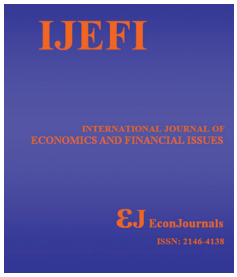

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An Analysis of Poverty among the Poor using the Poverty Depth Measure

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ABSTRACT

There are multiple measures that are used to determine the poor households, however, within the households below the poverty threshold, there are differences that exist among them. This paper explores poverty in South Africa using the poverty depth measure, which refers to the extent to which the income of the poor falls below the poverty line. The paper presents a succinct conceptualisation of poverty and the income poverty line measurement, and then goes on to examine the various ways in which poverty depth can be measured. The paper provides a comprehensive review of the literature on poverty gap and introduces the concept of poverty depth. The literature review shows that there are weaknesses in the poverty gap as traditionally conceived. A calculation of a poverty depth is done and an analysis of the determinants of poverty gap using an ordinary least squares (OLS) regression is conducted. The results show that the head of household's characteristics such as gender, employment status and marital status are significant in explaining the variation in the poverty depth. The paper reveals that the poor are different in their circumstances and recommends targeted interventions in dealing with poverty at household level.

Keywords: Poverty Gap, Poverty Depth, Poverty Line, Inequality, Poverty Reduction
JEL Classifications: A10, A12, D10, D13

1. INTRODUCTION

Poverty is a persistent and widespread problem globally, (World Bank, 2016; 2018; 2020). The millennium development goals (MDGs) which were later replaced by the sustainable development goals (SDGs) in 2015, all put poverty as a number one priority for global efforts for eradication (United Nations, 2015; 2018). The fact that it has been on the top of global discourse and remains unresolved, points to the difficult nature of the problem. The need therefore to further understand poverty in an in-depth manner cannot be overemphasised. Most studies use poverty lines to understand the extent of poverty globally or at national levels (Mdluli and Dunga, 2021; World Bank, 2022). There are also growing efforts to use other measures like the multidimensional poverty index among others (OPHI, 2018; UNDP, 2020). One other way of having a well pointed approach to poverty is to use the poverty gap which pinpoints the areas of deep need (World Bank, 2016b). The poverty gap, which measures the extent to which the income of the poor falls below the poverty line, is a key indicator of poverty and inequality (Rio Group, 2006). However, the existing calculation of the poverty gap, aggregates the extent at national level or regional without specifically pinpointing the households from where the aggregates emanate.

This paper attempts to present a calculation of poverty gap, here after referred to as poverty depth[1], which will attempt to show at household level the distance between the household total income and the household poverty line. The rest of the paper is organised as follows, section two will present the literature around poverty and poverty measures, paying specific attention to poverty lines and related poverty gap. Section three of the paper will present

1 There already exists a calculation of poverty gap, and hence this proposed calculation is called poverty depth to create a distinction between the two.

the methodology and the data sources used in the calculation and analysis of the poverty depth. Section four presents the results and discussion, and the last section presents the conclusions drawn from the data analysis of the determinants of poverty depth at household level.

2. LITERATURE REVIEW

2.1. Theoretical Review on the Measures of Poverty

Poverty can be measured in many ways, (Rio Group, 2006; World Bank, 2018a). A measure that one uses may affect the level and extent of poverty as it may only capture those within the boundaries of the selected measure. Bradshaw (2007) points out the importance of a theoretical understanding and biases involved in the remedial approaches to poverty. There are several theories of poverty which can be grouped into two broader categories namely the liberal theories and the conservative theories (Bradshaw, 2007; Dunga, 2014). The theories of poverty, however, do not really affect the measures of poverty. The measurements are mostly used based on the availability of data and what the resources of data collection can allow. The most common types of poverty measurements are the monetary measures which assign a monetary value to a threshold defined by the necessities needed for a basic life at an individual level. These thresholds can be absolute like the World bank $1.9 a day to a country specific threshold determined by the purchasing power parity that buys a defined basket. For cross country comparison, a standard measure is required. This is because different poverty lines provides different perspectives on the nature and extent of poverty in a given society (Rio Group, 2006). Some of the most commonly used poverty measurements include: Absolute poverty, Relative poverty, multidimensional poverty, human poverty index, capability poverty, social exclusion and the poverty gap (Rio Group, 2006).

2.1.1. Absolute poverty

Absolute poverty is a measurement based on a fixed income or consumption threshold below which individuals or households are in poverty. The global threshold has been $1.90 for some time until recently when it was revised to $2.15/day (Diaz-Bonilla et al., 2022; World Bank, 2022). This threshold is usually set at a level that is deemed to be the minimum necessary to meet basic human needs, such as food, shelter, and clothing (Dunga 2014, 2023; Rio Group, 2006). Beyond the global absolute poverty line, which is usually championed by the World bank, each country has their own poverty line which differ due to the purchasing power parity and what is considered a basic basket of needs for that individual country. For South Africa, it is called a food poverty line (Statistics SA, 2020). This number changes every year in adjustment to inflation.

2.1.2. Relative poverty line

This type of poverty measurement is based on a comparison of a person or household's income or consumption level to the average income or consumption level in the society in which they live (Walker and Lichao, 2020). Individuals or households whose income or consumption falls below a certain percentage of the average are in poverty. This kind of poverty cannot be eradicated by mere changes in a county's income, especially when the income distribution remains unchanged. Walker and Yang (2020) argues that relative poverty is a manifestation of social inequality or unequal distribution of income and other resources that directs attention to acceptable living standards, the benefits of citizenship and the need to avoid social instability caused by severe deprivation, (Walker and Lichao, 2020:2). Thus, based on this poverty measure, a person or household who would have been considered well off in one context, maybe be considered poor in another.

2.1.3. Multidimensional poverty measures

Due to the many weaknesses associated with the monetary poverty line, a multidimensional poverty line was conceived to address the weaknesses and introduce a more encompassing measure. This measure of poverty, takes into account a range of different factors that contribute to poverty, such as lack of access to education, healthcare, or basic services like housing quality, as well as low income or consumption levels (OECD, 2015; OPHI, 2018; UNDP, 2020; Walker, 2015).

There are also numerous measures that are used in the literature other than the ones discussed above (Rio Group, 2006). The human poverty index (HPI) which is also a multidimensional measure is a type of poverty measurement that was developed by the United Nations Development Programme (UNDP) and is based on a combination of income, education, and health indicators (UNDP, 2006). Capability poverty is a type of poverty measurement that is based on the idea that poverty is not just about low income or consumption levels, but also about the lack of opportunities and capabilities that prevent people from achieving their full potential (Ballon and Krishnakumar, 2015; Sameti et al., 2012; Sen, 1981). Social exclusion is another type of poverty measurement that takes into account the ways in which individuals or groups are excluded from participating fully in society, such as through discrimination, stigma, or lack of access to social networks and resources (UNECE, 2022). This paper however delves deeper into the poverty gap and then extends to propose a poverty depth measure that looks at poverty at household as opposed to an aggregated index at a societal level.

2.2. Literature on Poverty and Poverty Gap

Globally, poverty is a significant challenge, with millions of people still living in extreme poverty (World Bank, 2018b). According to the World Bank report of 2022, an estimated 9.2% of the world's population lived below the international poverty line of $1.90/day in 2022. The position of global poverty shows that the target of ending poverty by 2030 will not be achieved as it is estimated that 7% of the global population will be living below the $2.15/day poverty line in 2030 (World Bank, 2022). The effects of Covid-19, climate change (with natural distasters increasing in both frequency and intensity) and the Ukrain war has put the global poverty reduction efforts many years backwards. The lower 40% of the income brackets suffered the most especially in the developing world. The World Bank reports that the global median income declined by 4% in 2020 (Ferreira, 2021; World Bank, 2022). Sub-Saharan Africa remains the region with the highest poverty rate, with more than 40% of the population living in extreme poverty in 2022 (Diaz-Bonilla et al., 2022; IMF, 2022). In contrast, East

Asia and Pacific have seen significant reductions in poverty over the past few decades, with the poverty rate dropping from 60% in 1990 to <3% in 2021 (IMF, 2022).

The poverty gap is a widely used measure of poverty and inequality and has been the subject of much research and analysis in the academic literature (Chornyy 2011; Ferri, 2003; Giovanni, 2005; Rio Group, 2006; World Bank, 2020). This literature review aims to provide an overview of the key findings and debates related to the poverty gap.

The formula for the poverty gap is:

$$\text{Poverty Gap} = \frac{1}{n}\sum_{i}^{q} = 1\left[\frac{z - y_i}{z}\right]$$

Where:

- n is the total number of individuals in the population being considered
- q is the number of individuals who are below the poverty line
- z is the poverty line, or the minimum income required to meet basic needs and maintain a decent standard of living
- y_i is the income of the i^{th} individual in the population.

One of the central debates in the literature on poverty gap is how it should be measured. Some researchers argue that the poverty gap should be measured as the mean shortfall of the poor, while others argue that it should be measured as the sum of the absolute differences between the poverty line and the incomes of the poor. The choice of measurement can have serious implications on policy, as it can influence the interpretation of poverty and inequality, and the development of effective strategies to reduce poverty (Foster, 2003; OECD, 2008). For example, an income poverty line that ignores other sources of wellbeing like subsistence farming, will categorise households with no monetary income as poor even if then have food and animals from their own farming. Another important theme in the literature on the poverty gap is the relationship between poverty and inequality. Many researchers have found that poverty and inequality are closely linked, with higher levels of inequality often leading to higher levels of poverty (World Bank, 2016c; 2018b). This has important implications for poverty reduction policies, as reducing inequality may be an effective way to reduce poverty. The poverty gap measure is, however, not useful when considering poverty at household level and the determinants thereof when considered in its aggregated sense.

Several studies have also explored the factors that contribute to the poverty gap (Bradshaw, 2007; Dunga and Grobler, 2018; World Bank, 2018b). Some of the key factors identified in the literature include unemployment, lack of access to education and healthcare, and income inequality. Income inequality has been found to be a major contributor to the poverty gap, as it can reduce the opportunities for the poor to improve their income and living standards (World Bank, 2016a; 2020b).

The literature on the poverty gap also includes several studies that have examined the effects of poverty and inequality on various aspects of well-being, including health, education, and social mobility (Dunga, 2023; Dunga and Sekatane, 2013; International Monetary Fund (IMF), 2017; Leatt, 2006; Makhalima et al., 2014; UNDP, 2022; World Bank, 2018b). Many of these studies have found that poverty and inequality can have negative effects on well-being, and that reducing poverty and inequality may be important for promoting human development and improving quality of life.

2.3. Poverty Gap in South Africa

South Africa is a country with a high level of poverty and inequality, with the inequality being the one of the highest globally (Makgetla, 2020; Statistics South Africa, 2018). Among the poor, there are difference as well which can be captured in the poverty gap measure. This literature review aims to provide an overview of the key findings and debates related to the poverty gap in South Africa. One of the central themes in the literature on the poverty gap in South Africa is the relationship between poverty and inequality. Many studies have found that poverty and inequality are closely linked in South Africa, with high levels of inequality contributing to high levels of poverty (Makgetla, 2020; Statistics SA, 2020; Statistics South Africa, 2018). This has important implications for poverty reduction policies, as reducing inequality may be an effective way to reduce poverty.

Several studies have also explored the factors that contribute to the poverty gap in South Africa, including unemployment, lack of access to education and healthcare, and income inequality (Mhlanga and Dunga, 2020; The World Bank, 2022). Income inequality has been found to be a major contributor to the poverty gap in South Africa, as it can reduce the opportunities for the poor to improve their income and living standards. Poverty gap essentially measures inequality among the poor.

The literature on the poverty gap in South Africa provides a comprehensive perspective on the persistent challenges of poverty and inequality in the country (Makgetla, 2020; Statistics South Africa, 2018). The findings of this literature suggest that effective poverty reduction policies in South Africa will need to address the root causes of poverty and inequality, such as unemployment, lack of access to education and healthcare, and income inequality, and that the government will need to develop more comprehensive and coordinated strategies to reduce poverty and inequality (Jansen et al., 2015; Mdluli and Dunga, 2021). The literature also highlights the importance of monitoring progress in reducing poverty and inequality over time, in order to ensure that poverty reduction policies are effective and achieve their intended goals. The literature on the poverty gap provides a rich and diverse perspective on poverty and inequality and highlights the importance of reducing poverty and inequality for promoting human development and well-being. The findings of this literature suggest that effective poverty reduction policies will need to address the root causes of poverty, such as unemployment, lack of access to education and healthcare, and income inequality. Additionally, policymakers will need to consider the challenges of measuring poverty and inequality and develop appropriate metrics and indicators to monitor progress in reducing poverty and inequality over time.

Shortfalls of the poverty gap is that it makes it impossible to use for household data for the analysis of poverty depth at household level as opposed to the aggregated one (Kakwani, 1980). This paper proposes a measure of household depth that is at household level. In calculating household poverty, a household poverty line is drawn by multiplying the individual poverty line with household size. Thus, a shortfall of the household from that poverty line shows how far deep the household is in poverty. Thus, an averaged amount as arrived from the poverty gap calculation may still leave other households below the poverty line. But each household should be considered to have its own poverty gap as will be shown in this paper.

3. METHODOLOGY AND DATA

The poverty gap index (PI) measures the extent to which individuals fall below the poverty line (the poverty gaps) as a proportion of the poverty line. The sum of these poverty gaps gives the minimum cost of eliminating poverty, if transfers were perfectly targeted. The PI? measure does not reflect changes in inequality among the poor (Makoka and Marcus, 2005). This measure is weak for household analysis as it averages everyone below the poverty line.

Analysing poverty gap requires a comprehensive methodology that considers multiple factors that contribute to poverty. There are several steps that needs to be followed in the methodology process. The positivism approach entails that a hypothesis will be tested using data. Thus, the first step is to define what is meant by poverty. This will involve the application of the poverty lines defined by Statistics South Africa (STATSSA) which are the food poverty line, the lower bound poverty line and the upper bound poverty line (Statistics SA, 2020; World Bank, 2020a). A poverty line is basically a defined minimum income or consumption level required to meet basic needs for that threshold. The poverty line can vary depending on the country or region under consideration and should consider the cost of living and the local context, basically the relative poverty.

3.1. Calculation of the Poverty Depth

3.1.1. The poverty lines

A poverty line is a measure of the minimum income or resources needed to meet basic needs and maintain a decent standard of living (Rio Group, 2006). It is used as a threshold to determine whether an individual or a household is living in poverty or not. The poverty line is typically defined in monetary terms, such as the $1.9 or $2.15 a day. The poverty line is usually set by the government or international organizations, based on factors such as the cost of living, average expenses, and social norms. The poverty line varies from country to country and region to region, depending on the local conditions and standards of living. Examples of a country based line is like those used by STATSSA which vary from year to year categorised as food poverty line, lower bound poverty line and upper bound poverty line (Statistics SA, 2017; World Bank, 2022). In South Africa, there are three main poverty lines that are used to measure poverty these are the food poverty line, the lower bound poverty line and the upper bound poverty line (Mdluli and Dunga, 2022; Statistics SA, 2020): The food poverty line is the minimum amount of money needed to purchase enough food to provide the daily nutritional requirements for a person. As of 2021, the food poverty line was R624 per month.

The upper-bound poverty line is defined in South Africa as the minimum amount of money needed to purchase a basket of goods and services that are deemed necessary for a basic standard of living (Statistics SA, 2021). This includes not only food, but also housing, water, electricity, clothing, transport, and communication. As of 2021, the upper-bound poverty line is R1, 335 per month. The upper-bound poverty line is used as the official measure of poverty in South Africa. It is used to determine eligibility for social assistance programs such as the social grant system. The government also uses a multidimensional poverty index, which considers a range of social and economic indicators, to identify and address poverty in a more comprehensive way. The lower bound is between the food poverty line and the upper bound poverty line. This refers to the food poverty line plus the average amount derived from non-food items of households whose total expenditure is equal to the food poverty line. For the year 2021 it was R890. We use these three poverty lines to calculate the three poverty depths for South Africa.

Table 1 provides the three poverty lines used in South Africa in 2021. These lines are adjusted for inflation every year. However, in this paper we use the 2021 lines since data used were also collected in 2021. In calculating poverty status of a household, we basically use the following formulation.

STATSSA 2021 the poverty lines are adjusted for inflation every year.

$$\sum_{i=1}^{n} y_i < (PL_F * HS) = poor\ household \quad \text{I}$$

Where $\sum_{i=1}^{n} y_i$ is the total household income contributed by persons 1 to n. PL is the poverty line to be used and where F is used as a subscript it implies that a food poverty line is used and where a subscript is LB means the lower bound and where a subscript UB is used it means the upper bound poverty line has been used in the calculation.

$$\sum_{i=1}^{n} y_i > (PL_F * HS) = Non\ poor\ Household \quad \text{II}$$

The household poverty depth will therefore be give formulated as follows.

$$PD_F = \sum_{i=1}^{n} y_i - (PL_F * HS) \quad \text{III}$$

Table 1: The poverty lines of South Africa 2021

Poverty line	Rand Amont per month
Food poverty line	R624
Lower bound poverty line	R890
Upper bound poverty line	R1, 335

But since the analysis is done for poor household the value from equation III above would always be negative since a household is considered poor when.

$$\sum_{i=1}^{n} y_i < (PL_F * HS)$$

Thus, we consider the absolute value of equation 1 order to get a non-negative number and hence the household poverty depth will be given as.

$$PD_F = \left| \sum_{i=1}^{n} y_i - (PL_F * HS) \right| \quad \text{(IV)}$$

Thus, three poverty depth measures can be calculated for each household using the three poverty lines. And hence we end up with the following equations.

$$PD_F = \left| \sum_{i=1}^{n} y_i - (PL_F * HS) \right| \quad \text{V}$$

$$PD_{LB} = \left| \sum_{i=1}^{n} y_i - (PL_{LB} * HS) \right| \quad \text{VI}$$

$$PD_{UB} = \left| \sum_{i=1}^{n} y_i - (PL_{UB} * HS) \right| \quad \text{VII}$$

3.2. Model Specification

Given poverty gap as a dependent variable in a regression analysis, then the independent variables should include factors that are likely to be associated with poverty and the poverty gap. Some of the factors that can be included in the analysis of poverty from the literature (Dunga, 2019; Mdluli and Dunga, 2021; World Bank, 2020a) some of the variable included in the analysis are Household income, Education, head of household factors such as age and gender among others.

Household income or consumption: This is the most important variable to include in a regression analysis of poverty gap, as it directly affects the poverty gap. A higher household income or consumption is associated with a lower poverty gap. Education: Education is often associated with higher income and better job opportunities, which in turn can reduce poverty and the poverty gap. Including variables such as years of schooling, literacy rate, or school enrolment rates can provide insight into the role of education in poverty reduction. Demographic characteristics: Certain demographic characteristics, such as age, gender, and household composition, can also affect poverty and the poverty gap. Thus, the model will be specified as follows.

$$PD_F = \left| \sum_{i=1}^{n} y_i - (PL_F * HS) \right| = \beta_0 + \sum_{1}^{n} \beta_i + \sum_{j=1}^{n-1} \beta_J + \varepsilon \quad \text{VIII}$$

$$PD_{LB} = \left| \sum_{i=1}^{n} y_i - (PL_{LB} * HS) \right| = \beta_0 + \sum_{1}^{n} \beta_i + \sum_{j=1}^{n-1} \beta_J + \varepsilon \quad \text{IX}$$

$$PD_{UB} = \left| \sum_{i=1}^{n} y_i - (PL_{UB} * HS) \right| = \beta_0 + \sum_{1}^{n} \beta_i + \sum_{j=1}^{n-1} \beta_J + \varepsilon \quad \text{X}$$

Where equation VIII is for food poverty depth, IV is for lower bound poverty depth and X is for upper bound poverty depth. Basically, the equation will take the formation of an Ancova model with both the continuous variables as represented by β_i and the categorical variables represented by β_J. Where PD remains poverty depth of the household and the constant and error term as discussed above.

4. RESULTS AND DISCUSSION

In the regression analysis we use all the three poverty lines from STATSSA. The Tables 2-4 present the frequencies of the three poverty lines. The three poverty lines are based on the inflation adjusted poverty line and then using the household size as per equation I to calculate the household poverty status.

The percentages in Table 2 shows that the sample had 52.3% of the households falling below the food poverty line. Thus, of the 9594 households, only 4999 are used in the regression analysis of the food poverty depth as the analysis is concerned with the poor only, as there is no depth for the non-poor.

The number of households falling below the poverty line, when the lower bound poverty line is used is 5500 that is why 5499 are used in the regression analysis (one more is excluded for missing variables). This is 57.5% of the total sample. The number increases for the upper bound poverty line as the requirement to be non-poor is higher than the other two poverty lines. Table 4 shows that out of the 9594 households included in the sample 6118 fall below the upper bound poverty line representing 63.8% of the sample.

Table 5 shows the frequency distribution of race of population group in the sample. As is expected based on the population representation (STATSSA, 2022), the number of Black Africans is higher than all the other races representing 86.2% of the total sample. This is a reflection of the actual proportional picture of the population in the country (STATSSA, 2022). Based on the mid-year estimates of 2022 the South African Population was estimated to have more than 60 million people, with the Black population taking more than 80% of the share followed by Coloured at around 8.8%. The white population was estimated at around 7.6% and the Indian/Asian population at 2.7%. Thus, the sampling for this study as reflected in Table 5 is reflective of the population.

Table 6 presents the gender distribution of the heads of households in the sample. The results show that there are more male headed households than are female headed households. From the 9594 households included in the study, 53% are male headed and around 47% are female headed households. The majority of the male headed households are those that indicate to be married or living

together with a partner and in these households the man is usually considered the default head. Although there are still households which indicated to be married and the female is indicated as the head of household.

There are studies that show a link between income and marital status (Dunga, 2017) where married people are likely to be better off that the other marital status categories. Table 7 shows that marital status of heads of household in the sample. The legally married are the biggest group taking up 32.7% of the sample followed by the widowed at 19.4%. The majority of the widowed are female headed households with 84.1% of that category (Table 8) this does not necessarily imply that more men are dying, it may indicate the rate of remarrying after a partner is deceased. One explanation could be that men are usually able and willing to date and remarry quicker that their female counterpart fulfilling the adage 'women mourn, men replace' (Carr, 2004).

The percentage of those living together although not legally married is the third largest group. This group is also increasing at an increasing rate as more and more people are preferring to cohabit without committing to marriage. Horowitz et al. (2019) found that in the USA the share of adults who have lived with a romantic partner is now higher than the share who have ever been married (Juliana et al., 2019: 1). STATSSA also reports a reduction in marriages and that the marriage age for those that end up being married has been increasing over time STATSSA (2021) reported that number of registered marriages consistently declined in the 10-year period (2012-2021) (STATSSA, 2021).

Employment status is also an important variable use in the analysis of poverty depth. Employment is considered as one of the main channels of poverty reduction. Where people have a decent job with a living wage, they are likely to escape poverty. Table 9 shows that there are 44.7% unemployed people before the data is selected to only focus on the poor households. The number of people that are not economically active is also very high at 42.2% which may represent the level of discouraged workers or the retired group.

Table 2: Food poverty line poverty status

Poverty status	Frequency	Percent	Cumulative percent
Non-poor	4595	47.7	47.7
Poor	4999	52.3	100.0
Total	9594	99.6	

Table 3: Lower bound poverty line poverty status

Poverty status	Frequency	Percent	Cumulative percent
Non-poor	4094	42.5	42.5
Poor	5500	57.5	100.0
Total	9594	99.6	

Table 4: Upper bound poverty line poverty status

Poverty status	Frequency	Percent	Cumulative percent
Non-poor	3476	36.2	36.2
Poor	6118	63.8	100.0
Total	9594	100.0	

Table 5: Household population group/race

Population group	Frequency	Percent	Cumulative percent
African/black	8297	86.5	86.5
Coloured	636	6.6	93.1
Indian/Asian	150	1.6	94.7
White	511	5.3	100.0
Total	9594	100.0	

Table 6: Gender distribution of the sample

Gender	Frequency	Percent	Valid percent	Cumulative percent
Female	4495	46.7	46.9	46.9
Male	5099	53.0	53.1	100.0
Total	9594	99.6	100.0	

4.1. Discussion of the Regression

The regression analysis uses three dependent variables. These are based on the three poverty lines in Table 1 which are used to calculate the poverty statuses for the households presented in Tables 2-4. And bases on these poverty statuses, we calculate poverty depth using equations *V*, *VI* and *VII.* The poverty depths are then used in *VIII*, *IX* and *X* to come up with the results presented in Table 10.

The Overall F tests for the three regressions are reported in Table 11 and on all the three instances we reject the null hypothesis that the regressions are not a good fit. The $P < 0.01$ for the three regression models.

The variables used in the regression were marital status, employment status, population group, province[2], gender of head of household, age of head of household and household size.

2 South Africa is divided into 9 provinces, and these can have an effect on the wellbeing of the household as different opportunities exist in these provinces. For example, Gauteng is the smallest in size but has the biggest cities and has the biggest economy hence provides more job opportunities.

Table 7: Frequency table of marital status

Marital status	Frequency	Percent	Valid percent	Cumulative percent
Legally married	3152	32.7	32.9	32.9
Living together	917	9.5	9.6	42.4
Divorced	293	3.0	3.1	45.5
Separated	183	1.9	1.9	47.4
Widowed	1870	19.4	19.5	66.9
Single, but have lived together with someone as husband/wife	414	4.3	4.3	71.2
Single and have never been married/never lived together	2765	28.7	28.8	100.0
Total	9594	99.6	100.0	

Table 8: Cross tabulation of marital status and gender of head of household

Marital status	Head sex		Total (%)
	Female (%)	Male (%)	
Legally married			
Count	372	1344	1716
% within HH marital status	21.7	78.3	100.0
% within head sex	11.0	49.0	28.0
% of Total	6.1	22.0	28.0
Living together like husband and wife/partners			
Count	128	389	517
% within HH marital status	24.8	75.2	100.0
% within head sex	3.8	14.2	8.5
% of total	2.1	6.4	8.5
Divorced			
Count	105	60	165
% within HH marital status	63.6	36.4	100.0
% within head sex	3.1	2.2	2.7
% of total	1.7	1.0	2.7
Separated, but still legally married			
Count	85	41	126
% within HH marital status	67.5	32.5	100.0
% within head sex	2.5	1.5	2.1
% of total	1.4	0.7	2.1
Widowed			
Count	1300	245	1545
% within HH marital status	84.1	15.9	100.0
% within head sex	38.5	8.9	25.3
% of total	21.2	4.0	25.3
Single, but have lived together with someone as husband/wife			
Count	205	71	276
% within HH marital status	74.3	25.7	100.0
% within head sex	6.1	2.6	4.5
% of total	3.4	1.2	4.5
Single and have never been married/never lived together as			
Count	1181	592	1773
% within HH marital status	66.6	33.4	100.0
% within head sex	35.0	21.6	29.0
% of total	19.3	9.7	29.0
Count	3376	2742	6118
% within HH marital status	55.2	44.8	100.0
% within head sex	100.0	100.0	100.0
% of total	55.2	44.8	100.0

Table 9: Frequency table of employment status

Employment status	Frequency	Percent	Valid percent	Cumulative percent
Employed	4300	44.7	44.8	44.8
Unemployed	1234	12.8	12.9	57.7
Not economically active	4060	42.2	42.3	100.0
Total	9594	99.6	100.0	

These variables were considered to have an influence on the poverty status of the household and the depth thereof to which the household falls below the poverty line.

Marital status was recategorized into three categories, the legally married and the living together were put into one group. The separated and the divorced were also put together. All the other categories were grouped together into the single category. Thus, being a categorical variable, they were entered as dummy variables. The variable has three categories and hence two dummy variables were used, single and divorced and separated were entered while legally married and living together was used as a reference category. The single head of household are more likely to be deeper in poverty in all the poverty depth than the legally married with P-values that are significant. The divorced are seen to be deeper than the legally married in the food poverty depth and the lower bound, however for the upper bound, the coefficient is negative, meaning that the divorced are less likely to be deeper than the legally married when the upper bound poverty depth is used as a dependent variable.

When employment status is considered, the employed are found to be less likely to be dipper in poverty compared to those that are not economically active which was the category left out as the reference category. This is an outcome that would be expected as those that are employed have an income compared to those that are not economically active. The literature is awash with evidence showing the importance of employment in dealing with poverty (Chambers, 1995; Dunga, 2023; Han et al., 2020; ILO, 2004; World Bank, 2020a). The most important channel that has produced results in moving households from poverty into better

Table 10: Regression results of the three poverty depths

	Food poverty depth			Lower bound poverty depth			Upper bound poverty depth		
Variables	Unstandardized Coefficients	t	Sig.	Unstandardized Coefficients	t	Sig.	Unstandardized Coefficients	t	Sig.
	B			B			B		
Constant	432.119	4.444	0.000	735.466	5.410	0.000	1000.727	5.436	0.000
Single	15.992	0.582	0.561	12.933	0.346	0.730	147.047	2.999	0.003
Divorced and separated	59.731	1.139	0.255	4.814	0.067	0.946	−104.521	−1.114	0.265
Employed	−1199.630	−34.320	0.000	−1489.136	−34.039	0.000	−1880.997	−34.662	0.000
Unemployed	−14.072	−0.438	0.661	−5.147	−0.115	0.909	22.335	0.369	0.712
education	0.015	0.036	0.971	0.144	0.248	0.804	0.612	0.792	0.429
Black	11.089	0.159	0.874	−95.491	−0.970	0.332	−336.901	−2.496	0.013
coloured	5.552	0.067	0.947	−251.786	−2.182	0.029	−612.683	−3.946	0.000
Indian/Asian	−114.650	−0.793	0.428	−456.930	−2.297	0.022	−718.671	−2.682	0.007
Western Cape	−12.958	−0.196	0.844	−180.149	−2.026	0.043	−548.376	−4.796	0.000
Eastern Cape	39.267	1.073	0.284	103.297	2.033	0.042	113.341	1.666	0.096
Northern-Cape	−17.166	−0.260	0.795	−77.376	−0.857	0.391	−153.758	−1.294	0.196
Free State	−11.972	−0.234	0.815	−42.167	−0.602	0.547	−100.272	−1.086	0.278
KZN	−27.686	−0.726	0.468	−53.657	−1.027	0.305	−151.528	−2.191	0.028
North-West	−98.541	−2.024	0.043	−43.719	−0.649	0.517	−78.967	−0.875	0.382
Gauteng	−106.521	−2.588	0.010	−242.166	−4.341	0.000	−478.620	−6.592	0.000
Mpumalanga	−67.221	−1.511	0.131	−105.291	−1.728	0.084	−236.109	−2.934	0.003
Gender (1=male)	−95.310	−4.198	0.000	−152.677	−4.902	0.000	−184.376	−4.473	0.000
Age of HH	−1.362	−1.579	0.114	−2.465	−2.055	0.040	−1.293	−0.809	0.418
HH Size	485.967	110.467	0.000	691.475	114.063	0.000	1074.773	133.135	0.000

Three regressions using three different poverty lines as dependent variables

Table 11: Overall model fitness for the three models

Model	Sum of squares	df	Mean square	F	Sig.
1					
Regression	18717582051.675	19	985135897.457	817.833	0.000b
Residual	6601036622.120	5480	1204568.727		
Total	25318618673.795	5499			
a. Dependent variable: LB-poverty depth					
Model	**Sum of squares**	**df**	**Mean square**	**F**	**Sig.**
1					
Regression	48698217500.425	19	2563064078.970	1104.006	0.000b
Residual	14157136699.413	6098	2321603.263		
Total	62855354199.838	6117			
a. Dependent variable: UB poverty depth					
Model	**Sum of squares**	**df**	**Mean square**	**F**	**Sig.**
1					
Regression	48698217500,425	19	2563064078,970	1104,006	0.000b
Residual	14157136699,413	6098	2321603,263		
Total	62855354199,838	6117			

a. Dependent variable: UB poverty gap

livelihoods has been the creation of employment especially for labour intensive sectors that accommodates people of varied skills. Although there are studies that have attempted to ascertain the employment elasticity to growth and poverty to employment (Klasen and Misselhorn, 2008).

Education level was not significant in this model. This could be because the data was sorted to only include the poor households whose education levels are likely to not differ much and maybe mostly being on the lower side of the education spectrum. If all households were to be included education would have been an important determinant of poverty depth (Frey et al., 2017).

Population race or population group as captured in the general household survey, was not a significant determinant of the depth of household poverty in the first two model. However, it was found to be significant in the upper bound poverty depth model. Gender of the head of household was statistically significant and negative for male headed households. This implies that households that are headed by males are less likely to be deeper in poverty compared to the female counterparts. The negative coefficient is in agreement with the literature where women are usually more deprived due to a number of factors (Dunga and Sekatane, 2014; Liu et al., 2014; World Bank, 2016c). The literature shows that poverty has a young female face, meaning the most vulnerable groups are the youth and females.

Linked to the young and female are the older heads of households. The result on age has a positive coefficient plying that the older one gets the deeper they fall in poverty when the household is already

in poverty. This shows the vulnerability of the older generation in society. The fact that there are more and more older people due to the successes in medical research means that there are more households that will be in try globally (Mncayi and Dunga, 2019; UNDESA, 2017).

Finally, the size of the household was also considered and was found to be statistically significant with a positive coefficient implying the more the people in the household the deeper the household falls in poverty. This is in agreement with the literature here household size is also considered as a determinant of housing insecurity (Cox et al., 2017; Desmond and Carl, 2016; Dunga, 2021; Dunga and Grobler, 2018). Thus policies that intend to lift households out of poverty need to consider the different idiosyncrasies of individual households as the heterogeneity of households calls differentiated approaches to dealing with the scourge (Bradshaw, 2007).

5. CONCLUSION

Poverty remains an unresolved problem globally, one that needs urgent attention as it has a tendency of bleeding other problems which are all highlighted in the sustainable development goals. These goals are all linked one way or another. This paper intended to analyse poverty from a poverty depth point. First by explaining what a poverty gap is and then distinguishing a poverty gap to a poverty depth. A poverty depth calculation has been presented that enables the analysis to focus on a household level as opposed to an aggregated index. Three poverty lines were used as are determined by the Statistics South Africa (STATSSA) each of these three poverty lines was then used to calculate a poverty depth for the poor households using the general household survey data that were collected in 2021. The results reveal that there are several factors at household level that can be used to explain the depth at which the household finds itself. This also therefore dispels the thinking that a generalised social grant can be useful in pulling out households from poverty. The analysis shows that different households have different levels of needs and that their circumstances are different.

Besides providing households with social grants or any form of safety net, there is need for a greater and wider approach to dealing with poverty that include such programs as education and reskilling of older people. Education that targets younger people from poor households with a plan to make sure they do not drop out in the process due to lack of support. Also, with the advent of technology that has made the labour market completely different, there is need to reskill the older people so that they can be absorbed in the highly technical labour market. Another suggestion is the adoption of devolution and decentralization models such as increased involvement of local municipalities in distributing grants/aid as they have a better appreciation of the local context. This is because results clearly indicate the household idiosyncrasies which need to be addressed to take individuals out of poverty.

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