defines poverty as a situation whereby an individual's resources (material) are not sufficient to meet their minimum needs. Yet, the World Bank definition is broadened to include conditions such as illiteracy, malnutrition, diseases and human decency. In general, poverty is framed as absolute or relative. Absolute poverty is defined in terms of human capabilities in place of commodities or income. Recently there have been other concepts such as the poverty line and poverty traps. The approach in this study is to contextualise poverty definitions and provide a foundation for understanding this complex topic.

### **1.1.1 HISTORIC VIEWS**

According to Adam Smith, poverty is defined as the inability to purchase necessities by custom. Necessities, in this case, include commodities, at the same time, other necessities that are dependent on the custom of the country which provides a decent standard of living (Smith, 1776). Therefore, in this definition, there is a mix of an absolute measure (necessities required by nature) and relative measures (necessities required by customs). For instance, a smartphone, for example, may not be a necessity for someone living in rural areas where network coverage is poor. Although, someone in urban areas may feel ashamed of not having one. As pointed by Smith (1776), the concept is relative of time.

## 1.2 CONTEMPORARY VIEWS ON POVERTY

Historic definitions of poverty focus mainly on material things. Recently in the poverty discourse, a number of scholars do agree that poverty is multidimensional. As a result, definitions of poverty need to consider that aspect. Sen (1983) argues that historic definitions have a number of shortcomings. For instance, absolute deprivation (person capabilities) relates to relative deprivation (income, commodities and resources). Sen holds that each individual has fixed capabilities that should be exercised so as to not be considered poor. Although, resources needed to develop these capabilities are not fixed over time.

Sen (1999) posit that households are formed with a stock of endowments or assets that are mapped in capabilities or entitlements, with the economic, social and political environment playing a major role in the transportation of goods and services needed for a decent life. Thus, poverty is a result of having insufficient endowments grouped as a package including education, health, and freedom. Public goods are then seen as defining social capital as consequences of social position that facilitate the acquisition of human capital. Putnam (2000) postulate that social capital consists of connections among individuals, including social networks. This can be explained by breaking down social capital into components namely, 'bridging social capital' and 'bonding social capital'.

Bridging social capital takes the form of inclusive social networks that connect heterogeneous groups. Lack of bridging social capital, therefore, contributes to social isolation, undermining efforts of poverty escapes (Putnam, 2000). Likewise, lack of social bridging capital may lead people to poverty if there cannot find jobs in their docile areas, especially a high unemployment area. Osterling (2007) claims that such individuals will greatly benefit if they have access to social capital that would enable them to get a job elsewhere. This being driven by a solid network of contacts. Osterling (2007) further argues that social capital yields information and opportunities that would not have been available in a costly, hence, it is a crucial asset. This can be easily explained by today technological era, where social networks are used to advertise employment opportunities. Poverty stricken individuals would have struggled to be in

contact with people with steady jobs or highly educated if they were isolated from social networks.

On the other hand, bonding social capital is inclusive of inward social networks with strong social support and cohesion. Osterling (2007) states that the lack of this capital has a negative impact on poverty through problems relating to communities social organisations and lack of trust, and social support. Therefore, these elements can help reduce the deterioration of the standard of living and speed the process of uplift people out of poverty. Trust on its own improves the evaluation of mutual support among society members. Similar, reciprocity is enhanced on the basis that social networking involves members networking on behalf of others with the hope that someday others will act for members benefit in future (Osterling, 2007).

However, social capital can be detrimental to a society when it is used in the wrong manner. It is not always the case that social capital contributes to the wellbeing of a society. For instance, the use of social networks to promote prostitution, barbarism, fake news and gangsters. Putnam (2000) points that these networks may yield good substantial returns to their members, and obviously do not contribute to community wellbeing.

The major difficulty with the Sen's approach is the measurement of capabilities. This problem has led to researchers measuring the outcomes (literacy rates, life expectancy etc) instead of capabilities. Likewise, the Sen's approach is viewed as individualistic, because it omits the determination of which capabilities are important or not.

On the other hand, Townsend (1979) defines poverty as the lack of resources necessary to permit participation in activities that are approved by a society. In other words, poverty is exemplified by resources that one accumulates or inherits. Thus, poverty is an outcome of a system that an individual is exposed to. As pointed by Seymour (2009), this definition is broad in the sense that it considers an exclusion element to which individual resources can lead to social exclusion in social activities. Levitas et al., (2007) defines social exclusion as a complex and multidimensional process that involves lack or denial of resources, goods and services, rights and

inability to participate in normal relationships available to the majority people in the society, be it cultural, economic, political and social.

Ravallion and Chen (2008) state that a person is said to be poor if his or her consumption or income level falls below the minimum level (poverty line) necessary to meet basic needs. The poverty line approach has been adopted by a majority of countries on the basis that it gives a better comparison among income groups. The World Bank uses reference lines of \$1.25 and \$2 per day in purchasing parity terms. Meanwhile, the European Commission defines poverty as situations where people incomes and resources are inadequate as to preclude them from having a standard of living considered acceptable in society. This definition acknowledges the social component in dealing with poverty. On the contrary, the widely used United Nations (1995) definition states that poverty includes lack of income and productive resources to ensure sustainable livelihoods, hunger and malnutrition, ill health, lack of access to education and other basic services, increased mortality and morbidity, homelessness and social discrimination, sums poverty.

Based on this background, we have these concepts:

- Absolute poverty- a condition characterised by severe deprivation of basic human needs such as food, shelter, water, health and so on;
- Relative poverty-a standard which is measured in terms of society in which individual lives and this differs in countries;
- Poverty line-the minimum level of income deemed adequate in a particular place or country (Ravallion, 1992).

These concepts would be frequently used as a reference throughout this study. Some of the concepts related to poverty include the following; inequality, deprivation and vulnerability. These concepts are usually used interchangeably in a number of cases, although there is a thin line separating them. These concepts are explained below:

**Inequality**-is defined in social context as a situation whereby social groups have different power relations. This is similar to social exclusion, whereby a certain group of society has more access to social, economic and political resources ahead of

others. In economic terms, inequality is referred to an imbalance in the distribution of economic resources, mainly income.

**Deprivation-** is defined as a lack of something one needs be it food; shelter, health or anything deemed a necessity. While poverty refers to a lack of certain resources to meet one need, deprivation goes beyond poverty by taking into account other factors which are not particularly a necessity.

**Vulnerability-** can be simplified to mean any negative outcomes of the process if the change that exposes household or individual to risks and shocks. These include economic, environmental, political, and social. In other words, a vulnerability can mean a state of being defenceless to threats or a lack of well-being.

In South Africa, there is an on-going debate on ways of eradicating rising poverty levels. This is complicated by the racial divide between some groups which led poverty to be concentrated to certain groups during the apartheid era. While apartheid ended in 1994, its scars are still evident to date. There is no unified definition of poverty, and Statistics South Africa (2014) defines poverty as characterised by deprivation of basic human needs such as food, shelter, sanitation, health and education. This study views poverty as multidimensional, complex and a relative phenomenon that affects an individual or society in their livelihoods. A phenomenon that is influenced and affected by the cultural arrangements in a region or place.

### **1.3 ECONOMIC THEORIES ON POVERTY**

The literature on poverty recognises different theories of poverty in different ways. Some view poverty as individual driven and others view it as a social phenomenon. While these theories provide a basis of understanding the major causes of poverty, there is no consensus on which theory best explains poverty.

This section focuses on theories of poverty. The focus is to analyse views on poverty from different economic schools of thought, such as the Classical, Keynesian and so on. However, more emphasis is placed with relevance to Africa. We begin with the

analysis of poverty from the classical and neoclassical schools. We then proceed to other contemporary theories that have emerged in recent years.

### **1.3.1 CLASSICAL THEORY**

The classical theory assumes that poverty is an outcome of individual choices (lack of self-control) which negatively affects productivity. Although it is widely accepted that differences in generic abilities are a potential contributing factor to poverty. In simple terms, an individual's choices can contribute to poverty or lead them to be in a poverty trap.

#### ***1.3.1.1 Decision /behavioural theory***

The classical views on poverty hold that poverty is an individual decision. As a result, people should be held accountable for their individual deficiencies. These deficiencies range from lack of work ethics, low education and competitive market skills. This implies that the state role is diminished given that poverty is linked to individual choices or determined by market forces. On the contrary, this pervasive view that poverty is an individual cause was held throughout the nineteenth century as it was generally accepted that poverty was a necessary means to motivate labourers to work (Townsend, 1979). Therefore, policies were skewed to favour such notions of laissez-faire, a view that was influenced by the Victorian Poor Law. The focus was to keep public redistributive expenditure very low at the same time maximising relief through voluntary work and charity. As pointed by Townsend (1979), the belief was that poverty was a self-inflicted case, rather than a market failure.

#### ***1.3.1.2 Subculture of poverty***

Intergenerational poverty theories claim that behavioural preferences are passed across generations within families due to a genetic component or upbringing. In this case, poverty is seen as recreating itself as children growing in dysfunctional families' inherent deviant behaviour of their progenitors (Blank, 2010). Put differently, the view is that intergenerational poverty can be perpetuated through persisting culture of poverty. Lewis (1965) points out that the poorest in a society tend to form subgroups with similar traits that are largely self-perpetuating. Some of the characteristics forming this subculture include violence and crowded places, as well as, the inability to

accumulate private and social assets. The subculture theory treats poverty as an individual or family phenomena rather than a social problem.

However, notable critics of this approach include its inconsistency, where poverty can be a result of external causes rather than internal created. Similarly, there are blurred boundaries between those experiencing poverty and those who not experiencing it, since this cannot be quantified. The major objection is that there is bias in the interpretation of common attitudes and patterns among groups of poor individuals; in short, the criteria used to distinguish the culture of poverty are based on western methodologies.

One thing that is observed from the theories discussed above, as pointed by Blank (2010), policies dealing with poverty regardless of whether it is personal weakness or inappropriate behaviour should aim to change the individual's behaviour positively. This may involve activities such as drug rehabilitation, personal support or criminal sanctions and punishments. In this regard, cash transfers as a means of poverty alleviation are not recommended since it encourages dysfunctional behaviour of poor individuals (Blank, 2010). Rupasingha and Goetz (2003) suggest that if the culture of the poor is the cause of poverty, the approach is to replace that culture with a functional one which supports productive work, investment and social responsibility.

### **1.3.2 NEOCLASSICAL THEORY**

The neoclassical theory builds from the classical tradition, but stresses the role of unequal endowments of skills, talents and capital as a determinant of productivity of an individual in generating poverty, within a market –based competitive system. Consequently, market failures such as externalities, moral hazard and adverse selection are seen as aggravators of poverty (Davis, 2007). However, uncertainty plays a role as well because people in poverty are vulnerable to shocks (sickness, recessions, instability) in their livelihoods. There is a limited role for the government in addressing the plight of the poor, although in certain instances policies that address market failures are more welcomed. For instance, trade unions are seen as valuable in that they strive to fight for labourers rights and bargain for better wages in the market. Similarly, poor choices that are seen as inherently individuals' problems leading to poverty are rationalised as incomplete information (Banerjee & Duflo, 2011).

The same authors state that people in poverty tend to make decisions contrary to their interest because of the few resources they may trade off for desirable ends.

Redistributive policies aimed at reducing inequality are welcomed; although the neoclassical economists hold the view that full income inequality cannot be attained without incurring high costs in efficiency terms. Jung and Smith (2007) point that public policy is justified if it produces gains in excess of losses so that its possible for the winners from a policy to compensate losers, even the compensation doesn't occur. This is a direct shift from the Kaldor-Hicks criterion stresses that public policy should be concerned with maximising efficiency ahead of inequality.

Banerjee and Duflo (2011) propose interventions that can marginally improve the lives of those in poverty. Basically, they propose a radical stance with regards to institutional reforms needed to help those in poverty as advocated by Sachs (2005), and in field assistance. Small-scale transfers, behavioural change inducing policies and subventions are some of the assistance or even setting business, incentives for good nutrition and birth control. However, Rosenzweig (2012) argues against such initiatives, stating that individual centred solutions are rather small in absolute compared to relative terms. As a result, efforts should be focused on increasing employment opportunities since people in poverty struggle to start a business.

Another problem linked to market failure is a mismatch of skills in the labour market, notable from low-income earners (Pemberton et al., 2013). In order to avoid poverty, types of skills held by people is very important, having the wrong ones may prove catastrophic. The reason behind this problem is that asymmetric information in the labour market is linked to high training and education costs, which cannot be afforded by those in poverty. This aggravates poverty because inadequacies in skills or level of education contribute to a declining demand of unskilled labourers, leading to exposure to poverty.

Besley and Burgess (2003) point that market regulation may be a solution to market failure that leads to poverty, although excessive regulation can be viewed as detrimental to poverty reduction efforts because it hampers investment opportunities leading to a decline in economic activity. Consequently eroding any employment

creation activities. Empirically it has been proven that in countries where transactions costs of starting a business are high and where markets are heavily regulated, the public interest is harmed and poverty is exacerbated. Likewise, employee protection regulations may protect the rights of workers and low-income earners to a certain stage, although sometimes it can hamper economic growth. A view held by the classical economist that gains on equality cannot outweigh efficient cost imposed by regulation (Persky, 2004).

### **1.3.2.1 Monetary approach**

According to Laderchi et al., (2003) the monetary approach is more neo-classical in that it is in harmony with utility maximising behaviour. Income and consumption constitute the variables of interest, on the basis that welfare can be measured by consumption. As advocated by Bhalla (2002), income should be the primary target in the alleviation of poverty because it enables people to provide resources unavailable and to gain purchasing power. This enables the poor to address the problem of resource inequality and purchase free public goods. The main view in this approach, poverty is defined as a shortfall below a specific poverty line. Those below the poverty line are said to be primarily in poverty and those above the poverty line are classified as in secondary poverty. Rowntree (1901) conceptualise poverty as objective because it is based on an external assessment and individualistic.

Some of the major drawbacks in this approach is that it rests on some unknown assumptions, with the utility expressed in consumption facing criticism of reliability, or if money expenditure captures the level of consumption (Laderchi et al., 2003). Likewise, Ulimwengu (2008) argue that there may be a need to re-measure poverty over time since people can be in transitory poverty and persistent poverty. This possible depends on their power to invest in human or capital assets which reduce their vulnerability to poverty. Measuring food poverty makes this approach more complex. Given that nutritional requirements form the basis of the poverty line, there is discontent in terms of how it measures poverty because different people have differing metabolism, size, gender and dietary adequacy is not a one size fits all. Thus, this monetary approach assumes individuals have the same preferences and needs, thus, ignores the benefits accrued to an individual from the community and social interaction. Consequently, the main policy routes taken by the government using this

approach focus on GDP expansion so as to improve employment and wages for the people in poverty.

### **1.3.2.2 Assets approach**

One of the most cited explanations of poverty from a neoclassical view is asset scarcity. The general view is that households owning assets are less affected by income fluctuations because their asset holding varies. Hence, the risks of being poor because of a negative shock are less compared to an asset poor household. Therefore, the lack of income diversification result from holding too few asses affect the probability of being poor and the length of the poverty episode, more so when the principal job is insecure and a family us prone to instability (Ulimwegu, 2008). Furthermore, the same author raised an important issue about social assets such as education and health that increase or decrease the poverty rates. However, housing although a necessity it is seen as a less liquid asset in cases of an income shock. In general, people facing poverty tend to struggle to save and are characterised by lack of financial assets because of the discrimination they face in financial markets.

Johnson and Mason (2012) proposed matched saving accounts to be offered to people in poverty as a way of reducing asset poverty. In this way, people facing poverty can benefit through services offered by banks such as debit bank accounts (Jason and Mason, 2012). This might help them in participating in low credit markets, subsequently reducing the impact of income shocks. Of similar view, De Freitas et al., (2009) raise the importance of life insurance ownership or pension schemes by older people, especially those vulnerable to poverty. Accumulation of pension encouraged by legislation works a long way in reducing poverty to most retirees. De Freitas et al., (2009) found that most poor people did not have life insurance. Therefore, the immediate policy implication is that savings to such households should be enhanced to reduce their exposure to risks. On the contrary, Sachs (2005) points out that poor household's lack of capital to get on the ladder of development. Mostly they lack human capital (skills and education, infrastructure (transport and sanitation, business capital (buildings and machinery), natural capital (land), knowledge capital (technical know-how) and institutional capital (rule of law).

### **1.3.2.3 Ethnic minority groups**

Poverty among minority ethnic groups has been observed in a number of countries, for instance, in the United Kingdom, two-thirds of people living in poverty are an ethnic minority. Poverty among ethnic groups is largely seen as emanating from discrimination, although cultural effects in certain instances play a huge role (Tackey et al., 2011). However, an obvious factor is the immigration status of the ethnic minority groups, immigrants are more vulnerable to poverty due to the challenges they face in integrating into the economy (Blume et al., 2005). These challenges include a lack of employment opportunities and hostile policies towards them. Stephen and Smolensky (2009), point that the higher propensity for an immigrant to be classified as poor, areas with high rates of immigrants tends to show higher poverty rates.

However, in instances where low wages are offered to immigrants due to higher labour supply, the higher the chances of poverty increasing among the natives. This displacement happens when immigrants affect the relative supply of labour at different levels. On the contrary, Jason and Mason (2012) investigate this link between poverty and immigration but find a negative weak link. Lisenkova et al., (2014) tests the effects of reducing immigrants in UK incomes and find that gross wages may increase although such an increase would be cancelled about by fiscal pressure in absence of extra government revenue. In a nutshell, a reduction of immigrants would lead to an increase in poverty rates due to the loss in the purchasing using power if workers that it generates. Manacorda et al., (2012) found that immigrants in the UK were more educated than UK natives and earned higher wages than natives. Therefore, a skilled immigrant may reduce inequality due to a rise in wages relative to the unskilled (Kahanec & Zimmermann, 2009).

### **1.3.3 LIBERAL/KEYNESIAN THEORY**

The liberals are of the view that poverty is not only caused by market distortion but broadly underdevelopment is a factor. Yet, the Keynesians see growth as a means of promoting economic development and ultimately leading to the eradication of poverty. Therefore, the belief is government intervention at the micro level via the use of fiscal and monetary policy is vital in poverty eradication and tackling unemployment. Sachs (2005) points out that underdevelopment in country or region is shown by low levels

of human capital, infrastructure, natural capital and knowledge capital. Sachs (2005), therefore, proposes a big push instead of a one size fits all approach in ending poverty. The common belief that the poor are poor because they are lazy or their governments are corrupt is a misconception. The poor face structural challenges that keep them from getting their foot on the development ladder. The challenge is not to overcome laziness and corruption, but rather to take on geographic isolation, disease, vulnerability to climate shocks, etc. with new political responsibility.

Sachs proposes a strategy for ending extreme poverty by 2025, focusing on the key investments in people and infrastructure that can give impoverished communities around the world the tools for sustainable development. For this, plans, systems, mutual accountability and financing mechanisms are needed. Therefore, Sachs approach is clinical in that anti-poverty strategies need to adapt to circumstances rather than one size fits all.

However, critics like Davis (2007) are against the big push on the basis that getting people in poverty out of the poverty trap has yielded little results, as shown in the 1950s. Probably a bottom-up approach for those experiencing is favoured than a top-down approach.

Keynes believed that market forces could promote economic development; as a result, they are an important tool to fight poverty. Economic growth is seen as the driving force in this quest. In this regard, the role of the government in intervening to correct poverty and unemployment is encouraged. This is contrary to the classical/ neoclassical view that the role of the government should be limited. According to the Keynesians, poverty is a misfortune that befalls certain minorities who fall out of work or cannot work. As put by Townsend (1979), it becomes prudent for the state to act as a regulator in the market. The Keynesian then view poverty as a market failure and taxations are justified as a redistributive approach.

The new Keynesians stress the role played by investments in generating growth which leads to poverty relief. If an investment is slow, this begets unemployment and consequently leading to poverty. Keynes viewed the collection of taxes or bonds issued as a means to channel funds for the 'socialisation of investments' (Jung &

Smith, 2007). This approach helps entrepreneurs as well since they can invest rather than save if direct taxes are increased.

A number of liberals claim that growth needs to be sustainable in order to reduce poverty. Demand should be accompanied by aggregate supply to improve land and capital. However, it is hardly the case; demand sometimes leads to a recession in which supply is low. Likewise, financial liberalization can intensify poverty in cases where it is poorly designed, especially if there are un-sustained booms followed by recessions (Cline, 2002). Although, Dollar and Kraay (2002) found limited evidence on the impact of economic rises on the income of people in poverty.

### ***1.3.3.1 Poverty and unemployment***

Liberalist views unemployment as a primary source of poverty, on simple reasoning that if one does not receive labour income; they are likely to be poor. People who do short-term jobs are likely to slide back to poverty when those jobs end. Aassve et al., (2005) points out that the reason is that they might have insufficient savings to maintain a good standard of life. Meanwhile, Pemberton et al., (2013) posit that in social and pension system, gaps in entitlement can lead to a decline in the standard of living. Thus, stable employment is a prerequisite in preventing poverty. Ulimwegu (2008) states that employment facilitates borrowing and investments which can lead to a growth in one's human capital. As pointed by Sen (1999), investment influences the ability to transform assets into entitlements. Reinstadler and Ray (2010) are of the view that the unemployment rate can have a direct or indirect effect on poverty. Simply put, a high rate in unemployment reduces chances for an individual to be employed. Subsequently, leading to poverty in the end, as such an individual standard of living declines. Technological changes can have far-reaching consequences even when the unemployment rate is low. Take the case of Germany during the 2008 crisis, poverty increased while unemployment rate decreased (Kyzyma, 2013). Therefore, it is not always the case that the unemployment rate decline leads to a decline in poverty.

### **1.3.4 MARXIAN THEORIES**

The Marxian economists contend that capitalism, political and social factors are seen as causing class division leading to poverty. Bluntly put, the market is inherently

dysfunctional (Blank, 2010). In this view, capitalist general keep the cost of labour unnatural lower than it should, with a threat of unemployment. Thus, poverty can be addressed by strict regulations. However, a number of scholars in the political economy view poverty as an outcome of structural factors such as stratified labour markets and corruption. Therefore, reform programmes are welcome in this situation. According to Marx, the lowering of wages is the reason why workers are unemployed. This is the outcome of the labour market that is dysfunctional, hence, needing the state to intervene, especially on workers conditions. As pointed by Blank (2010), one of the central claims of the Marxian theory is that state regulation should enhance the working conditions of workers and higher wages. Consequently, the state should be the enforcer of minimum wages to prevent workers from falling into poverty due to exploitation from the capitalist.

The justification of such a move is that competition increases when former welfare recipients enter the low wage job market, subsequently leading the lowering of wages of all workers, resulting in poverty (Jung & Smith, 2007). Pemberton et al., (2013) points' that low paid workers also cause poverty because of their likelihood to be unhealthy, making their escape from poverty impossible. Nonetheless, the most obvious problem with low wages is that people can save; as a result, their likelihood of falling into poverty increases. Therefore, unionisation is welcome in this situation because trade unions fight for the rights of the workers. Consequently, helping people to move out of poverty. Neumark and Walscher (2002) suggest that increasing the minimum wages can have redistribution effects in income among low-income earners, compared to redistribution of resources from high-income earners to low-income earners.

Another issue is the existence of a dual market (long lasting and low paid jobs) in the labour market. According to the dual market theory, the labour market is stratified into two segments namely; primary and secondary. Where the secondary sector is characterised by unstable employment, very poor prospects of promoting and low pay levels. On the contrary, the primary sector is viewed as the economic driver. Rank et al., (2003) view poverty because of inherent vulnerabilities in the system rather than individual characteristics or traits. Consequently, the Marxian theory holds that the secondary labour market has disadvantageous characteristics, which contribute to

poverty, rather than individual traits or personalities (Townsend, 1979). The view is that the capitalist takes advantage of this weakness in the labour market system to perpetuate inequality. Likewise, poor labour market regulations can contribute to the problems inherent of the dual market.

Social class is a central argument to the Marxian theory, where a class is seen as the most divisive element in a society that leads to a disproportionate distribution of income. Since different classes in society are said to have unequal opportunities to access capital and social resources. Therefore, to address poverty, resources should be accessible to the lowest classes in society. In other words, the view is that those who are affected by it, without the need of an external party, can only solve poverty. The focus, thus, is the fulfilment of social rights and justice.

However, discrimination is part of the labour market system. Social inequality is rife in such circumstances. Western and Dwan (2005) define social inequality as differential access to scarce resources for a certain group in society because of structural factors that they cannot control. These individual factors include gender, age, class, ethnicity and geographic location. For instance, a race is one of the predictors of poverty, and sometimes pro-poverty policies overlooks certain races. Hoover and Perez (2014) establish that non-white people in the US were excluded from poverty reduction programmes. On the other hand, social status according to literature has shown that resources are distributed in line with social status.

Meanwhile, social factors like education, crime, housing, occupation and health combined with individual factors determine the degree of social inequality among certain groups in society (Morazes & Pintak, 2007). This also leads to discrimination in terms of participation in economic, social and political activities. Economically certain individuals are excluded involuntarily from social activities in terms of economic resources. This then leads to social discrimination since it is well linked to economic activities. Thus, discrimination can be seen to be in existence from both economic and social levels (Jefferson, 2012). In such cases, anti-poverty programmes should target economic development and anti-discrimination laws (Jung & Smith, 2007).

## 1.4 POVERTY MEASURES

Recently, many countries use a poverty line to estimate poverty. The choice of the poverty line depends on the consumption bundle considered as adequate in terms of food and non-food consumption. In other words, it is the threshold of a household consumption. Following Ravallion (1998), the poverty line for a household ( $h_i$ ) may be defined as the minimum consumption or spending needed to achieve a certain level of utility, let us say  $u_h$  is the minimum utility level given the price level ( $p$ ), demographic characteristics of household ( $z$ ). This can be expressed as follows:

$$h_i = e(p, z, u_h) \quad \text{eq1}$$

Considering that we cannot measure  $u_h$  or  $e(\cdot)$ , one approach is to compute a poverty line for each household, taking into account differences in the prices each household face and its demographic situation. In this case, a small household in a certain area may face low housing costs and modest food prices. Thus their poverty line ( $h_i$ ) may be low compared to a large household where housing is expensive and food prices are higher. Taking this into considering, each household has a different poverty line. Another approach is to construct per capita poverty for each individual, but adjust their capita expenditure ( $y_i$ ) for differences in prices and the composition of the household. The adjusted per capita is then compared with the poverty line to determine if whether the individual is living below the poverty line or not.

### 1.4.1 CHOOSING THE POVERTY LINE

The poverty lines are chosen by measuring the standard of living and picking an appropriate level to serve as the poverty line. Firstly, Ravallion (1998) points out that conceptual problems arise when one uses an absolute poverty line. The absolute poverty line measures the cost of buying a basket of goods (commodity-based poverty line). We assume the following;

$$u = f(y) \quad \text{eq2}$$

Where  $u$  is the utility or standard of living, and  $y$  is the income or expenditure, then

$$y = f^{-1}(u) \quad \text{eq3}$$

Equation 3, simply means that to achieve a certain level of utility, there is some income or expenditure level that is needed. Then if  $u_z$  is the utility that one needs to avoid being poor, then

$$z = f^{-1}(u_z) \quad \text{eq4}$$

Given a poverty line that the absolute poverty line gives  $u_z$ , there is a corresponding absolute commodity based poverty line. We further suppose that utilities are interdependent. In this case, well being may not depend on what one consumes but the rest of the society consumption. We can assume the following:

$$u = g\left(y, \frac{y}{y^*}\right) \quad \text{eq5}$$

Where  $y^*$  is the society mean income

$$u_z = g\left(z, \frac{z}{y^*}\right) \quad \text{eq6}$$

And assuming invertibility,

$$z = g^{-1}(y^*, u_z) \quad \text{eq7}$$

In equation 6 the absolute poverty line in terms of welfare in order to yield  $u_z$ , the commodity based poverty line ( $z$ ) need to rise as  $y^*$  does. In this case, the commodity-based poverty line would look like a relative poverty line. The idea is to set the poverty line at a level that allows individuals to achieve certain capabilities such as full participation in society and healthy and active lives. As postulated by Sen (1983), an absolute approach in terms of capabilities translates into a relative approach in terms of commodities. The value of  $u_z$  is chosen arbitrarily.

#### 1.4.2 HEADCOUNT INDEX

The headcount index measures the proportion of the population that is poor. Although it does not indicate the degree of how poor the individual household is. Formally, it takes the following form:

$$P_0 = \frac{N_p}{N} \quad \text{eq 8}$$

Where  $P_0$  denotes the proportion of the population that is said to be poor,  $N_p$  is the number of the poor and  $N$  is the population. Assuming that 80 people are poor in a survey of 200 people, the  $P_0 = 80/200 = 0.4 = 40$  per cent. However, eq 8 can be extended to be of the following nature:

$$P_0 = \frac{1}{N} \sum_{i=1}^N I(y_i < z) \quad \text{eq9}$$

Where  $I(\cdot)$  is an indicator function taking a value of 1 if the bracket expression is true, and 0 otherwise? Assuming that expenditure  $y_i$  is less than poverty line  $z$ ,  $I(\cdot)$  equals 1 and the household will be counted as poor. However, the headcount does not take into account the intensity of poverty. The major advantage is that is is easy to construct and understand.

### 1.4.3 POVERTY GAP INDEX

The poverty gap index is a measure of the extent to which individuals fall below the poverty line as a proportion of the poverty line. Formally, the poverty gap  $G_i$  is the poverty line ( $z$ ) less income  $y_i$  for poor individuals, and the gap is zero for everyone else. This can be expressed as follows:

$$G_i = (z - y_i) \times I(y_i < z) \quad \text{eq10}$$

Alternatively, the poverty gap can be expressed as shown in eq11.

$$P_i = \frac{1}{N} \sum_{i=1}^N \frac{G_i}{z} \quad \text{eq11}$$

### 1.4.4 THE SEN INDEX

The Sen Index combines the effects of the number of the poor, their depth of poverty and the distribution of poverty within the group (Sen, 1976). The index takes the following form:

$$P_s = P_0 \left( 1 - (1 - G^P) \frac{\omega^P}{z} \right) \quad \text{eq 12}$$

Where  $P_0$  is the poverty headcount index,  $G^P$  is the Gini coefficient of inequality among the poor, and  $\omega^P$  is the mean income or expenditure of the poor. The Gini coefficient measures inequality, where 0 = perfect equality to 1= perfect inequality. The Sen Index tackles income distribution among the poor into account. Nonetheless, its usage is mostly limited in academic literature.

## 1.5 MULTIDIMENSIONAL POVERTY

The literature on the multidimensional poverty measurement has grown rapidly in the last twenty years. Seminal articles by Kolm (1976), Atkinson, and Bourguignon (1982) brought the multidimensional poverty discourse to the forefront. Atkinson and Bourguignon (1987) developed a sequential dominance criterion for income and household composition with the aim of ranking family types in terms of need. Maasoumi (1989) used a unidimensional utility-like function to recast multidimensional analysis. This previous analysis relied on partial ordering. In 1995, Tsui introduced an axiomatic approach analysis of both partial and complete poverty ordering. Following the axiomatic analysis Chakravarty et al., (1998), Tsui (2002), Bourguignon, and Chakravarty (2003, 2009) provided further grounding to the complete ordering approach. Multidimensional indices of poverty, just as the univariate analysis of

composite wellbeing, associate each number of a multivariate distribution. Thus, allowing for separate threshold in each attribute.

Two strands of multidimensional poverty are identified throughout literature. The first focuses on the axiomatic approach to poverty measurement. In this case, researchers aim to find different ways of modelling the association between the variables, a feature that distinguishes multidimensional analysis from the unidimensional analysis. The second strand focus on the counting approach (Atkinson, 2003). In terms of theoretical application, it is newest although empirical it is the oldest. The pioneering works of Townsend (1979) are reflected in modern applied research. However, recent works by Alkire and Foster (2011) extend previous work on multidimensional poverty by providing an axiomatic characterisation of family poverty indices.

### **1.5.1 POVERTY DIMENSIONS**

Traditional the studies on deprivation state that we can better understand hardships by focusing on an individual or household necessity instead of income. In this approach, the idea is to consider a bunch of indicators that can be easily framed to indicate some form of deprivation. For instance, most deprivation indicators aim to assess material living conditions, which are usual, linked to social exclusion. Burchardt et al., (1999) postulate that failures to achieve a reasonable standard of living, less security and poor support from relatives is usually an outcome of social exclusion.

However, the dimensions used for deprivation may be very larger. For example, Nordic countries use around nine domains of human life namely; education and skills, housing, economic resources, health and access to health care, family and social integration, political resources, recreation and culture, employment and working conditions. On the other hand, Nussbaum (2003) on the capability approach proposes a list of ten so-called human capabilities. While these examples are for illustration purposes, the choice of dimensions is due to advise from experts, statistical technicians and citizen value. Alkire (2007) points that it may be a result of empirical evidence and regard citizen values or it could be based on a consultative process involving a number of players such as focus groups and the public.

### 1.5.2 ALKIRE-FOSTER (AF) APPROACH

The Alkire-Foster methodology is based on the axiomatic counting approach, where a vector of deprivations is identified. Three aggregate measures of multidimensional well-being are estimated based on deprivations suffered by a population. The AF methods count the simultaneous deprivations that an individual or household experiences in different indicators of poverty. The indicators carry equally or different weights were people are identified as poor if their weighted sum of deprivations is greater or equal to a poverty cut-off. The AF measures is simply a product of  $H \times A$ ; the headcount ratio multiplied by the average share of weighted deprivations that poor people experience. The MPI has ten indicators: two apiece in education and health, and six for living standards. This is shown in table 1.1.

**Table 1.1: The global MPI indicators and dimensions**

Three dimensions of poverty	Ten indicators
Health	Nutrition Child mortality
Education	Years of schooling School attendance
Living standards	Cooking fuel Sanitation Water Floor Assets Electricity

The education dimension measures the years of schooling of household members and if whether children are attending school. The MPI requires that at least one person in a household has completed 5 years of school and that children of school age attend school. Deprivation happens when someone lives in a household where there is at least one child attending school. Alternatively, someone living in the household was at least one member has over 5 years in schooling is considered none deprived. In terms of health, two indicators are used. Firstly, the person is identified as deprived if anyone in his or her households is malnourished. The second indicator focus on child mortality.

The living standard dimension has six indicators as follows, where deprivation is when:

**Electricity:** a person is deprived if there is no access to electricity.

**Flooring:** if flooring material is made of sand or dung

**Cooking fuel:** were a household cooks with dung, charcoal or wood.

**Water:** if a person has no access to clean water and water is beyond a distance of 30 minutes' walk (roundtrip)

**Sanitation:** if a household does not have proper sanitation like a flush toilet or latrine, or composting toilet or ventilated pit and if they are sharing

**Assets:** if a household does not own more than one telephone, radio, TV, motorbike or refrigerator and does not own a car or tractor.

### 1.5.3 COMPUTATION OF THE MPI

The MPI combines the proportion of people who experience deprivation and the intensity of deprivation and the averagely weighted deprivation they experience. The multidimensional headcount ratio ( $H$ ) is:

$$H = \frac{q}{n} \quad \text{eq13}$$

Where  $q$  is the number of people who are poor (multidimensional), and  $n$  is the total population. The intensity of poverty ( $A$ ) is expressed as follows:

$$A = \frac{\sum_{i=1}^n c_i(k)}{q} \quad \text{eq14}$$

Where the censored deprivation score of an individual  $i$  is represented by  $c_i(k)$ , and  $q$  is the number of people multidimensional poor. Therefore, the MPI is a product of  $MPI=H \times A$

Literature review points that the MPI has been largely a successful poverty measurement tool due to its breath of country coverage and comparability. Devarajan (2013) points out that the databases upon which the MPI is calculated may be more reliable than the one used in income poverty measures, where it is hard to compare survey instruments across countries. In this case, the MPI is a better alternative to the income poverty line. Another factor to consider about the MPI is that it is easier to decompose the MPI by regions or groups, thereby allowing countries to see directly which groups are deprived and in what dimensions.

The MPI dimensions and indicators have their fair share of criticism due to their uniformity. Alkire and Santos (2014) found evidence that countries with high poverty incidence and MPI, the major contributor was the living standard dimension. In 17 of the 104 countries, it was found that the standard of living indicators contributed over 50 per cent to multidimensional poverty. This is expected considering that in poor countries the standard of living reveals more multidimensional poverty than income estimations. Furthermore, households in rural areas are usually deprived of this indicator than the ones in urban areas. Dotter and Klasen (2014) estimated the contribution of indicators in India, Armenia and Ethiopia and found that the living standard indicators contribute approximately 50 per cent of poverty in rural areas and 36 per cent in urban areas. Therefore, this finding provides a clue on how indicators flare in rural and urban areas. In basic terms, some indicators are hard to measure because of certain biases found in certain countries. For the purposes of our discussion, we focus on cooking fuel, sanitation, and drinking water, and flooring indicators.

Frequent power outages are a phenomenon in numerous developing countries. In other countries, the electricity costs are very exorbitant and access does not lead to use. Therefore, a household benefit to access to electricity would largely depend on price and quality of service. Given that the standard of living dimension electricity indicator identifies a household as deprived if they do not have access to electricity, it less simple means the indicator is bound to be biased. Numerous countries, for instance, in Africa have largely relied on various means of energy, for instance, wood, coal and other renewable sources. Other areas, especially in rural areas might be having a competitive advantage in terms of coal mines and wood. Economically it would make sense for such places to use those energy sources. Therefore, it would be unjust and unfair to conclude that the household is deprived because of electricity; yet, other energy sources can fulfil the same role as electricity.

The cooking fuel indicator state that a house is not deprived if the cooking fuel has a low environmental impact and low effect on indoor air population. The indicator mainly focuses on the health impacts, which is already captured by the health indicator (Dotter, 2015). In simplicity, the impact of cooking fuel on health depends on numerous factors. For instance, in rural areas families' usual use coal or wood outside, which

means that the smoke emitted by those energy sources has less impact compared to the smoke contributed by a thermal coal reactor. We can further stretch this argument by suggesting that this indicator seems to be mainly driven by western ideology without considering other factors such as competitive advantage, cultural practices and access to electricity. The indicator is somewhat not clear on how non-modern fuel sources are considered in terms of deprivation. A plausible indicator would simply focus on access to cooking fuel or energy without necessarily identify the type of cooking fuel. If for instance, we consider Central European countries like Belgium, Netherlands, Switzerland we find that land scarcity is a reality in relation to the populations in those counties. Therefore, cooking with non-modern fuels possess more danger compared to a rural household in Africa where land is usual in abundance and rural areas have low populations. In terms of environmental harm, since in rural areas, there is hardly any serious air pollution, cooking using firewood would lead to saving than using electricity that would be expensive in terms of price.

Likewise, sanitation has been subject to debate due to its effect across countries. Gross and Gunther (2014) find that improved sanitation in rural areas has little effect on health compared to urban areas where there are densely populated areas. Therefore, sanitation improves health in regions or places where they are dense populations. Moreso, sharing a toilet with another household does not necessarily undermine sanitation, unless the households have many members. The sanitation indicator classifies a household as deprived if there is a shared toilet between households. A proper approach to capturing such deprivation would be to provide the minimum number of household members who use a toilet facility. For instance, the indicator cut off point could have been let us say more than five people sharing one toilet facility. This is a better approach compared to household sharing a single toilet; because it may happen that in each household, they are less than two members.

Drinking water and flooring are objective measures of the standard of living and can be easily comparable across countries. However, considering that a dung floor or untiled floor is said to represent deprivation, we find this indicator lacking cultural aspects. For instance, a dung floor in rural areas especially in Africa is part of a design and art. It does not necessarily mean that the household is failing to get a certain floor. In numerous cases, it is a case of preference and culturally driven more than income

driven. In rural areas people work in farms, so assuming that a tiled floor is used, it would likely get dirty frequently than a natural non-slippery floor. So the floor indicator is not properly framed to consider other factors, which affect the choice of having a certain floor another. Secondly, the indicator provides that one be deprived if the floor is dirt. The motivation for such an approach is not properly given. We fail to understand how a dirt floor proves that a household or an individual is deprived, considering that; a floor can be cleaned instantly. Had the indicator focused on a household having a standard floor suitable for that environment, the indicator would capture deprivation in a holistic many and easily fit in any region.

Similarly, the drinking water indicator is affected by household decisions largely. In numerous African countries fetching water from sources beyond 30 minutes round trip maybe a prevalence of water quality than simple water access. Some households prefer less alkaline water since in both instances; the water would be mainly from a spring or an aquifer. The distance to fetching water, therefore, becomes a deprivation when there is no close clean water source. The indicator ignores the fact that sometimes the distance to fetching water may be short but affected by terrain or topography. One may take a few minutes walking to the water source, but once the water containers are filled with water, it becomes a slow journey back to home. Without properly understanding the reason why a water trip takes more than 30 minutes, the indicator would capture deprivation if it were limited to access to clean water.

Lastly, another contention has been the asset indicator were an individual or household is said to be deprived if they do not own more than one asset such as TV, bike, motorbike, car or tractor. Numerous decisions and environments affect the chosen assets. For instance, in urban areas, one can own a car, TV, radio or motorbike because it is easy to access these assets. Nevertheless, in rural areas, a motorbike, for instance, makes noise pollution and scares away livestock. As such, numerous households in rural areas avoid owning it. In certain instances, car or tractor ownership is affected by the quality of infrastructure in certain regions, not necessarily that the household does not afford that asset. In rural areas, people farm with livestock and use the same livestock as a source of income. In comparison with owning a tractor, livestock farmers find it profitable to own livestock since they can be used a draught power in many cases and is liquid compared to a tractor. Therefore, in the economic

sense, one would not buy a tractor simply because livestock can fulfil the role of a tractor. Moreover, livestock is seen as a better investment since it can be used as a source of income and nutrition, or even for organic fertiliser. Looked holistically, a tractor would be likely a bad investment in places where livestock is in abundance. Therefore, the most relevant assets that can measure deprivation in a rural area where farming is dominant is livestock and farming equipment. If we apply the current asset indicator, a household with no bike, TV, car, and motorbike would be likely classified as deprived. Yet, in reality, that household has numerous stock of livestock and farm equipment that can be used to generate income to buy the stated assets. In our view, the tests of this indicator are to identify if whether the household has no capacity to buy the chosen assets. It is good as saying an individual is deprived if they do not possess a smartphone, meanwhile they have enough resources to purchase that smartphone if it becomes a priority to do so. Subsequently, this indicator needs to be customised based on location or environment.

#### **1.5.4 UNION, INTERSECTION APPROACH AND DUAL CUT-OFF**

Numerous scholars have criticised the MPI approach. Subramanian (2010) point out that similar formulations were proposed previously by Brandolini and D'Allessio (1998), Bourguignon and Chakravaty (2003), Jayaraj and Subramanian (2010). However, the Alkire and Foster (2011) approach contribution lies on the dual cut-off approach, which falls in between the union approach and intersection approaches to multidimensional poverty identification. The union approach finds anyone to be poor if there is any deprivation in any poverty indicator. While the intersection approach finds anyone to be poor if he or she are deprived in all indicators. Hence, Alkire and Santos (2014) point that the union approach yields a high incidence of poverty than the MPI. Bossert et al., (2012) and Jayaraj and Subramanian (2007) previously used the union approach for identifying deprivation. Further arguments are provided pertain the stated approaches.

Empirically, the union method returns high poverty outcomes as highlighted by Rippin (2013), as if the MPI indicators cut-offs are used with the union approach, the incidence of poverty is over 90 per cent in many countries. Possible such an estimate is found to have numerous measurement errors or indicators failing to cover deprivations well. The MPI assumes that a household that does not report on a

particular asset, does not own that particular asset. Yet, the union approach simple rate that household as deprived. Alkire and Santos (2014) point that the empirical advantages of the dual cut -off approach is the number of indicators chosen compare to the union approach. Assuming the MPI was composed of 25 indicators, the union approach would be inappropriate since a household would likely to be deprived in one indicator. Thus, the union approach would then exaggerate the problem of multidimensional poverty, making it meaningless. However, the MPI can make the problem less prominent were 4 to 6 well-structured indicators are used to measure deprivation.

The dual cut-off approach is then seen as superior to the union approach if the focus is on households or individuals suffering from joint deprivations. Consequently, this approach has a less measurement error in single indicators (Dotter, 2015). Likewise, in terms of policy actions, it produces a clear and easily communicable poverty outcome. However, in certain instances, the dual cut-off approach is bound to be misinterpreted on the basis that it identifies individuals as deprived yet not poor. Subramanian (2010) points out that the approach violates the monotonicity of poverty measurements among the deprived because people/hardly pass the second threshold. Ravallion (2012) points that additional aggregation of deprivations in the dual cut off approach add the problem of choosing weights and the likelihood of potential trade-offs between deprivation.

Nonetheless, the dual cut-off possesses numerous advantages compared to the mentioned approaches in that it is open to an unlimited number of indicators (Dotter, 2015). Possible capturing the broader definition of poverty and possible capturing cultural specifics of poverty. Dotter (2015) further points that the dual cut off method is less sensitive to misclassification and mis-measurement.

## **1.6 POVERTY OVERVIEW IN SOUTH AFRICA**

Since attaining democracy, South Africa has worked tirelessly to address the plight of the poor by establishing policies and strategies meant to reduce poverty. The Reconstruction and Development Programme (RDP), Accelerated and Shared Growth Initiative for South Africa (AsgiSA) and the Growth, Employment and Redistribution

Strategy (GEAR) were some of the government initiatives that were meant to redress the legacy of apartheid. While these policies managed to reduce public sector borrowing, the impact they made in terms of poverty reduction is debatable. The major clash is that most of these initiatives managed to improve discipline in both the micro and macroeconomic sector; however, their effect on poverty reduction cannot be ascertained. In 2009 going onwards, they have been an ushering of new policies such as the New Growth Path (NGP) and recently the National Development Plan (NDP). Other poverty reduction strategies include the Poverty Alleviation, the Presidential Poverty Nodes and the War on Poverty Campaign.

In post-apartheid South Africa, studies have shown that poverty trends are mainly race and gendered (Posel and Rogan, 2012). In other words, the risk of falling into poverty is based on gender differences and race. StatsSA (2014) notes that in 2011, 60 per cent of females were living in poverty compared to 55 per cent males. Similarly, the issue of female-headed households has contributed to a reduction in women access to income because women have more dependents they live with. Consequently, this highlights that gender inequalities in the labour market has accelerated poverty in the backdrop of apartheid made poverty.

Unemployment remains stubbornly high at over 24 per cent within the age group of 18 to 35 years available to work unemployed (35%) (StatsSA, 2016). On the contrary, those aged 65 years and older saw their poverty levels decline by over 36 per cent in 2011 compared to 2009 figures. This can be attributed to the old age grants that have seen levels of food poverty declining substantially among families.

The Department of Women (2015) point out that while South Africa has put in policies to address poverty and protect vulnerable groups, youth and women remain vulnerable to poverty. Subsequently, the social security system has addressed some concerns in gender-based inequality and poverty, with over 16.8 million receiving social grants (South African Social South Africa, 2016). On the contrary, Rogan (2013) found that the expansion of social grants was not enough to cater to gender differences in the labour market, as a result, the poverty gap widened. The majority of the grant beneficiaries are child grants, which are meant to fight child poverty. Whitworth and Whilkinson (2013) point that 81 per cent of South African children

experience income and material deprivation. Leading other provinces with the highest deprivation was the Eastern Cape, which has over 70 per cent of child poverty.

In terms of poverty in population groups, 54 per cent blacks were under the upper bound poverty line, far ahead of coloured (27,6%), Indians (3,4%) and whites (0,8%). These 2011 figures show that there was a reduction in poverty among blacks and coloured by over 20 per cent compared to 2009 figures. Table 1.2 illustrates that poverty levels have declined throughout the years in every population groups, with the exception of 2009, when the global financial crises led to a surge in poverty. Nonetheless, this was reversed in 2011, and poverty levels have continued to decline nationally.

**Table 1.2: Poverty by population groups**

	Headcount poverty			Poverty Gap		
	2006	2009	2011	2006	2009	2011
Black African	66,8	66,9	54	31,6	33,4	23,6
Coloured	41,6	37,8	27,6	17	15,1	9,6
Indian/Asian	13	11,6	3,4	3,3	2,1	1
White	0,6	1,5	0,8	0,2	0,6	0,3
Total	57,2	56,8	45,5	26,7	27,9	19,6

Source: StatsSA (2014)

In terms of provinces, high poverty levels were recorded in Limpopo (74%), Eastern Cape (69,5%) and KwaZulu Natal (69,1%) in 2011. With the least poor found in the Western Cape (36,8%) and Gauteng(32,4%). Table 1.3 provides a summary of poverty figures by province.

**Table 1.3: Poverty levels by province**

Province	Headcount			Poverty gap			Severity		
	2006	2009	2011	2006	2009	2011	2006	2009	2011
Eastern Cape	69,5	70,6	60,8	34,1	36,7	27,2	19,7	22,6	15,3
North –West	60,2	61,4	50,5	28,1	29,3	22,6	16,2	17,2	12,6
Limpopo	74,4	78,9	63,8	36,8	44,4	30	21,9	26,6	17,3
KwaZulu Natal	69,1	65	56,6	35,7	33,4	25,5	22	20,6	14,4

Gauteng	32,4	33	22,9	11,3	13,1	8,1	5,3	6,8	4,1
Western Cape	36,9	35,4	24,7	13,8	13,8	8,5	7	7	3,9
Northern Cape	63,8	63	46,8	31,1	29,9	19,1	18,2	17,1	9,9
Free State	53,2	61,9	41,2	22	28,4	17,5	11,4	15,8	9,3
Mpumalanga	66,3	67,1	52,1	32	34,1	21,7	18,8	20,7	11,5

Source: StatsSA (2014)

The province of Limpopo (17,3), Eastern Cape (15,3), KwaZulu Natal (14,4) and Mpumalanga (11,5) showed high severity in poverty. Given that the Gauteng and KwaZulu Natal are one of the populous provinces in South Africa, the severity of poverty in those provinces was expected to be higher. However, in Gauteng poverty severity was as low as 4.1 compared to 14, 4 in the KwaZulu Natal. The possible cause of this difference can be attributed to the composition of population groups in both provinces. In the Gauteng, there is a high number of economic migrants' compared to KwaZulu Natal. These migrants are mostly undocumented; as a result, they do not qualify to be included in the census. This means that most deprivation in Gauteng is mainly from migrants. StatsSA (2014) highlights the fact that although in Gauteng the poverty headcount was below the poverty, the province had the fourth highest number (10%) of poor people in 2011. Noticeable, this shows that more people in the Gauteng were vulnerable to poverty compared to previous years.

However, Statistics South Africa (2014) pointed out that poverty levels have dropped nationally as a low as 45,5% (2011) when utilising the upper bound poverty line. This suggests that approximately 23 million people were below the upper poverty line. While those living under the food poverty line (extreme poverty) were 10 million. In terms of poverty gap (a measure of depth in poverty), it revealed that in 2011 they were a declined of poverty from 2009 figures. This means that the government has been successful in reducing the poverty gap of those who are poor. The smaller the gap, the higher the chance of the poor escaping from poverty. StatsSA(2014) state that's the 19,6 per cent of those who were on the UBPL cost the state over R73,7 billion per annum, and to push those in FPL out of poverty would cost at least R12 billion per annum. Table 1.4 provides a summary of poverty gap estimates.

**Table 1.0:4: Poverty gaps (2006 -2011)**

Poverty gaps	2011	2009	2006
Poverty gap (food poverty line)	6.2%	11,6%	8,5%
Poverty gap (upper bound poverty line)	19.6%	27,9%	26,7%

Source: StatsSA (2014)

Based on these statistics it can be concluded that pro-poor policies and strategies have an impact on the poor. However, the most problematic thing in South Africa has been inequality that remains higher compared to other countries in the region. According to table 1.5, the Gini coefficient has remained constant at 0.65 from 2009 to 2014.

**Table 1.0:5: Inequality estimates (2006-2014)**

Inequality indicators	2006	2009	2011	2014
Gini coefficient (income per capita)	0,72	0,70	0,69	0.69
Gini coefficient (expenditure per capita)	0,67	0,65	0,65	0.65
Share of the national consumption the poorest (20%)	4,4%	4,4%	4,3%	3%
Share of national consumption of the richest (20%)	64,1%	61,4%	61,3%	65%

Source: StatsSA (2014)

In terms of inequality, the Gini coefficient is roughly 0.65 based on expenditure data and 0.69 based on income data. The share of national consumption of the poorest (20%) remains at 3 per cent, and the share of the richest (20%) climbed slightly from 61 per cent in 2009 to 65 per cent in 2014, suggesting that the gap between the poor and the rich has widened. Standard Bank Consumer Outlook (2016) found that the poorest 20 per cent of the population saw a decline in their share of income in 2011. Nonetheless, the proportion of the poor using the national-bound level revealed that in 2011, 45,5 per cent were poor.

In general, South Africa has made strides in addressing some of the problem faced by the poor. However, modest economic growth that has never passed 4 per cent for the past decade highlights big challenges the country needs to conquer. In 2011, the GDP growth was around 3,6 per cent, and in 2015 less than 2 per cent (SARB, 2016). The three socio-economic challenges currently facing country include inequality, poverty

and unemployment, coupled with hunger. While the poverty headcount has progressively declined between 2009 and 2011, growth is expected to be less than 3 per cent in 2017. Thus, little progress is expected in reducing inequality, poverty and unemployment. Rising unrest in the manufacturing and mining sectors has also contributed to the bleak outlook prospects. The share of mining to the GDP decline from 11 per cent in 1994, to just below 5 per cent in 2012 (SARB, 2016). One of the major contributors to economic growth has been the financial and business sector that has rose to 24 per cent (2012) from 17 per cent (1994). Unemployment trends have been mimicking the economic growth trends, suggesting that as long as economic growth is low, little can be done in poverty reduction initiatives. Unemployment levels have reached over 25 per cent depending on the definition one uses to define it. With the youths accounting to over two-thirds of the unemployed (May, Sulla and Zikhali, 2016).

### **1.7 Organisation of the thesis**

The thesis is organised into six chapters. Chapter 1 provides the background of the study, concepts and theories of poverty. Chapter 2-5 provides various articles on the issues under study. Lastly, Chapter 6 concludes the study and provides recommendations

## **CHAPTER TWO: VULNERABILITY TO POVERTY: AN EMPIRICAL ANALYSIS USING GENERAL HOUSEHOLD SURVEYS**

### **ABSTRACT**

This article explores vulnerability to poverty and poverty dynamics in South Africa. Utilising panel data from 2012 to 2015, we estimate the likely determinants of household vulnerability using a multinomial logit model. We then decompose the FGT poverty index by groups and income components using the Shapley Value to identify household vulnerability status. Our analysis reveals that black Africans residing in tribal or traditional areas are the most exposed to vulnerability and poverty. In addition, their likelihood of escaping poverty is minimum. High-income variability contributes to vulnerability and poverty among urban and rural areas. Additionally, we demonstrate that only a few households fall in the middle (lower bound) poverty lines. Race and location are strong predictors of poverty in South Africa. These findings have an important implication in the design of poverty policies. Therefore, there is a need for the government to design customised policies that are race and location sensitive, as opposed to a blanket approach.

## 2.1 INTRODUCTION

During the past decade, South Africa has faced numerous challenges including unpredictable fuel prices, volatile exchange rate and severe weather events. However, the lack of longitudinal data has led to a neglect in studies focusing on vulnerability and poverty dynamics. Studies conducted by Vakis et al., (2015) and Ferreira et al., (2013) focused on intragenerational mobility on the middle class and chronic poor in South Africa and found that the middle class had a low probability of experiencing poverty. Empirical studies have proven that poverty is sometimes generational driven, and in certain instances, an outcome of vulnerability. In general, vulnerability refers to the exposure of individuals or households to contingencies and stress and their difficulties in coping with them. According to Chambers (1989), vulnerability is both internal and external, where the external side refers to risks, stress and shocks to which an individual is subjected to, and the internal side refers to the lack of means to cope with the vulnerability. Risks vary in nature and range from macroeconomic shocks, hazards and natural disasters. In economics, vulnerability is an outcome of a process of households' responses to risks given a set of underlying conditions (Alwang, Siegel & Jorgensen, 2001). Consequently, vulnerable households are the ones who are likely to fall into poverty because of cumulative risks and responses.

The poor are the most vulnerable because of their location and exposure to risky events such as natural disasters, economic disturbances to name a few (Sharma et al., 2000). Devereux (1999) and Sharma et al., (2000) found that the poor have less access to assets that can be used to manage risk through their responses. Therefore, the poor tend to be disfranchised and their ability to managed risk is compromised (Narayan et al., 2000). In support of this view, Winters et al., (2004) reiterate that vulnerability is a key element of poverty and a major concern, although the authors admit that the two are not coterminous. Poverty is seen as demonstrating a wellbeing status; yet, vulnerability is said to be stochastic and dynamic (Winters et al., 2004).

Pritchett, Suryhadi and Sumarto (2000) define vulnerability as the probability of being below the poverty line in a three-year period. On the other hand, a vulnerability can then be said to be a measure of wellbeing, reflecting the likely future prospects of a household (Chaudhuri, 2003). Broadly, risk can come from covariate shocks or idiosyncratic shocks. Household-specific shocks can be a death in the family of an

income earner, unhygienic living conditions or any unfavourable household situation. Yet, covariate shocks are community-level shocks such as natural disasters like cyclone, floods, drought to name a few. All these have a potential to contribute to volatility in a household income. Therefore, we can view vulnerability as a product of poverty, which exposes household abilities to cope with risks. As stated by Carter and Barrett (2006), a household can be in persistent poverty due to risks. Thus, an understanding of how households should cope with such risk is an important step in poverty reduction efforts. Ajay and Rana (2005) point out that knowing the characteristics of movements in and out of poverty can help policymakers.

A household vulnerability is said to be in four ways namely; changes in income, changes in household portfolio activities, poverty traps and changes in variability of existing income. According to Reardon (1997), a household has a variety of sources of income, as a result, a household maximises a portfolio which increases its utility by taking into account the degree of the risk aversion (Ellis, 1993). Thus, any changes in their portfolio arrangements have a likelihood of increasing their vulnerability to poverty. Similarly, income variability can pose a challenge to struggling households by exposing them to shocks both endogenous and exogenous. For instance, Gilbert and Varangis (2002) claim that an abolishment of official purchasing incentives increased cocoa price variance in West Africa. Such changes exposed households to shocks. In China, Jian and Ravallion (1997) study demonstrated that geographical externalities in rural areas in terms of human capital factors and endowment affected household productivity. Jalan and Ravallion (1999) further note that the poor are not well insured and are less able to deal with shocks compared to the non-poor. This view was reaffirmed by the World Bank introduction of a social risk management framework. A framework used to assess the vulnerability of households to shocks. Nonetheless, although vulnerability is a huge issue in terms of household security, few studies have been done in South Africa to assess vulnerability faced by households.

One may argue that there is a linkage between vulnerability and being poor, however, there is a persistent pattern of social exclusion over time. In this article, we aim to understand this perspective by using survey data. We use a multinomial logit model fitted to a household survey from 2012 to 2015. Furthermore, we incorporate our estimation by using the FGT poverty indices to estimate the severity of poverty. We decompose the FGT poverty index by groups and income components using the

Shapley Value to identify vulnerability status. While the methodological approach is not novel, to our knowledge, this paper is the first that incorporate FGT indices to estimate vulnerability to poverty, more specifically in the sub-African region. In addition, unlike numerous studies that employ the Jalan and Ravallion (1998) approach to estimate transient and chronic poverty, we move away from this approach by including Gini index estimations as well estimating vulnerability using Smooth hazard estimates. In this case, our approach can identify regions and population groups that are likely to exit poverty in the near future. Something that has been ignored by existing vulnerability-poverty based approaches. While we cannot determine an individual's stay in poverty, our estimates indicate that variables such as gender, location and population group are important predictors of vulnerability to poverty. Based on these characteristics of each household, we can predict the likelihood of poverty entry and exit. We use risk ratios to project three classes of households that fall in different poverty lines, namely: (1) food poverty line, characterised by high poverty, (2) lower bound poverty line, characterised by likelihood of escaping poverty, and (3) Upper bound poverty line, characterised with high living standards and above average incomes.

We extend on the growing literature strand in quantitative economics by focusing on *the ex-ante* measures of poverty (Zhang & Wan, 2006; Chaudhuri, Jalan & Suryahadi, 2002). Mina and Imai (2016) point that it is very imperative to consider macro and micro shocks in poverty analysis. This is because households are faced with various vulnerabilities most emanating from global shocks. These shocks add-on persistent exposure to micro level shocks in developing countries (Dercon, 2005). Some of those shocks include economic shocks in form of unemployment, adverse prices and a decline in productivity. On the other hand, weather-related shocks such as droughts, floods, pest and other natural disasters. Rural households usually get more exposure to such shocks, and their inability to deal with them complicates the problem. While some of the shocks are at individual household level, other affect communities and villages. As a result, it is very critical to assess the extent to which households are exposed to such shocks and how they can mitigate them. Form a policy viewpoint; it is important that successful poverty reduction policies should focus on people at risk in their near future. Despite the relevance of this issue, studies on vulnerability and its determinants are limited, especially in the sub-Saharan Africa where poverty is high.

This is largely caused by the lack of specialised data to analyse vulnerability, as well as methodological challenges in analysing risks.

The remainder of the article is structured as follows. In section 2 we brief summarise issues of vulnerability and how it is estimated. Then we proceed to describe the data and the methodology used in examining poverty dynamics. Section 3 presents the results and discussions on household characteristics of the vulnerable. Lastly, section 4 concludes the study and provides recommendations.

## 2.2 Conceptualisation of vulnerability to poverty

Vulnerability analysis provides information on how individuals and households can be affected by shocks both exogenous and endogenous. Previous approaches to vulnerability were more of qualitative assessments; however, recently we have witnessed an increase in quantitative methods used to measure vulnerability. There are three approaches to vulnerability analysis namely Vulnerability as Expected Poverty (VEP), Vulnerability as Low Expected Utility (VEU) and Vulnerability as Uninsured Exposure to Risk (VER). The main important feature of all these approaches is that they are based on welfare indicators; this can be consumption, expenditure or income. The VEP and VEU approach make reference benchmark to a welfare indicator and the probability of falling below the benchmark. Yet, the VER does not assign any probabilities, instead, it assesses if whether observed shocks generate welfare losses. The expected poverty approach reduces to a basic cumulative distribution of income below the poverty line (probability of poverty) (Christiaensen & Subbarao, 2009). For simplicity in conceptualising vulnerability analysis, we focus on the VEP approach. Thus, we outline the following equation, were the poverty index for a household  $i$  at the time  $t$ .

$$p_{it} = \frac{u(z) - u(c_{it})}{|u(z)|} \quad \text{eq 15}$$

In this case,  $z$  is the poverty line,  $c_{it}$  is the household  $i$  consumption level at  $t$ , and  $u(.)$  is an increasing function. We then take the following function as the form for  $u(.)$

$$u(c) = z^\alpha - (\max\{0, z - c\})^\alpha \quad \text{eq 16}$$

$\alpha$  take integer values 0,1,2...n respectively, then the poverty index in eq2 can be reduced to the Foster-Greere-Thorbecke (1984) poverty measures as follows:

$$p_{\alpha,it} = \left(\max\left\{0, \frac{z-c_{it}}{z}\right\}\right)^{\alpha} \quad \text{eq17}$$

Where  $\alpha=0$ , the poverty index is a binary indicator,  $\alpha=1$  the index estimates the poverty gap ratio, and  $\alpha=2$  represents the squared poverty gap. Therefore, to estimate vulnerability we have the following function

$$v_{\alpha,it} = E[P_{\alpha,i,t+1}(c_{i,t+1}) | F(c_{i,t+1})] \quad \text{eq18}$$

$$= \int (\max\{0, \frac{z-c_{i,t+1}}{z}\})^{\alpha} dF((c_{i,t+1}))$$

$$= F(z) \int_c^z \left(\frac{z-c_{i,t+1}}{z}\right)^{\alpha} \frac{f(c_{i,t+1})}{F(z)} dc_{i,t+1}$$

Where  $F(c_{i,t+1})$  is the cumulative distribution and,  $f(c_{i,t+1})$  is the density function. A vulnerability can be defined by the household's ability to smooth consumption in response to income shocks, with those households who cannot deal with the income shocks leading to them being vulnerable. A problem arises when a household's vulnerability is defined in terms of its smoothing consumption ability in face of income shocks. A household may have a high ability to smooth consumption in face of numerous income shocks. Therefore, the expected poverty approach is said to take both components of vulnerability into account. Nonetheless, whatever approach is chosen, specifying the consumption process is crucial because vulnerability is an ex-ante measure, yet poverty is ex- post measure. Consumption is dependent on the current income and the future expected income, and other household characteristics factors. Some which may be observable or unobserved (socio-economic). The consumption function, hence, takes the following form:

$$c_{it} = c(X_i, \beta_t, \alpha_i, \varepsilon_{it}) \quad \text{eq 19}$$

Where  $X_i$ = bundle of observable household characteristics,

$\beta_t$ =vector of parameters describing an economy at a certain time  $t$

$\alpha_i$  = unobserved time-invariant household level effect; and

$\varepsilon_{it}$  = represents idiosyncratic factors that contribute it differential welfare purposes.

We can rewrite the expression by substituting eq5 into eq4, we get the following:

$$v_{it} = E[P_{\alpha,i,t+1}(c_{i,t+1}) | F(c_{i,t+1}) | X_i, \beta_t, \alpha_i, \varepsilon_{it}] \quad \text{eq20}$$

As shown in the expression (eq20), a household vulnerability level can be derived from stochastic properties of inter-temporary consumption stream it faced, and these depend on the household characteristic and the environmental characteristics in which it operates. The expression on its own allows interactions between multiple cross-sectional determinates of a household vulnerability level. For instance,  $X_i$  can include variables such as the household size, farm areas to name a few. However, such an approach when estimating vulnerability requires an estimation of the distribution of household income (mean or variance), specification of the poverty line and a cut-off point where probabilities can be assigned to identify if the household is vulnerable or not.

### **2.3 Data**

The study makes use of General Household Surveys (GHS) conducted in 2012 and 2015. According to Statistics South Africa (StatsSA), the data collection period for the survey covers a 12-month period, and the samples include domestic households, holiday workers and households' workers in residences. The surveys cover 25330 households in 2012 and 21601 households in 2015. They contain information on household demographics, ethnicity, health, education, economic activities, service delivery, employment, assets and a number of institutional and infrastructural variables. The GHSs are very important because they follow a panel of urban and rural households every year, although, the two samples are representative of the population nationally, we cannot guarantee that it is a true reflection of both populations in urban and non-urban areas due to a number of factors, such as inaccessible of certain areas, especially in rural areas. Nonetheless, we are very confident that our results provide useful inferences for the population in South Africa. We closely focus on income expenditure and apply the general poverty lines as estimated by Statistic South Africa (2014). In line with our empirical framework, we include a number of explanatory variables based on a review of the relevant literature focusing on a vulnerability in a household. We focus on three poverty lines, namely the Food Poverty Line, Lower Bound Poverty Line, and the Upper Bound Poverty Line.

## 2.4 Modelling vulnerability and poverty

To measure households' vulnerability, we use poverty indicators to estimate the probability of households becoming poor (McKay and Lawson, 2003; Jana and Ravallion, 1998). A vulnerability is measured as the risk of household or community falling into poverty at least once in the next few years. Thus, vulnerability is, therefore, measured as a probability. Following StatsSA (2014), the study used three national poverty profiles to determine vulnerability. Firstly, the food poverty line (FPL) which is the level of consumption below, which individuals are unable to purchase sufficient food to provide them with an adequate diet. The Lower Bound Poverty Line (LBPL) includes non-food items, although it requires individuals to sacrifice food in order to obtain these, yet individuals on the upper bound poverty line (UBPL) can purchase both adequate food and non-food items (StatsSA, 2014). The FPL was pegged at around ZAR321 per capita per month, LBPL is ZAR443 per capita per month, and the UBPL is ZAR620 per month per capita (2014 figures). The LBPL and UBPL are obtained using Ravallion cost of basic needs approach, where two different sets of non-food expenditure are obtained from two separate reference households and added to the poverty line to yield two sets of poverty (LPBL and UBPL) (StatsSA, 2014).

In order to identify the likely causes of a household being vulnerable to poverty, we follow Glewwe et al., (2000) and Justino and Litchfield (2002) approach of using a multinomial regression model, although our approach differs in a number of ways. To begin, this study is focused on estimating the likelihood of a household being vulnerable to poverty in the near future. We thus, explore both rural and urban populations to get a deeper understanding of the factors that may likely contribute to vulnerability. Therefore, we limit our analysis to variables that we believe can have an influence on the vulnerability of households or individuals to poverty. Consequently, a multinomial logit (MNL) model is used to estimate the probability of being vulnerable to poverty. We examine vulnerability to poverty using the three poverty lines that are used by Statistics South Africa were: 0= the FPL (reflect extreme poverty), 1= LBPL and 2=UBPL. The main reason for choosing such an approach is to identify the likelihood of households falling in between the poverty lines based on the cut- off in terms of income. The multinomial model takes the following specification.

$$Prob(Y_i = j) = \frac{e^{\beta_j X_i}}{\sum_{m=1}^3 e^{\beta_m X_i}}, \quad j = 1, 2, 3 \dots M. \text{ (eq21)}$$

All the parameters are estimated using the odds ratio (relative probabilities)

$$\log\left[\frac{p\{Y_i=j\}}{p\{Y_i=1\}}\right] = x_i \beta_j \text{ and } \log\left[\frac{p\{Y_i=j\}}{p\{Y_i=1\}}\right] = x_i(\beta_j - \beta_k) \text{ (eq22)}$$

With the marginal effects as follows:

$$\frac{p_j}{x_i} = p_j(\beta_i - \beta^*) \text{ with } \beta^* = \sum_{k=1}^j p_k \beta_k \text{ (eq23)}$$

Where  $Y_i$  the outcome is faced by household  $i$ , and  $X_i$  is the vector for household characteristics  $i$ , and  $\beta_j$  is the vector of coefficients on  $X_i$  applicable to a household in state  $j$  and  $\beta_1=0$ . In this study, we estimate  $K-1$  slope coefficients plus an intercept for all the available alternatives. The model is estimated by the maximum likelihood, where all the probabilities of the observed outcomes enter the loglikelihood function. Nonetheless, we can easily estimate households' movement in between the poverty lines based on certain characteristics that may have a direct impact on household poverty like geographic location. Some areas without economic activity contribute to poverty due to the fewer job opportunities, which affect household consumption patterns. Thus, basing on the proposed poverty lines we have a three-tiered stratification in terms of vulnerability as follows in table 2.1.

**Table 2.1: Three-tiered stratification**

Sustained Poverty Escapes	$\leq$ UBPL
Vulnerable	$\geq$ FPL $\leq$ LBPL
Poor	$\geq$ FPL

We investigate the determinants of poverty and vulnerability by focusing on household and geographic factors. In our equations, the base outcome is the UBPL (the household moving out of vulnerability/poverty). We control for characteristics of household head and regional variables. We have the following equation:

$$Pr(povertyline_{i,t} = 1 | \beta, v_{i,t}) = f(\beta_0 + \beta_1 Geo_{i,t} + \beta_2 HH_{i,t}) \dots \text{(eq24)}$$

Where  $v_i = (1, Geo_i, HH_i)$

$povertyline_i$ =the probability of a household  $i$  being poor, vulnerable, and sustained poverty escapes;

HH = is a vector of variables defining the household head;

Geo= is a set of variables stating where a household resides, if whether it is located in urban or non-urban areas

In interpreting the results from the multinomial model, a risk ratio greater than 1 indicates that a household has a higher risk ratio of the outcome relative to the base category of sustained poverty escape (UBPL). Food poverty (poor) and vulnerability (LBPL) are the outcomes that we compare to this reference category.

In order to identify the likely causes of a household being vulnerable to poverty, we follow the Foster, Greer and Thorbecke (FGT) class of poverty measures, exposure of poverty with greater inequality among the poor. Let us consider two incomes below the poverty line, poverty is said to be severe if one of the incomes is 1 per cent below the poverty line and one income is 99 per cent below the poverty line, in comparison with a situation with two incomes 50 per cent below the poverty line. The FGT takes the following form:

$$P_\alpha = \frac{1}{n} \sum_i (1 - x_i/z)^\alpha \prod(x_i \leq z) \dots \dots \dots (eq25)$$

Where  $\alpha$  is a parameter that can be set at 0, 1, 2 or more according to the importance attached to the poorest. If  $\alpha=0$  we get a headcount measure as follows:

$$P_0 = \frac{1}{n} \sum_i \prod(x_i \leq z) = \frac{q}{n} \dots \dots \dots (eq26)$$

If  $\alpha=1$ , the index takes into account the distance of an individual/ household to poverty line using the poverty gap  $(z - x_i)$  as follows:

$$P_1 = \frac{1}{n} \sum_i (1 - x_i/z) \prod(x_i \leq z) \dots \dots \dots (eq27)$$

The poorer the individual, the larger their contribution to the value of the index, although the index is insensitive to income distribution among the poor. Consequently, it is insensitive to certain types of transfers among the poor. For  $\alpha=2$ , the index measures sensibility of the distribution of income among the poor and takes the following form.

$$P_2 = \frac{1}{n} \sum_i (1 - x_i/z)^2 \prod(x_i \leq z) \dots \dots \dots (eq28)$$

As suggested by Foster et al., (1984), the index can be decomposed because of its linear structure. For instance, let us assume we have a population between urban and rural areas. If  $X$  represents the income of the population, then  $X$  can be partitioned as follows ( $X=X^U+X^R$ ). We the call  $p$  the proportion of  $X^U$  in  $X$ . The index is finally decomposed into

$$P_\alpha = p \frac{1}{n} \sum_{i=1}^{n_U} \left(\frac{z-x_i^U}{z}\right)^\alpha \prod(x_i \leq z) + (1 - p) \frac{1}{n} \sum_{i=1}^{n_R} \left(\frac{z-x_i^R}{z}\right)^\alpha \prod(x_i \leq z) = pP_\alpha^U + (1 - p)P_\alpha^R \dots \dots \dots (eq29)$$

Where  $P_\alpha^U$  is the index representing the urban population and  $P_\alpha^R$  represents the rural population. Table 2.2 provides a summary of variables that were used in the regression analysis.

**Table 2.0:2: Summary of variables**

Variable	Mean	Sd	Skewness	max	min	Kurtosis
Prov (Province)	5,288829	2,535005	-,2903871	9	1	1,876151
head_popgrp( Household head race)	1,373779	,8810796	2,299443	4	1	6,832962
head_sex (household head gender)	1,417064	,4930851	,336404	2	1	1,113168
head_age (household head age)	47,55322	15,74482	,4157647	110	8	2,595324
Povline (poverty line)	2,910566	,4083907	-4,404661	3	1	20,54465
Geo (Geo Location)	1,389195	,5734495	1,164745	3	1	3,359297
Totmhinc (Total monthly income)	7048,606	9506,378	2,25068	40000	0	7,466051

## 2.5 Empirical Results

In this section, we focus on the two periods (2012 and 2015) to find out a household vulnerability in terms of inequality and poverty using surveys stated previously. Considering that only a few studies have been done in Africa on the same topic, specifically in South Africa, our results would closely focus on changes between the two periods with little reference to literature. In order to have a proper grounding on households' likely exposure to vulnerability, we start by looking at the distribution of household by poverty lines and geographic location. The poverty lines are as follows:

FPL=Food Poverty Line (ZAR321), LBPL =Lower Bound Poverty Line (ZAR443) and UBPL=Upper Bound Poverty Line (ZAR621) per household per month.

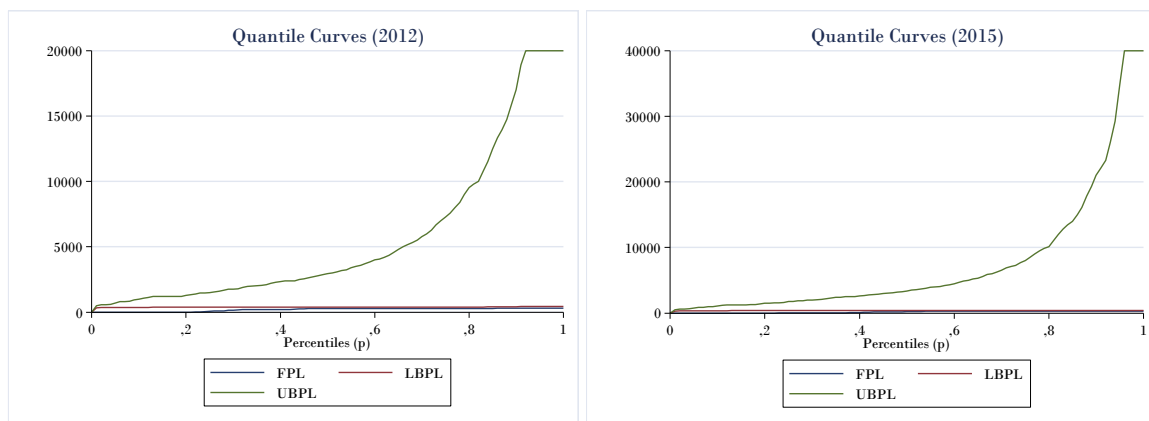
**Table 2.3: Summary of poverty lines in South Africa**

AREA	GHS 2012			GHS 2015		
	FPL	LBPL	UBPL	FPL	LBPL	UBPL
<b>Urban</b>	487	77	15323	566	45	12452
<b>Tribal areas</b>	376	92	7906	279	37	5962
<b>Farm areas</b>	33	9	1027	20	1	910
<b>Total</b>	<b>896</b>	<b>178</b>	<b>24256</b>	<b>865</b>	<b>83</b>	<b>19324</b>

As shown in table 2.3, households in urban areas, poverty lines are higher than other areas. This means that urban areas respondents have more income compared to other areas. The World Bank (2013) estimated that households would need to spend double the food poverty line per year to be out of poverty. However, in urban areas, the costs were over ZAR2000 and in rural areas ZAR100. This reflects that costs are higher in cities. In time we expect the poverty lines to shift based on economic changes. Firstly, the poverty lines are a reflection of the costs of purchasing food and non-food items. Thus, as price rises (inflation), nominal poverty lines are expected to follow suit. This is reflected in the 2015 survey, where there was a decline in the number of households falling in the UBPL and an increase in households falling in the FPL. Perhaps this is a replication of the volatile currency, which has contributed to higher food prices in the market, as well as a reduction in the purchasing power of the currency in the stated period.

This can be explained by using Quintiles Curves between the periods of 2012 to 2015. As shown in figure 2.1 we observe that the income share per quintile increased, in 2012, the maximum share was at ZAR20000, but in 2015, it jumped to ZAR40000. At the same time, the LBPL line decline from the 2012 level compared to 2015, and the percentile of households in the UBPL increased. The income increases in households can be attributed to high inflation rates that were experienced in 2015, which led to an

increase in food prices. Thus, having ripple effects on salaries and other incomes. While price changes were expected due to a volatile currency, the devaluation of the South African Rand to close to US\$=ZAR18 in 2015 had a serious strain in the labour market, where wage and salary protests increased in the 2014/15 period. The strikes were mainly emanating from the manufacturing and mining sectors which contribute over 20 per cent of South Africa`s GDP (StatsSA, 2016). Whereas these strikes were concentrated in these sectors, the effects they had in the economy was devastating, with a number of fatalities and destruction of public property. As a result, there was a decline in economic activity, and other economic disturbances contributed to this situation.



**Figure 2.1: Quintile Curves**

**Source: Author calculations**

In terms of income distribution, we can observe that figure 2.2 is organised based on quintile, race and province. The mean income was lower than ZAR80000 in 2012, with around 6/9 Provinces approaching the maximum income. The Eastern Cape Province and the North West Province regarded as one of the poorest provinces were ranked lower in terms of income per household (<ZAR50000). Yet, the Gauteng and Mpumalanga Provinces were neck and neck in terms of income distribution. In relation to population groups, we note that whites followed by Indians had the highest income per households in every quintile and province. In provinces such as the Eastern Cape and Limpopo, we note a change in the 5<sup>th</sup> quintile (highest) were the whites come ahead of the coloureds and blacks, surprising no Indians fall in that quintile. Briefly, it can be summed that black Africans and coloureds rank lowest in every quintile regardless of the province, demonstrating that the two races are the most likely to be more vulnerable to poverty than other races.

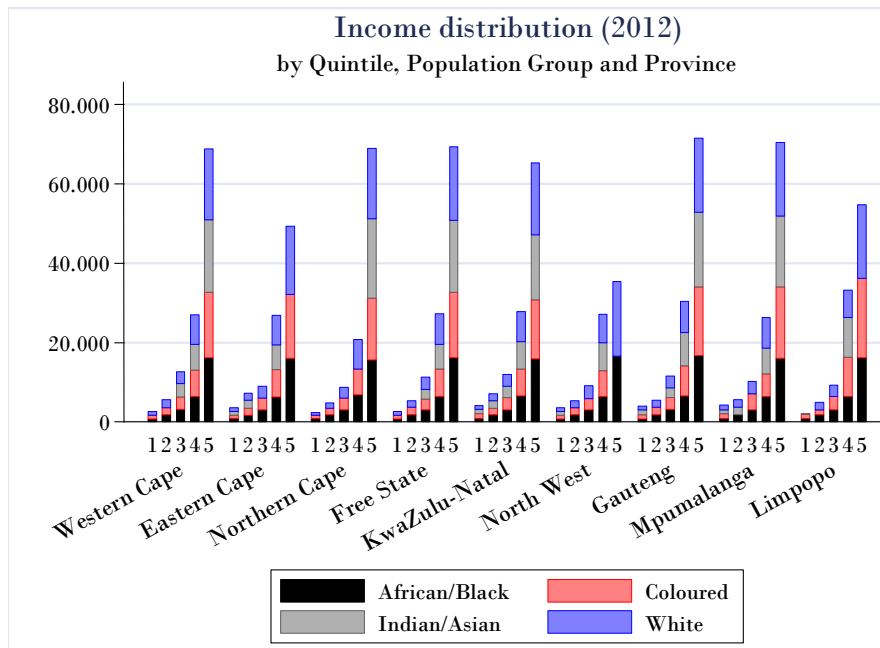


Figure 2.2: Income distribution (2012)

Source: Author calculations

In 2015, we note that the Eastern Cape lags behind in terms of income distribution with over ZAR 50000 (2012 figures) to approximately ZAR 70000. On the other hand, the Northern Cape Province fell to around ZAR 60000 from over ZAR65000, making it the lowest ranked province. Likewise, the income distribution means increased from ZAR80000 (2012) to ZAR100000, demonstrating that households incomes have tremendously increased compared to the 2012 period. In the 2015 period, Gauteng, Western Cape and the Free State Provinces had mean household incomes surpassing ZAR100000, highlighting that income distribution is skewed to those provinces. The Gauteng and Western Cape Provinces contribute to over 54 per cent of the South Africa Gross National Product (StatsSA, 2016). Thus, income distribution is expected to be influenced by the skewed economic activities in those provinces compared to the rest. In terms of income distribution per province, there has been an improvement from 2012, although between population groups inequality has increased. We note that Whites and Indians have increased their income shares as shown in the 5<sup>th</sup> Quintile, and it is a trend in almost every province with the exception of the Northern Cape, where the Indians are replaced by the Coloureds. This is shown in figure 2.3.

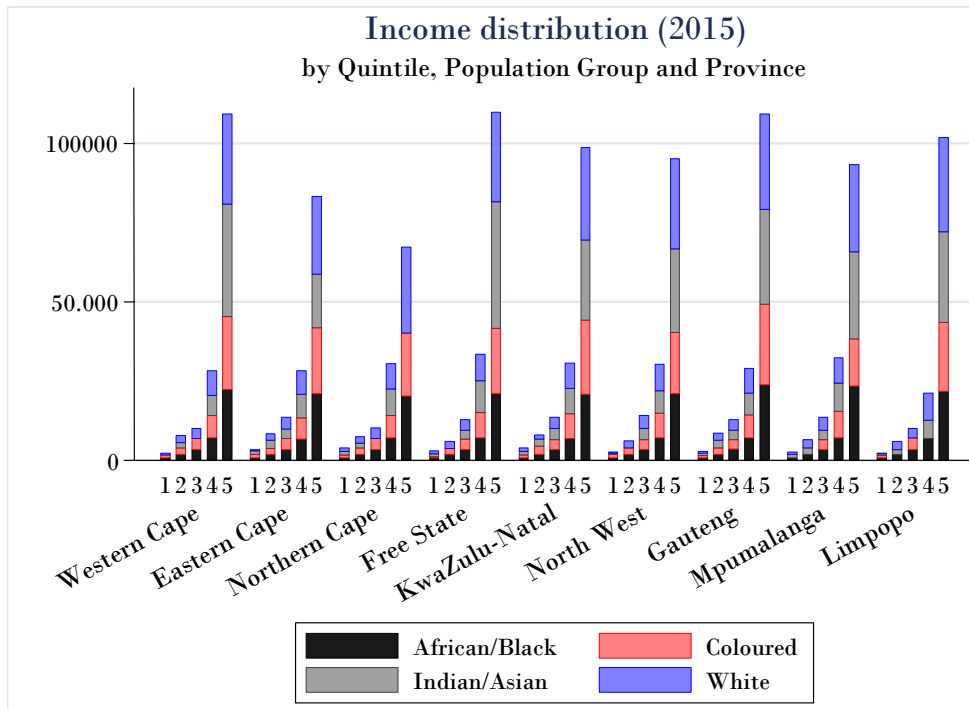


Figure 2.2: Income distribution (2015)

Source: Author calculations

To get a deeper insight on inequality, we estimate Generalised Lorenz Curves for both periods as shown in figure 2.4. We strongly focus on urban (metro) vs non-urban areas (non-metro). The Generalised Lorenz Curve (GLC) provides information on inequality as measured by the partial mean ratio. Thus, inequality ordering is represented by the generalised Lorenz curve, where the higher generalised Lorenz curve indicates unambiguously lower inequality according to the poverty gap measure.

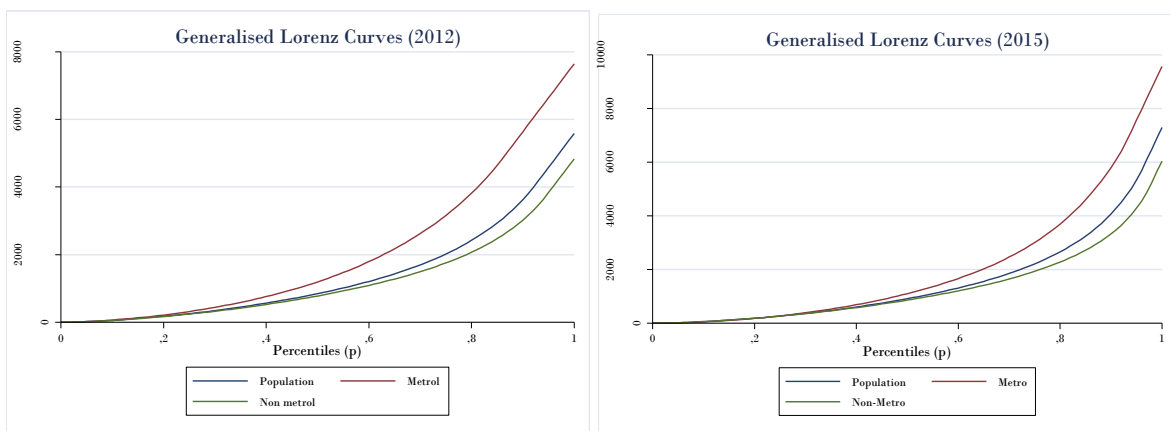


Figure 2.3: Generalised Lorenz Curve

Source: Author calculations

In this case, we note that the GLC in 2012 and 2015 reveal that the curve Metro (Urban) dominates both the Non-Metro (Non-Urban) and population curves. Suggesting that inequality is lower in urban areas compared to non-urban areas. At the same time, non-urban areas are worse in terms of inequality compared to the general population. In simple terms, households staying in non-urban areas are more vulnerable to poverty than those in urban areas are. However, the GLC in 2015 shows an improvement in terms of inequality from the 2012 period, with the gap between curves declining between urban areas and non-urban areas.

We then estimated the FGT elasticities according to Provinces. As shown in table 2.4, Gauteng, Eastern Cape, Limpopo and the Western Cape Provinces had a large share of over 10 per cent each for the whole population sampled in 2012. The marginal impact on inequality was high for the Gauteng (8 %), the KwaZulu Natal and the Western Cape (6%) Provinces. Yet, in terms of the marginal impact on poverty, Limpopo, KwaZulu Natal and Gauteng provinces showed an impact of over 6 per cent. Within Provinces, the marginal impact on inequality was 49 per cent, and the poverty was at 55 per cent. Overall, the marginal impact on equality was 51 per cent and the marginal impact on poverty was 58 per cent.

**Table 2.4: FGT elasticities within groups' components of inequality (2012)**

Poverty and inequality indices

Indices	Estimate
FGT	0,057771
Gini	0,513250

Marginal Impact & Elasticities By Groups

Group	Population Share	Marginal impact on ineq.	Marginal impact on pov.	Elasticity
1: Western Cape	0,117712	0,060964	0,050985	7,430095
2: Eastern Cape	0,124246	0,050025	0,064568	11,466991
3: Northern Cape	0,058916	0,029080	0,032446	9,912634
4: Free State	0,082074	0,040967	0,050806	11,018141
5: Kwazulu-Natal	0,165545	0,080382	0,090677	10,022114
6: North west	0,084332	0,041449	0,052831	11,323839
7: Gauteng	0,144732	0,087936	0,083487	8,434784
8: Mpumalanga	0,101960	0,049071	0,052282	9,465691
9: Limpopo	0,120483	0,047042	0,070707	13,353618
within	.	0,487044	0,548789	10,010597
Between	.	0,014097	0,006868	4,328490
Population	1,000000	0,513250	0,582760	10,087484

Source: Author calculations

Striking differences were noted in the elasticity between provinces, where Limpopo, North West, Free State and Eastern Cape showed a higher elasticity's (>10 per cent)

compared to the population (10 per cent). The four provinces showed their sensitivity to inequality and poverty impacts.

In 2015, we note that the Gini index increased from 0.51 (2012) to 0.58 pointing that inequality increased in Provinces, as well as the poverty FGT index increased from 0.57 per cent to 0.62 per cent in 2015. In terms of population share, Gauteng, KwaZulu Natal, Eastern Cape and Limpopo provinces provided more households for the sample. Therefore, in standing on the marginal impact on inequality, we note that Gauteng (16 %) and KwaZulu Natal (8%) showed a high impact compared to other provinces. Yet, in terms of marginal impact on poverty, we note that the same two provinces dominate, maybe because of the skewed sampled households, which were more than in other provinces.

**Table 2.5: FGT elasticities within groups' components of inequality (2015)**

Poverty and inequality indices

Indices	Estimate
FGT	0,062620
Gini	0,580305

Marginal Impact & Elasticities By Groups

Group	Population Share	Marginal impact on ineq.	Marginal impact on pov.	Elasticity
1: Western Cape	0,095891	0,061877	0,050653	7,586174
2: Eastern Cape	0,137786	0,052686	0,067751	11,916874
3: Northern Cape	0,046797	0,021561	0,023995	10,313466
4: Free State	0,059222	0,031918	0,043437	12,611228
5: KwaZulu-Natal	0,182434	0,087377	0,116223	12,326477
6: North West	0,064568	0,031155	0,045319	13,480451
7: Gauteng	0,217894	0,163411	0,168703	9,567227
8: Mpumalanga	0,082486	0,046065	0,050607	10,180896
9: Limpopo	0,112923	0,048357	0,076781	14,714243
Within	.	0,544378	0,643470	10,953953
Between	.	0,024208	0,008563	3,278028
Population	1,000000	0,580305	0,703475	11,234022

Source: Author calculations

However, we note that elasticities increased in every province from 2012 figures, although the within groups elasticity increased marginally by less than 1 per cent. While the within marginal impact on inequality increased from 48 per cent (2012) to 54 per cent (2015). It was a huge increase in line with marginal impact on poverty, which increased from 54 per cent (2012) to 64 per cent (2015). This contributed to an overall population marginal impact on poverty increasing by 8 per cent in 2015 and the

marginal impact on poverty increasing by 12 per cent as illustrated in table 2.5. Consequently, poverty and inequality increased amongst provinces.

We note that urban areas contributed 27 per cent of the total FGT, while the non-urban areas contributed 73 per cent in 2012. Thus, we can safely say poverty is higher in non-urban areas as shown in table 2.6.

**Table 2.0:6: FGT index by groups (2012)**

Decomposition of the FGT index by groups  
 Poverty index : FGT index  
 Household size : hholds  
 Group variable : Metro  
 Parameter alpha : 1,00

Group	FGT index	Population share	Absolute contribution	Relative contribution
Metro	0,140256	0,384165	0,053882	0,266225
	0,004875	0,006056	0,002060	0,008765
Non metro	0,241152	0,615835	0,148509	0,733775
	0,003075	0,006056	0,002355	0,008765
Population	0,202391	1,000000	0,202391	1,000000
	0,002717	0,000000	0,002717	0,000000

Source: Author calculations

In 2015, we note a similar trend, where the urban areas contribute 35 per cent of FGT, while the non-urban areas contribute 65 per cent. Poverty has increased in urban areas compared to non-urban areas, where the majority of the population lives as revealed in table 2.7. However, the non-urban areas continue to have a sizable contribution to the overall poverty.

**Table 2.0:7: FGT index by groups (2015)**

Decomposition of the FGT index by groups  
 Poverty index : FGT index  
 Household size : hholds  
 Group variable : Metro  
 Parameter alpha : 1,00

Group	FGT index	Population share	Absolute contribution	Relative contribution
Metro	0,154989	0,415975	0,064472	0,345208
	0,000000	0,000000	0,000000	0,000000
Non-Metro	0,209392	0,584025	0,122290	0,654792
	0,000000	0,000000	0,000000	0,000000
Population	0,186762	1,000000	0,186762	1,000000
	0,000000	0,000000	0,000000	0,000000

We then set the FGT at alpha=0, in 2012 we note that there was a huge poverty gap between the Western Cape Province and the rest of provinces when the poverty line is estimated to be at around ZAR1200, although such a gap was evident when the

poverty line was over ZAR700. This means that as the poverty line increases so does poverty headcount ratio increases in every province. This is shown in figure 2.5.

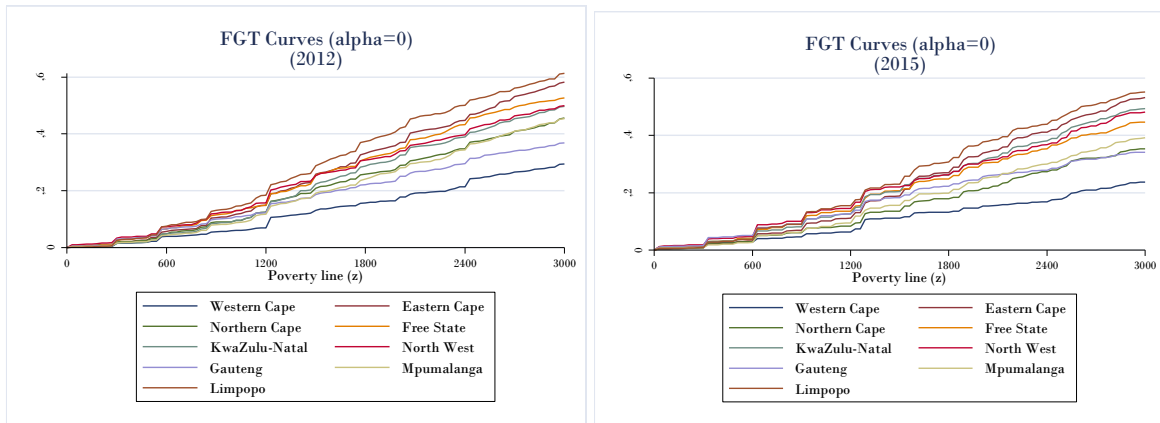


Figure 2.0.4: FGT curves

Source: Author calculations

On the hand, in 2015 the differences in poverty become evident when the poverty line is set at around ZAR1800, with the Western Cape revealing a huge headcount poverty gap from the rest of the provinces.

Decomposing poverty by provinces reveals that the Gauteng, Limpopo and the Eastern Cape provinces contributed more to the overall poverty as demonstrated in figure 2.6. At the same time, we realise that in terms of poverty, the Eastern Cape Province has shown no changes since 2012. Yet, the Gauteng Province has shown a shift using 2015 survey data, from being second least poor to be the fourth poorest Province. In short, the Eastern Cape dominates all other provinces in terms of income distribution up to the maximum poverty line, meaning that the poverty gap of income distribution is always high in the Eastern Cape than any province in South Africa.

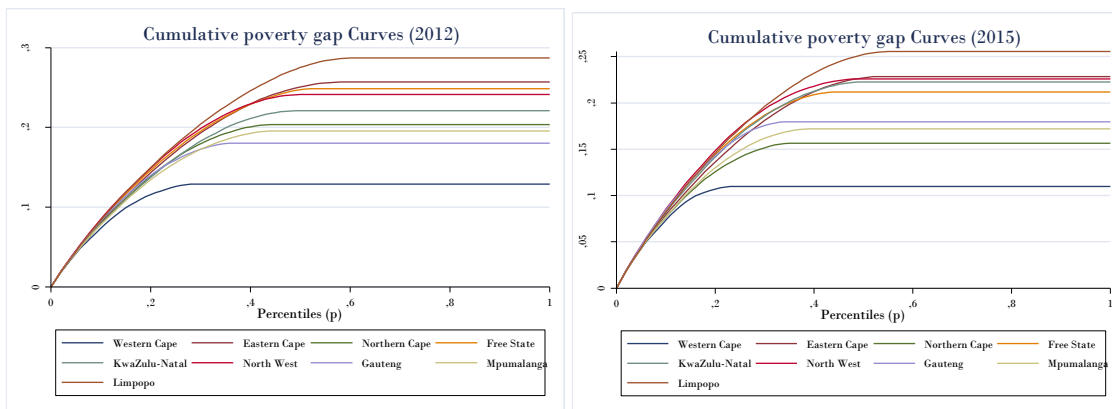


Figure 2.5: Poverty gap curves

Source: Author calculation

While other provinces have shown improvements in terms of income distribution, the Gauteng province has shown a regressing income distribution in the 2015 period, with poverty rising from the 2012 estimates. The Western Cape maintains its position as the province with the least poor households in both periods.

Vulnerability among population groups is evident as shown in figure 2.7. We split population groups in terms of a population group, and estimate exposure to hazard. In this case, we estimate the likelihood of population groups falling poverty over time. In 2012, black Africans showed high levels of vulnerability in terms of poverty exposure followed by coloured, and Indians. We observe a similar trend in 2015, but this time there is a sudden rise in the coloured curve where it intersects with the black Africans curve. This illustrates that poverty exposure has risen for coloureds compared to other races. We also notice a decline in vulnerability on Indians compared to the 2012 estimates. However, in 2015 there are low levels of vulnerability in comparison to other groups. While the poverty level have declined throughout the years, whites in the 2015 survey show high levels of vulnerability compared to the 2012 estimates.

Suggesting that income distribution has changed tremendously in both periods for every group, with more population groups either low-income earners or high-income earners. This finding is in line with Zizzamia, Schotte, Leibbrandt and Ranchhod (2015) study, which pointed that middle class in South Africa, is smaller than previous estimated, and has been sluggish since 1993. The study went on to claim that previous households that fell in the middle class have fallen to poverty throughout the years. This is very evident, with StatsSA (2016) admitting that while poverty levels have declined, inequality has tremendously increased in South Africa.

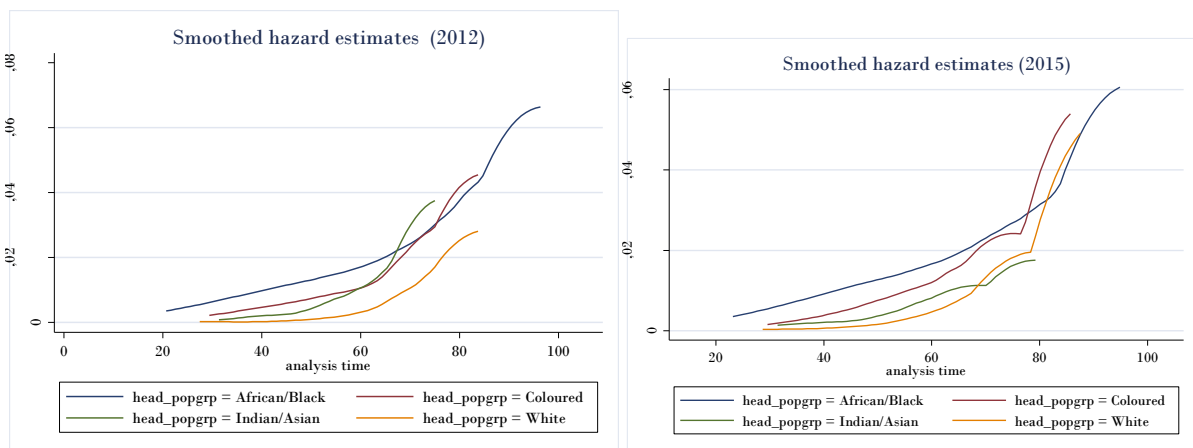


Figure 2.6: Smoothed hazard estimates

Source: Author calculations

## 2.6 Multinomial logit results

A relative risk ratio (rrr) of less than one means that an increase in variable  $X$  increases the probability that the household falling in the reference category (base category), yet, an rrr more than one implies an increase in the probability of the household being in the alternative state. Households located in tribal/ traditional areas are more at risk of being in deprivation compared to urban areas or farm areas. These households are located in rural areas dominant Provinces like the Eastern Cape, North West, Mpumalanga, Limpopo and the KwaZulu Natal. We run a series of regressions and exclude provinces in both periods from the empirical analysis because the results show skewness to provinces with households in tribal areas, suggesting that in both periods there was no significant change in terms of vulnerability within Provinces. Thus, we at least focus on geographic location as a measure on which areas are more vulnerable. Results in table 2.8 indicate variations on the risk ratio of being poor relative to sustained poverty escapes.

### FPL

Geo- this is the relative risk ratio for a one-unit change in geographic location for FPL relative to the UBPL given other variables in the model are held constant. If income were to increase by a unit, the relative risk ratio for FPL relative to UBPL will decrease by 0.89 in farm areas given other variables are constant. In short, we can say if respondents change were to change their income based on geographic location, there would be expected to fall in the UBPL compared to the FPL. It seems staying in the tribal area is associated with an increased risk ratio of FPL relative to the UBPL in both periods. This could be a reflection of income distribution throughout South Africa, where tribal areas have the most vulnerable households compared to many areas. The variable is statistically significant in both periods. Yet, those residing in farm areas in 2015 were associated with a decreased risk ratio of FPL relative to the UBPL, suggesting that farm areas households in 2015 were likely to be out of food poverty.

Similar, nonblack African population groups were associated with a decreased risk ratio of FPL relative to UBPL. The population variables in both periods (2012 and 2015) revealed that nonblack population groups were likely to be out of food poverty in comparison to black Africans in both periods. This is a known fact that most poor

households are mainly black Africans residing in tribal or traditional areas (rural areas). This finding reveals that little has changed for black African in terms of income poverty.

Female-headed households' have a statistically significant less risk of falling into the poor category in 2015 compared to their male counterpart. This reflects that women are slowly moving out of food poverty. Age of household head seems to be showing a less risk of falling in the food poverty line, pointing out that younger people are less likely to be in food poverty compared to the older. This is a true reflection of income dynamics in South Africa, where the majority of older people are relying on government grants for their livelihoods. Yet, the young people are relying on income generated through salaries or other incomes for their livelihoods. Nonetheless, literature is divided concerning the effect of age on poverty and vulnerability. Households residing in non-metro (non-urban) areas showed a low relative risk ratio of falling into food poverty in 2015, pointing that there has been an improvement in terms of income distribution between urban and non-urban areas. It is important to point that in terms of non-urban areas, farm areas showed fewer income disparities with urban areas, highlighting that most of the households who are likely moved out of food poverty in 2015 were in farm areas.

**Table 2.8: Multinomial results**

Variables	2012			2015			Variables	2012			2015		
Povline	RRR	Z	P>z	RRR	Z	P>z	Povline	RRR	Z	P>z	RRR	z	P>z
<b>FPL (POOR)</b>							<b>LBPL (VULNERABLE)</b>						
<b>Geo</b>							<b>Geo</b>						
Tribal areas	1,31	3,33	0,001***	1,17	1,67	0,095*	Tribal areas	1,75	3,20	0,001***	1,60	1,80	0,072*
Farm areas	0,89	-0,61	0,544	0,47	-3,23	0,001***	Farm areas	1,35	0,84	0,403	0,23	-1,46	0,144
<b>head_popgrp</b>							<b>head_popgrp</b>						
Coloured	0,56	-3,84	0,000***	0,67	-2,52	0,012*	Coloured	0,267	-2,58	0,010*	2,45	-0,02	0,986
Indian/Asian	0,21	-3,08	0,002***	0,30	-2,86	0,004***	Indian/Asian	1,09	-0,02	0,980	2,03	-0,01	0,993
White	0,09	-6,34	0,000***	0,62	-2,72	0,007***	White	0,075	-2,57	0,010*	0,212	-1,53	0,125
<b>head_sex</b>							<b>head_sex</b>						
Female	0,89	-1,57	0,117	0,83	-2,57	0,010*	Female	0,80	-1,40	0,163	0,45	-3,12	0,002***
head_age	0,97	-14,	0,000***	0,97	-10,83	0,000***	head_age	0,96	-7,56	0,000***	0,95	-5,40	0,000***
<b>Metro</b>							<b>Metro</b>						
Non metrol	1,11	1,14	0,256	0,85	-1,92	0,055*	Non metrol	1,53	1,81	0,070	1,26	0,81	0,415
_cons	0,18	-14,2	0,000***	0,19	-14,57	0,000***	_cons	0,032	-12,25	0,000***	0s,035	-9,01	0,000***
<b>UBPL (reference category)</b>													
<b>Note * , ** , *** represent 10%; 5% &amp; 1 % significance level</b>													

## **UBPL**

The geographic location variable (Geo) shows that if income were to increase by one unit in geographic location for LBPL relative to UBPL given other variables are constant, the relative risk ratio for LBPL to UBPL would be expected to increase by a factor of 1.75 given other variables are constant. In 2012 and 2015, tribal areas households showed a relatively high risk of falling into vulnerability. Yet, farm areas although the variable was insignificant, showed some improvement; in 2012, there was a high risk of falling in the vulnerability group, although in 2015 we note a change with a likelihood of falling in the UBPL.

Yet, in terms of population groups, coloured and whites had a relatively high risk of moving out of vulnerability compared to black Africans in 2012. While in 2015, in terms of gender female showed a relatively high risk of moving out of vulnerability compared to males, with age having a similar influence as noted before. In both periods, non-metro areas have a statistically significant increase in the relative risk ratio of vulnerability. A key change faced by non-urban households is having few sources of income. In our analysis, an increase in the likelihood of living in non-urban areas increases the risk of being vulnerable in both periods under study.

The analysis of this study reveals several important areas of focus on the likelihood of households moving to sustained escape from poverty. A number of determinants have differential effects on vulnerability and poverty when disaggregated by sex, suggesting that different approaches are needed to identify a vulnerability in a broader sense. While poverty has declined national, inequality has increased as revealed by StatSA (2016).

## **2.7 Conclusion and recommendations**

Although South Africa is a middle-income per capita economy, poverty and vulnerability are still rife. Incidences of poverty are imminent in specific areas or provinces. The study revealed there was a reduction of households falling in the middle poverty line. This signifies that poverty is either extreme or low in certain households or provinces. On the other hand, factors such as race, location and gender had an impact on the poverty status. In numerous cases, black African households residing in non-urban areas were the most exposed to poverty and vulnerability, highlighting that since democratisation, a little has been done in bridging the poverty gap between races. This finding is cemented by the fact that whites (both in urban and non-urban areas) have very low incidences of

poverty. This showed that income was skewed to one race, with most black Africans relying on pensions and government grants.

The implication of these findings is that vulnerability is more prominent to household facing food poverty. Firstly, policymakers should focus on anti-poverty strategies that address food security, especially in rural areas. This means that the government should focus on developing rural areas where a large number of households are facing food poverty. The findings revealed that female-headed households mainly in the rural areas were the most vulnerable to poverty. Gendered poverty has been a problem in South Africa as revealed by Rogan (2015) who concluded that labour market policies are discriminatory. Thirdly, the government should focus on opening the economy to every race, evidence from the survey revealed that income was skewed to favour certain races. For instance, the Western Cape Province, which is mainly dominated by whites, had lower rates of poverty compared to other provinces, although within race estimates; suggest that the gap in income distribution between whites and blacks was very high. This paper calls for policy instruments that target different income groups, this can be in form of social protection schemes for the poor and farmer insurance to prevent mainly rural households from falling into poverty in situations where there are negative shocks. A better policy would have a mix of strategies that can target vulnerable households and poverty at the same time.

## CHAPTER THREE: CULTURE AND POVERTY IN SOUTH AFRICAN RURAL AREAS

### **Abstract**

In this article, we elicit the effects of culture on poverty reduction efforts in South Africa. Culture plays a huge role in the household decision-making process, as a result, it can determine if whether the household falls into a poverty trap or falls out of poverty. Utilising a recently Community Survey (2016) we employ a Categorical Principal Component Analysis (CATPCA) to identify potential poverty indicators in South Africa. We then regress the identified components (indicators) using the Ordinary Least Square (OLS) and the Weighted Ordinary Least Square (WOLS) methods to identify the influence they have on non-income poverty. The findings of the study reveal that poverty seems to be driven by geographical location, gender and population groups. A probable outcome of colonialism, although intensified by apartheid. Policy efforts should be targeted at identifying ethnic groups that are in poverty as opposed to a blanket approach.

### 3.1 Introduction

In 2012, the World Bank estimated that the number of the poor declined in every region for the first time since it began monitoring extreme poverty in 1981. Using the 2008 data, the Bank stated that 1.29 billion people lived below \$1.25 a day compared to the 1.94 billion people in 1981. Furthermore, it was pointed out that the Millennium Development Goal of halving extreme poverty by 2015 was achieved because the \$1.25 a day poverty rate had declined by 2010. This was based on small samples that were extrapolated, and the entire drop of the people who live below \$1.25 was accounted for by China-where extreme poverty fell by 662 million (Broad, 2012). However, in actuality, the number of poor people outside China rose by 13 million, and most people who fell into poverty during that period were from South Asia and in sub-Saharan Africa. Chandy and Kharas (2012) noted methodological issues from the World Bank estimates for the period of 1981-2008, where the populations in India, sub-Saharan Africa and China accounted to over three-quarters of the world poor. The issues identified included insufficient survey data, faulty purchasing parity conversion and flawed surveys. Given that South Africa is one of the countries in sub-Saharan Africa, it is worthwhile to consider its poverty trends.

The South African economy has grown at an annual rate of above 3 per cent since 2000, due to a number of interventions in terms of policy. While South Africa is regarded as one of the fastest growing developing economies accompanied by gradual reductions in poverty rates, growth has stagnated in recent years. In 2009, the global recession led to a 6.3 per cent shrinking in the gross domestic product. However, by 2010 the growth rate was 6 per cent as per the Accelerated and Shared Growth Initiative for South Africa (AsgiSA) programme. The World Bank (2010) pointed that South Africa showed the largest swings in inequality and poverty due to a favourable fiscal policy that targeted the poor. The major contributor to poverty reduction was the government social security programme which led to poverty rates falling from 46 per cent to 39 per cent in 2010/11 (Purfield, 2012). To date, over 16 million beneficiaries are in the government social grants programme.

Statistics South Africa (2014) notes that the standard of living has been not uniform around the country and is accompanied by rising inequality. The Gini coefficient for

South Africa in 2015 was 0.59 (World Bank, 2015). Leibbrandt, Finn and Woolard (2010) claimed that 85 per cent of income inequality is caused by labour market income, with unemployment being the driver to inequality. Given the racial divisions in South Africa, it is expected that income disparities show a racial footprint, and inequality remains high among racial groups. Adato et al., (2006) investigated asset changes in South Africa and found evidence that racial discrimination of apartheid may have left behind a legacy of poverty after its abolishment. They found institutional social exclusion on non-white citizens from mainstream opportunities. Similarly, Daniels et al., (2013) and Klasen (2000) found that disparities in urban and rural locations of South Africa mirror the spatial policies of the apartheid regime. While these studies have shaped the poverty discourse in South Africa, our empirical work explicitly investigates the influence of social norms in determining poverty profiles of both individuals and households.

South Africa recorded an impressive growth during the 2000s, and social security played a key role in it. As a result, poverty declined gradually. However, there is a concern that while poverty has continued to decline, inequality has increased abruptly in the past years. New challenges are emerging which need a review of policy priorities and a sharper focus in new methods of fighting poverty. Intuitively poverty trends have been less impressive, with empirical illustrations revealing little in terms of what is driving poverty at a micro level. Irregularities in households surveys especially in places where there are chronic poverty and potential poverty traps have contributed to policies paying little attention to interactions between poverty determinants and local contexts. Specifically, a shift of emphasis is made from static indicators of poverty to dynamic indicators that target various groups and policy regime changes. The emphasis on this shift is justified on the basis that static poverty indicators have contributed to unclear poverty reduction strategies or policies and the ever-rising inequality in South Africa. This study is motivated by this concern.

The poverty discourse in South Africa has taken a twisted turn, with the creation of certain objects. Recently, these words (objects) '*radical economic transformation*', '*white monopoly capital*', '*black economic empowerment*' and '*economic freedom*' have become prominent in various initiatives and strategies meant to address poverty. Suggesting that, the same machinery which was used to construct abnormalities such

'*small farmers*', '*underdeveloped*', and '*poor*' is currently at operational in South Africa. These objects have been linked to instruments of control and power. Simply put, these same instruments allow the poverty discourse to adapt to new conditions and to be confined to the same discursive space. Given the delicacy of this matter, it should be noted that racializing poverty can have devastating effects on the economy and in an extremity can regress the South African economy back to the apartheid era. Therefore, we problematize poverty as inherent to a cultural system that was rigorously fragmented due to the capital system in operation. In this study, culture is defined as customary beliefs and values that include ethnic, religious and social groups from generation to generation (Guiso, Sapienza, Zingales, 2006).

Central to our contribution, we take a different stance in the poverty discourse by discarding the claim that poverty is a market failure that can be remedied by a good function market. This view is held by a various organisation such as the World Bank and International Monetary Fund. Scott (1998:4) argued that a state develops measures that allow it to translate local and practical knowledge into administrative responses.....even well-intended state interventions lead to '*tragic episodes*'. Likewise, Barnett and Finnemore (2004) contend that in modern societies, expert knowledge and neutral scientific knowledge receives legitimacy. We problematize poverty on the basis to which it was created not necessarily wholly driven by racial disparities. To understand the poverty discourse, one must look into the system to which it was established. Poverty is seen in this lens as a developmental issue that is influenced by patriarchy and ethnocentrism. In that, indigenous populations had to be modernised by the white minority.

This modernisation made women invisible in their role as producers as well as perpetuate their subordination (Escobar, 1995). Consequently, to examine poverty, one needs to consider the context of the discourse as a whole. The accumulation of capital emerged as a greater part of a complex set where financial institutions, decision-making systems (mechanisms for allocating public resources) and systems of classification (GDP/GNP), and knowledge play a role. Therefore, poverty in this sense is an outcome of a broken cultural system that emerged when communities were broken down due to the market economy.

Theoretical, our contribution rests on the family behaviour model, were we conceptualise a patriarchy and misogynist society. Our point of departure is that a number of customary laws exclude women, although affirmative action has addressed the plight of women. Ignoring this component has contributed to numerous studies on gendered poverty failing to explain how females fall into poverty compared to males. Rogan (2015) explored multidimensional gendered poverty in South Africa and found that female poverty is high due to the disadvantages faced by women in the labour market. We extend on this analysis by imposing that gendered poverty is caused by a patriarchal society that views females as unequal. As a result, the labour markets wage differences between males and females is an outcome of a deep cultural system that views female as less than males. While our focus is beyond gendered poverty, we note that once gendered poverty is addressed, it becomes easy to eradicate poverty.

In this article, we have not argued that scholars of poverty should only concern themselves with culture. Rather, our goal is to introduce alternative ways to understand how culture affects poverty in rural areas. A number of econometric models ignore the underlying effect of culture in determining if whether households escape poverty or not. While our method does not fully capture a culture variable, our analysis is meant to be as a guide in trying to explain how cultural arrangements do have an influence on poverty. Some of the process at micro-level include decision-making among the poor (how narratives of different ethnic or racial groups affect their perceptions to a good life). Cultural responses may shape poverty. Therefore, the question to ask is, 'how does culture influence poverty?'

In the following session, we provide a brief discussion on issues surrounding the creation of poverty. This is followed by the methodology in section three. Then in section four results and discussions are provided, and lastly, section five concludes and offers recommendations.

### **3.2 Literature Review**

The discovery of mass poverty in Africa, Asia and Latin America post World War II brought changes in the global culture and political economy. Milbank Memorial Fund

(1948) declared that genuine prosperity could not last in one part of the world, while the rest lives in poverty. This was the ushering of the new poverty discourse that was totally different from the treatment of poverty before the 1940s (Sachs, 1990). During the colonial times, the 'natives' were seen as less economically developed by their colonizers, as a result, the view was that their capacity for science and technology was nil (Adas, 1989). Vernacular societies had developed ways of dealing with poverty in a way that accommodated their vision of community, and frugality (Escobar, 1995). Whatever ways there were, it was quite clear that poverty became an issue once modernisation appeared and when the market economy was born. Rahnema (1991) points out that poverty was ushered with the emergence of capitalism in Europe and the development of the Third World. Therefore, modernisation spelt doom for vernacular cultures and at the same time placing new mechanisms of control. As pointed by Escobar (1995), the treatment of poverty allowed the creation of consumers and transformation of societies by treating the poor into objects of knowledge and management. Procacci (1991) state that the management of poverty came with interventions in health, education, employment and so on. The outcome was the creation of 'the social' (Burchell, Godon and Miller, 1991). The social was prominent through the nineteenth century and later on consolidated to a welfare state.

Thus, poverty, health, education, and employment was then constructed as social problems needed social planning (Escobar, 1992). As the government of the society was established, a separate class of the poor was created (Williams, 1973). The most significant outcome was the creation of apparatuses of knowledge and power, which optimised life under scientific (modern) conditions. In 1945, two-thirds of the world were classified as poor. The poor by then were defined as lacking in terms of material possession and money in relation to the standard of the wealth of more economically advanced nations (Escobar, 1995). This, later on, brought the economic competition of poverty in form of per capita income. As put by Sachs (1990), the concept of poverty was then a result of the comparative statistical operation. In 1948, two third were classified by the World Bank as poor with an annual income of less than \$100 (Escobar, 1995). In Foucault (1986) words, poverty becomes an organised concept and the object of problematizing. Therefore, the solution to poverty was then seen as economic growth and development, and this became a universally accepted truth.

There was a belief that the only way for modernisation to come into being, was through the destruction of the superstitions and relations in social, cultural and political ways. Urbanisation and industrialisation were inevitable seen as necessary routes to modernisation. Escobar (1995) points out that capital investment was seen as an important ingredient to achieve economic growth and modernisation. In the same construct, poor countries were to rely on capital from abroad since there were seen to be in a vicious poverty circle. Capital formation was then composed of various factors that included population and resources, technology, monetary and fiscal policies, commerce and trade and industrialisation. Education was furthered to cater to modern cultural values. Moreover, various institutions were then created to carry out this complex task namely the World Bank and the International Monetary Fund.

Objects of development varied with cultural attitudes and value, racial, religion, ethnic factors being seen as representing backwardness. Then elements emerged from numerous sources including the new institutions, government offices in abroad capital, university and research in developing countries. Escobar (1995) claimed that development created abnormalities such as '*the underdeveloped*', '*small farmers*' or '*landless peasants*', '*illiterate*' and the '*malnourished*'. Consequently, these objects were then linked to instruments of control and power. The specification was the prime goal that led to problems being given levels such as 'local or regional'. Put simply by Escobar (1995), the specification of the problems involved detailed observations of villages, regions and countries in the Third World. For instance, they were numerous strategies like the agrarian reform, green revolution and rural development, which were constructed based on 'hunger'. While these instruments have remained unchanged in the 21st century, they allow the discourse to adapt to new conditions. The outcome being a discourse confined to the same discursive space.

In the same vein, the historical discourse has influenced the representations of poverty. Patriarchy and ethnocentrism had an influence in the development of the poverty discourse. Indigenous population were forced to modernise by the white minority. Consequently, their cultures were then thrown in the drain and industrialisation era took the stage. The old barter economy was replaced by a market-based economy that quantified resources and assets. In the process, anyone who did not have such resources was classified as poor.

Vetterlein (2012) contend that the World Bank is an instrument of powerful industrialised countries that impose western norms on developing countries, and it has contributed to the worsening of poverty through the policies adopted. In addition, Barnett and Finnemore (2004) posit that the bank organises information and knowledge, and therefore shapes world politics. In 1990, the World Bank claimed that attacking poverty was not primarily the task of focused anti-poverty projects; however, it was the task of economic policy. This led to the shift in attacking poverty to be based on income-earning assets of the poor. According to the World Bank (1991), this strategy was designed to ensure that the poor both gain from and contribute to growth. Vetterlein (2012) points out that poverty was viewed as a multidimensional problem that is not only affected by income.

However, based on the interviews that were conducted in 60 developing countries, it was pointed that the poor themselves prefer local knowledge to be put into practice and also have an input on how policies are designed. Crouch (2007) argues that economic models fit nicely in the modern bureaucracy and policymaking. Therefore, even while it is clear that poverty is multidimensional, actionable knowledge is subject to quantification. Yet, the problem needs to be qualitatively addressed. Meanwhile, Vatterlein (2012) argues that there is a need to break the economization and quantification of the Bank practice by treating economic growth and poverty reduction separately. This allows for the introduction of redistribution or social policies that are politically detected but based on societal values.

This study investigates the effect of culture on poverty reduction efforts in South Africa. By so doing, the study aims to challenge two critiques against poverty reduction efforts in South Africa.

First, against the claims that poverty in South Africa is wholly driven by the apartheid era, the study notes that while apartheid created a parallel state, the current poverty policies are in the new dispensation. Meaning, the current policies for fighting poverty are mainly adopted by from institutions like the World Bank and International Monetary Funds. This leads to the assumption that poverty in South Africa just like in every Third World country is likely driven by the construct to which poverty was created. The

underlying causes of poverty maybe ecocentric or structural. Our view is that poverty is mainly pronounced in predominantly rural areas compared to urban areas, where culture plays a huge role in household decision-making. As pointed by Lamont (2008), numerous scholars have neglected the cultural impact on poverty, largely because much work is conducted by social scientists who are not part of the community working on poverty and policy. Consequently, quantitative social scientists always dismiss the qualitative work as non-empirical.

Secondly, the study argues that unless indigenous knowledge is considered in poverty eradication, it will be hard for any country to fight poverty in rural areas due to the deep norms and cultural values. The current policies are more ecocentric in nature despite changes to more inclusive poverty policies. The study contends that South African poverty policies are plagued with bureaucracies and the economisation trap that does not fit into spaces where poverty is rife. The main instruments that have been used recently to fight poverty are economic growth and government social grants. While these tools can moderate the impact of poverty, they do not address the major source of poverty. Therefore, it is essential to understand the cultural and social mechanisms that affect ethnic and racial differences in poverty eradication.

### 3.3 Analytical framework

Poverty is usually measured individual or at a household level. Therefore, considering that this study aims to introduce a cultural component in understanding poverty and provide determinants of poverty, we introduce the family behaviour model. Numerous models of family behaviour focus on the husband and wife as two decision makers, with children customary excluded on the set of decision-making agents. Although they are recognised as consumers of goods chosen and provided by the family. Unitary models provide a theoretical understanding of family behaviour like the Samuelson (1956) consensus model. Samuelson (1956) point out that income distribution within a family is a result of optimising choice than arbitrarily determined.

For the sake of this study, suppose we have a dictator who holds a utility function of the form  $(W(U_1(x_1, y) \dots \dots U_n(x_n, y)))$  whose allocation  $(x_1^*, \dots \dots x_n^*, y^*)$ . The allocation maximises  $(W(U_1(x_1, y) \dots \dots U_n(x_n, y)))$  subject to  $p_x \sum_{i \in H} x_i + p_y y \leq W$

and implement this outcome by providing the family with the vector  $y^*$  of public goods and giving the family income of  $px_i^*$ , which  $i$  would be used to purchase  $x_i^*$ . If we assumed that the function  $V(x, y)$  to be the maximum of  $W(U_1(x_1, y) \dots \dots U_n(x_n, y))$  subject to  $\sum x_i = x$ , then it follows that the aggregate demand in this family is always chosen to maximise  $V(x, y)$  subject to a budget constraint. Samuelson goes further by suggesting that if the family has no dictatorship, it might be that preferences of the different members are integrated by a 'consensus' or 'social welfare function' which takes into account ethical worth of consumption levels of each family members. Leading to the family acting as if there are maximising their joint welfare function in form of  $W(U_1(x_1, y) \dots \dots U_n(x_n, y))$ . Where  $W$  represents the increasing function of each member of the family utility. Samuelson stresses that, if welfare is determined jointly, it becomes impossible using data on total family consumption to distinguish the behaviour of a family that maximise their social welfare function from the behaviour of a rational consumer. However, if  $W$  is a concave function of  $x_i$ 's, then the consumption of each family member can be uniquely determined by aggregate family income.

Gender relations or relations of power between men and women is a complex concept, although these relations influence economic outcomes in many ways. Numerous economists have criticized the unitary model on the basis that it treats a household as a single entity in terms of consumption and production. It also assumes that household resources are pooled and allocated by an altruistic household head, who represents the households' preferences and tastes, and seeks to maximise the household utility. In the majority of rural areas and traditional areas, males are usually regarded as the household head cultural. This means that household decision-making rests on the male figure. In the Sub Saharan region, poverty seems to be more of a generation-manufactured problem because of certain household decisions made by males. Put simple, males migrate to urban areas to work leaving behind a wife/wives and children in rural areas. This means it is easy to control household consumption and expenditure since the male is the main source of income.

Culture and social norms that are imposed on women in patriarchal societies have made this acceptable. Social norms often define the principles governing households. This means they determine what type of food may be shared or bought. Food norms

determine who eat first and how much quantity one can eat, even the criteria of contributions to family income or well-being. Therefore, social norms weaken women by restricting their growth possibilities and earning potential by discouraging them from working out of the house and institutionalised lower wages for women than male restrict their access to markets. Equally, they affect how ones voice within a household. In numerous occasion, norms affect their economic situation, property rights, and group strength. This means that in this case, poverty is driven by a cultural system.

Customary laws also contribute to poverty because they allow males to have polygamous families. Various studies by the United Nations and other Non-Governmental Organisations found evidence that cultural arrangements contribute to child and female poverty. Apart from poverty, a male usual pay dowry in form of livestock, effectively buying ownership rights from the women family. This practice contributes to the weakening of females in decision-making. Thus, poverty is created by a system of repeated decisions making that harms the household likelihood of escaping poverty. Polygamous families have a large number of children, this put excessive pressure on the male, leading to some children failing to get an education. For instance, Ethiopia has been suffering from extreme famine for decades, however, women in rural areas die with no access to education. This practice is driven by culture, where the woman is a child bearer in a household and a male is for security and protection.

In simplicity, when a culture has more influence on household decision-making, government policies not addressing this problem would not solve poverty. This leads to a generation of kids born in poverty, who later spend their lives striving to be out of poverty in a system that keeps them in poverty. As a result, poverty in the sub-Saharan region has remained stubbornly high for numerous years because policies are addressing the outcomes of a patriarchal system, instead of the system itself. In this study, we hold this view that households are led by an altruistic household head, who chooses how family members ought to live.

### 3.4 Methodology

Traditionally, poverty has been measured using the income or consumption expenditure of a household over a period. The major advantage of this approach is that it allows poverty to be measured across time. We begin by applying a principal component analysis methodology to identify factors that are linked to deprivation. A principal component is defined as a linear combination of optimally weighted observed variables. The basic formula for a principal component analysis is as follows:

$$C_j = \beta_{j1}X_1 + \beta_{j2}X_2 + \dots + \beta_{jm}X_m \dots \dots \dots (eq30)$$

where  $C_j$  is the first component extracted,  $\beta_{jm}$  is the component loading of the  $j^{th}$  variable on the  $m^{th}$  component. Bentler and Kano (1990) stated that factor analysis does not differentiate between unique variance and error variance to reveal the underlying factor structure. Yet, on the other hand, a PCA accounts for total variance of variables, with components reflecting a common variance of variables (Garson 2010). In short, the PCA-observed variables are relatively error-free, the unobserved latent component is perfect linear on its variables and ideal for data reduction. However, the PCA is suitable for continuous variables. To overcome challenges in estimating categorical variables, we employ the categorical principal component analysis (CATPCA) for nonlinear data. The CATPCA methods use the optimal scaling process to transform category labels into numerical values (Linting and Van der Kooij, 2012). The main idea is to extract components that would be used in a regression model.

After conducting the CATPCA, we then estimate an augmented basic growth-poverty model (Ravallion 1997; Dollar and Kraay 2001). Consequently, the empirical model we estimate is parsimonious and takes the following form:

$$Poverty = \beta_0 + \beta_1F_1 + \dots + \beta_mF_m + \mu \dots \dots \dots (eq31)$$

where  $F_1, F_2, F_2, \dots, F_m$  is observable random scalars,  $\mu$  is a random disturbance term, and  $\beta_0, \beta_1, \beta_2, \dots, \beta_m$  are the parameters we want to estimate. The estimation is an extended regression specification as follows:

$$Poverty = \beta_0 + \beta_1F_1 + \beta_2HHgender + \beta_3HHgender * GEO + \beta_4assetHH + \beta_6PPGroup + \beta_7PPGroup * GEO + \mu \dots \dots \dots (eq32) \text{ (Restricted model)}$$

$$Poverty = \beta_0 + \beta_1 F_1 + \beta_2 HHgender + \beta_3 HHgender * GEO + \beta_4 assetHH + \beta_6 PPGGroup + \beta_7 PPGGroup * GEO + weights + \mu \dots \dots \dots (eq33) \text{ (Unrestricted model)}$$

Components that were extracted were used as dimensions representing determinants of poverty. In this case, we have; Amenities, Education, Public Services, Economic activity and Household deprivation represented by  $F_1$ . We then add variables such as Household Gender, Geographic location and Population group. To get a detailed picture of the factors contributing to household poverty we do this by interacting household gender and population group with geographic location. The main idea in doing this is to estimate if gender or belonging to a certain population group (race) does have an influence on poverty. We test the model in equation (4) by using the Ordinary Least Squares (OLS) method and the Weighted Ordinary Least Squares (WOLS) method. In this case, we follow Winship and Radbill (1994) argument on selecting the robust model between the two methods, considering that the sample we have is weighted.

According to Winship and Radbill (1994), when sampling weights are a function of independent variables in the models estimated the unweighted OLS is a natural choice because it would be unbiased and consistent as long as the variables are linearly independent and have a positive variance. Therefore, we estimate a restricted model where we put controls on certain variables and an unrestricted model. The idea with this approach is to compare the robustness of both models and the best one in determining deprivation. Following Winship and Radbill (1994), sampling weights can affect parameters estimates when they are used as a function of the dependent variable. In this case, weights are used as independent variables in the unrestricted model.

### 3.5 Data

We use the Statistics South Africa Community Survey 2016, which has over 1 million households interviewed in all nine provinces in South Africa. Table 3.1 provides a list of variables that were used for the factor analysis. As it can be seen from the table, all the variables can be said to describe situations of socio-economic deprivation. The

dataset excludes income or anything related to aggregate income earned by households. According to StatsSA (2016), this variable was deliberately excluded, for reasons which were not provided to us. All the variables in table 3.1 are categorical in terms of measurement.

**Table 3.1: Descriptive statistics**

Variable	Description	Mean	Std. Dev.	Min	Max
RateWater	Quality of water services	1.729254	.9377088	1	9
RateRefuse	Quality of rate refusal removal services	2.089166	1.217637	1	9
RateElectricity	Quality of electricity supply services	1.676567	1.002849	1	9
RateToilet	Quality of toilet/sanitation services	1.805821	1.043105	1	9
RateHospital	Quality of local public hospital	(1) 2.109299	1.236232	1	9
RateClinic	Quality of local public clinic	2.057718	1.187887	1	9
RatePolice	Quality of police services	1.999792	1.10803	1	9
RateSchool	Importance of education to improve the standard of living of the household	1.743668	1.213505	1	9
Education	Education level	1.171566	.4741913	1	9
Health	Health access	1.183814	.4665733	1	9
LivingConditions	Importance of living conditions to improve the standard of living of the household	1.207652	.5061563	1	9
HHAssets	Importance of Household Assets to Improve the standard of living	1.23247	.5423362	1	9
Employment	Employment status	1.206589	.534616	1	9
Safety	Importance of security to Improve the standard of living	1.214299	.4979017	1	9
WaterSource	Main drinking water source	2.873444	2.737178	1	13
Toilet	Type of toilet in the dwelling	2.770613	2.328944	1	10
ElectricityAccess	Household access to electricity	2.560246	2.125796	1	9
Refuse	Number of times refuse is collected	2.702314	2.001971	1	7
EnergyCook	Availability of energy to cook	1.732015	2.207782	1	9
AgricAct	Household agricultural activities	1.824863	.3800848	1	2
FarmPrac	Household farm practices	7.284008	1.901252	1	8
OwnLivestock	Household livestock ownership	1.890422	.3625061	1	9
Province	Province of the household	1.405153	.5601817	1	3

### 3.6 Results and Discussions

Before we proceed with factor analysis, we provide a breakdown of the sample characteristics. As shown in Figure 3.1, the mean age was between 40-60 years. The Eastern Cape Province had a mean age of around 25 years for respondents residing in tribal areas (rural areas). Similarly, in the KwaZulu Natal, North West and the Northern Cape provinces, the mean age was less than 40 years for other races. It can be seen that the respondents who participated in the survey were mostly beyond their youth (18-38 years); this is a reflection of an ageing population, especially in farm and tribal areas. Black Africans had more outliers in terms of age with a number of respondents approaching the age of 100 years, especially in urban areas, and in tribal areas surpassing 100 years. In short, there were no significant differences in terms of age.

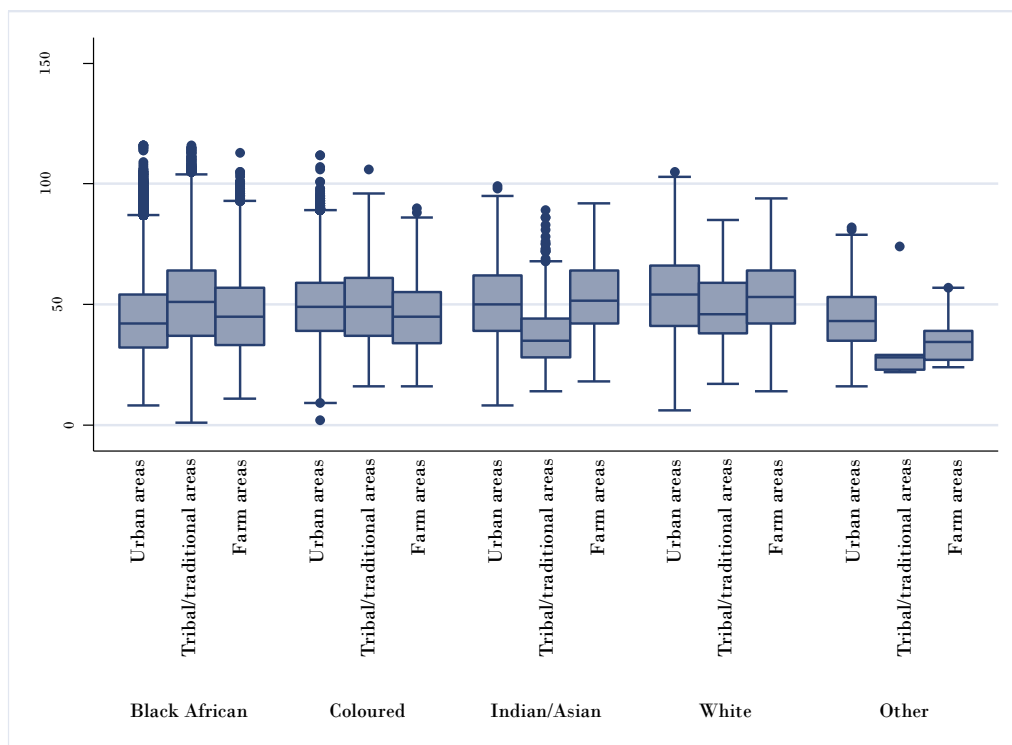
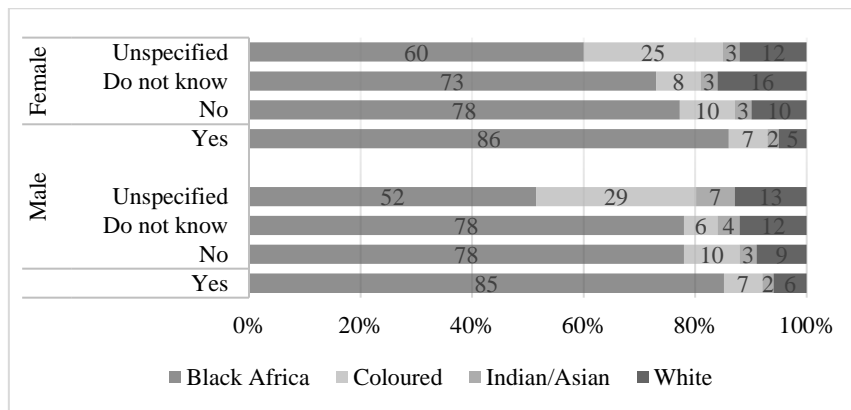


Figure 3.1: Age by race and geographical location

#### 3.6.1 EDUCATION

We then focused on education attendance by race and gender as shown in Figure 3.2. As illustrated in the figure, black Africans were the majority in terms of both gender and education attendance. At the same time, the percentage of black Africans and

coloured people, who were not educated, was closely similar for both genders. Overall, more people were literate regardless of both gender and race; although, for whites and Indians, the percentage declined for those who attended and those who did not have any education.



**Figure 3.2: Gender and education attendance by race**

While it was ascertained that a number of people were literate, Likert scale questions were used to elicit respondents pertaining to service delivery to the public. Figure 3.3 reveals that most services rated low were police services, public hospitals and public clinics, with refuse removal following in the list. In terms of quality, public schools (61%), electricity (59%), water (54%) and toilets /sanitation were seen as good. It was unexpected that 21 per cent had poor access to police services considering the high crime rate in South Africa. Similarly, 20 per cent had poor access to public clinics and 18 per cent to public hospitals; this was a norm especially in tribal and farmlands where health access is a challenge for many people. Equally, the rate of refuse (16%) and water services (18%) were other services where people lacked access. Public service delivery in South Africa has been a challenge considering that there are frequent service delivery protests, with some being violent and vandalism of property.

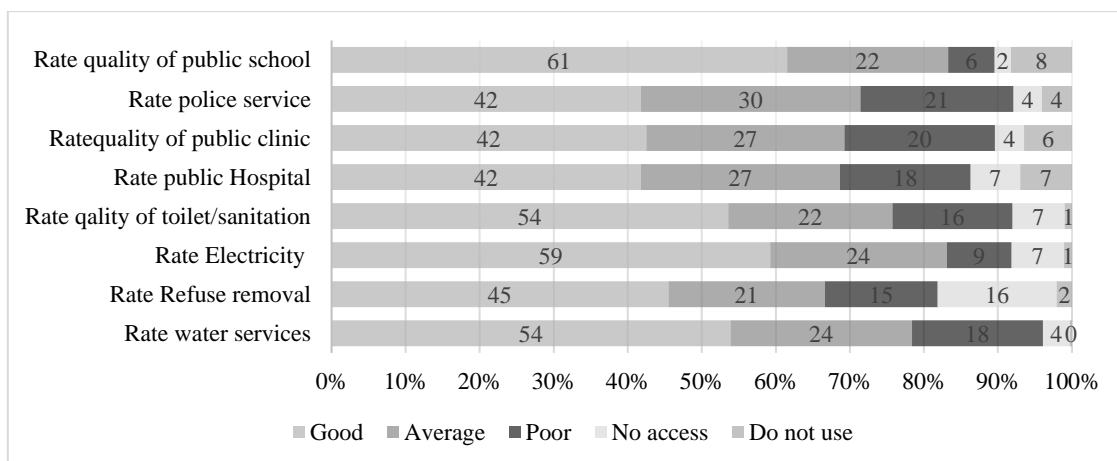


Figure 3.3: Quality of services

### 3.7 CATPCA analysis results

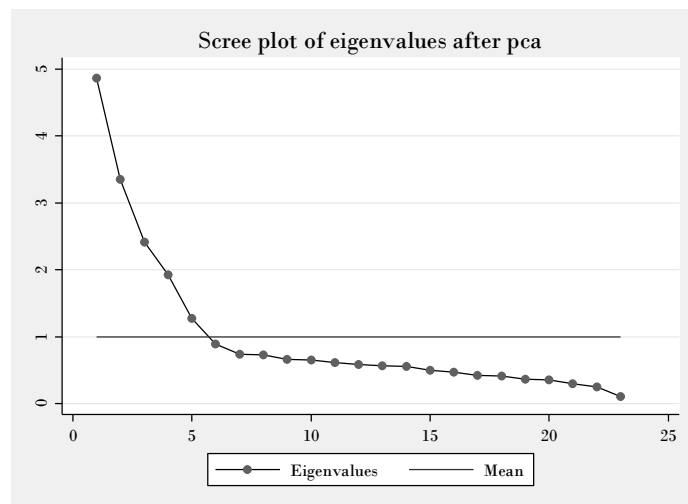
In order to provide a detailed picture of deprivation, we proceed with a principal component analysis to unearth common factors. Variables tend to belong to the same category when there are strongly correlated. Only five factors were retained because the eigenvalues associated with the remaining factors are less than one (see Table 3.2). One of the most commonly used methods is to exclude any factor with an eigenvalue of below one according to the Kaiser Criterion. Another method is to keep factors with cumulative variance explained by over 60 per cent of the factor; overall, the five factors explain over 60 per cent of the cumulative variance.

Table 3.2: Variance decomposition

Component	Variance	Difference	Proportion	Cumulative
Amenities	3.79522	.378496	0.1650	0.1650
Education	3.41673	1.07758	0.1486	0.3136
Public Services	2.33915	.0323861	0.1017	0.4153
Economic activity	2.30676	.339515	0.1003	0.5156
Energy	1.96725	.	0.0855	0.6011

Norma and Streiner (2008) raise the point that factor loadings (components) should satisfy the following four conditions: (i) factor loadings should be close to 1 or zero; (ii) variance should be evenly distributed across retained factors; (iii) factors should be either positive or negative (unipolar); and (iv) each variable should load on one factor. Once these conditions are satisfied, it becomes easy to interpret the component

analysis. Applying the criteria stated before, the five factors account for 60 per cent variance with all of them evenly distributed. Factor loadings are negative and positive, with each variable loading on one factor, as well as close to 1 or zero. Thus, satisfying the criteria stated beforehand. According to the literature, there are disagreements with the impact of rotating principal components. One side argues that rotation destroys some properties of principal components, in particular, the first rotated component which no longer has maximal variance. On the other hand, it is strongly argued that rotating principal components means that the total variance explained by those components is equal to the variance explained by rotated components. This is particularly the case when an orthogonal rotation is applied because the components are still uncorrelated. Considering the strand of arguments, we performed a principal component analysis using the varimax orthogonal method to ensure the robustness of the identified components.



**Figure 3.0.4: Variance decomposition**

A screen plot in figure 3.4 suggested we retain five factors. A mean value of 1 was set as a cut-off point in determining the factors to retain.

**Table 3.3: KMO results**

Variable	KMO
RateWater	0.8707
RateRefuse	0.8917
RateElectricity	0.7397
RateToilet	0.8523

RateHospital	0.6987
RateClinic	0.6860
RatePolice	0.8614
RateSchool	0.8486
Education	0.8877
Health	0.8723
LivingConditions	0.8833
HHAssets	0.8916
Employment	0.8978
Safety	0.8933
WaterSource	0.9119
Toilet	0.8792
ElectricityAccess	0.7133
Refuse	0.8592
EnergyCook	0.9008
AgricAct	0.6068
FarmPrac	0.5813
OwnLivestock	0.6548
Province	0.8853
Overall	0.8086

The Kaiser-Meyer-Olkin (KMO) measures the sampling adequacy, where values lie between zero and one. According to Kaiser (1974), values lying below 0.69 are said to be mediocre and over 0.80 are meritorious. Accordingly to Table 3.3, the optimal KMO measure for this study was 0.81 and meritorious. This means the data were adequate for a principal component analysis.

Table 3.4 provides the components that were extracted from the analysis. The first factor seems to be describing amenities of a household, with the toilet condition loading high (0.3954) and refuse (0.4395). At least 54 per cent of the sampled respondents have a toilet connected to a public sewage system, and over 30 per cent of them have a pit latrine toilet. Yet, in terms of refusal collection, 32 per cent of the respondents are doing their own disposal. Nonetheless, refuse collection has been a problem in South Africa, in almost every province. Similarly, the water source loaded moderately at 0.3402. Water quality has been under the spotlight in the advent of drought since 2015/16. This has increased the vulnerability of households to water borne diseases.

The second factor seems to be describing education because it addresses basic needs that are a necessity in having a literate nation. Health, safety and living conditions load over 0.4, pointing to their usefulness in influencing education. This factor summarises items whose deprivation may be considered indicators of exclusion from basic necessities needed to achieve optimal education. Consequently, it is important in our analysis as it contributes around 14 per cent of the variance.

The third factor seems to describe the public services received by respondents. The hospital and clinic loaded higher (0.5) compared to school and police services. The loadings are moderate, as lack of these basic services contributes to a poor standard of living. Thus, moderate loadings reveal that these services are provided on an average basis, meaning there are instances where there is a deprivation of these services.

The fourth factor seems to describe economic activity. All three items relate to asset ownership, with agriculture activity loading high (0.6248) and farming practice (0.5791). These items seem to describe the economic activity of a household.

The last factor describes accessibility to energy. Given that more than 54 per cent of households in Africa is energy-deprived, this factor is very important on the basis that it determines household access to energy. A lack of energy means households spend their time looking for energy than improving their livelihoods. Three items, namely, '*rate of electricity*', which loaded with 0.6376, meaning that electricity access is above average in South Africa. Yet, '*energy to cook*' loaded with 0.4377, pointing that in general households have access to energy to cook.

Uniqueness can be said to be the percentage of variance for a variable not explained by a common factor or simply a measurement error. The higher (0.6>) the uniqueness, the greater the chances that it is not explained by the factor. In this case, the majority of variables were below 0.6 suggesting that they properly explain the factors.

**Table 3.4: CATPCA results**

Variable	Amenities	Education	Public Services	Economic activity	Energy	Uniqueness
RateWater	0.3057					.6038
RateRefuse	0.3950					.3915
RateElectr~y					0.5819	.2987
RateToilet	0.3034					.5428
RateHospital			0.5378			.3279

RateClinic			0.5482			.306
RatePolice			0.4393			.5345
RateSchool			0.4087			.586
EduImport~e		0.3890				.4829
HealthImpo~e		0.4247				.3842
LivingCond~e		0.4183				.4023
HHAssetsIm~e		0.4045				.4413
Employment~e		0.3997				.455
SafetyImpo~e		0.4103				.4204
WaterSource	0.3402					.4618
Toilet	0.3984					.359
ElectrAccess					0.6376	.2304
Refuse	0.4395					.2713
EnergyCook					0.4377	.5911
AgricAct				0.6248		.07799
FarmPrac				0.5791		.2591
OwnLivestock				0.4904		.398
Inter factor correlations						
	Amenities	Education	Public services	Economic activity	Energy	
Amenities	0.8224	0.2309	0.0985	-0.3533	0.3685	
Education	-0.1745	0.9673	0.0268	0.1720	-0.0589	
Public services	-0.0492	-0.0801	0.8984	0.3468	0.2524	
Economic activity	0.2003	-0.0622	-0.4148	0.7685	0.4397	
Energy	0.5007	-0.0251	0.1018	0.3670	-0.7769	
Notes: -The orthogonal rotation method was used -loadings are >0.3						

We plot component loadings in order to identify how the components are related as shown in Figure 3.5. It is evident that variables that were measuring service delivery loaded negatively in the plots suggesting that in certain instances service delivery was below average. Variables, which loaded positively in components, were mainly to do with economic activity and geographical location. Component loadings are helpful in identifying variables that are correlated. In short, variables that are close together have high correlations and those on the opposite side have negative correlations. Nonetheless, most variables showed some correlation, with the exception of energy variables that showed a negative correlation in almost every component.



of livestock owned. Livestock ownership is an indication of agricultural productivity, income generation, and self-subsistence (Booyesen et al., 2008; Batana, 2013). As a result, livestock was set a proxy to capture cultural factors based on the simple reason that it is a store of wealth, it is used for agricultural activities, it is also used for income generation and used to pay dowry. Therefore, ownership of livestock means that in terms of cultural significance, a household has assets that can be used to fight poverty.

In both models, the indicators (Amenities, Education, Public services, Economic activity and Energy) were statistically significant at 1 per cent significant level. In terms of gender, females were 5 times less likely to influence household poverty compared to males in the same household; the variable is statistically significant at 1 per cent level. This finding is held by the Department of Women (DoW) (2015), where it was pointed out that there exists a poverty gap between males and females in South Africa. Similar sentiments were echoed by the Human Sciences Research Council (2014) where it found that there were poorer female-headed households than male-headed households, especially in provinces such as Mpumalanga, Free State and KwaZulu Natal.

All the five poverty indicators namely, Amenities, Education, Public services, Economic activity and Energy - were statistically significant at 1 per cent significance level in both models. In terms of coefficients, they were negative with the exception of Amenities, although the WOLS has high *t values* compared to the OLS in the stated variables. The interpretation is that a reduction in education, public services, economic activity, energy and household assets would increase the likelihood of a household being exposed to poverty. Dutta (2015) points that low education level leads to a lack of formal employment. Thus, households with low education levels are expected to be in a poverty trap. In terms of household decisions, male-headed households in rural areas may contribute to the lack of education, especially in cases where farming is prioritised more than schooling. Thus, cultural values have a devastating effect in reducing the likelihood of a household escaping poverty in the near future. For instance, if there is a dictator in a certain household, decision making is usually done with less consultation, especially with the wife. In such a situation, the decision made by the dictator would likely stand simple because of the power a male figure inherits due to cultural values and beliefs. Furthermore, the female bargaining power is

reduced by the fact that a man inherits rights when paying dowry. Dulfo and Udry (2004) point that discrimination in education and health care received by daughters and sons of the family is always present. The literature points out that female bargaining inside a household is associated with other good outcomes like a decrease in fertility, child literacy and resource allocation in favour of children. Therefore, taking into consideration that women face discrimination in the society, noting different areas of development is very crucial.

Meanwhile, a unit increase in amenities decreases poverty by 3 per cent. We added the household assets variable and it was significant at 5 per cent level in the WOLS and not significant in the OLS. The household asset variable has an impact in terms of minimising the impact of poverty by cushioning households to sell or lease assets to raise income. For instance, households owning farming equipment can lease it out to raise income that can be used for their consumption. Dutta (2015) point that poor households rely on single income mainly from agriculture, as a result, in critical situations they end up selling their livestock or land in the long term because of a weak asset base. Consequently, such households mainly in rural areas are exposed to poverty as shown by their lower livestock numbers. Cohen and Saisana, (2014) argued that livestock owners can secure nutritional needs and provide transport for households. However, in rural areas livestock is a store of wealth. Suggesting that if a dictator decides to get rid of livestock for one reason or the other, a family may struggle to be out of poverty. In a patriarchal society, women opinions or views are often overlooked. As such, female bargaining power in terms of household assets, decision making is weakened.

In terms of geographical location, there was a negative association between livestock ownership and tribal areas in both the OLS and WOLS. The variable was significant at 1 per cent level of significance for the WOLS and at 5 per cent level of significance for the OLS. Suggesting that rural areas households had little livestock that can be used to cushion against poverty. In other words, there were more likely to face poverty compared to farm areas. This is particularly the case because whites who own property in form of land and other capital assets residing in farm areas are not in poverty. As a result, the likelihood of them being poor is minimal. Thus, the variable is

strongly significant at 1 per cent level of significance. Steinert, Cluver, Torres and Vollmer (2016) posit that indeed poverty levels are high in rural families.

Traditional, black Africans practise subsistence farming which is meant to provide for the family or community. While whites in farm areas are into commercial farming. As a result, in terms of liquidity, they are better placed due to the resources at their disposal. Cultural subsistence farming or farms are passed from generation to generation with little improvement to the land. As a result, black Africans hardly earn much income through farming. Cultural beliefs and values dictate that a man needs to fend for his family, once that objective is achieved, a little is done to gain extra income that can be used to cushion a household from economic shocks. Indirectly, culture plays a huge role in influencing households to stick to practices that may have a likelihood of keeping them in generational poverty. Making it hard for generations to escape the poverty trap unless if certain measures are undertaken to shield households from both exogenous and endogenous shocks.

Cheteni (2014) found that smallholder farmers (subsistence farmers) in the rural areas in South Africa refused to adopt new biofuel crops for commercialisation, simply because the land was mainly for household consumption and community owned. The interviewed farmers pointed out that cultural practices were also limiting their choices. Since the land was owned by the community, the decision to farm biofuel crops for commercial farming rested on the villagers. On the other, the land was inherited from their forefathers mainly for communal activities, making it hard for villagers to use it for commercial farming. Such instances are a norm in a number of rural areas, especially where land is owned by the community and title deeds are unclear. Consequently, opportunities meant to improve people lives are turned down as a result of cultural practices which are usually rigid in many instances

**Table 3.5: OLS and WLS results**

	OLS				WLS				
	Coef.	Std. Err.	T	P>t	Total livestock	Coef.	Std. Err.	t	P>t
<b>Total livestock</b>					<b>Total livestock</b>				
Amenities	3,0876	,7406866	4,17	0,000***	Amenities	3,121157	,0813627	38,36	0,000***
Education	-1,24958	,3171707	-3,94	0,000***	Education	-1,267218	,0583809	-21,71	0,000***
Standard of living	-2,469999	,6877512	-3,59	0,000***	Standard of living	-2,462214	,0712826	-34,54	0,000***
Economic activity	-4,942623	1,308372	-3,78	0,000***	Economic activity	-5,123382	,0786541	-65,14	0,000***
Energy	-1,897778	,6017574	-3,15	0,002***	Energy	-1,814863	,1148646	-15,80	0,000***
HHassets	-,0149375	,0142893	-1,05	0,296	HHassets	-,0138119	,0072497	-1,91	0,057**
<b>HeadHH_Sex</b>					<b>HeadHH_Sex</b>				
Female	-,4101745	,3310655	-1,24	0,216	Female	-,6568362	,2529958	-2,60	0,009***
<b>GeoLocation</b>					<b>GeoLocation</b>				
Tribal/traditional areas	-3,495048	1,56985	-2,23	0,026**	Tribal/traditional areas	-4,640758	,4711125	-9,85	0,000***
Farm areas	18,48452	13,86553	1,33	0,183	Farm areas	14,41806	,8019344	17,98	0,000***
HeadHH_Sex# GeoLocation					HeadHH_Sex# GeoLocation				
Female#Tribal/traditional areas	-2,106746	1,166577	-1,81	0,071*	Female#Tribal/traditional areas	-1,575846	,4740439	-3,32	0,001***
Female#Farm areas	-25,08716	16,0037	-1,57	0,117	Female#Farm areas	-21,15874	1,123737	-18,83	0,000***
<b>HeadHH_Derived_PopGroup</b>					<b>HeadHH_Derived_PopGroup</b>				
Coloured	1,166358	,5947035	1,96	0,050**	Coloured	1,117564	,4227132	2,64	0,008***
Indian/Asian	,8591305	,387576	2,22	0,027**	Indian/Asian	,8554145	,6967567	1,23	0,220
White	2,485116	2,240023	1,11	0,268	White	2,209	,3905133	5,66	0,000***
Other	-,1315415	,5967716	-0,22	0,826					
<b>HeadHH_Derived_PopGroup# GeoLocation</b>					<b>2 HeadHH_Derived_PopGroup# GeoLocation</b>				
Coloured#Tribal/traditional areas	1,819519	1,851552	0,98	0,326	Coloured#Tribal/traditional areas	1,01793	4,563151	0,22	0,823
Coloured#Farm areas	16,80273	17,85497	0,94	0,347	Coloured#Farm areas	10,86848	1,645281	6,61	0,000***
Indian/Asian#Tribal/traditional areas	1,160239	1,921417	0,60	0,546	Indian/Asian#Tribal/traditional areas	1,788794	5,597301	0,32	0,749
Indian/Asian#Farm areas	-4,367169	7,707835	-0,57	0,571	Indian/Asian#Farm areas	4,211431	7,863925	0,54	0,592
White#Tribal/traditional areas	76,05122	85,98735	0,88	0,377	White#Tribal/traditional areas	30,34694	8,54328	3,55	0,000***
White#Farm areas	189,3891	118,8422	1,59	0,111	White#Farm areas	143,5144	1,333673	107,61	0,000***
Other#Tribal/traditional areas	-,4344202	3,031097	-0,14	0,886					
Other#Farm areas	-15,32223	10,71617	-1,43	0,153	Hhld weight	-,0424923	,0038487	-11,04	0,000***
_cons	5,207093	1,518925	3,43	0,001***	_cons	6,440565	,3462359	18,60	0,000***
Significant at 10%*, 5%** & 1 %*** significance level									

Interacting gender with a location, we find that females residing in tribal areas/rural areas are more exposed to poverty than males. Both models confirmed this, where the *p-value* was significant at 10 per cent level of significance for the OLS and at 1 per cent significance level in the WOLS. Yet, females in farm areas were exposed to poverty than their male counterparts in the WOLS and strongly significant at 1 per cent level of significance. Rogan (2015) found evidence that females in South Africa were more exposed to poverty compared to males.

This was attributed to discriminatory laws in the labour market, which leads to skewed wages in terms of gender. Sundaram and Tendulkar (2003) found evidence that households belonging to certain tribes and lower caste have limited assets. The same can be said about African tribes in South Africa, they are the most exposed to poverty. The United Nations Women (2015) points out that, globally, the poor tend to be girls and women because they earn 24 per cent less than males. This has the likelihood of leading to uneven distribution of power in a household. Power imbalances are very evident in rural/tribal areas where cultural roles are biased towards males. As a result, women are the most vulnerable in terms of poverty exposure. Given their exposure to poverty, women face more gender violence because of their over-dependence on males (DoW 2015).

In terms of population groups, we note that coloureds in farm areas and whites were unlikely to be facing poverty. Both models confirmed this, where the interaction was strongly significant for the WOLS, and not significant for the OLS. The coefficient was statistically significant at 1 per cent level of significance and positive in both models, suggesting that a positive effect on the independent variables is expected to increase the dependent by 5 per cent for the OLS and 6 per cent for the WOLS, and vice versa. The results are consistent with the DoW (2015) in terms of poverty; black Africans were poorer compared to coloureds and whites. According to the results in Table 3.5, whites in farm areas were over 143 per cent better off, with whites staying in tribal areas being 30 per cent better than black Africans and coloureds in farm areas 10 per cent better.

We then make a comparison between the OLS and WOLS to find the robust model. The result on the comparison of the robustness of both models is found below.

*SSR restricted = 9.84*

*SSR unrestricted = 1.01*

The sum of squares of residuals (SSR) is the residual difference between the actual  $y$  and the predicted  $\hat{y}$  from the model. Thus, the smaller the SSR, the better the model is. From the data, we can see that after we drop the weight variable, the SSR increases from 1.01 to 9.84, which is an over 800 per cent increase. Therefore, we can conclude that we should keep the variable. Our F statistics is 130.67 and statistically significant at 1 per cent level of significance. According to Winship and Radbill (1994), if the parameter estimates are similar, the OLS is preferred since it produces standard errors that are more efficient. However, in this case, the WOLS produces more robust results than the OLS. Thus, we prefer the WOLS to the OLS.

### **3.9 Conclusions and Recommendations**

Poverty remains a major issue among population groups in South Africa and elsewhere sub-Saharan Africa. The findings of the study revealed that in terms of poverty, black Africans and coloureds were the major affected. Ethnic and racial differences are said to reinforce ethnic identity by parents who create a boundary between the poor and non-poor. In the process, contributing to racial stereotypes and policing of racial groups boundaries. Consequently, policies meant to address poverty should clearly dissociate poverty from ethnicity and race, to avoid stereotypical views on racial differences. In this paper, we have argued that culture is part of the drive to address poverty in rural areas in South Africa. However, it is often overlooked by poverty scholarly. Culture often determines which ethnic groups end up in poverty. Therefore, to determine if whether black Africans born in homelands (rural areas) are likely to escape poverty demands that different cultural tools and strategies are utilised than simple determining that certain individuals fall below or above the poverty line. Thus, to understand racial and ethnic disparities amongst groups needs that we break down culture into various components where policy can target. Poverty is seen as self-perpetuating in certain cultural orientations. Therefore, future studies should endeavour to build on the knowledge base on culture. Once a broader understanding of how culture determines households likelihood of escaping poverty, then customised solutions can be adopted to address the problems identified. Unfortunately, current

poverty studies rely mainly on quantitative approaches to estimate poverty trends. Although various social and ecological studies have shown that poverty is not a simple game of numbers. It is an endemic driven by certain social constructs, which need various tools. The family behavioural model helps to explain that certain sociologically factors like an altruistic household head can keep a household in generation poverty through uninformed decisions making. Something that has been prevalent in numerous ethnicities in sub-Saharan Africa were patriarchy is practised with impunity.

## **CHAPTER FOUR: DRUG-RELATED CRIME AND POVERTY IN SOUTH AFRICA**

### **Abstract**

This paper argues that the link between poverty and drug-related crime might be spurious. We take an empirical approach to investigate the causality and plausibility of this link. Firstly, we regress crime against envisaged explanatory variables in order to estimate the contribution of poverty to crime. Secondly, data is analysed using an ARDL ECM. The quarterly sample data for our estimation is for the period 1995-2016. We found a strong association between crime and poverty both in the short and long run. We recommend the government should focus on non-income linked factors in dealing with the scourge in drug-related crime. As demonstrated in this study, various drug-related crimes are driven by socio-economic factors.

## 4.1 Introduction

South Africa is dogged by three social evils, namely, high crime rate, inequality and poverty. There have been claims that poverty promotes criminal activity; however, there is little evidence to back that claim. While crime has a direct impact on discouraging investment, it remains a challenge on how it is influenced by poverty. This paper examines if crime and poverty are linked.

Previous studies (Bourguignon, 2000; Fajnzylber, Lederman and Loayza, 2002) on crime and poverty have failed to provide compelling reasons for the link between the two. The reason being that poverty is multidimensional, while crime is caused by a number of factors not linked to poverty. For instance, studies (Hu, Hu and Xu, 2005; Chen and Yi, 2009) conducted in China found that the crime rate increases substantially along with economic growth. Bourguignon (1999) pointed out that property crime and violence activities were partly a consequence of excessive inequality and poverty. While factors causing poverty may be the same factors contributing to inequality, literature is divided in terms of the impact of these factors on crime. The cost of crime has damaging effects on the society leading to poor social integration and substantial amounts spent by governments in reducing it. These costs include prisons, courts, health care and private security expenditure. Yet the indirect costs include a decline in national productivity, employment and human capital (Fajnzylber, Lederman & Loayza, 2000).

Only a few studies have been done to test the relationship between crime and poverty due to a lack of data in a number of African countries. Currently, the major conclusion from a number of studies is that poverty has little effect on crime (Morgan, 2000; Ludwig, Duncan and Hirschfield, 2001; Oreopoulos, 2003). Fortunately, all these studies were done in developed countries where poverty is very minimum. Meanwhile, a study conducted by Fajnzylber et al., (2000) on developing countries found that crime rates are related to growth, and poverty is driven by demographic factors. Similarly, Demombynes and Ozler (2005) noted that inequality is correlated with violent crime and property crime. Meanwhile, Drezea and Reetika (2000) pointed out that murder rates in India were not related to poverty. Turning to Africa, Fafchamps and Moser (2003) find that crime is higher in isolated, less populated places and in non-urban areas. This finding suggests that the geographic terrain found in certain countries exhibits a different outcome with regard to

crime. Consequently, pointing out that in Africa, the geographic location of people has a direct impact on crime. Such a scenario is expected in South Africa as well, considering that most crimes occur outside urban areas.

We use quarterly data from 1995 to 2016 to examine the linkage between the two social evils, namely, crime and poverty. The observation that crime comes from economic segregation needs to be tested. Therefore, this paper argues that youth in poor areas have been the most affected by hardships - as a result, their anger is revealed by an increase in crime. It further argues that neglecting of poverty of unemployed youth has contributed to a rise in crime. Kingston and Webster (2015) recorded that there is a relationship between youth poverty and policy changes in welfare, housing and employment. Subsequently, there is a view that those who live in poverty are more likely to be the victims of crime and offend.

South Africa has undergone numerous policy changes since the democratisation in 1994, most policies were targeted at redressing previous harms that were created by the apartheid system. Despite these policies, crime has continued to rise with poverty showing its impact on the youth. South Africa slipped from the 122nd position in 2014 to 136th in 2015 in the world in terms of crimes and ranks 37th of the 44 Sub Saharan nations. The Institute of Economic and Peace (2014) pointed out that South Africa ranks as the 15th worst country in terms of societal safety and security, and the 8th most violent with a murder rate of 34 per 100000 people. It was further pointed out that conflicts in South Africa were driven by poverty, inequality and slow pace in reform by the government, which in turn fuels crime and political confrontation.

This paper contributes to the literature by examining the relationship between drug-related crime and poverty. To the best of our knowledge, this is a first attempt to study this relationship in South Africa. We focus on South Africa as it represents a unique case among African countries. The country is one of the most unequal in the world and has high crime rates. While positive strides have been made in reducing poverty, the Gini index remains stubbornly high at over 0.65 in 2017 compared to 0.63 in 2015, pointing

out that inequality has increased. Therefore, the availability of crime and poverty data makes it easier to follow its trends.

The rest of the paper is organised as follows. Section 2 outlines the theories that link poverty and crime and discusses empirical studies. The economic specification of the equations to be tested is given in section 3. Section 4 discusses the regression results, and the last section concludes the study.

## **4.2 Theoretical Framework**

Economic determinants of crime and poverty may be considered too empirical; however, without some theoretical perspective, a little can be said about their impact. As a result, the theoretical need arises because of the lack of clarity in terms of the relationship among the stated factors. While at prima facie inequality may seem to be the driving factor between crime and poverty, the effect is not clear as shown by a number of studies that would be mentioned in the coming sections. Another concern that justifies the use of a theoretical perspective is the types of crimes committed under substance abuse or alcohol, drug dealing in large cities in developing countries at most, and violence. Data scarcity in developing countries makes it harder to estimate the linkage between crime and poverty and even comparisons across countries. While this is a challenge for policy, the available data points to the fact that there is a possibility that inequality and poverty may have a significant positive effect on criminality. At the same time estimates indicate that the cost of crime is substantially high in countries with high levels of criminality. Thus, our point of departure starts with understanding the effect of inequality on poverty and crime.

### **4.2.1 ECONOMIC THEORY**

The linkage between crime and inequality is stressed by three ecological crime theories, namely, Shaw and McKay social disorganisation theory, Becker's economic theory of crime, and the strain theory by Merton. Becker's (1968) economic theory of crime points out that individuals allocate time between market and criminal activity by comparing the expected return from each crime, and taking into account the severity of punishment. In this case, inequality leads to crime by placing low-income individuals, who have low returns from market activity, in proximity to high-income individuals, who have things

worth taking. This leads to low-income individuals committing a crime in order to improve their economic situation.

The strain theory (Merton, 1938) points out that individuals who are low in the social structure are frustrated by their failures to attain material attributes of success; this failure is manifested when surrounded by successful individuals. The theory states that the higher the inequality, so is the strain; in other words, individuals placed next to successful individuals feel frustrated at their situation. As inequality broadens, so is the strain in such individuals and the greater the likelihood of them committing a crime. As a result, they commit a crime in response. This is more common when it is income inequality.

According to Shaw and McKay (1942), poverty, ethnic heterogeneity and residential mobility weaken social controls and undermine the willingness of communities to control their members. This situation can be exacerbated by a lack of family stability (Sampson, 1987). Of concern is that when social controls are undermined, it becomes harder to control crime.

These three theories are complementary in that they focus on different aspects of individuals; yet, the goal is to explain why certain individuals commit crime because of their social status. The strain theory focuses on pressures to commit crimes; the social disorganisation theory considers social deterrents to crime, and the economic theory is concerned with the incentives to commit a crime and the deterrent of the justice system.

Extensive literature review addresses the relationship between crime and numerous economic deprivations such as inequality, poverty and unemployment. The forthcoming section does not attempt to provide an extensive literature review on the current subject under study, but provide a basis for a proper understanding of the current problem under investigation. It is important to stress that the objective of the study differs in many aspects of existing literature on crime and poverty. Most existing literature focuses on the linkage between crime and poverty without considering the income status of the victims. While such approaches may seem direct, they do not provide policymakers with solutions on how to deal with crime caused by inequality in a certain area. Consequently, this study diverts from the norm and considers variables such as the Gini index and GDP, so as to understand how they influence drug-related crime. We strongly suspect that inequality can influence crime when there is economic growth in a certain area.

This we demonstrate by using a hypothetical example: there is a sudden rise in economic growth in a certain province, suggesting that people’s income per capita may arise in relation to this change. Suddenly people find themselves with extra income, something that was previously hard to achieve. Some may increase their saving power, while others may find it easy to spend it on gambling and partying. Such a situation increases their risk of buying drugs and drunk driving. Given that the economic growth cannot be sustained for a long time, those who were dissaving may find themselves with little to spend in maintaining their previous lifestyle. As their assets base is eroded, there is a likelihood that they may find it easy to do illegal things as a means of survival and sustaining their extravagant lifestyle. This can be explained using Friedman’s (1957) permanent income hypothesis. We consider an individual who lives for  $T$  periods, and whose lifetime utility is as follows:

$$U = \sum_{t=1}^T u(C_t), \quad u'(*) > 0, \quad u^{ii}(*) < 0 \quad \dots \dots \dots \text{eq34}$$

where  $C_t$  is consumption in period  $t$ , and  $u(*)$  is the utility function. Assuming the individual has a wealth function of  $W_0$  and labour income of  $Y_1 \dots \dots Y_T$  in the  $T$  periods of his or her life. The individual is subject to the constraint that any outstanding debt must be repaid at the end of his or her life. Furthermore, the individual can borrow or save at an exogenous interest rate. Given that we assume zero interest rate, the individual budget constraint is as follows:

$$\sum_{t=1}^T C_t \leq W_0 + \sum_{t=1}^T Y_T \quad \dots \dots \dots \text{eq35}$$

The individual, therefore, satisfies the budget constraint with equality if the marginal utility of consumption is positive. The Lagrangian maximisation problem is as follows:

$$\mathcal{L} = \sum_{t=1}^T u(C_t) + \lambda \left( W_0 + \sum_{t=1}^T Y_T - \sum_{t=1}^T C_t \right) \dots \dots \dots \text{eq36}$$

where the first order condition of  $C_t$  is

$$u'(C_t) = \lambda \quad \dots \dots \dots \text{eq 37}$$



will feel deprived. This may lead to the disgruntled poor individuals resorting to other means of improving their income status, and this includes both legal and illegal activities.

Rosenfield (2017) posits that having less wealth puts a strain on individuals and families, and the added stress from poverty lead people to commit a crime to get cash, especially substance abuse. The author points out that it is unclear how low-income people are more likely to be addicted to substance; however, they are more likely to break the law while under influence.

### **4.3 Overview of crime determinants**

Webster and Kingston (2014), focusing on post-war economic inequality and poverty in Britain, found that crime corresponded with long-term patterns of change in the national rate of property crime. For instance, during the 1980s and early 1990s, the rate of property crime increased coinciding with high levels of inequality and unemployment. Similarly, the same authors found that crime and poverty increased after the 2008 recession, but this time it was not a property crime. They witnessed an upsurge in violent crimes as well. This finding is consistent with recent studies on a similar topic, who noted that poverty went hand in hand with violent crimes.

While studies have shown that there is a link between crime and poverty, this relationship does not occur simultaneously, but sequentially. For instance, the witnessing of violent crimes does not simultaneously occur with high poverty rates or inequality. We note that most studies on crime, inequality and poverty rely on cross-sectional analysis, more commonly focusing on American states, dating back to 1980s (see, Bailey, 1984; Glaeser et al., 1996). Some of the studies (Sampson, 1985; Land et al., 1990) find a positive relationship between crime and inequality. Farrall and Jennings (2012) find that rising unemployment and inequality correspond to long-term patterns of change in the national rate of property crime, suggesting that poverty and inequality contribute to criminal behaviour. Metz and Burdina (2016) find that the wider the median income gap from the poorest neighbouring block group, the greater the property crime in richer block groups.

Nonetheless, empirical evidence has found an ambiguous direction of causality (Pridemore, 2011). Yet, some studies like (Bailey, 1984; William, 1984) find no link between these two. Wikstrom and Butterworth (2013) find a weak link between socio-economic status and crime between parents' income and children's offending.

Nonetheless, Bjerck (2007) finds a strong link between crime and socio-economic status. The opposing view on this linkage seems relatively determined by the study area largely. However, Valdez (2007) point out that the causality between poverty and crime involves a complex interrelationship among the community and individual variables. Clearly, literature is inconsistent with regard to the causality between crime and poverty.

For instance, Jarjoura et al., (2002) posit that the longer a young person lives in poverty the more likely would they engage in violent behaviour. In this study, we also hold a similar view with regard to South African crimes. Lack of personal growth and employment opportunities force individuals to commit criminal activities as a means of survival. Raphael and Winter-Ebmer (2001) indicated that there is a strong relationship between unemployment and crime. Similarly, a number of drug-related crimes are also committed by people who are unemployed and find solace in drugs. SAPS (2016) pointed out that most drug-related crimes in South Africa were committed by uneducated youths. Jarjoura et al., (2002) also noted that other factors influencing criminality included the education status of the individual, and parent occupation added more strain on such individuals.

Some studies (Sareen, Afifi, McMillan and Asmundson, 2011; McMillan, Enns, Asmundson, Sareen, 2010) point out that income level is linked with substance abuse. Similarly, children of parents in the lowest income decile are said to have a high propensity to commit crime compared with their peers in the fifth decile. Yet, on the other hand, behaviourists have noted violent offending and substance abuse are greatly influenced by genetics, although family environmental factors come into play (Sariasian, Langstrom, D'Onofrio, Hallqvist, Franck and Lichtenstein, 2013). When viewed holistically, the relationship between violence and poverty holds in various crimes including domestic violence, murder and assault (Pridemore, 2011; Kelly, 2000). Hipp and Yates (2011) find that the relationship between crime and poverty is not always direct, instead, crime follows poverty. This is a norm in numerous studies focusing on crime and poverty; as it was stated before, the link is very unclear.

In certain instances, the linkage between crime and poverty is very complex. Kaylen and Pridemore (2013) found that poverty effects led to a strong poverty-homicide relationship, while the homicide-inequality relationship was weak. Given the variations in terms of crime determinants, it becomes a bit clear that certain factors, which were overlooked by numerous studies, also contribute to making this relationship complex. For example,

Hallsten (2013) study in Sweden on immigrants' children concluded that ethnicity and culture were unlikely to be the cause of crime, but, instead, socioeconomic resources, and neighbourhood segregation - which expresses itself as an economic disadvantage - were major contributors.

Such views are held by a number of studies (Valdez, 2007; Lee, 2000), who claim that people living in poor neighbourhoods were likely to be involved in criminal activities, especially when there are economically disadvantaged. Hayden (2007) pointed out that the youth offending in the United Kingdom were from social housing. In other words, those youths staying in low-income neighbourhoods were more likely to commit crime than youth in non-low income areas. While this finding may seem distant, the reality is that income status pushes youth to commit a crime in certain areas; yet, economic segregation plays a role in some areas.

#### **4.4 Data**

We use annual data from 1995 to 2016. The crime data is extracted from the South African Police Service database, which comprises numerous crimes ranging from robbery, violent crimes, murder and property theft. The Gini Index is extracted from the World Bank Database; Poverty headcount ratio from Quantec database; and GDP from the World Bank Poverty database. We omit the deterrent effect of police expenditure on crime, intuitively; areas with high crime rates are usually apportioned high expenditure. In terms of demographics, we note that most people who commit a crime, especially in South Africa, are males; as a result, we omit this variable. Yet, people in poverty are mostly children, single mothers and old people who have limited means to resort to crime as a mechanism to move out of poverty. Furthermore, most black Africans are in poverty, as a result, we expect them to be contributing a sizeable amount of offenders. Consequently, we exclude a number of demographic variables in our regression estimation. We focus on variables of interest, namely, Gini Index, GDP and Poverty Headcount ratio.

##### **4.4.1 MODEL CHOICE**

Numerous studies on crime and poverty or inequality employ the Ordinary Least Square (OLS) estimation. However, there is no clear justification except that the regression model to be estimated is assumed to be lognormal. Some applications of the OLS ignore the

feedback effect that can be caused by the determinants of crime. Approaches such as Error Correction Models allow estimation of co-integrated variables, in the process permitting dynamics to be modelled. Recent studies have focused on using the Fixed Effects and Random Effects Models to control certain estimators. While on the other hand, some use the GMM estimator. Verbeek (2008) highlighted the limitations of the model especially when there is over instrumentation of the control variables. Nonetheless, there is no perfect method; it all depends on which one provides plausible results in order to answer the objectives set forthwith. Fajnzylber et al., (2002) used a GMM estimator because of the assumption that if a crime is among low-income individuals, possible crime positively affects inequality. Hauner, Kutan and Spivey (2012), while estimating inequality and crime in Russia also took a similar route. The model was based on its power of lagged differences on explanatory variables. In this case, Hauner et al., (2012) implement GMM finite-sample SE correction because the GMM SEs are biased downwards.

However, we follow Pesaran et al., (2001) in estimating an autoregressive distributed lag model (ARDL) because of numerous advantages. For example, the ARDL overcomes the challenges faced by traditional models in estimating different order of integration such as purely I(0), I(1), and so on. Haug (2002) points out that the ARDL approach is more suitable for small samples and provides long and short-run parameters simultaneously. This is a shift from the basic approaches in testing cointegration (see Engle and Granger, 1987) and the system-reduced ranks (Johansen, 1995). Pesaran et al., (2001) point out that the ARDL follows a generalised Dickey-Fuller regression to test the lagged levels of variables under consideration in a conditional unrestricted correction model. Furthermore, the model has shown that the asymptotic distributions of statistics are nonstandard under the null hypothesis (no relationship exists in levels between variables) when the included variables of purely order I(0) or I(1) or mutually cointegrated. Therefore, the model uses a critical bound test, where, if the F statistic that falls outside the critical value bounds testing procedure, it can be inferred without needing to know integration/cointegration of regressors. Based on our small sample size, our parsimonious conditional ARDL model takes the following form;

$$\Delta y_t = \beta_0 + \beta_1 \Delta Gini_t + \beta_2 \Delta POV_t + \beta_3 \Delta GDP_t + \beta_4 + \beta_5 \Delta Gini_{t-1} + \beta_6 \Delta POV_{t-1} + \beta_7 \Delta GDP_{t-1} + \beta_8 \Delta y_{t-1} + \varepsilon_t \quad (\text{Eq 39})$$

$t=2,3,\dots,T$

where  $y_t$  is crime rate (Crime Ratio per 100 000 of the population) and in time period  $t$ ,  $Gini_t$  is the measure of inequality using the Gini coefficient,  $POV_t$  represent poverty measures (poverty headcount),  $GDP_t$  represents the per cent of GDP (Percent of GDP),  $\varepsilon_t$  is the idiosyncratic error term.

Drugs are related to crime in various ways. In a direct way, it is a crime to possess, manufacture and distribute any form of drugs. Marijuana, cocaine, heroin and amphetamines are some of the drugs which are illegal. On the other hand, drugs are related to crime through the effects they have on the end user or generating any other illegal activity. The following is a summary list of the relationship between drugs and crime.

<b>Drugs and crime relationship</b>	<b>Definition</b>	<b>Examples</b>
Drug-related offences	These are offences in which drugs contribute; offences connected to drug distribution and by the end, users need for income to support continued use	Violent behaviour resulting from drug effects or violence against rival drug dealers
Drug define offences	This includes offences such as violations of laws regulating or prohibiting the use, distribution and manufacture of illegal drugs	Use of marijuana or its cultivation. Sales of cocaine. Marijuana and heroin etc
Drug-using lifestyle	The likelihood and frequency of involvement in illegal activity are increased drug users tend not to participate in the mainstream economy and are exposed to situations that encourage crime.	Opportunities to offend resulting from illegal activities and illegal markets.

#### **4.5 Results and discussions**

The selected model choice does not require stationarity in time series since cointegration among variables can be tested using the Wald test and the F test. However, to know the order of our variables, we performed the ADF test to the first difference of the variables, and the variables were of order 1(0) and I (1) as shown in table 4.1. This suggested that we can continue with the ARDL model since the only situation that would affect the model estimation would be if the variables were of order I(2) variables.

**Table 4.1 Unit Root Test (Augmented Dickey Fuller test)**

Variable	Intercept	Intercept & trend	None	Order of integration
$\Delta y$	-2.817658 (0.0598)*	-3.428410 (0.0540)**	-1.195859 (0.2106)	I(1)
$\Delta Gini$	-1.401584 (0.5784)	-4.084109 (0.0093)***	-1.132637 (0.2326)	I(0)
$\Delta POV$	-1.631107 (0.4628)	-3.330307 (0.0677)*	2.278697 (0.9944)	I(0)
$\Delta GDP$	-3.002652 (0.0383)**	-3.073429 (0.1188)*	-1.238839 (0.1966)	I(1)

Note: P-values in parentheses.

Source: Authors calculations

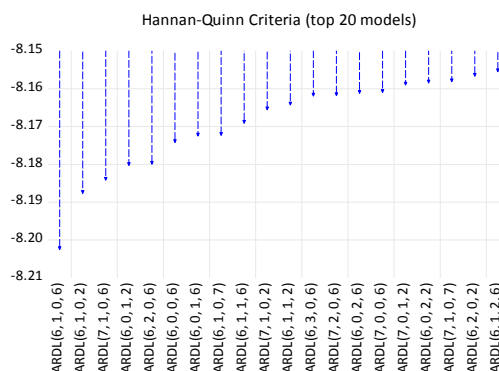
\*Represent the rejection of the null hypothesis at 10 %

\*\*Represent the rejection of the null hypothesis at 5 %

\*\*\*Represent the rejection of the null hypothesis at 1 %

First, we conduct an F statistic in order to test the null hypothesis that states that there is no level relationship. The null hypothesis is rejected on the basis that the F statistic (5.32) is over the critical value at all levels. This is also confirmed by the t-bounds tests, which test the lagged value on the dependent variable. Thus, we can conclude that a long run relationship exists, or there is cointegration among variables. Having established that there are possible cointegration relation inbound tests, we then perform an ARDL-ECM approach to estimate the level relationships among variables. The selected ARDL model is 6,1,0,6.

Figure 4.1 reveals, using the Hannan-Quinn criteria, the procedure selected an ARDL (6, 1, 0, 1). The selected model ARDL (6, 1, 0, 1) showed its relative superiority over other selected models using the Hannan-Quinn Criteria. It was also slightly better than an ARDL model (6, 1, 0, 2) as shown in figure 4.1. However, all the top two models use six lag of the dependent variable.



**Figure 4.1: ARDL Hannan-Quinn criteria**

The short-run estimates of the ARDL in Table 4.2 show that lagged dependent variable LOG(Y) is negative and significant at 1 per cent level. Meanwhile, the LOG (GINI) was also negative and significant at 1 per cent level. The negative coefficient (-0.02) means that a decline in the Gini index by 1 per cent will lead to a decline in drug crime by 0.02 per cent. Likewise, the LOG (POV) lagged in period one has a positive relationship with drug-related crimes by 0.10 per cent. The findings are in line with Fafchamps and Minten (2005) study, which found that poverty, has a positive effect on criminal activities besides crop theft. However, based on the literature review, we found that living in poverty increases someone's chances of being involved in criminal activity. On the other hand, LOG (GDP) has a positive coefficient and significant at 1 per cent level.

**Table 4.2 : ARDL Long Run Form and Bounds Test**

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.807609	0.192105	4.203990	0.0001***
LOG(Y(-1))*	-0.138140	0.033568	-4.115233	0.0001***
LOG(GINI(-1))	-0.022325	0.005465	-4.085260	0.0001***
LOG(GDP)**	0.054466	0.013031	4.179746	0.0001***
LOG(POV(-1))	0.107858	0.029834	3.615290	0.0006***
DLOG(Y(-1))	0.666969	0.085601	7.791621	0.0000***
DLOG(Y(-2))	0.118826	0.067926	1.749340	0.0846*
DLOG(Y(-3))	0.084441	0.068775	1.227781	0.2236
DLOG(Y(-4))	-0.695854	0.068949	-10.09224	0.0000***
DLOG(Y(-5))	0.461403	0.082853	5.568948	0.0000***
DLOG(GINI)	0.009307	0.013097	0.710599	0.4797
DLOG(POV)	0.342278	0.110112	3.108443	0.0027**
DLOG(POV(-1))	-0.221398	0.114356	-1.936039	0.0569*
DLOG(POV(-2))	-0.017168	0.108436	-0.158327	0.8747
DLOG(POV(-3))	0.003389	0.108500	0.031233	0.9752
DLOG(POV(-4))	-0.318684	0.119301	-2.671267	0.0094*
DLOG(POV(-5))	0.300514	0.096448	3.115804	0.0027**
@QUARTER=2	0.001174	0.000967	1.213571	0.2290
@QUARTER=3	0.000853	0.000954	0.893946	0.3744
@QUARTER=4	0.000807	0.000954	0.845880	0.4005
* p-value incompatible with t-Bounds distribution.				
** Variable interpreted as $Z = Z(-1) + D(Z)$ .				

Using the Hannan-Quinn criteria, a maximum of 8 lags of both the dependent and regressors were selected. Out of the possible 5832 models evaluated, the procedure selected an ARDL(6,1,0,6) model- 6 lags of the dependent variable LOG(Y), a single lag of the LOG(GINI) and 6 lags of the regressor LOG(POV). Each of the lagged dependent variables LOG(Y(-1)), LOG(Y(-2)) LOG(Y(-4)) LOG(Y(-5)) LOG(Y(-6)) and regressors

LOG(GINI(-1)), LOG(GDP) LOG(POV) LOG(POV(-1)) LOG(POV(-4)) LOG(POV(-5)) and LOG(POV(-6)) were significant, and that the coefficient of the lag of dependent variable of LOG (Y(-1), and (-5) were quite high, over 1.

**Table 4.3: Long Run regression results**

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GINI)	-0.161613	0.017723	-9.118604	0.0000***
LOG(GDP)	0.394281	0.025596	15.40386	0.0000***
LOG(POV)	0.780783	0.060956	12.80902	0.0000**
C	5.846297	0.154428	37.85770	0.0000

The levels equation (Table 4.3) reveals the long run relationship between variables. We find that LOG(POV) and LOG(GDP) is linked to increases in drug-related crimes in the long run. Meanwhile, LOG(GINI) has a negative relationship with the dependent variable in the long run. The ECM model equation is shown as follows:

$$EC = LOG(Y) - (-0.1616*LOG(GINI) + 0.3943*LOG(GDP) + 0.7808*LOG(POV) + 5.8463 )$$

The positive coefficients between LOG(POV) and LOG(GDP) suggest a positive elasticity among those variables in the long run. When LOG(POV) increases by 1 per cent, drug-related crimes increase by 0.79 per cent. Meanwhile, a similar increase in LOG(GDP) is expected to lead to 0.39 per cent elasticity in drug-related crimes. We point out two possibilities on how this unfolds in an economy. If GDP increases this leads to a rise in per capita income, and if individuals' purchasing power is enhanced, they may increase consuming non-essential products since their capacity to save has increased. Likewise, the poverty headcount ratio increases because of other factors, either exogenous or endogenous; individuals may try to survive by resorting to drugs. This may be a survival strategy considering that drugs are usually easy to sell and addictive to victims. Therefore, considering that the drug-related crimes have been rising at an alarming rate in South Africa, one possible explanation may be that since unemployment is high in South Africa, people are trading drugs to survive.

The validity of the results is confirmed by the F test and t-test as shown in Table 4.4. The null hypothesis of no level relationship is not rejected for both tests. We see that the F-statistic for the Bounds Test is 5.32, and this clearly exceeds even the 1% critical value

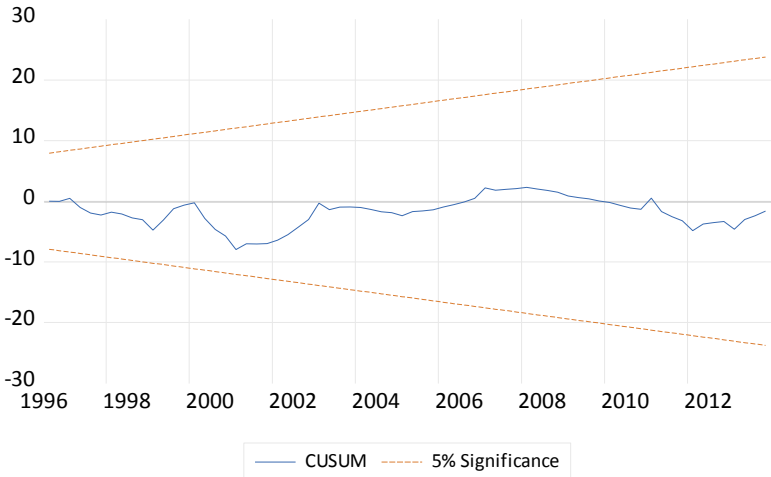
for the upper bound. Accordingly, we strongly reject the hypothesis of ‘No Levels Relationship’.

**Table 4.4: F bound tests**

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	5.322987	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	90		Finite Sample: n=80	
		10%	2.474	3.312
		5%	2.92	3.838
		1%	3.908	5.044

Note, the null hypothesis is rejected if  $F > I(0)$  critical value, and accepted if  $F < I(0)$ . For the t statistic, the null hypothesis is rejected if  $t > I(1)$ , rejected if  $t < I(1)$ .

We then examine the stability of the short-run and long-run coefficients by performing the CUSUM stability tests for ECM. The tests reveal that there is no instability of the coefficients because the plots of the CUSUM statistics lie within the 5 per cent critical bounds of parameter stability (figure 4.2).



**Figure 4.2: CUSUM plots**

## 4.6 Diagnostic and stability tests

Table 4.5 summarises the results of various stability tests. The validity of the results is always dependent on the stability of the model. According to the Ljung-Box Q statistics, there is no autocorrelation. The model passes all heteroscedasticity tests, implying that there is no heteroscedasticity.

**Table 4.5: Stability diagnostics checks**

Test	Null hypothesis	Test statistic	P value	Conclusions
Jarque –Bera	Residuals are normally distributed	1.56	0.30	Do not reject Ho as PV is greater than the L.O.S at 5%, therefore the residuals of the model are normally distributed
Ljung-Box Q	No autocorrelation	7.22	0.22	Do not reject Ho as PV is greater than the L.O.S at 5%, therefore the model does not suffer from autocorrelation
Breusch-Pagan-Godfrey	No heteroscedasticity	18.43	0.39	Do not reject Ho as PV is greater than the L.O.S at 5%, therefore there is no heteroscedasticity in the model
Arch	No arch heteroscedasticity	0.29	0.55	Do not reject Ho as PV is greater than the L.O.S at 5%, therefore there is no heteroscedasticity in the model
White	No heteroscedasticity	15.41	0.56	Do not reject Ho as PV is greater than the L.O.S at 5%, therefore there is no heteroscedasticity in the model
Lagrange Multiplier test	No serial correlation	11.37	0.09	Do not reject Ho as PV is greater than the L.O.S at 5%, therefore there is no heteroscedasticity in the model

L.O.S is the level of significance

## 4.7 Discussions

The effect of poverty on drug-related crime was present in both the short and long run. Sariaslan et al., (2014) found that low income in one's family of origin was associated with violent offending and substance misuse, especially during adolescence. Meanwhile, the Gini index, a measure of inequality reveals that it has an effect on drug-related crime. Some studies (Brush, 2008; Choe, 2008) in the US find little evidence of inequality effects on crime. This, therefore, means that evidence of inequality effect on crime may be data-dependent. Baier (2015) points out that when using lagged variables, the Gini coefficient shrinks tremendously and loses significance, suggesting that inequality contributed to the

model is very little. Baier (2015) concludes that there is no relationship between crime and inequality – our analysis points otherwise. However, when Baier (2015) adds more control variables to control for a spurious regression, they find no link between crime and inequality. Adopting Neumayer's (2005) procedure, Baier (2015) tests the model using a fixed effects model and finds no relationship between the two variables. Contrary, Pare and Felson (2014), Fajnzylber (2002) and Neumayer (2005) find a significant relationship between crime and inequality. Our analysis finds a strong negative association between drug-related crimes and inequality.

Baier (2015) then replicates Neumayer's (2005) estimation using variables at levels; in this case, all the additional variables are significant and signs are consistent with theory. However, the author fails to provide a viable explanation on what is driving the model except for deterministic trends in both the dependent explanatory variables and concludes that all the three models that were estimated found no causality between crime and inequality. The findings of this study establish dissimilar results; however, the focus is on drug-related crime. While Baier (2015), Neumayer (2005) and Fajnzylber (2002) found no relationship between crime and inequality in Latin America, this study finds evidence between these two variables in South Africa.

Aliber (2003) contends that high inequality and poverty is a legacy of South Africa's apartheid and colonial past. This is supported by the fact that poverty and inequality in South Africa seem to be ethnic-driven. Therefore, it would not be surprising that drug-related crimes are more prominent to non-white races, where poverty is mainly concentrated. Nevertheless, the association between crime and poverty may not be clear-cut as shown by the findings. Neff (2007) finds no association between income or expenditure and South Africa ethnic groups. However, the author noted that racial classification in South Africa was artificially created to generate racial differences. A similar case is in India, where economic activities and professions are linked to race, ethnic and religious background, popularly known as the caste system. Thorat (2010) noted that poverty is significantly higher in lower castes and selected tribes. Likewise, Cheteni, Khamfula and Mah (2017) found a similar conclusion, whereby black Africans and the-so-called coloureds in South Africa are in the lower caste; implying that these two races have a high likelihood to commit a crime, a view supported by the South Africa Police Service Crime Statistics Report 2014/15.

Statistics South Africa Report (2017) claimed that unemployment levels have risen to over 27 per cent, its highest percentage in the last decade. Unemployment is more prominent to the youth, and, coincidentally, youth are the major offenders in drug-related crimes. Badiora's (2015) study found that gang activities and participants staying in high-density areas encounter more drug and alcohol abuse. Consequently, they are involved in gang activities and in constant street fights. In the Cape Flats in Cape Town, the BBC Documentary, '*Ceasefire for Cape Town Gangs in South African drug war*', documented gang violence linked to drugs. It was found that gang violence was prominent in certain areas where rival gangs fight for the drug market. A similar trend exists in major cities in the whole of South Africa, where there are gang cartels selling drugs. Martinez, Rosenfeld and Mares (2008) found that drug trafficking was more prevalent in disadvantaged neighbours where the risk of engaging in crime was high. On the other hand, Freisthle, Needell and Gruenewald (2005) point out that the likelihood of obtaining drugs and alcohol was linked to adolescent antisocial behaviour.

Based on the view that antisocial behaviour can contribute to crime, we argue that drug-related crimes motivate offenders to commit various crimes. We support this view by using the crime opportunity theory, which states that opportunity determines the outcome of environments prone to crime. In other words, offenders look for an opportunity before committing a crime, and cannot do so unless the opportunity is available to break the law. Therefore, drug-related crimes are committed because of weak law enforcement throughout South Africa. As pointed out by the SAPS (2017), the youth find it easy to acquire drugs. Sindiyandiya, Cheteni and Ncube (2016) study on road accidents in South Africa found that most offending motorists were either intoxicated or under substance abuse.

Conversely, not every opportunity to commit crime translates into crime. According to the rational choice theory, offenders aim to maximise benefits and minimise costs to a decision. Consequently, the offenders look for a crime that offers immediate satisfaction and requires little effort to complete. The fact that drug-related crimes are on the rise highlights a weakened moral fibre in the society. At the beginning of 2017, communities in the Gauteng province staged xenophobic marches, blaming foreign nationals for contributing to drug-related crimes. This was reminiscent of the 2008 xenophobic attacks that leftover 48 people dead. At any rate, the drug marches turned violent. Accordingly, we conclude that drug offenders are rational beings who explore the vulnerability of the

criminal justice system to their advantage. Our view is backed by the routine theory, which focuses on societal factors that have an impact on crime opportunism, i.e., where crime is likely to occur at a given point. Zabyelina (2017) stated that crime is relatively not affected by poverty, inequality and unemployment. That is, for crime to occur there needs to be space or time for a motivated offender to find a suitable target. Put differently, offenders tend to follow people's routines as they go on about their lives.

The other avenue is that drug-related crime in South Africa has a complex network. Usual drug members adapt to investigation methods of law enforcement agencies making it hard for them to deal with organised crimes. Spapens (2011) point out that those apprehended by police and serving jail time replace new criminal groups. However, corrupt contacts among law enforcement agencies have contributed to the creation of organised crime groups.

The contact issues an early warning to drug criminals if the investigative agencies apply new methods or if whether the law enforcement is doing random patrols and search. This leads to a situation whereby the less-protected drug groups disappear, and the protected ones escape arrests. Reuter (1983) once stated that organised crime adopts a market perspective whereby criminal groups run on a principle of survival of the fittest. For instance, Rhino poaching syndicates run an efficient market whereby it is hard to detect the main owners of such a system. The poaching gangs are involved in organised crime as pointed out by Cheteni (2014), where rhino horns are easily smuggled out of Africa through airports. While efforts on anti- rhino poaching efforts have intensified, little has changed. Drug criminals operate a similar network.

#### **4.8 Conclusions and recommendations**

This article furthers the discourse on the link between drug-related crime and poverty. Building on certain theories, this study argued that drug-related crimes are usually linked to poverty and inequality. We find evidence that poverty, inequality and income have an effect on drug-related crimes. Drug-related crimes are committed because offenders find an opportunity to do so. In other words, there are a few means of dealing with drug-related crimes in South Africa.

Our findings, therefore, indicate that preventive efforts should specifically aim to decrease substance abuse and target family-linked factors, rather than income inequality alone.

We recommend that law enforcement should monitor and seize drugs. This includes follow-up checks on repeat offenders who are able to resume their involvement in the production or wholesale dealing of drugs. As pointed out by the SAPS (2017), 80 per cent of crimes in South Africa are mainly committed by repeat offenders. The existence of drug gangs highlights a major societal problem and this point to a weak policing system. Therefore, the government should focus on creating special units that deal with drug crime until such a point where drugs are eradicated from the streets. In cases of gang activities, it is known that investigations ending in apprehensions and convictions of both the producers of drugs and the buyers reduce the chances of future offending.

Future research can thus focus on identifying how governments can effectively reduce the use of drugs, and how poverty eradication efforts can be used to create formal employment.

## **CHAPTER FIVE: GOVERNMENT GRANTS, FOOD SECURITY AND HOUSEHOLD DIETARY DIVERSITY IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA**

### **ABSTRACT**

Malnutrition and food security are some of the challenges facing a number of households in rural areas. This study investigated how government grants and income dynamics affect household food security status and dietary diversity in the Eastern Cape Province in South Africa. A total of 296 household heads were randomly sampled to participate in the study. A Household Dietary Diversity Score (HDDS), Household Food Consumption Score (HFCS) and a binary model were used to assess food security and its determinants in a rural area. Findings from the Household Food Consumption Score (HFCS) show that the majority of the households had adequate levels of food consumption. The Household Dietary Diversity Score (HDDS) reveals that 61 per cent of the households had lower dietary diversity and were consuming at least 3 food groups; namely, pulses, milk and cereals. The binary model reveals that age, household income, access to credit, and gender are statistically significant in influencing household food security status in the study area. There was evidence that household food insecurity was a prominent feature in the sampled areas. A number of households are food secure in the short term; this sends a strong message to policymakers, programme designers and agencies on efforts needed to help those households to be food secure in the long term considering that in 2015/16 there was drought throughout South Africa. Thus, efforts should be directed in helping rural households to reduce incidences of food insecurity.

## 5.1 BACKGROUND

The main aim of this paper is to explore household food dietary, diversity, and food security in a rural area in South Africa. The emphasis will be to find out how income dynamics drive food security, especially to districts relying on subsistence farming and government grants. I first examine household and farm characteristics of different districts, then, I analyse the determinants of food security. In doing so, I focus on income distribution as a determinant to food security and dietary diversity.

There is an urgent need to address the issue of under-nourished people who are mainly living in rural areas. The World Summit on Food Security in 2009, defined food security as a situation where all people, at all times, have social, physical and economic access to nutritious and safe food to meet their dietary needs for an active healthy life. In South Africa, over 13.8 million people are said to have inadequate access to food (DAFF, 2015). Vermeulen et al., (2013) found that, of the three consumers (marginalised, emerging, established) classes found in South Africa, marginalised consumers spend over 35 per cent of their budget on food compared to an approximately 14 per cent national average. It was pointed out that total expenditure per household head had increased by over 15 per cent in both the marginalised and emerging consumers.

Lack of nutrition was identified as a contributor to deaths in South Africa. Norman et al., (2007) found that, of eighteen risk factors for death in South Africa, eight were linked to a lack of critical nutrients. Excess body weight, high cholesterol, childhood and maternal underweight, iron deficiency, Vitamin A deficiency and low fruit intake were identified as the major contributors. In a survey done by Mchiza et al., (2015), it was discovered that in rural areas in KwaZulu Natal Province and Free State Province there was a large variation in energy and macronutrient intake. The most consumed food groups were maize products, food products containing sugar, beverages, oil, butter and poultry. These food groups show an unbalanced nutritional intake, especially in rural areas. Yet, there are basic commodities mostly consumed by households falling in the food poverty line. Since achieving democracy, the South African government identified food security as a priority; as a result, it launched the Reconstruction and Development Programme (RDP) in 1994. The programme was meant to address issues such as poverty, inequality and economic development in a new democratic South Africa. However, scholars are divided

on the impact of the programme in terms of meeting its basic socioeconomic objectives such as the provision of basic services and poverty reduction.

To date, inequality and poverty is still a nightmare for the South African government, with a Gini coefficient of around 0.660 to 0.697. In such an unequal state, food security remains a problem for the poor. Numerous reports point that South Africa is food secure at a national level producing enough staple food to meet the basic nutritional need of its population (FAO 2008). South Africa committed itself to address food security by 2014, up to date it remains a problem. Hart et al., (2009) pointed that South Africa has no specific or accepted food security measures and there are no ways of monitoring it. Therefore, this makes it harder for policymakers to address food insecurity. This is made more complex by the fact that policymakers cannot identify interventions appropriate to different scenarios.

Recent studies (Naicker et al., 2015; Crush & Caesar., 2014; Shisana et al., 2013) show a high prevalence of food insecurity amongst residents in low-income areas across South Africa. In this study, we focus on the Oliver Tambo Municipality, a high rainfall area in the Eastern Cape Province. The focus is to dismantle household dietary diversity in an area where a number of crops and vegetables are grown. Special focus is given to the impact of income on household dietary and food security. Furthermore, a number of households in the Eastern Cape Province fall in the food poverty line (FPL); this makes the study relevant in identifying the major causes of food insecurity, which is a contributing factor to food poverty.

Empirically, our contribution is to shed light on possible determinants of food security in poor districts in the rural areas by introducing a previous untested variable, food consumption score. We estimate the determinants of food security by using a probit model. There have been relatively few studies on food security in rural South Africa, which explicitly focus on this variable. Numerous studies that have been conducted largely focused on urban areas, with estimates on the farm and demographic variables. A number of South African households rely on the informal food economy for everyday food needs. However, little research has been done in assessing the food security status of the poorest province in South Africa, where there is an informal agricultural economy. Only a few studies (Taruvunga et al., 2013) have been conducted so far to assess the dietary diversity in rural areas in the Eastern Cape Province, where most households

depend on government grants for their livelihoods. The available studies on the same topic focus on dry areas, which receive inadequate rainfall (see Taruvinga, 2013).

Theoretical our contribution is on applying a household production model and a utility function to explain an agricultural household decision-making in decisions on food consumptions. The theoretical literature on measuring food security has reached alarming levels, with numerous studies coming using a utility maximisation function to explain household behaviour. Consequently, the introduction of a household production model to depict an agricultural household in face of food consumption is a huge extension in the food security discourse.

We apply various techniques to a sample of South Africa rural households. It is widely accepted that the poor face deprivation in many aspects such as education, health, nutrition and poor living conditions. This study adds to existing literature by exploiting a survey that contains data on nutrition and income. By so doing we unearth evidence about rural households relying on subsistence farming and dependent on government grants. Having explored the determinants of food security, we propose a novel approach of integrating the informal agricultural economy in the rural area, and this is the paper central contribution to the literature. Therefore, the study aims to answer the following question: "How do farm income and government grants affect household dietary diversity and household food security?"

The paper is organised as follows. Section 2 provides the methods that were used to measure dietary diversity and food security in the study area. Section 3 discusses the study findings, and section 4 concludes the study.

## **5.2 Defining food security**

Broadly, food security is defined in different ways by a number of scholars and organisations worldwide. The basic definition of food security is that it refers to the ability of individuals or households to access to adequate, nutritious and safe food on a day-to-day basis. The Food and Agriculture Organisation (FAO) point that food security has three dimensions namely food access, food availability and food use. Food access implies the ability of a nation and its households to acquire sufficient food on a sustainable basis.

Food availability is when the country has sufficient quantities of food at either national level or household level. Food use refers to the user based on knowledge of basic care and nutrition (DAFF, 2011). Food security at national and household level is distinguished based on approaches in access food security. Anderson (1990) referred to food security at national levels as the condition whereby the nation is able to manufacture import and sustain food needed to support its population with a minimum per capita nutritional standards. Meanwhile, at the household level, it is when family members do not live in hunger or fear starvation. This paper adopts the broad definition of food security as proposed by FAO.

### **5.3 Role of smallholder agriculture in food security**

Agricultural production has intensified in the last 30 years due to the expansion of uncultivated areas and the unfolding of the 'green revolution' (Ramankutty et al., 2008; Royal Society, 2009). The green revolution, through the advances in high yielding crop varieties, agrochemicals and other techniques has increases grain production from 800 million to 2.2 billion (FAO, 2011). Despite these efforts, food supply has proved to be unevenly distributed, with over 870 million people food insecure (FAO, 2011). In Southern Africa, food security has continued to be a problem for every nation, making it hard for commercial farmers to increase their production in line to population growth. However, smallholder farmers remain a vital component in food security besides the fact that they produce food with limited inputs. As pointed by Koohafkan (2011), smallholder farmers produce the bulk of food, in the process contributing to food security. IAASTD (2009) claimed that smallholders' farmers produce 70 per cent of Africa's food supply. Likewise, FAO (2014) reports that Africa has made insignificant progress in addressing the in international hunger targets, especially in the sub-Saharan region, where people are undernourished. Hazell (2013) pointed out that intensive crop production reduced malnutrition and poverty in rural economies.

Apart from this contribution, smallholder farmers spend their hard-earned income in boosting local economies, in the process stimulating local business and job creation (Wiggins, 2011). Consequently, they are very instrumental in reducing poverty. Demery and Kuhl (2011) found that an increase of one per cent per capita GDP in agriculture-reduced poverty five times more compared to a GDP increases in other sectors. Such a

view was also held by Cervantes-Godoy and Dewebre (2010), where they found that agriculture activities tend to reduce poverty compared to other sectors.

On a different note, smallholder farmers can provide wellbeing of people through nutrition (Wenhold et al., 2007). They do this by providing a variety of foods in sufficient quantities. These enable households to have an adequate balanced diet. IFAD (2011) posit that smallholder farmers, despite their contributions, they suffer from lack of nutrition. One reason pointed by Magingxa et al., (2009) was that they smallholder farmers are trapped in poverty due to the lack of access of markets. As a result, they cannot afford to buy nutritious food at all times. Baipheti and Jacobs (2009) found that 10 per cent of household food emanates from subsistence farming.

Therefore, enhancing smallholder farming may be a means for food price reduction. A view held by Thomas (2012) who points that agriculture both rural and urban appears to be a solution in addressing poverty. Accordingly, the United Nations Development Programme (UNDP) (2006) point out that food (in) security was linked to income, poverty and unemployment. It was found that poverty and unemployment had a strong relationship with food insecurity. Briefly, food insecurity begins with job losses, which in turn leads to a degraded standard of living. Consequently, lack of employment begets lack of income contributing to food insecurity as well as social exclusion.

#### **5.4 Determinant of food security**

Numerous scholars identified a number of factors that contributed to food insecurity at household level. According to Gundersen and Gruber (2001), household income is one of the critical determinants of household food security. As pointed by Aliber (2009), the relationship between a household's food security status and its purchasing power is far from static; it changes over time. According to Statistics South Africa (2011), many South African households are unable to purchase food primarily because their purchasing power is limited by a scarcity of income generation opportunities, especially in rural areas. Jacobs (2009) posit that household food security depends largely on household income and asset status. A household with few assets is likely to suffer from intermittent food shortages due to that their factor inputs cannot generate the much-needed income. Machethe (2004) contend that the level of farm income is relative to total household

income. This simply means that agricultural household derives their income from farms, although a significant income is from non-farm sources.

Gender remains one of the factors that influence the food security status of a household. Studies from de Cock et al., (2013) and Gebre (2012) found evidence that female-headed households spend a large portion of their income on food compared to male-headed households. As a result, they face more exposure to food insecurity. FAO (2012) agrees that female-headed households have higher dependency ratios, which hinders household capacity to allocate labour to on-farm or other income-generating activities. As observed by D'Haese et al., (2011), women usually do not have sufficient means to access the productive resource and their low educational levels contribute to this cause. Nonetheless, Elias et al., (2013) pointed out that if both male and female have equal participation in agriculture, production may be enhanced leading to food security.

Dlova, Fraser and Belete (2004) found that age is one of the factors that can affect the probability of a farming household being food secure. Perhaps age contributes to influencing the labour and capital needed in the farming. Bashir et al., (2012) and Kassie et al., (2012) found a negative relationship between age of household head and food security. The older the household head, the likelihood of that household being food insecure is increased due to the reliance on pension and grants. Similarly, getting older might pose disadvantages in agriculture because most of the work is physically demanding and because older household heads might be too conservative to try new and more efficient techniques that could help to increase farm productivity (Elias et al.,, 2013).

Large family sizes are known to put a strain on food consumption according to a number of studies. Dlova et al., (2004) and Olayemi (2012) state that large families are less food-secure compared to those small. The simple reasoning is that, as the household size grows, consumption increases because of the higher dependents numbers who hardly contribute to income-generating activities or food production.

Unemployment is expected to have a direct impact on food security in a household. Altman and Ngandu (2010) pointed out that high unemployment and low wage income were a major contributor to food insecurity. On the hand, poverty has been at the forefront in contributing to food insecurity. Mwaniki (2011) point to the impact of poverty as a reason

for food shortages in developing countries. Similar views were echoed by Aliber (2009), that employment has increased but with little meaningful contribution in address income poverty. As a result, numerous government policies emphasise the importance of social grants. Tanga and Gutura (2013) and Cheteni (2016) found that social grants were one of the means were households in rural areas rely upon for food security and income to purchase essentials. Fiszbein et al., (2008) noticed an increased spending on food by grant recipients, suggesting that food security is directly impacted by grants. According to the UN (2011), agriculture contributes to poverty reduction as a valuable source of income.

Access to credit is regarded as one of the most important ways of enhancing agricultural production in rural areas. However, household does not have access to financial support due to the lack of formal employment and collateral security. Kuwornu et al., (2012) point that access to credit boosts household chances of acquiring factor inputs which would boost production and improve food situation in the household. However, Masuku (2013) highlighting that households in rural areas could not access credit due to illiteracy, lack of information, and lending processes. Lack of capital is one of the contributors to food insecurity especially in rural areas were land stays idle for a long time.

Access to extension can contribute to productivity by increasing farmers' knowledge and assisting them in improving farm management practices (Feder, Murgai, & Quizon, 2004). Elias et al., (2013) noted that the extension services facilitate the adoption of improved technologies through awareness creation, acquiring knowledge and skills with the dissemination of information, and providing training that will ultimately help increase agricultural productivity thus increase household food availability. Benin et al., (2011) and Abebaw and Haile (2013) agree that membership in farmers' organization has positive significance for the probability of participation in the extension program as expected and consistent with past findings.

## **5.5 Theoretical framework**

Our theoretical framework is drawn from the household production model and the utility maximisation model. These two models help in the understanding of a household decision-making process.

In both the developed and developing countries, farming is usually organised in family units. According to the household production farm model, a farm can be perceived as a firm, producing agricultural outputs and a household supply labour and capital for the firm. Alternatively, the firm uses factor inputs (land, capital and labour) and non-factor inputs (fertilisers, pesticides, to name a few) to produce outputs. Factor inputs are sourced from the household (labour, land and capital) and external sources (banks, paid labour). The non-factor inputs are referred to as non-factor costs. These are costs, which are paid just like non-household costs such as interest to the bank and wages. We will call these paid factor costs, although in certain instances there are normative costs linked to the use of factor inputs from the agricultural household. These costs are not expenses. Revenue received from selling agricultural outputs fewer non-factor costs and paid factor costs equals income from farming from the household. The total factor income of the agricultural household originates from the supply of factor inputs to the farm and non-farm institutions.

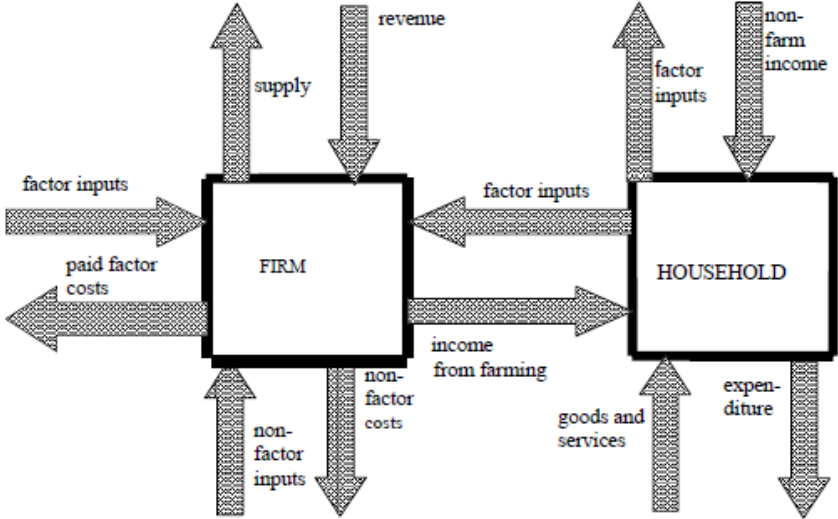


Figure 5.1: A family farm

Total factor income of the agricultural household is equals factor income plus other income originating from social benefits or direct income payments. The agricultural household spends its income (expenditure) on goods and services (consumption). Savings can be estimated from the total income less expenditure. The household maximises its utility given a budget constraint, yet the family farm maximises profit given a market or technological constraint.

Households receive income from the supply of factor inputs (labour and capital). Where is assumed that the supply of factor inputs is exogenous for example, the income is given and constant. Other sources can be income transfers from the governments. Therefore, the household behaviour is driven by a utility maximisation under a budget constraint. The indirect utility function provides a better analytical framework for a household as a function of prices of goods and services and income. The basic indirect utility function takes the following form:

$$v(Y + E, \mathbf{w}) = \max\{U(\mathbf{x}): \mathbf{w} \cdot \mathbf{x} = Y + E\} \dots \dots \dots \text{eq40}$$

Where:

- $v(\cdot)$ : indirect utility function
- $U(x)$ : direct utility function
- $\mathbf{w}$ : vector of prices of goods and services
- $Y$ : income from factor supply
- $E$ : income transfers
- $\mathbf{x}$ : vector of demanded goods and services

The assumption is that; rural households maximise utility by choosing from a set of choices. In this case, the income received from both the farm, government and other sources is used to buy food. Considering that the targeted villages rely most on the informal economy, we expect limited sources of income. For the sake of this study, we would ignore the demand for leisure analysis. Where if the labour supply were no longer exogenous, households would consume leisure.

The inverse of the indirect utility is the expenditure or cost function ( $e(U, \mathbf{w})$ ) of an individual. It reveals that the individual expenditure on consumers is dependent on the prices of commodities and the level of prices. The expenditure derivative function in respect to the price of goods or services is equivalent to the Hicksian demand function or Shepherd's lemma. The Hicksian demand function shows how demand is related to the utility level of an individual and the commodities prices. The Shepard's lemma takes the form:

$$\frac{\partial e(U, \mathbf{w})}{\partial w_1} = h_i(U, \mathbf{w}) \quad i = 1, \dots, N \dots \dots \dots eq41$$

Where:

$e(U, \mathbf{w})$ : Expenditure function

$h_i(U, \mathbf{w})$ : Hicksian demand for good  $i$

Based on the Hicksian demand function, we hypothesize that food demanded by agricultural households is related to their utility level and commodity prices. In other words, expenditure is marched with demand, suggesting that households that produce food, which they consume, are subject to certain constraints in production, income and time factors.

## 5.6 METHODS

This section provides a description of the study area and the methods of data analysis. This research was done in the Eastern Cape Province of South Africa. The province is shown diagrammatically in Figure 2 with all district municipalities.

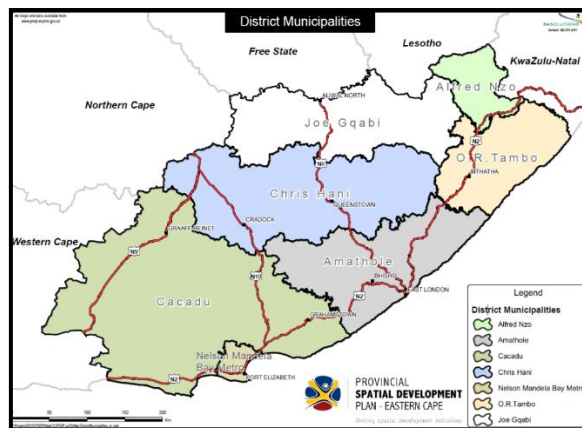


Figure 5.2: The Eastern Cape Province Source: Provincial Spatial Development Plan-Eastern Cape (2012)

### 5.6.1 STUDY SETTING

The Eastern Cape Province is the second largest in the country with the third largest population and is one of the two poorest in the country (StatsSA, 2016). The unemployment rate is generally high in the whole province, with the manufacturing sector being the dominant employer (StatsSA, 2016). The province is divided into six districts

and two metropolitan areas, namely the Buffalo City and Nelson Mandela Bay. It has 37 local municipalities, with the majority located in the peri-urban areas.

The O.R Tambo municipality has high rainfall areas with annual rainfall of over 700 mm annual. The municipality is characterised by a range of farming activities from crop production to stock farming. This makes the area ideal for investigating food security. According to the National Disaster Management Council (NDMC, 2011), agriculture is practised predominately by subsistence farmers residing in rural settlements dominated by communal settlements. Communal grazing and arable land for farming surround the settlements. USK Consulting (2009) pointed that the household income levels are generally low, and the municipality is regarded as the second poorest in the Eastern Cape Province, with over 88 per cent living under the minimum poverty line (DAFF, 2015). In terms of poverty, the municipality has over 72.2 per cent of households in poverty (OR-IDP, 2016). At the same time, the Gini coefficient is 0.59, slightly lower than the national (0.66). At least 75.1 per cent of households depend on government grants, which represent around 20 per cent of the Eastern Cape Province income (OR-IDP, 2016). Thus, demonstrating that poverty is endemic considering that most households rely on grants, which hardly surpass an equivalent of US\$200 per month. The population density is around 110 people per square kilometre, which is above the national 42.39 persons per square kilometre (OR-IDP, 2016).

### **5.6.2 STUDY POPULATION AND SAMPLING**

The study was conducted in 15 villages, which fall under rural areas, and the population included all the households residing in those villages. A sample size of 320 was targeted, although only 296 households managed to participate in the study due to circumstances beyond the researcher's control. All the districts were purposively chosen because of their agricultural potential, geo-climatic and cropping history. This was done specifically to ascertain rich information that would assist the researcher to assess the food security status and dietary diversity in detail. The study employed a cross-sectional design, where data was collected at one point in time. Households were randomly selected to partake in the study.

**5.6.3 DATA COLLECTION**

A household diversity questionnaire composed of 19 items which asked the food eaten or drank during the day and night, whether home or outside, was administered to the respondents. The study used a reference period of 3 to 7 days as a benchmark, although the recall period was 24 hours as suggested by FAO (2014) due to a less recall error. As pointed by Arimond et al., (2010) and Kennedy et al., (2007), basing on a 24-hour recall period are easier compared to longer recall periods. In rural areas, it is a common feature for people to consume meals outside a home where sharing is a norm. In terms of consumption patterns, it was necessary to avoid doing the study during holidays because consumption in those periods does not reflect a typical household diet.

The Household Dietary Diversity Score (HDDS) for each household was calculated by hand and with the help of an Excel Spreadsheet. Scores were summed up by adding the number of food groups consumed by a household or individual respondent over a 24 hours' recall period (FAO, 2012). For instance, we assign letters from A to L for each food group (A + B + C + D + E + F + G + H + I + J + K + L). Then we use the average HDDS indicators as shown in equation 1

$$\text{Average HDDS} = \frac{A+B+C+D+E+F+G+H+I+J+K+L}{\text{Number of Households}} \dots\dots\dots (\text{eq42})$$

The dietary diversity score varies across food groups and does not indicate the quantity of food consumed by a household. We then estimate a Household Food Consumption Score (HFCS). According to IFPRI (2008), the HFCS is a frequency weighted HDDS. Therefore, the HFCS is calculated using by using the frequency of consumption of 8 food groups consumed as shown in equation 42 (USAID, 2015).

$$\text{FCS} = (\text{starches} * 2) + (\text{pulses} * 3) + \text{vegetables} + \text{fruit} + (\text{meat} * 4) + (\text{dairy} * 4) + (\text{fats} * . 5) + (\text{sugar} * . 5) \dots\dots\dots (\text{eq43})$$

In order to get a score, the weighted food groups scores are summed up, and the HFCS variable is recoded from a continuous variable into a categorical variable by using the following threshold: 0-21 (poor), 21.5-35 (borderline) and above 35 (acceptable) (FAO, 2011).

## 5.7 Binary logistic regression model

The study made use of a binary logistic model. The probability of a dichotomous outcome is related to a set of explanatory variables in this statistical technique. Katwijuke (2004) noted that it is a statistical tool used to determine the influence of independent variables on dependent variables. The model can be used to predict a dependent variable based on continuous and categorical independent variables. In this study, the binary model is employed for these reasons.

Prob(Event) = Prob (Y, represents *i*th household food secure, and 0 otherwise)

We estimate a binary model and it takes the following specification:

$$y^* = \begin{cases} y = 0, & \text{if } UV^0 \geq U(V^1) \\ y = 1, & \text{if } UV^0 < U(V^1) \end{cases} \quad (\text{Eq44})$$

where  $y^*$  is the unobservable latent value of a household, and  $V^0$  and  $V^1$  represent the expected outcomes of food secure and non-food secure in a certain period. The equation shows that a household would be regarded as food poor when the total income for a month is on the food poverty line or under. The empirical model of household  $i$  on period  $t$  can be written as follows:

$$y_{it}^* = \beta_0 + \beta_i X_{it} + \mu_{it} \quad (\text{Eq45})$$

$$y_{it} = 1 \quad \text{if } y_{it}^* > 0 \quad (\text{Eq46})$$

$$y_{it} = 0 \quad \text{Otherwise}$$

where  $y_{it}^*$  is the unobservable value of household  $i$  in time  $t$ ,  $y_{it}$  is the observable choice,  $X_{it}$  is the explanatory variables for a household  $i$ ,  $\beta_i$  is a vector of coefficients for household  $i$  and  $\mu_{it}$  is a vector of unobservable characteristics related to household  $i$  in time  $t$ . A number of models can be used to estimate the empirical model. The basic point of departure is to use a probit or logit model to depict the choice of being poor or non-poor. Another approach is to use a multinomial model or a bivariate probit model (Jenkins, 1998; Devicienti, 2000; Greene, 2000; Justino & Litchfield, 2003). Our empirical strategy is based on the operation that a household status is not a nested problem. Therefore, we have a binary response as follows:

$$E(y_{it}^* \parallel X_{it}, \mu_{it}) = \beta_0 + \beta_1 X_{it} + \mu_i \quad (\text{Eq47})$$

where a binary response  $y_{it}$  we have  $E(y_{it}^* \parallel X_{it}, \mu_{it}) = \pi_{it} = \Pr(y_{it}=1)$  and a generalised intercept model for the dependency probability  $\pi_{it}$  on  $X_{it}$  is as follows:

$$F^{-1}(\pi_{it}) = \beta_0 + \beta_1 X_{it} + \varepsilon_i \quad (\text{Eq48})$$

where  $F^{-1}$  is the link function which is the inverse cumulative distribution function of a known distribution. In the logit model,  $F^{-1}(\pi_{it})$  is the log-odds that  $y=1$ . Thus, eq5 takes the following form:

$$\log\left(\frac{\pi_{it}}{1-\pi_{it}}\right) = \beta_0 + \beta_1 X_{it} + \mu_i \quad (\text{eq49})$$

Therefore,  $\beta_1$  is the effect of a 1-unit change in  $x$  on the log odds that  $y=1$ , while holding the household effect  $\mu$  constant. Simply put, we are looking at the effect of  $x$  on household food security status.

Let  $X_i$  represents the set of parameters which influence food security of the  $i$ th household.  $Z_i$  is a direct utility, which is a linear function of  $k$  explanatory variables ( $X$ ) which are expressed as follows;

$$Z_i = \beta_0 + \sum_{i=1}^n \beta_i X_{ki} \quad (\text{eq50})$$

where  $\beta_0$  is the intercept,  $\beta_1, \beta_2, \dots, \beta_i$  are coefficients associated with the explanatory variables  $X_1, X_2, \dots, X_{ki}$ . Factors in a vector  $X$  explain the probability of the  $i$ th household being food secure.

$$P_i = \frac{e^{z_i}}{1+e^{z_i}} \quad (\text{eq51})$$

where  $P_i$  denotes the probability that the  $i$ th household is food secure and  $(1-P_i)$  is the probability that the household is food insecure. The odds ( $Y=1$  versus  $Y=0$ ) to be used is defined as the ratio of the probability that the household is food secure ( $P_i$ ) to the probability of food insecure ( $1-P_i$ ) namely odds  $= P_i / (1-P_i)$ . By eliminating the natural log, we get the following equation:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) \quad (\text{eq52})$$

where  $L_i = \log$  of the odds ratio,  $P_i =$  probability of being food secure and  $(1-P_i) =$  the probability of being food insecure.

$$P_i = \frac{1}{1+e^{-z_i}} \quad (\text{eq53})$$

and the value of  $Z_i$  is referred to as the log of the odds ratio in support of being food secure and is calculated as follows:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + \mu \dots \dots \dots \text{(eq54)}$$

where:

$\beta_0$  = intercept term

$\beta_1, \beta_2, \beta_3 \dots \beta_n$  are slopes of the parameters of the model which measures  $L_i$  for a unit change in explanatory variables.

$X_1 \dots X_n$  is factors that explain factors influencing food security of a household.

The variables used in this study and the expected signs are shown below in Table 5.1.

The food security status was measured by recoding the HDDS, where households consuming over 5 food groups were said to be food secure and assigned a numerical value 1, and those consuming less than 5 food groups were said to be food insecure assigned a numerical value (0).

**Table 5.1: Binary model variables**

Variable	Variable description	Type of measure	Expected outcome (+/-)
<b>DEPENDENT VARIABLE</b>			
<b>FOODSECURE</b>	If whether the household is food secure or not	Dummy (1=yes, 0 = no)	
<b>EXPLANATORY VARIABLES</b>			
FCS	Food consumption score	Actual numbers	
AGE	Age of respondent	Actual number of years	+/-
GENDER	Gender of respondent	Dummy (0=male, 1 = female)	+/-
EDUCATION	Highest education of the respondent	Categorical	+
HHINCOME	Household income	Continuous	+
ACCCREDIT	Whether the household has access to credit or not	Dummy (1=yes, 0 = no)	+
HHS	Size of the household	Continuous	+
EXTENSION	Whether the household has access to extension services or not	Dummy (1=yes, 0 = no)	+

EMPLOYMENT	If whether the household head is employed	Dummy (1=yes, 0 = no)	+
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## 5.8 FINDINGS OF THE STUDY AND DISCUSSIONS

Demographic characteristics in the study area indicate that most households were composed of respondents who were over 45 years (approximately 70 %) of age, and most were female-headed (87%). In terms of marital status, 51 per cent of the household's head were married, 43 per cent were single and 4 per cent were divorced. Yet, the majority (35%) of households had around 6-12 family members and 53 per cent possessed secondary level qualification. In terms of credit support, 73 per cent of households were not receiving credit support and 85 per cent had to access to agricultural extension services. To illustrate the demographics in a detailed manner, a B plot was done on household size, income, education level and marital status. This is shown in Figure 5.3.

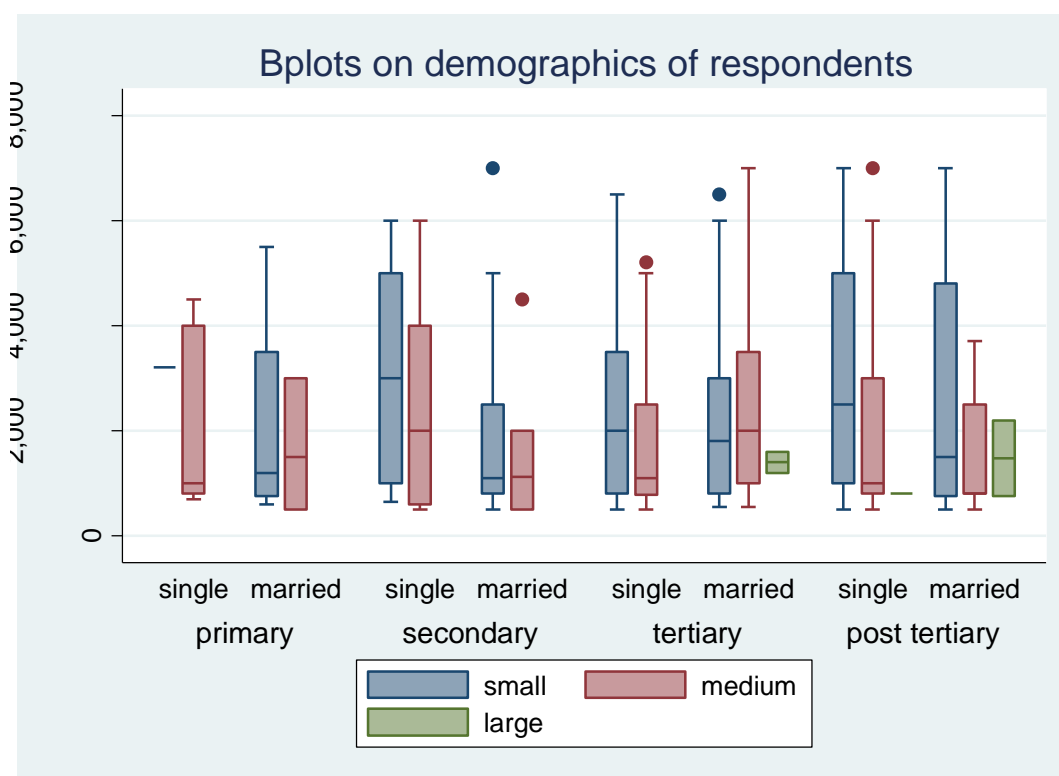


Figure 5.3: Demographics of respondents

Source: Survey data (2017)

According to figure 5.3, households with primary education, but with small to medium family size had the lowest income (ZAR4000 or less) level. Yet, households with secondary had over ZAR500-6000 in terms of income level. Although a small-medium

sized household (single) had high-income levels (ZAR2000-4000) compared to the small-medium households (married) who had around ZAR2000-2500. Although there were outliers with some households (married) having an income level of over ZAR5000-6000 month.

Partly it may be that single households with small to medium family sizes save more income compared to the married households with a similar family size. On the other hand, households with tertiary level education had a monthly income of below ZAR4000 for both the single and married. While those with a large married household had the lowest income (less than ZAR2000). Lastly, small households with post-tertiary level education had an income ranging between ZAR4000-6000 monthly. While, medium households ranged from ZAR2000-4000, and large households had ZAR2000 or less in terms of income. One thing that can be noted is that small sized households had more income and bigger households had the lowest income monthly. The major reason is that, as the household gets smaller in terms of family size, their propensity to save is greatly enhanced, yet when the household has a large family size their propensity to consume increases.

A scatter plot was done on income distribution and age. Figure 5.4 shows that most households had a monthly income which was less than ZAR2000, although some had close to ZAR4000. The scatter plot shows that most of the respondents were over 40 years of age. The income distribution was a reflection of the current situation in a number of rural areas in South Africa where most households rely on government grants. This is the case in South Africa, especially in the Eastern Cape Province as pointed by Cheteni et al., (2015) and Taruvinga et al., (2013) with regards to income dynamics in rural areas.

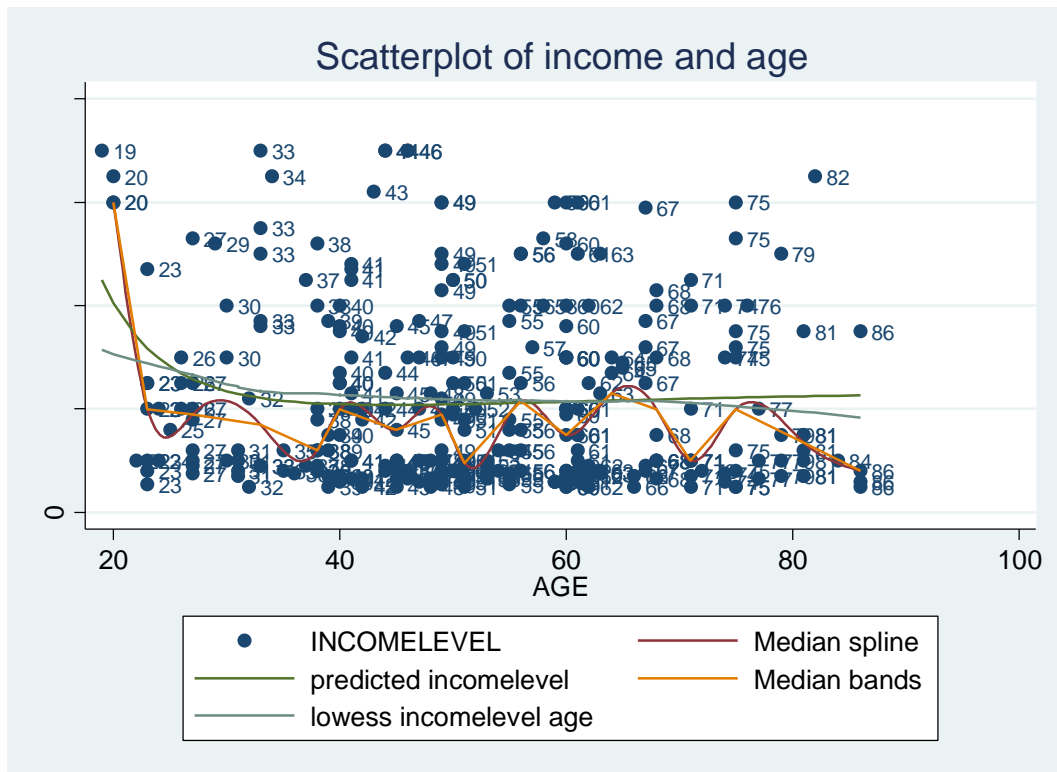


Figure 5.4: Scatterplot of income and age

Source: Survey data (2017)

The predicted income level is almost similar to the lowest income level for all ages. Notable the median band line is hovering around the lowest income, pointing out that most households had income levels around ZAR2000.

### 5.8.1 HOUSEHOLD FOOD SECURITY STATUS

To have a clear picture of the household food security status, demographic characteristics were included as shown in Figure 5.5.

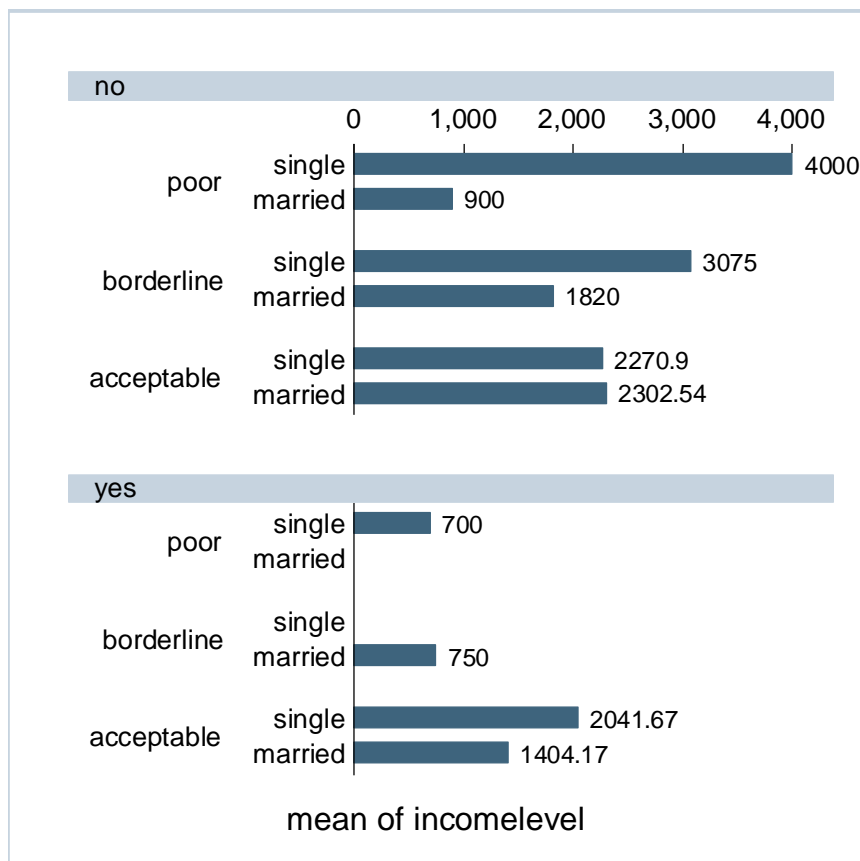


Figure 5.5: Household food security status and income

Source: Survey data (2017)

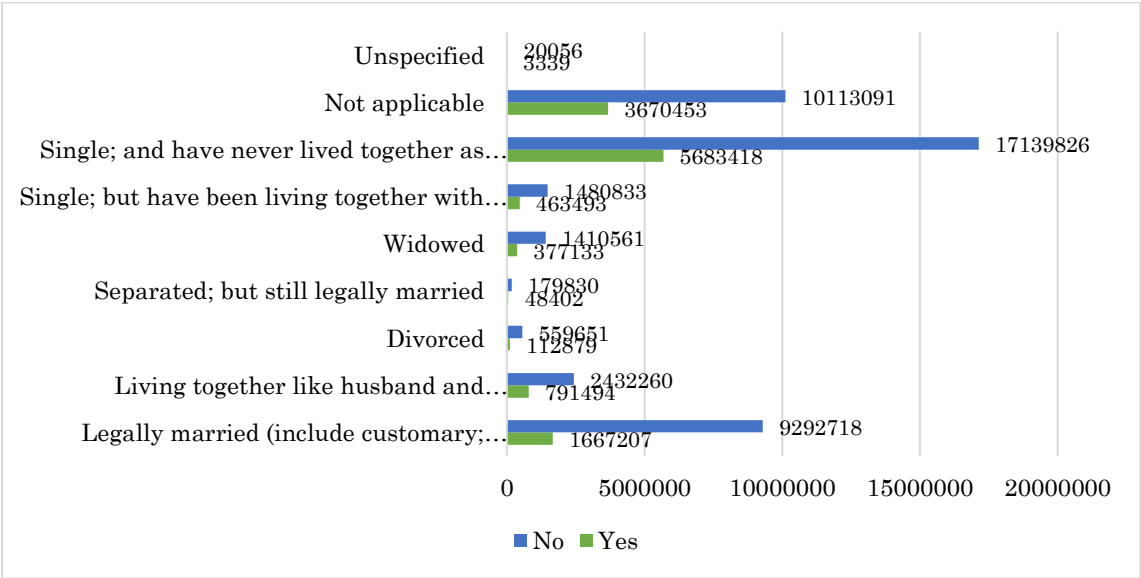
According to Figure 5.5, households were grouped into three classes' namely; poor, borderline and acceptable. Households classified under 'no' were not participating in a government food security programme and the ones under 'yes' were participating in a government food programme. Non-participating households in food security programmes regarded as poor, single had the largest income mean of ZAR4000, yet, those falling on the borderline, and single had ZAR3075 mean income. However, those at the acceptable range were at an income level of about ZAR2270-2302 for both the single and married. Based on this finding, it can be concluded that single households on the poor-borderline bandwidth had more income, as a result, they might have not seen the need to participate in food security programmes.

On the other hand, households who were participating in food security programmes were mostly at acceptable levels in terms of food security, with both single and married having a mean income of around ZAR1400-2050. There were no single households falling in the borderline and there were no married households falling on the poor bandwidth. Therefore, we can safely conclude that households participating in food security

programmes were more food-secure compared to the non-participating, although in terms of income levels, households who were not participating in food security programmes had more income. Put differently, we can also conclude that households with high-income levels did not see the need to participate in food security programmes, although the study results pointed that majority of those households were on the poor to borderline bandwidth.

Single households were the most who were not participating in food security programmes compared to the married ones. Therefore, it can be inferred that marital status has an impact on the decision to participate in food security programmes, as well as, impact on income dynamics as shown in figure 5.5.

We compare the findings with the results from the South Africa Community Survey 2016. As shown in figure 6, single households who have never lived together as partners run out of money to purchase food more often than the legally married. This observation is consistent with the study finding that married households are more food-secure compare to the single households. Concisely, this means that married households make it a priority that they have adequate food compared to the single that have few responsibilities in terms of family upkeep.



**Figure 5.6: Marital status by Run out of money to buy food in the past 12 months** **Source: StatsSA (2016)**

**5.8.2 HOUSEHOLD DIETARY DIVERSITY SCORE (HDDS)**

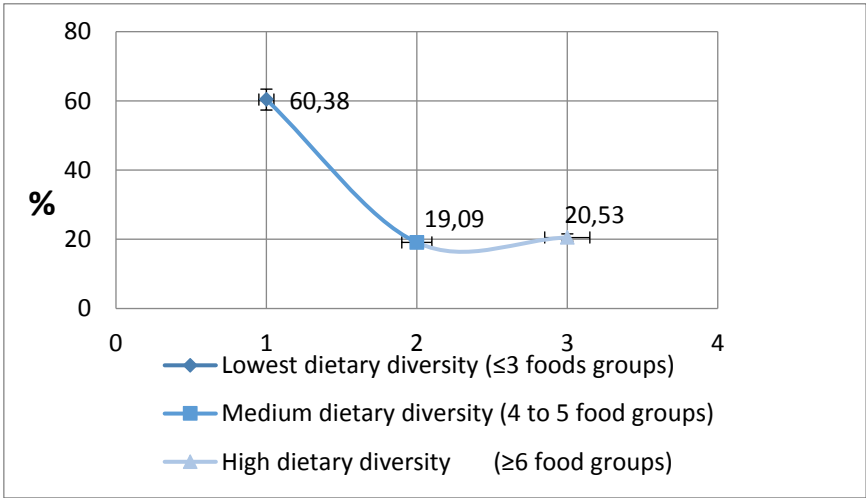
The HDDS was calculated by grouping the following 12 food groups: roots and tubers, cereals, fruits, milk products, sugar and honey, meat, eggs, fish and seafood, poultry and offal, pulses legumes and nuts, miscellaneous (FANTA, 2006). The HDDS was categorical coded into 3 dietary classes were lowest diversity (3 or fewer foods groups), medium diversity (between 4 and 5 food groups), and high diversity (6 or more food groups). Table 5.2 illustrates the food groups.

**Table 5.2: HDDS for households**

Lowest dietary diversity (≤3 food groups)	Medium dietary diversity (4 and 5 food groups)	High dietary diversity (≥6 food groups)
Cereals, root crops, tubers	Fruit	Fruit
Milk	Milk	Milk
Pulses	Pulses	Pulses
	Meat and fish	Meat and fish
	Cereals and tubers	Oil
		Sugar
		Vegetables
		Cereals tubers

Source: Survey data (2017)

According to Table 2 households with a lower dietary diversity consume at most three food groups, while those with medium dietary diversity households consumed at most 5 food groups. High dietary households consume at least 6 food groups as shown in figure 5.7.



**Figure 5.0.7: Household Dietary Diversity Scores** Source: Survey data (2017)

Figure 5.7 shows that 60 per cent of households fell in the lower dietary diversity group, 19 per cent in the medium dietary diversity group, and 21 per cent in the high dietary diversity group. Most households consumed 3 food groups namely; milk, cereals and pulses. The mean average of the HDDS was 3, possibly revealing that most households were not consuming many food groups. Lower dietary households consuming 3 food groups were regarded as food insecure, households consuming 3-5 food groups were moderate food secure, and those consuming over 6 food groups were food secure. The results clearly point that households in the study area had poor dietary diversity, which is one of the major contributors to stunted growth in children.

The USAIDS (2015) points out that the HDDS gives an indication of food groups consumed by households in the last 24 hours, as a result, it should not be used as a nutrition indicator but rather an indicator of food access. A study conducted by Taruvinga et al., (2013) in the Eastern Cape in two local districts found that food groups such as sugar, condiments, oils, grains and potato were dominant. However, this study finds dissimilar results in different local villages, although the same conclusion of low dietary diversity by Taruvinga et al., (2013) holds in this study.

As stated before, this might have been influenced by the geographic location of the households. Areas with inadequate rainfall mainly rely on starch food such as maize, potatoes and other foods compared to areas with high rainfall, where households can have a variety of food groups. However, this study finds similar results to Taruvinga et al., (2013) on low dietary diversity regardless of geographic location. Basically, this point that geographic location has a minimum impact in influencing household dietary diversity. An HDDS distribution chart according to income level was done in order to assess how income affects food security and household dietary diversity.

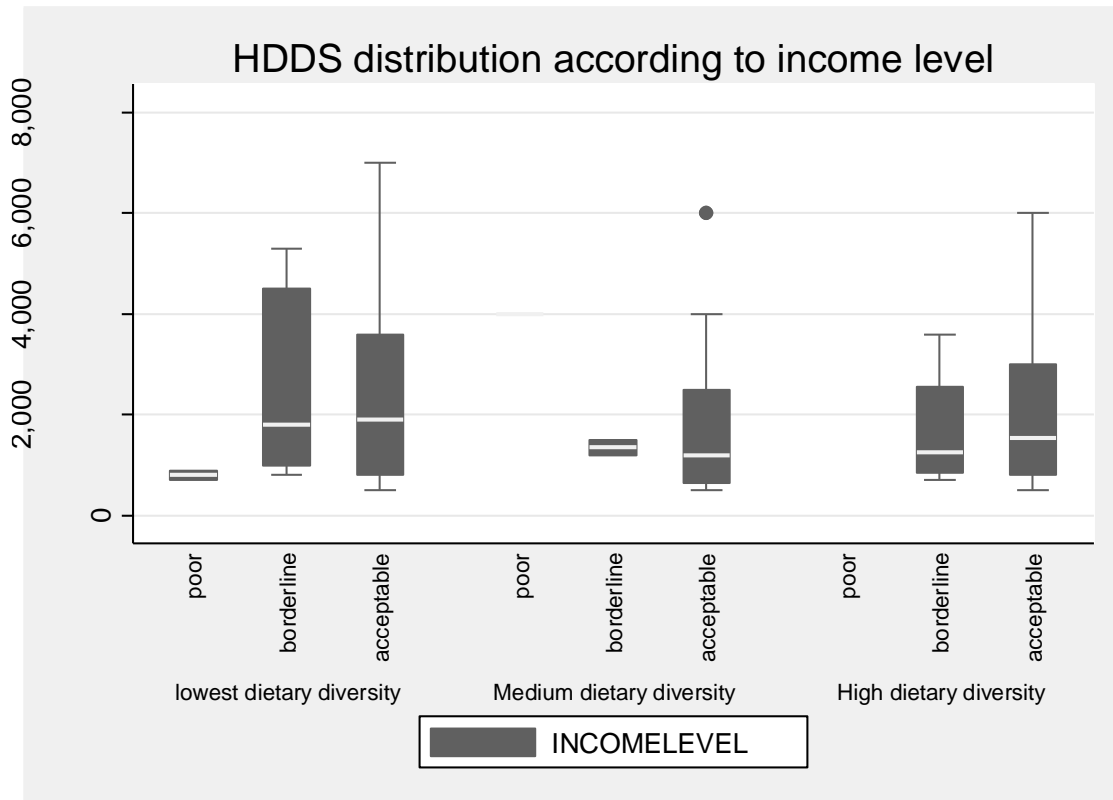


Figure 5.8: Households Dietary Diversity Scores Source: Survey data (2017)

Figure 5.8 shows that households with the lowest dietary diversity had a high-income level compared to the high and medium dietary households. In lower dietary diversity households, the majority were of borderline in terms of food consumption and acceptable. Yet, households with medium dietary diversity had acceptable food consumption level, and high dietary diversity households were both in borderline and acceptable food consumption level. Concisely, income level is having an impact on household food security and dietary diversity to a lesser extent. Most households were spending their income on food consumption. Therefore, regardless of their dietary diversity, most households were lying on the borderline and acceptable food consumption level.

### 5.8.3 THE 7-DAY FOOD FREQUENCY

Figure 5.9 illustrates the findings of the 7-day food consumption frequency.

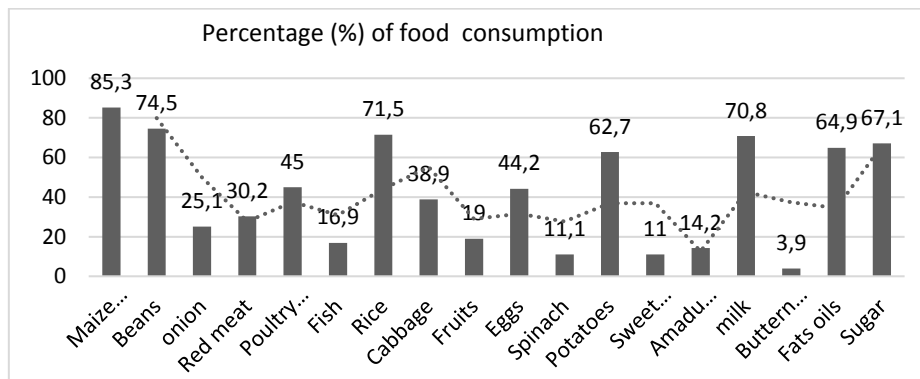


Figure 5.0.9: 7-day frequency food consumption

Source: Survey data (2017)

The average HDDS score was 3.4 indicating that on average each household consumes 3 food groups out of the 8 food groups available signifying a lower dietary diversity in their access to food. Maize was the most consumed food (85%) by households, the reason being that it is used for mealie meal, porridge and pap. Secondly, 75 per cent of the respondents had consumed beans in the last 7 days, as well as rice (71%). Respondents stated that beans are usually eaten as a complementary product with rice or pap, and it is very cheap. As a result, most households usually consume it. Besides the mentioned food, potatoes, fat oil, sugar, milk and poultry were some of the consumed food items.

FAO (2007) stated that in developing countries, low dietary diversity is a norm because of challenges faced by households such as poverty and unemployment. Given that most households surveyed were doing subsistence farming, the FAO (2007) observations hold in this case. Nonetheless, households surveyed stated that they usually eat what is available, or anything from their farms or gardens. Moreover, they pointed out that dietary diversity is not a prime concern when buying food. As a result, obesity is a norm around the study areas due to the food eaten by households.

#### 5.8.4 HOUSEHOLDS FOOD CONSUMPTION

According to figure 5.10. low income, and above income households had poor food consumption levels, although in terms of dietary diversity the above income households were on the medium dietary level. On the other hand, high income and over poverty line households were on borderline in terms of food consumption level, yet there were regarded as low dietary. In terms of acceptable food consumption level, households with above average income had at most low dietary diversity. Succinctly, most households

had low dietary diversity with the exception of the above average income households who had poor food consumption levels but with medium dietary diversity. It can be concluded that the sampled population had a low dietary diversity, although there had borderline to acceptable food consumption levels regardless of their income.

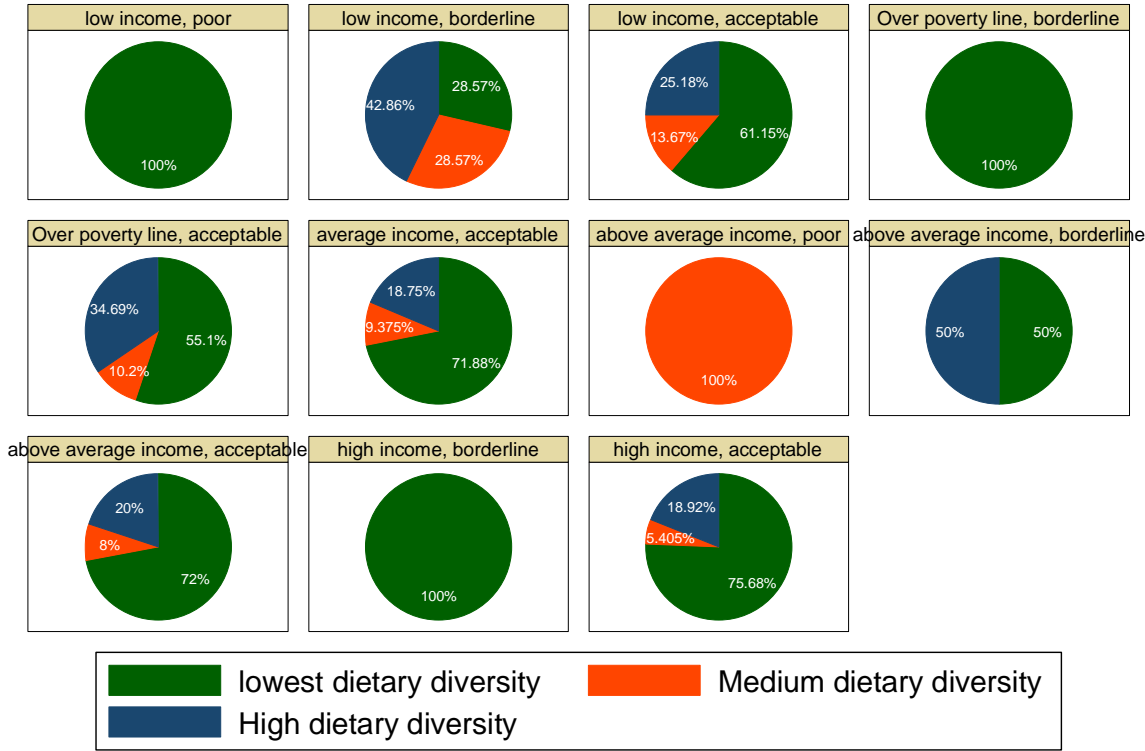


Figure 5.0.10: Household Food Consumption

Source: Survey data (2017)

**5.9 Binary Model Results**

A binary model was used to estimate the factors influencing the food security status in the study areas.

**5.9.1 MODEL FIT**

The number of observations was 296 and the Restricted Log likelihood value is 351.230 and Cox & Snell at 11 per cent. The Hosmer and Lemeshow test statistic were used to test the goodness-of-fit or predictive efficiency of the model (Table 3), and the model explained about 65 per cent (Nagelkerke R-Squared) of the variance in household factors influencing food security status and correctly classified about 14 per cent of cases. The Hosmer and Lemeshow Test is the most robust test or the model fit. Unlike the most *p-values* we want  $p \geq 0.05$  to indicate a good fit to the data. As shown in Table 5.3, the *p-value* is over 0.05 suggesting that there is no difference between the observed and the

predicted model values of the dependent variable. The -2 log likelihood is a measure of how well the model explains variations in the outcome of interest. The *p-value* for the model is less than  $p = 0.05$ , hence, we conclude that the addition of variables is statistically significant.

**Table 5.0:3: Binary logistic model results**

VARIABLES	B	S.E.	WALD	DF	SIG.	EXP(B)
FCS	-0.002	0.008	0.049	1	0.825	0.998
GENDER	-1.172	0.483	5.882	1	0.015***	0.310
AGE	-0.022	0.009	6.504	1	0.011***	0.978
EDUCATION			4.062	3	0.255	
EDUCATION(1)	0.445	0.629	0.501	1	0.479	1.561
EDUCATION(2)	-0.425	0.450	0.893	1	0.345	0.654
EDUCATION(3)	0.326	0.304	1.146	1	0.284	1.385
EMPLOYMENT	-0.348	0.278	1.569	1	0.210	0.706
HHINCOME	0.000	0.000	3.457	1	0.063*	1.000
ACCCREDIT	0.938	0.318	8.721	1	0.003***	2.555
EXTENSION	-0.242	0.370	0.429	1	0.512	0.785
HHS	-0.007	0.039	0.033	1	0.855	0.993
Constant	.589	0.812	0.525	1	0.469	1.801
Number of observations				296		
-2 Log likelihood				351.230		
Cox & Snell R Square				0.109		
Nagelkerke R Square				0.138		
Hosmer and Lemeshow Chi-Square Test				8.775 (df = 8; p-value = 0.362)		
Omnibus Tests of Model Coefficients Chi-square				31.473 (df =11; p-value = 0.001)		
Overall model prediction (%)				65%		
Significant at 10%*; 5%** & 1 %*** significance level						

Source: Survey data (2017)

The binary logistic model results indicate that 4 variables were statistically significant in influencing food security status in the study areas.

The variable employment status **AGE**- is negative in influencing the household food security status and statistically significant at 1 per cent significance level with  $p = 0.011$ ; beta coefficient  $\beta = -0.022$ . The odds ratio ( $\text{Exp}(\beta) = 0.978$ ) means that the young the household head there are about 0.978 times more like to be food secure. On the contrary, Aidoo, Mensah and Tuffour (2013) found no statistical significance of age influencing food security status in households.

With reference to **GENDER**, results indicate a negative association between gender and food security. The variable was statistically significant at 5 per cent significance level with

$p=0.015$ ; beta coefficient  $\beta=-1.172$ . The odds ratio ( $\text{Exp}(\beta) = 0.310$ ) suggests that female-headed household was 0.310 times more likely to be food secure compared to males. This finding is similar to Taruvinga et al., (2013) who also pointed out that female-headed households were likely to be food secure compared to males. Similarly, Rogers (1996) claimed that female-headed households spend more on high quality and protein-rich foods because women are involved in food preparation.

The variable household income **HHINCOME**- positively influences the household food security status and is statistically significant at 1 per cent significance level with  $p=0.063$ ; beta coefficient  $\beta =0.000$ ; the odds ratio ( $\text{Exp}(\beta) =1.000$ ) means that the higher the income, the household has 1.000 times of improving their food security status. Gebre (2012) indicated that households who have access to employment and earning an income are less likely to be food insecure. Therefore, their household food security status is usually positive. As noted by Taruvinga et al., (2013), income had an association with food security. This is in line with a number of authors (Thiele and Weiss, 2003; Pollack, 2001) who claimed that an increase in income leads to a demand for a variety of fruits and vegetables.

Lastly, the variable access to credit **ACCCREDIT**- is positive in influencing food security status and statistically significant at 10 percent significant level with  $p=0.003$ ; beta coefficient  $\beta=0.938$  with the odds ratio  $\text{Exp}(\beta) =2.555$ ), which means that the more credit a household has access to, the higher the chances of being food secure.

## 5.10 SUMMARY OF THE FINDINGS

The study was conducted in the Eastern Cape Province, South Africa, and the aim was to identify factors influencing household food security. The data was gathered through the administration of questionnaires. According to the HDDS, a majority of households (61%) were consuming at most three food groups and lacked dietary diversity. The most consumed food groups were the milk, cereals and pulses. On the other hand, the HFCS pointed out that most households were at an acceptable level in terms of food security, although it was on the short term. The empirical model confirmed that age, access to credit, gender and household income were influenced household food security status and dietary diversity in the study area. The findings clearly demonstrated that income was a huge factor in fighting food insecurity in the study area. There was evidence that

household food insecurity was a prominent feature in the sampled areas. A number of households are food secure in the short term; this sends a strong message to policymakers, programme designers and agencies on efforts needed to help those households to be food secure in the long term considering that in 2015/16 there was drought throughout South Africa. The drought led to number of rural households losing agricultural yields and livestock, which is the backbone of a rural economy. Therefore, the government should focus on improving rural livelihoods if they want to improve food security.

#### **5.10.1 POLICY IMPLICATIONS**

The implications of the study findings is that gender, access to credit and income play a huge role in food security in rural areas. Therefore, as the proposed National Development Plan targets poverty, the first step would be to eradicate food poverty that is prevalent in the rural areas. In the 2015/16 period, drought caused considerable loses to livestock in rural areas. This livestock were also used for farming, suggesting that household's factor inputs have severely declined in a number of rural areas. Consequently, the government needs to focus on initiatives, which drive capital assets to improve food security in rural areas.

This would go a long way in improving their household income status considering that numerous participants were relying on government grants. Most participants were beyond youth age, suggesting that agriculture is facing problems of less participation by the youths. As Cheteni (2016) study on youth participation in agriculture pointed that, there is less youth participation in agriculture. Failure to address this problem will further expose agricultural households to food insecurity as the ageing population declines. Subsequently, there is a urgent need for the South African government to find lasting solutions in addressing this problem. Unemployment amongst the youth has spiked to its highest levels as well.

Another case to make is about women empowerment in agriculture. Numerous studies in rural South Africa found that most households are female-headed. Given that, females have limited options of sourcing income, to would be wise for the government to see that

female-led agriculture projects or initiatives need to be supported by the Department of Agriculture. This would, in turn, help in fighting food poverty.

Future studies can be directed at accessing the impact of the 2015/16 drought on rural households' informal economy. Such studies will unmask the likely effects of drought on food security, as well as, nutrition in the rural areas. This is because our study was limited to a rural area that was not seriously affected by drought. It would be worthwhile to consider some of the food indicators that capture calorie intake, crop yields and household coping strategies.

## CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

The study explored various causes of poverty in South Africa and stylised facts facing the poor. Consequently, the findings have various policy implications. Firstly, the findings in Chapter 2 highlighted that poverty is persistently higher in rural areas than in urban areas, suggesting that a lot needs to be done to bridge the gap between people in those areas. Macroeconomic policies should target to reduce this discrepancy. Pro-poor policies need to be intensified and complimented with state initiatives that aim to uplift the informal economy. Klasen (2009) defined pro-poor growth as maximising the income gains of the poor. This means that the government should take into account the sectors where the poor are more active, regions where they live and uplift their initiatives.

Statistics show that the most people who are unemployed are at the 15-36 years age group. Therefore, initiatives that target youth development can be used to promote the unemployed youths. For instance, capacity can be enhanced in the agricultural sector. Cheteni (2016) study on youth participation in agriculture, highlighted a major disjoint between what youth want in agriculture and what is provided. A number of youth interviewed in the study pointed that the government has not done much in terms of encouraging youth to contribute much in agriculture, yet, agriculture in form of subsistence farming is one of the major contributors to local development in rural areas. Subsistence farmers remain sidelined from the mainstream markets.

Thus, the government has already proposed that more contribution needs to come from agriculture, and small-scale farmers need to be supported. Findings from chapter 2 also pointed out that the most vulnerable provinces to poverty are the Eastern Cape, Limpopo and the KwaZulu Natal. These provinces are dominated by rural areas, where a number of people stay in homelands. Cheteni, Mushunje and Taruvinga (2014) found that these provinces had large stark of land that was underutilised for farming. Implying that if the government can identify households with underutilised lands in those provinces and sponsor them with farming inputs such as irrigation and seeds. Such an approach would undoubtedly create a job for the unemployed in those areas.

Provincial differences in Chapter 2 and 3 points that while poverty has reduced in a number of areas, this gives much justification for the government to be target pro-poor initiatives regional. Regional inequality and poverty can be solved by targeting regions

or geographical areas with customised development projects. For instance, the KwaZulu Natal has more potential in sugarcane farming, while the Eastern Cape has a viable automotive industry.

This means that the government should aim to resuscitate jobs by specifically targeting areas of great potential per province, as opposed to launching a policy that would struggle to kick off. Income disparities are sometimes caused by these regional differences as shown in Chapter 2, where the Gauteng and the Western Cape Province had high-income averages compared to the rest of the provinces. While Gauteng is said to be contributing 40 per cent of the GDP, focusing on it and neglecting other provinces has increased levels of poverty in other regions as pointed by the Department of Home Affairs. A number of people, mostly young relocate to Gauteng and the Western Cape to look for jobs, in the process, their own provinces lose out in terms of having skilled people who can contribute to its development. This inter migration leads to skewed growth in terms of opportunities and infrastructure growth.

Chapter 4 focused on the linkage between drug-related crime and poverty. It was found that poverty contributes to criminality in the short run. Likewise, inequality was found to be one of the contributors to crime. Literature review reveals that inequality and poverty have shown to be driving factors to crime. However, it is not always the case that the two leads to crime. South Africa is a unique case on the basis that local authorities are also involved in drug trade, which makes it difficult to fix the problem. Numerous government reports have pointed out that in general crimes committed constantly seem to be driven by a system.

The fact that drug trade is still at its highest levels, reveals that law enforcement is not doing enough to tackle the problem. A corrective action would be to establish drug dedicated units with the police force so as to get to the source of the problem. This alone would not end drug-related crimes, however, having long jail terms for offenders with no option of bail is another route that will discourage drug-related crime. For instance, when an offender is arrested for drugs he may spend over 10 years in prison without parole. Zimbabwe is one good example of where drug crime is not tolerated because of long jail terms.

Nonetheless, the major troublesome problems facing South African jails is that there seem to be offering offenders a good life compared to the societies where they came from. As a result, most criminals who have been to jail are constant offenders. In short, the jail environment is very encouraging for criminals, to such an extent that if they do a cost-benefit analysis. Jails offer a better alternative. This is made more complex by some member of the law enforcers being involved in criminal syndicates. A number of law officers have been relieved of duty because of cases of helping criminals. This is perhaps one of the compelling reasons why even drug trade is normalised in big cities like Johannesburg and Cape Town. Where one can find drug dealers selling as vendors without any fear of being arrested. Therefore, the major recommendation is that the criminal system needs a revamp, whereby the means of dealing with criminals are overhauled. It seems criminals have adapted to the system and have means of dealing with any threats. While each province can enforce its laws, this system has shown to be ineffective in dealing with crime. In other countries, police enforcers are deployed from a central office. This means that a police enforcer from a certain area, cannot work in his/her area of origin.

The major reason for such an approach is to reduce cases of bribes and biases since the deployment of police will follow a soldiers approach. Deployment of soldiers in unknown places has shown to be a very effective strategy in dealing with a crisis as proven when countries face a major crisis they deploy soldiers. Possible this is one route the government of South Africa needs to consider. Deploying police in provinces where they are not residents. While communication may prove to be a problem in the short term, the benefits of using such an approach are positive. Some law enforcers are afraid of making their families a target when they operate in their areas of origin. As a result, they tend to work with criminals because of that fear or threat. Failure to heed this calls means that government will continue wasting money of rehabilitating criminals who will back to jail within their first month of release.

Findings in Chapter 5 pointed out that food security and income distribution is problematic in the Eastern Cape. While the people who were interview were food secure in the short term, it was found that food insecurity has been ion the rise because of the 2015/16 drought which exposed some households to vulnerability. The government can do much more by reducing transaction costs faced by farmers in selling their produce in the market,

especially the rural farmers. Studies have shown that infrastructure in the rural area is a major contributor to market exclusion by increasing farmers transaction costs. Lowering these costs may boost agricultural production among rural households, and in turn, improve their food security. Likewise, investment in public infrastructure helps improve the social wellbeing of the people, thus, uplifting their standard of living.

That is another way of fighting poverty in the long run. Initiatives like the National Development Plan aim to eliminate poverty and reduce inequality by 2030, by growing an inclusive economy. This would be hard to achieve if some small barriers identified before are not dismantled. To have an inclusive economy, the government needs to face today's realities, that regions have huge disparities in term of the income distribution. A possible strategy would be to focus on the least developed regions and channel a lot of funding in those regions to reduce intermigration and brain drain. Once that is achieved it becomes natural easy to develop a place by tapping its own resources. The NDP targeted an unemployment rate of 20 per cent in 2015, however, unemployment has continued to spiral upwards and now at around 28 per cent (SARB, 2017).

Already the Department of Small and Medium Enterprise (SMEs) has been established to support emerging entrepreneurs, as envision the National Development Plan aims to create jobs by boosting entrepreneurship. This is welcomed approach because job creation is one means of fighting poverty and inequality. For instance, South Korea is one country that supported local industries as a means of fighting poverty. Today it is one the Asian giants in terms of being highly industrialised, and being a production powerhouse worldwide.

### **6.1 Limitation of the study**

The findings presented in the study should be seen as indicative of poverty dynamics in South Africa. One problem faced with poverty studies is using households as a unit of analysis. Vijaya et al., (2014) point out that when estimating gender differences in welfare, households do not reveal individual differences compared to the money metric approach. It ignores individual deprivations and achievements in household members. However, as shown in Chapter 1, the approach used to analyse MPI poverty indicators is meant to provide a detailed picture of household poverty.

While a number of surveys were explored to understand poverty dynamic's in South Africa. The study would have benefited more had all the survey variables have been consistent throughout the years to make it easy to compare how poverty has changed throughout the years. We noted that some variables were dropped in certain waves, and the main reasons are not properly explained. This made it harder to follow through on certain changes in households, for example in Chapter 3, General Households Surveys were used. The study would have yielded more policy recommendations with consistent variables.

Fourthly, in Chapter 4 the limitation was on time series data, where multiple variables had missing data. For instance, data on the Gini index, the poverty gap and headcount was not up to date. This led to extrapolation in variables that were missing. This method has its weakness as well because the way economies operate change instantaneously. However, we confident that the changes are limited in affecting the current findings. The study would have benefited had it been that the variables of interest and the necessary data.

Fourthly, in Chapter 5 the study focused on a small portion in the Eastern Cape to understand food poverty. The sample (296) was not representative of the whole population, however, it was meant to provide insight into how households in rural areas are food secure. Furthermore, the study areas chosen were favoured due to the interest of the researcher. The study would have benefited from a large-scale survey on food security that focuses on all provinces in South Africa. Such a route would have yielded more insight on how food security impacts efforts in fighting food poverty. Nonetheless, a lack of resources would have made that impossible to do.

## **6.2 Areas of future research**

The evidence contained in this study is very important in addressing factors that can influence poverty. However, to have a deeper understanding of other issues that lead to poverty, more research is a need in South Africa. Firstly in examining poverty dynamics in Chapter 2 and 3, the indicators were sourced from household's surveys. This study is limited to the quantitative aspect of investigating poverty, thus, our analysis could be complemented by qualitative or mixed approaches that recognise that some factors

causing poverty cannot be quantified. This is important in that policymakers can have a clue in getting a deeper insight into poverty dynamics.

Secondly, in identifying factors that affect income dynamics and food poverty, studies can be done at a national level. Whereby a number of provinces can be surveyed so that a national picture can be ascertained on how households adapt or mitigate poverty. Such an approach would yield rich text in terms of data that would be useful for the government to shape poverty reduction policies and strategies.

Future research can also investigate the driving factors in gendered and child crimes in South Africa. These crimes have been on the rise in the last five years. For instance, over 64 children were killed in Cape Town within a period of five months. Likewise, femicide is on the rise, where it is unclear what is driving such killings. Therefore, future studies can test if inequality or poverty is driving such serious crimes.

# ANNEXURES (TOC\_HEADING)

## APPENDIX 1: QUESTIONNAIRE

Questionnaire on Household Food Security Interventions

Please mark with an X or Tick (✓) the correct answer, fill in the blank spaces or number in the appropriate boxes. Example; Gender of respondent; (Male=1; Female= 2): X

Name of enumerator \_\_\_\_\_ DATE \_\_\_\_\_

(A) Demographic and personal characteristics

1) Name of village.....

2) Gender of Respondent =Male=1; Female is= 2

3) Age of Respondent \_\_\_\_\_

4) Marital status (fill in the box) \_\_\_\_\_   
 Scale; Married=1; single=2; Divorced=3; Widowed/widower=4

5) What is your highest level of education? (Mark with an X Tick (✓))

None	Primary	secondary	Tertiary
1	2	3	4

6) What is your employment status? (Mark with an X Tick (✓))

Unemployed	Employed (Temporary)	Employed (permanent)
1	2	3

7) Indicate the composition and number of your household members living with you:

Male <12	Female<	Male between 12 and 18	Female between 12 and 18	Male >18	Female>18
1=	2=	3=	4=	5=	6=

8. FOOD SECURITY CHECKLIST

6. If yes to the following questions, How often did this happen? 0= Never; 1 = Rarely (once or twice in the past four weeks); 2 = Sometimes (three to ten times in the past four weeks); 3= Often (more than ten times in the past four weeks)	
a. Did you worry that your household would not have enough food?	
b. Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	
c. Did you or any household member have to eat a limited variety of foods due to a lack of resources?	
d. Did you or any household member have to eat some foods that you really did not want because of a lack of resources to obtain other types of food?	

8(A) (IF SOMETIMES OR OFTEN NOT ENOUGH TO EAT) somewhat are the reasons you don't always have enough to eat? Mark with X or Tick (✓)

- (i) Not enough money for food
- (ii) Too hard to get to the store
- (iii) On a diet
- (iv) No working stove available.
- (vi) Not able to cook or eat because of health problems

8(B) (IF ENOUGH FOOD, BUT NOT THE KINDS YOU WANT) What are the reasons why you don't always have the kinds of food you want or need? Mark with X or Tick (✓)

- (i) Not enough money for food
- (ii) Too hard to get to the store

(iii) On a diet.

(iv) Kinds of food we want not available

(vi) Good quality food not available

9) The following question are the statements that people have made about their food situation. Please mark with an X or Tick (✓) whether the statement was often, sometimes, or never true in the last 12 months.

10) Get worried whether our food would run out before we got money to buy more.”

Was that

(i) Often

(ii) Sometimes

(iii) Or never true for you in the last 12 months?

11) “The food that we bought just didn't last, and we didn't have money to get more.”

Was that

(i) Often

(ii) Sometimes

(iii) Or never true for you in the last 12 months?

12) “We couldn't afford to eat balanced meals.”

Was that

(i) Often

(ii) Sometimes

(iii) Or Never true for you in the last 12 months?

13) "We relied on only a few kinds of low-cost food to feed the children because we were running out of money to buy food."

Was that

(i) Often

(ii) Sometimes

(iii) Or never true for you in the last 12 months?

14) "We couldn't feed the children a balanced meal because we couldn't afford that."

Was that

(i) Often?

(ii) Sometimes

(iii) Or never true for you in the last 12 months?

15) "The children were not eating enough because we just couldn't afford enough food."

Was that

(i) Often

(ii) Sometimes

(iii) Or never true for you in the last 12 months?

16) In the last 12 months, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?(Please mark with an X or Tick (√))

YES	NO	<input type="checkbox"/>
1=	2=	

17(A) If yes, how often did this happen?

(i) Almost every month.

(ii) Some months but not every month.

(iii) or in only one or two months?

18) In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?

YES 1=	NO 2=	<input type="checkbox"/>
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19) In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?

YES 1=	NO 2=	<input type="checkbox"/>
-----------	----------	--------------------------

20) Sometimes people lose weight because they don't have enough to eat. In the last 12 month, did you lose weight because there wasn't enough food?

YES 1=	NO 2=	<input type="checkbox"/>
-----------	----------	--------------------------

21) In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?

YES 1=	NO 2=	<input type="checkbox"/>
-----------	----------	--------------------------

22) How often did this happen?

(i) Almost every month

(ii) Some months but not every month.

(iii) or in only one or two months?

23) In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food?

YES 1=	NO 2=	<input type="checkbox"/>
-----------	----------	--------------------------

24) In the last 12 months, did any of the children ever skip meals because there wasn't enough money for food?

YES 1=	NO 2=	<input type="checkbox"/>
-----------	----------	--------------------------

25 (A) How often did this happen?

(i) Almost every month.

(ii) Some months but not every month.

(iii) or in only one or two months.

26) In the last 12 months, were the children ever hungry but you just couldn't afford more food?

YES 1=	NO 2=	<input type="checkbox"/>
-----------	----------	--------------------------

28) In the last 12 months, did any of the children ever not eat for a whole day because there wasn't enough money for food?

YES 1=	NO 2=
-----------	----------

29) 7 Day Food Frequency and Main Food Sources

(i) How many times does your household consume the following foods?

(i) What are the sources of these foods, and does the household get enough of it?

Food type	FREQUENCY OF CONSUMPTION PER WEEK						Main source of food (1-7)	Enough 1- YES 2=NO
	None	Once	Twice	3 Times	4Times	5 & more times		
1.Maize								
2.Sorghum								
3.Rice								
4.Wheat								
5.Poatoest								
6.Sweet								
7.potatoes								
8.Honey/sugar								
9.Fats/oils								
10.Carbohydrates carbohydrate								
11.Milk								
12.Red meat								
13.Poultry meat								
14.Fish								
15.Eggs								
16.Beans, green beans								
17.Nuts								
18. Other proteins(specify)								
19. Spinach								
Cabbage								
20. Carrots								
21. beetroots								

22. Other vegetables (specify)								
23.Mango								
24.Paw paw								
25.Banana								
26.Oranges								
27.Guava								
28.avocado								
29.Other fruits (specify)								

29) 24 HOUR DIETARY RECALL FOR DIETARY DIVERSITY

M E A L	Age group	Household member's codes	Dish	Ingredients	Adequate	
					Yes (1)	No(2)
B B R E A K F A S T	UNDER 5 YRS	1.				
		2.				
		3.				
		4.				
	5 -18 YRS	5.				
		6.				
		7.				
		8.				
		9.				
	OVER 18 YRS	10.				
		11.				
		12.				
		13.				
		14.				

S N A C K	UNDER 5 YRS	1.				
		2.				
		3.				
		4.				
	5-18 YRS	5.				
		6.				
		7.				
		8.				
		9.				
	OVER 18 YRS	10.				
		11.				
		12.				
		13.				
		14.				
L U N C H	UNDER 5 YRS	1.				
		2.				
		3.				
		4.				
	5-18 YRS	5.				
		6.				
		7.				
		8.				
		9.				
	OVER 18 YRS	10.				
		11.				
		12.				
		13.				
		14.				
S N A C K	UNDER 5 YRS	1.				
		2.				
		3.				
		4.				
	5-18 YRS	5.				
		6.				
		7.				
		8.				

		9				
	OVER 18 YRS	10.				
		11.				
		12.				
		13.				
		14.				
S U P P E R	UNDER 5 YRS	1.				
		2.				
		3.				
		4.				
	5-18 YRS	5.				
		6.				
		7.				
		8.				
		9.				
	OVER 18 YRS	10.				
		11.				
		12.				
		13.				
		14.				

Thank you

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