

**ASSESSMENT OF MULTIDIMENSIONAL POVERTY CHANGES IN MALAWI  
FROM 2010 TO 2019**

**MASTERS OF ARTS IN ECONOMICS**

**CHRISPINE ADAMS MTOCHA**

**UNIVERSITY OF MALAWI**

**FEBRUARY 2023**



**University of Malawi**

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**MASTERS OF ARTS IN ECONOMICS**

**By**

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***B.Sc. Agricultural Economic - LUANAR***

Submitted to the Department of Economics, Faculty of Social Science, in partial  
fulfilment of the requirements for the degree of Master of Arts in Economics

**UNIVERSITY OF MALAWI**

**FEBRUARY 2023**

## **DECLARATION**

I hereby declare that this thesis is my original work and has not been submitted to any other institution for similar purposes. Acknowledgements have been duly made where other people's work has been used. I bear the responsibility for the contents of this paper.

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## **CERTIFICATE OF APPROVAL**

The undersigned certifies that this thesis represents the student's work and effort and has been submitted with our approval.

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## **DEDICATION**

To my beloved mother, Mrs Getrude Chiwere Mtocha, who never lived long enough to see this dream come true. This paper is for you.

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## **ABSTRACT**

Poverty reduction has long been one of the most important goals for the international development community. However, multidimensional poverty in Malawi has been significantly high, with an MPI above 50%, for the past decade (2004-2016). Previous studies on poverty in Malawi have focused on money-metric poverty. Still, there is a lack of understanding of the changes in multidimensional poverty and the factors that contribute to these changes. This study provides a longitudinal analysis of multidimensional poverty in Malawi using a new, Malawi-specific Multidimensional Poverty Index (M-MPI) from 2010 to 2019. The study utilizes nationally representative data from the Integrated Household Panel Survey (IHPS) from 2010 to 2019. It employs the Alkire-Foster method for MPI computation and the Oaxaca-Blinder decomposition, an unconditional quantile regression model, to gain a holistic and more nuanced insight into the drivers and dynamics of poverty and disadvantage in Malawi. The study findings indicate that there have been significant favourable changes in the MPI and incidence of multidimensional poverty in Malawi over the time period, with child labour, school attendance, electricity, unemployment, asset ownership, housing, education, nutrition, and food security being major contributing indicators. The study identifies, on the one hand, an increase in household income, literacy of the household head, and higher education levels of the household head to be the factors that influence the decline of the household's MPI scores over time. On the other hand, the experience of a household to any shock, an increase in household size, being in a social protection program, being married, and residing in rural areas are the determinants that influence an increase in the MPI over time. In addition, access to credit was found to have an ambiguous effect on MPI changes, as it can influence the changes positively and negatively depending on the variable distributions. Policymakers can use these findings to devise targeted and cost-effective interventions to reduce socio-economic deprivation and maximize economic growth in Malawi.

## TABLE OF CONTENTS

|                                                             |            |
|-------------------------------------------------------------|------------|
| <b>ABSTRACT .....</b>                                       | <b>vi</b>  |
| <b>LIST OF TABLES .....</b>                                 | <b>x</b>   |
| <b>LIST OF FIGURES .....</b>                                | <b>xi</b>  |
| <b>LIST OF ACRONYMS AND ABBREVIATIONS .....</b>             | <b>xii</b> |
| <b>CHAPTER ONE .....</b>                                    | <b>1</b>   |
| <b>INTRODUCTION .....</b>                                   | <b>1</b>   |
| 1.1 Chapter Overview .....                                  | 1          |
| 1.2 Background .....                                        | 1          |
| 1.2.1 Multidimensional Poverty in Malawi .....              | 2          |
| 1.3 Problem statement.....                                  | 5          |
| 1.4 Significance of the study .....                         | 5          |
| 1.5 Objectives .....                                        | 6          |
| 1.6 Hypotheses .....                                        | 7          |
| 1.7 Organization of the Study .....                         | 7          |
| <b>CHAPTER TWO .....</b>                                    | <b>8</b>   |
| <b>LITERATURE REVIEW .....</b>                              | <b>8</b>   |
| 2.1. Introduction .....                                     | 8          |
| 2.2. Theoretical literature review .....                    | 8          |
| 2.2.1 Sen`s Capability Approach theory .....                | 8          |
| 2.2.2 The basic-Needs Approach .....                        | 9          |
| 2.2.3 The Social Contract Theory: Justice as Fairness ..... | 9          |

|                               |                                                                           |           |
|-------------------------------|---------------------------------------------------------------------------|-----------|
| 2.3.                          | Empirical Literature .....                                                | 10        |
| 2.3.1                         | Approaches to Poverty analysis .....                                      | 10        |
| 2.3.2                         | Poverty analysis in Malawi.....                                           | 11        |
| 2.3.3                         | Multidimensional Poverty Changes or Dynamics .....                        | 15        |
| 2.3.4                         | Methodologies of Multidimensional Poverty .....                           | 18        |
| 2.4                           | Contribution to literature.....                                           | 20        |
| 2.5                           | Summary .....                                                             | 21        |
| <b>CHAPTER THREE</b>          | .....                                                                     | <b>22</b> |
| <b>METHODOLOGY</b>            | .....                                                                     | <b>22</b> |
| 3.1                           | Introduction .....                                                        | 22        |
| 3.2                           | Conceptual Framework.....                                                 | 22        |
| 3.3                           | Malawi Multidimensional Poverty Index.....                                | 24        |
| 3.4                           | Analytical Framework.....                                                 | 27        |
| 3.4.1                         | Changes in Multidimensional Poverty in Malawi over time (2010-2019) ..... | 27        |
| 3.4.2                         | Decomposing Multidimensional Poverty Changes in Malawi .....              | 31        |
| 3.5                           | Data Sources.....                                                         | 36        |
| 3.6                           | Summary .....                                                             | 37        |
| <b>CHAPTER FOUR</b>           | .....                                                                     | <b>38</b> |
| <b>RESULTS AND DISCUSSION</b> | .....                                                                     | <b>38</b> |
| 4.1                           | Introduction .....                                                        | 38        |
| 4.2                           | Descriptive Statistics .....                                              | 38        |
| 4.3                           | Changes in Multidimensional Poverty in Malawi over time (2010-2019).....  | 43        |
| 4.3.1                         | Multidimensional Poverty Measures (2010-2019). .....                      | 43        |
| 4.4.                          | Determinants of MPI changes in Malawi over time .....                     | 58        |
| 4.4.1                         | Observed Coefficients.....                                                | 61        |

|                                                 |                                                                      |    |
|-------------------------------------------------|----------------------------------------------------------------------|----|
| 4.2.3                                           | The marginal effect of Change in the distribution of Covariates..... | 67 |
| 4.3                                             | Summary .....                                                        | 68 |
| <b>CHAPTER FIVE</b> .....                       |                                                                      | 70 |
| <b>CONCLUSION AND POLICY IMPLICATIONS</b> ..... |                                                                      | 70 |
| 5.1                                             | Summary of the study .....                                           | 70 |
| 5.2                                             | Conclusion.....                                                      | 71 |
| 5.3                                             | Study limitations .....                                              | 71 |
| 5.4                                             | Recommendations and policy implications.....                         | 72 |
| <b>REFERENCES</b> .....                         |                                                                      | 74 |

## LIST OF TABLES

|                                                                                                  |    |
|--------------------------------------------------------------------------------------------------|----|
| <b>Table 1:</b> Multidimensional Poverty in Malawi .....                                         | 4  |
| <b>Table 2:</b> Indicators of poverty dimensions and deprivation cut-offs. ....                  | 26 |
| <b>Table 3:</b> Variables used in the RIF regression .....                                       | 34 |
| <b>Table 4:</b> Descriptive statistics and Demographic information.....                          | 40 |
| <b>Table 5:</b> Malawi`s Multidimensional Poverty Changes over time (2010-2019) .....            | 44 |
| <b>Table 6:</b> Alkire-Foster decomposition by region .....                                      | 47 |
| <b>Table 7:</b> Alkire-Foster decomposition by place of residence .....                          | 48 |
| <b>Table 8:</b> Alkire-Foster decomposition by gender of household head .....                    | 50 |
| <b>Table 9:</b> Alkire-Foster decomposition by the education level of household head .....       | 51 |
| <b>Table 10:</b> Indicator Deprivations per Year .....                                           | 52 |
| <b>Table 11:</b> Indicator contributions to the MPI.....                                         | 55 |
| <b>Table 12:</b> Contribution of each Dimension to the MPI.....                                  | 57 |
| <b>Table 13:</b> MPI changes Determinants in Malawi : Oaxaca Blinder Decomposition Approach..... | 59 |

## LIST OF FIGURES

|                                                                                       |    |
|---------------------------------------------------------------------------------------|----|
| <b>Figure 1:</b> Malawi Multidimensional Poverty Index, 2004-2010 and 2010-2013 ..... | 3  |
| <b>Figure 2:</b> Multidimensional Poverty Change concept .....                        | 23 |
| <b>Figure 3:</b> Malawi MPI dimensions and indicators weights .....                   | 25 |
| <b>Figure 4:</b> Multidimensional Poverty over the Years.....                         | 45 |
| <b>Figure 5:</b> Marginal effect of change in the distribution of covariates .....    | 68 |

## **LIST OF ACRONYMS AND ABBREVIATIONS**

|       |                                                 |
|-------|-------------------------------------------------|
| ANS   | Azevedo Nguyen and Sanfelice                    |
| IFPRI | International Food Policy Research Institute    |
| IHSP  | Integrated Household Panel Survey               |
| MDG   | Millennium Development Goal                     |
| M-MPI | Malawi-Multidimensional Poverty Index           |
| MNL   | Multinomial Logit                               |
| MPI   | Multidimensional Poverty Index                  |
| NPC   | National Planning Commission                    |
| NSO   | National Statistical Office                     |
| OPHI  | Oxford Poverty and Human Development Initiative |
| RIF   | Recentered Influence Functions                  |
| SDG   | Sustainable Development Goal                    |
| UNDP  | United Nations Development                      |

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Chapter Overview**

This chapter outlines the background of the study in section 1.2, the problem statement in section 1.3, the objectives of the study in section 1.4, the significance of the study in section 1.5, and finally, the organisation of the study in section 1.6, which outlines how the rest of the paper has been organised in subsequent chapters

#### **1.2 Background**

Poverty reduction has long been one of the most important policy goals for the international development community. The first target of the first Millennium Development Goal (MDG) aimed at reducing the proportion of people with an income below the international extreme poverty line of US\$1.90 per person per day by half between 1990–2015. The centrality of poverty is confirmed in the 2030 Agenda, specifically in the Sustainable Development Goal (SDG) 1<sup>1</sup>. There have been debates in academia and some international organisations over the past three decades (Sen, 1999; UNDP, 2008; Narayan-Parker, 2002), consequently recognising the broader understanding of poverty of high value.

---

<sup>1</sup> While Target 1.1 concentrates on the eradication of income poverty, now measured as the proportion of people living on less than US\$1.90 a day, target 1.2 goes beyond the income dimension and calls for a reduction of “poverty in all its dimensions according to national definitions”.

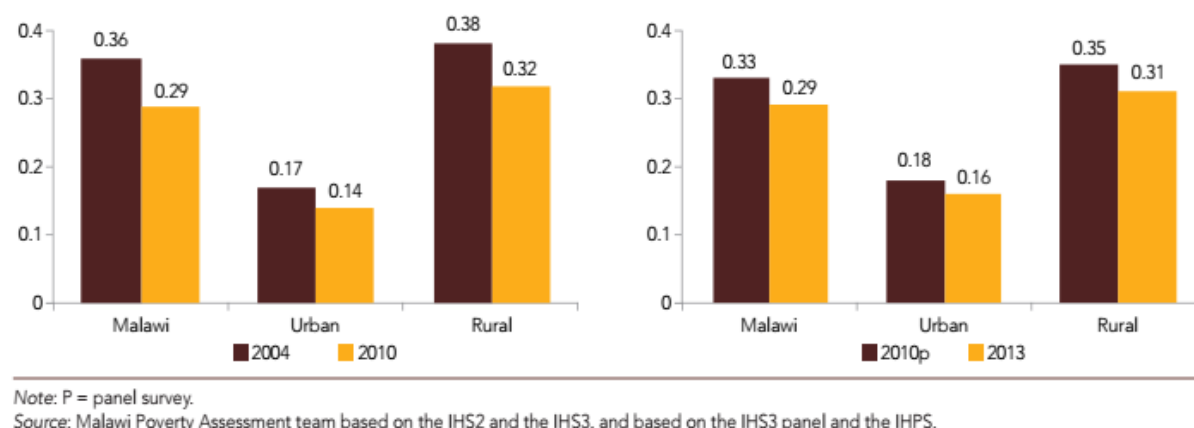
Ravallion and Huppi (1991) define poverty as the monetary cost to a given person, of a reference level of welfare, at a given place and time. On the other hand, according to the World Bank (2000), poverty is a pronounced deprivation in well-being. Malawi's total poverty line is the summation of food and non-food components. The food poverty line represents the cost of a food bundle that provides the necessary energy requirements per person per day, while the non-food poverty line represents the cost of basic non-food needs. As such, individuals who reside in households with consumption lower than the poverty line are then labelled “poor” (National Statistical Office (NSO), 2021).

Until recently, Malawi has focused on measuring poverty using income approaches (NSO, 2021). However, in complement to the monetary measure of poverty, other scholars have argued that poverty is a multidimensional phenomenon. Poverty researchers agree that disadvantage goes beyond income deprivation, with the argument gradually moving into the multiple dimensions of social deprivation and exclusion (Martinez Jr. & Perales, 2014). For example, people living in poverty often lack education, have poor health and nutrition, poor housing, and unsafe water as examples of their disadvantages to a meaningful quality of life (NSO, 2021). In complementing, Alkire and Foster (2011) argue that many aspects of poverty are ignored by a narrow focus on things that can be purchased by income, including health, education, community participation and living standards. These arguments are what led to the development of methods to measure multidimensional poverty, which encompasses the various deprivations experienced by poor people in their daily lives, such as poor health, lack of education, inadequate living standards, disempowerment, poor quality of work, among others (OPHI, 2022).

### ***1.2.1 Multidimensional Poverty in Malawi***

Several characteristics, not just consumption, influence the welfare of the Malawian population. In this regard, it is vital to consider the improvement of other indicators when assessing the well-being of people. Empirical evidence has established trends in Multidimensional poverty in Malawi. Several studies (World Bank Group, 2016; FPRI,

2019; UNDP, 2021; NSO, 2021) have focused on developing methodologies and indices at the same time while reporting the point-in-time poverty levels.



**Figure 1: Malawi Multidimensional Poverty Index, 2004-2010 and 2010-2013**

Figure 1 above illustrates the movement of multidimensional poverty in Malawi over time. The World Bank Group (2016) documented the improvements in multidimensional poverty in Malawi between 2004 and 2013 using the global multidimensional poverty index. Specifically, the proportion of multi-dimensionally poor people moved from 70.6% in 2004 to 57.2% in 2013. The declining trend over the years agrees with FPRI (2019) and UNDP (2021), who reported a decrease in MPI between 2004 and 2016, with both the incidence and intensity of poverty decreasing in each period, with a faster reduction in rural areas than in urban areas. However, even though these authors coincide in trend, the specific MPI values differ as the authors used different measurement indices and indicators.

The Malawi National Statistical Office (2021) developed a Malawian-specific Multidimensional Poverty Index (M-MPI) with a Malawian-specific multidimensional poverty line set at 38% and different from the global MPI measure in the indicators and poverty dimension. Using the index, a study on multidimensional poverty based on the fourth Integrated Household Survey (IHS4) 2016/17 data was conducted. Table 1 below shows the M-MPI results by NSO (2021).

**Table 1: Multidimensional Poverty in Malawi**

| Index (k=38%)                      | Value | (95% Confidence Interval) |       |
|------------------------------------|-------|---------------------------|-------|
| M-MPI                              | 0.337 | 0.327                     | 0.347 |
| Incidence or headcount ratio (H %) | 61.7  | 60.0                      | 63.4  |
| Intensity (A %)                    | 54.6  | 54.2                      | 55.0  |

*Source: National Statistical Office, MPI 2016-2017*

As shown in Table 1 above, 61.7% of people in Malawi were reported to be multidimensionally poor in 2016. The multidimensional poverty incidence was highest in rural areas at 70 % compared to 25.7 % in urban areas. Comparing these results with those of IFPRI (2019) and UNDP (2021), the outcomes of NSO (2021) show significantly higher levels of multi-dimensionally poor people than all the other studies. The reasoning behind the differences in these levels may be because of the differences in indicators and dimensions used by the authors. Nevertheless, all the authors concluded that Malawi was among Africa's countries with the highest incidence of multidimensional poverty.

Nevertheless, despite the authors quantifying the poverty levels of Malawian individuals based on their deprivations, these studies do not provide estimates of multidimensional poverty changes over the past years. Furthermore, the studies also fail to examine the share of the observed poverty changes that can be attributed to each factor hence making it impossible to assess how the current level of disadvantage affects the future risk of falling into multidimensional poverty.

With this background, the assessment of multidimensional poverty changes in Malawi cannot be overemphasised. Policymakers and researchers need to better understand the changes in Malawi's multidimensional poverty and the factors underlying the changes to identify priorities for intervention precisely. Furthermore, knowing the direction of change and its causal factors would provide policy planners with the tools necessary to devise policy interventions that maximize economic growth and reduce socio-economic deprivation in targeted and cost-effective ways. This study is unique as it unveils the

changes in multidimensional poverty in Malawi using the first MPI methodology developed specifically by Malawi's National Statistical Office.

### **1.3 Problem statement**

As stipulated from the background of the study, several studies (UNDP,2020; NSO, 2021; IFPRI,2019; The world bank,2016; Burchi et al.,2020; Alkire & Foster 2011; and UN data, 2020) have reported a significantly high MPI in Malawi, particularly above 50% over the years (2004 to 2016). In addition, there have been disagreements in Malawi's MPI results on specific levels, and in all these results, the factors regarding the changes in MPI are not known (IFPRI, 2019; UNDP, 2020; World bank, 2016). Previous studies on poverty in Malawi have solely focused on money-metric poverty in terms of its determinants (Mukherjee & Benson, 2003), exit from poverty (Mussa, 2013; Mussa, 2015; Mussa & Paul,2011), and resilience (Maganga et al., 2021). The studies on multidimensional poverty have aligned their scope and findings on the incidence and intensity of multidimensional poverty in Malawi. (UNDP,2020; NSO, 2021; IFPRI,2019; The world bank,2015; Burchi et al.,2020; Alkire & Foster, 2011; and UN data, 2020). A similar study was conducted by Martinez Jr. and Perales (2014) to examine the dynamics of multidimensional poverty in Australia. However, the results cannot be extended and generalized to Malawi.

In this regard, a gap in our current understanding of social exclusion and disadvantage in the Malawian context is knowing how multidimensional poverty has changed by using a new Malawi-specific Multidimensional Poverty Index (M-MPI) and how various factors have contributed to the changes in the poverty rates in recent times. This is important for strategic planning and policymaking, as it provides policy planners with the tools necessary to devise policy interventions that maximize economic growth and reduce socio-economic deprivation in targeted and cost-effective ways.

### **1.4 Significance of the study**

The study's relevance lies in the status core of Multidimensional Poverty in Malawi. According to the Oxford Poverty and Human Initiative (PHI) & United Nations

Development Programme (UNDP) (2021), Malawi still ranks in the top 20 of the poorest countries multi-dimensionally in the world. Nevertheless, the international development community through the Sustainable Development Goals (SDGs) target 1.2 aims at reducing at least half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions by 2030 (United Nations, Transforming Our World: The 2030 Agenda for Sustainable Development, 2015). In addition, Malawi's National Planning Commission, through the Malawi 2063, a National Development goal, emphasises not leaving behind those segments of the society that are vulnerable and marginalized (NPC, 2020).

Poverty monitoring is a crucial component of policymaking, as it allows planners to identify priorities for intervention (Callander, Schofield, & Shrestha, 2013). Several researchers have used the *Alkire and Foster Method* of measuring Multidimensional Poverty but using different indicators and indices. For instance, Burchi et al. (2020), UNDP (2020), and The World Bank (2015) used the Global Multidimensional Poverty Index to estimate Multidimensional Poverty for the global world, Malawi and Ethiopia respectively. On the contrary, Martinez Jr. and Perales (2014) used an Australian-specific Multidimensional Poverty Index to examine Multidimensional Poverty changes in Australia. This study seeks to assess multidimensional poverty changes in Malawi using the Malawian-specific multidimensional poverty index.

### **1.5 Objectives**

The study's overall objective is to assess the proximate determinants that influence changes in Malawi's multidimensional poverty. Specifically, the study aims to:

1. Assess the changes in multidimensional poverty in Malawi over time (2010-2019)
2. Examine factors that influence multidimensional poverty changes in Malawi.

## **1.6 Hypotheses**

The study tests the hypotheses:

- Multidimensional poverty has not changed over the years (2010-2019)
- There are no factors that significantly influence multidimensional poverty changes in Malawi.

## **1.7 Organization of the Study**

Having introduced the topic in chapter one, Chapter two provides a review of theoretical and empirical literature related to Multidimensional poverty. Chapter three proceeds with the methodology employed in this study. Chapter four presents the study estimation results and discussion. Finally, chapter five gives a summary of the analysis, conclusion , and limitations of the study and closes up with recommendations and policy implications of the findings.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1. Introduction**

This chapter discusses the theoretical reviews and empirical studies on multidimensional poverty, its theory and methodology. Section 2.2 presents the theoretical literature review describing the grounding theory and approach of multidimensional poverty and its underlying changes. Section 2.3 is the empirical literature highlighting different studies on the measurements and finding of multidimensional poverty. Finally, section 2.3 presents a chapter summary, literature gaps, and this paper's contribution to the literature.

#### **2.2. Theoretical literature review**

Despite having several unidimensional and multidimensional poverty theories, this study is grounded on Sen's capability approach theory, which focuses on functionings and wellbeing. Other competing theories include; the Basic-Needs approach, which is a pragmatic and humanitarian reaction to utilitarians, and the social contract theory, which focuses on justice as fairness.

##### ***2.2.1 Sen's Capability Approach theory***

Sen (1985;1992) describes poverty as capability deprivation, a multidimensional phenomenon. An individual's well-being is conceptualized by taking several attributes simultaneously. As such, no single indicator can capture the multiple living conditions that matter to people. Sen's capability approach theory claims that the freedom to achieve well-being is of primary moral importance and that well-being should be understood in terms of people's capabilities and functionings. In this regard, A person's capability to live a good life is defined in terms of the set of valuable 'beings and doings' (Sen, 1985).

### **2.2.2 *The basic-Needs Approach***

The basic-needs approach focuses on reducing inequality or meeting basic needs, which is the primary objective of egalitarianism or humanitarianism. However, Streeten et al (1981) argue that in the case of equality, no one knows how to achieve and maintain it, how precisely to define, or by what criteria to judge it. The basic-needs approach is a direct approach to the problem of poverty, seen as an unacceptable degree of social inequality. It emerged explicitly in the seventies as a reaction to welfarism in anti-poverty policies.

The basic-needs approach is not shaped within a conceptual revision of welfarism and utilitarianism. It is not a proposition for a theory of equality different from the one derived from the dominant economic paradigms. Instead, emphasis on basic needs must be seen as a pragmatic response to the urgent problem of world poverty; as the ultimate objective of economic development, it should shape national planning for investment, production and consumption (Asselin, 2009).

### **2.2.3 *The Social Contract Theory: Justice as Fairness***

As proposed by Rawls (1971), the social contract theory is a deontological one that either does not specify the good independently from the right or maximises the good. Instead, the view is established on two principles of justice. The first principle states that each person is to have an equal right to the most extensive total system of equal basic liberties compatible with a similar system of liberty for all. And the Second principle stipulates that social and economic inequalities are to be arranged so that they are both: a) to the greatest benefit of the least advantaged, consistent with the just savings principle, and b) attached to offices and positions open to all under conditions of fair equality of opportunity (Asselin, 2009).

In justice, as fairness, the concept of right is prior to that of the good. Something is good only if it fits into ways of life consistent with the principles of right already on hand. For the principle of justice to constitute a real contract, it must be agreed to by all members of society. Rawls uses a special mechanism or condition to reach this universal agreement,

which he calls the original position of equity (OPE). This condition stipulates that the principles of justice are the principles that free and rational persons concerned with furthering their interests would accept in an initial position of equality as defining the fundamental terms of their association. These principles are to regulate all further agreements; they specify the kinds of social cooperation that can be entered into and the forms of government that can be established. The question of attaining the greatest net balance of satisfaction never arises in justice as fairness; this maximum principle is not used at all (Asselin, 2009).

### **2.3. Empirical Literature**

#### ***2.3.1 Approaches to Poverty analysis***

Ballon & Apablaza (2012) argues that money-metric poverty measures, based on consumption theory, are multidimensional but neither understand poverty as capability deprivation nor give any importance to specific deprivations, which makes monetary poverty measures important but incomplete. Furthermore, empirical evidence has shown that people experiencing multiple deprivations in key areas of their lives, such as education, health, safety or employment, may not be income-poor (Bourguignon, et al., 2008), and policies to reduce income poverty may not touch other deprivations. For example, access to drinking water and sanitation does not reflect money-metric poverty, even though access to these services is an important dimension of experienced deprivation when measuring differences in poverty and household welfare.

Arguments have risen among analysts about the relevance and relative importance of dimensions. On the one hand, welfarists argue that there is incompleteness and a lack of perfect correlation between relevant dimensions of well-being, making the focus on a sole indicator such as income somewhat unsatisfactory (Atkinson, 2003; Bourguignon & Chakravarty, 2002) and (Duclos et al. (2006)). On the other hand, non-welfarist stresses the need to move away from utility space to a different space, where multiple dimensions are instrumentally and fundamentally important (Duclos, Sahn, & Younger, 2006). To solve the problem of comparing two distributions and assessing which one exhibits a higher poverty level than the other, one needs to make decisions about the domains

relevant to wellbeing, their respective indicators, threshold levels and the aggregation function (Dharendra, 2010).

Multidimensional Poverty Index (MPI) is a comprehensive measurement tool that has proven to provide a holistic understanding of the lives of the poor while enabling more effective and efficient poverty reduction policymaking (UNDP, OPHI, & University of Oxford, 2019). MPI provides a high-level view of an overall picture of poverty in the country while also enabling closer and more in-depth analyses of areas of interest (such as regions, districts and places of residence). Hence, it helps to depict and inform more precise policy actions that are not captured by monetary metrics.

### **2.3.2 Poverty analysis in Malawi**

#### *2.3.2.1 Money-metric poverty analysis*

Mukherjee & Benson (2003) conducted a study examining the determinants of poverty in Malawi in 1998. This study used a unidimensional approach, and money metric measures were adopted, particularly the cost-of-basic-needs poverty lines. The determinants of poverty were modelled for Malawian households by conducting an empirical multivariate analysis of household welfare primarily using data from the 1997-98 Malawi Integrated Household Survey. The model enabled the authors to simulate the effects of changes in key household characteristics and assess the likely impact on poverty of several poverty reduction policy interventions. The simulations indicated that higher levels of educational attainment, especially for women, and the reallocation of household labour away from agriculture and into the economy's trade and services sector proved to have effectively reduced poverty in Malawi.

A study by Bokosi (2007) aimed at identifying the sources of expenditure and poverty dynamics among Malawian households between 1998 and 2002 and to model poverty transitions in Malawi using a bivariate probit model with endogenous selection. In the study, the author uses money metric measurement of poverty. The study findings indicated that the education of the household head, per capita acreage cultivated, and changes in household size are significantly related to the probability of being poor in

2002, irrespective of the poverty status in 1998. In addition, for those households who were poor in 1998, the likelihood of being poor in 2002 was significantly influenced by household size, the value of livestock owned and mean time to services, while residence in the Northern region was a significant variable in determining the probability of being poor in 2002 for households that were not poor in 1998.

Both studies by Mukherjee & Benson (2003) and Bokosi (2007) agree that human capital, physical infrastructure, ownership of productive assets, access to wage employment, and participation in agriculture tend to lower the likelihood of being poor. On the other hand, having additional children increases monetary poverty but reduces subjective poverty. Moreover, severe weather shocks often drag households below the poverty line and limit the extent to which they can invest in inputs for the next production cycle.

Mussa & Paul (2011) conducted a study to establish a detailed understanding of Poverty in Malawi: Current status and knowledge gaps. The study identifies the knowledge and research gaps concerning poverty in Malawi. Among others, the study admits a research gap in multidimensional poverty. Specifically, the authors argue that the empirical analysis of poverty and inequality in Malawi often tends to be based on income or consumption expenditure as a measure of well-being. Nevertheless, the weak correlation between income and welfare means income may not be a good indicator of welfare. As Sen (1985) argues, poverty measurements should go beyond income and look at other dimensions of well-being, such as health, education, empowerment, and freedom of association. Despite Income being often instrumentally important as a means of achieving different dimensions of well-being, the other dimensions of well-being deserve recognition as they are intrinsically significant.

Another study by Mussa (2015) on Spatial comparisons of poverty and inequality in living standards in Malawi focused on both monetary (consumption) and non-monetary (health and education) dimensions of wellbeing. The study findings showed that rural areas are poorer in the three dimensions regardless of the poverty line chosen. In terms of

inequality, the study finds that the north and south dominate the centre of health inequality, and there is no dominance between the north and south. With respect to education inequality, dominance is declared for the south-centre pair only. However, a sub group decomposition analysis finds that the south contributes the most to consumption and education poverty while the centre is the largest contributor to health poverty. The study concludes that within-area inequalities rather than between-area inequalities are the major drivers of Malawi's consumption, health, and education inequality.

Maganga et al (2021) carried out a study to examine the magnitude of climate-induced vulnerability to expected poverty among farming households and how climate change relates to ex-post poverty and poverty transition. The study used panel data from Malawi Living Standards Measurements Survey data of 2010, 2013, and 2016. On the one hand, the study found that vulnerability was strongly associated with short-run climate stresses and less with long-run climate-related shocks. On the other hand, the effects of vulnerability on actual poverty lessen with time in the long run. The study also found that climate-related stresses worsen farming households' welfare. Droughts, floods, and irregular rainfall exacerbate poverty, with droughts showing the greatest impact on farmers' welfare loss, followed by floods. The study underscores the importance of livestock in buffering against poverty by serving as a safety net and off-farm income-generating activities. In conclusion, the study suggests that the inclusion of livestock in shaping climate management policies for farmers is crucial.

#### *2.3.2.2. Non-Money metric poverty analysis*

Looking into studies that focused on assessing multidimensional poverty (non-money metric), the World Bank Group (2016) fixated on trends and statistics on the proportion of multidimensionally poor people in Malawi between 2004 and 2013. The study used cross-sectional data, second and third Integrated Household Survey data (IHS2 and IHS3) to estimate MPI from 2004 to 2010, and Panel data; the Integrated Household Panel Survey (IHPS) data from 2013 to estimate 2013 MPI. This study estimated MPI using three dimensions: health, education, and living standards, which were tied to specific

indicators. Each dimension was equally weighted, and so was each indicator with a dimension. The following ten indicators were used; years of schooling and child school attendance under the education dimension, child mortality and nutrition under the health dimension and electricity improved sanitation, flooring, safe drinking water, cooking fuel and ownership of assets under the Living standards dimension. From their results, the authors found that even though the poverty headcount was above 50 percent in all time periods, Malawi improved in reducing multidimensional poverty from 2004 to 2013, which was most notable in rural areas compared to urban areas. However, although the study highlights the decreasing trend, it still fails to explain the differences in the multidimensional poverty headcount levels across the years.

Complementing the World Bank Group (2016), a paper by UNDP (2021) on unmasking disparities by ethnicity, caste and gender in Malawi used the global MPI indicators and dimension to estimate multidimensional poverty in Malawi in 2015/2016. The study's results established that more than half (54.2 percent) of the population in Malawi was multidimensionally poor.

A study on multidimensional poverty by Malawi's National Statistical Office (NSO) (2021) based on the fourth Integrated Household Survey (IHS4) data aimed at establishing the true metric and multidimensional poverty status by using a Malawian-specific MPI (M-MPI) measure with Malawian-specific indicators and dimensions, in the study the multidimensional poverty line was set at 38%. The M-MPI is formed of four equally weighted dimensions: Health and population, education, environment and work, which regroup thirteen (13) indicators; Sanitation, nutrition, drinking water, food security, literacy and schooling, school attendance, electricity, rubbish disposal, housing, asset ownership, unemployment, job diversity, and child labour, reflecting national priorities, which were all equally weighted within the dimensions. The study results revealed that 61.7 % lived in multidimensional poverty in 2016. Comparing these results with those of the World Bank Group (2016) and UNDP (2021), the outcomes of NSO (2021) show significantly higher levels of multi-dimensionally poor people than all the other studies. The reasons behind the differences in these levels might have resulted from

the differences in indicators and dimensions used by the authors. Nevertheless, all these studies mainly focused on establishing the poverty levels and developing the appropriate measures.

### ***2.3.3 Multidimensional Poverty Changes or Dynamics***

Since the development of MPI, several researchers have performed studies to assess changes or dynamics of multidimensional poverty in different countries using different methodologies. The methodologies have differed due to variations in study objectives, countries' contexts and data complexity. Nevertheless, empirical evidence has it that various possible methods exist to assess changes or examine determinants of MPI changes over time.

Apablaza and Yalonetzky (2013) emphasise carrying out more research on the dynamics of Multidimensional Poverty compared to monetary-based poverty due to the relatively young growing literature on the dynamics or changes of multidimensional poverty. However, recent studies have widely agreed that multidimensional poverty is more symptomatic of long-term poverty; this is so because households' multi-dimensionally non-poor necessitates like accumulation of assets, and improvements in health and education, are not likely to move in and out rapidly or repeatedly. As such, multidimensional poverty changes occur much more slowly than in monetary-based poverty (Bane and Ellwood, 1986; Barrett, 2005).

A study by Seff and Joliffe (2016) conducted a Panel data analysis using the Ethiopia Socioeconomic Survey (ESS), a panel sample of Ethiopian households that is representative of all rural and small-town households to analyze multidimensional poverty trends and dynamics over time (2012 to 2014). The study also compared trends and dynamics of poverty using both traditional and multidimensional measures. In their findings, the authors suggest that there had been mild declines in multidimensional poverty among rural and small-town Ethiopians. Among other things, the Panel data analysis reveals that nearly 82 percent of households were poor in both waves, 4 percent

fell into poverty between the waves, 8 percent escaped poverty, and 6 percent stayed non-poor.

Another study by Alkire et al. (2020), which aimed at understanding the changes in the global multidimensional poverty index over time among eighty countries, used 160 harmonized datasets from 80 countries of all major world regions (East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, South Asia, and sub-Saharan Africa) in order to make rigorous comparisons of changes in the MPI and its associated statistics overtime periods. Similar to the study by Seff and Joliffe (2016), a multidimensional poverty trend analysis was conducted using the Alkire and Foster Method. The absolute rate of change, the relative rate, and annualized relative rate of change were used to track and analyze changes over time. The methodology used in this study is similar to that used by Alkire, Roche, and Vaz ( 2017), which aimed to scrutinise the Multidimensional Poverty Dynamics methodology and results among 34 countries.

Adepoju (2018) examined multidimensional poverty transitions in rural Nigeria, employing the Alkire and Foster measure of multidimensional poverty, the Markov model of poverty transitions, and the multinomial logistic regression model for analysis. The study used the Multinomial logit (MNL) model to analyze the factors influencing the shifts in multidimensional poverty status between the two waves (2011 and 2013). The study found that toilet type, the household head having primary and tertiary education, number of household assets owned, land ownership, wall material (mud), roof material (grass), floor material (mud) and use of firewood for cooking are statistically significant factors explaining households 'exit from poverty.

The approach used in this study was almost similar to the one used by Acar (2014) to analyze the dynamics of multidimensional poverty in Turkey from 2017 to 2010. The author used panel data analysis to identify the "poor" by proposing a multidimensional poverty measure that incorporates various dimensions closely related to the well-being of individuals in the country. In addition, the random effect Probit model was used to investigate how the new measure differs from other existing poverty measures. In his

findings, the author found that the new measure was partially consistent with the other measures and multidimensional poverty decreased during the period under examination. However, despite the results, the MNL model and random effect Probit model used in these studies failed to quantify and assess the exact determinants leading to changes in multidimensional poverty and their prospect joint probabilities associated with the changes over the time periods.

A similar investigation to the study at hand was done by Martinez Jr. & Perales (2014) to evaluate and analyse the dynamics of multidimensional poverty in contemporary Australia. The authors used panel data and counterfactual simulations to examine the role of different MPI dimensions in explaining changes in multidimensional poverty in Australia between 2001 and 2012. Just as other studies highlighted above, this study also used the Alkire Foster method to analyse multidimensional poverty trends in Australia overtimes. Complementing the Alkire and Foster Method, the study adopted the ANS method proposed by Azevedo, Nguyen, & Sanfelice (2012) instead of the Oaxaca-Blinder method to analyse the drivers of multidimensional poverty dynamics. The technique was proposed over the Oaxaca-blinder method because of its ability to accommodate quantiles, variances and any other features of the underlying distribution of the indicator of wellbeing that was being used. As such, the ANS method can explain average differences in characteristics and other parts of the distribution. In this study, the authors found that year-on-year absolute changes in multidimensional poverty were mainly driven by fluctuations in social support, community participation, and health. Social support, health and material resources increased relative poverty, whereas personal safety, employment, community participation and education reduced it. Changes in socio-economic returns to parental characteristics also impacted changes in poverty rates. Nevertheless, the study also fails to highlight heterogeneity in the overall and specific endowments and structural constraints that contribute to the Multidimensional changes over time.

### ***2.3.4 Methodologies of Multidimensional Poverty***

According to Sen (1985), poverty is considered to be a lack of capability, where capability is defined as being able to live longer and being well-nourished, healthy and literate. This definition formed the basis for establishing multidimensional poverty measures that subsequently led to various methods and indices (asset-based methods and multidimensional poverty indices) being developed to capture many forms of deprivation and poverty (Bruck & Sindu, 2013). Multidimensional poverty measures are thought to better encapsulate long-term well-being and direct indicators and variables (Hulme & Shepherd, 2003).

During the past decades, poverty measurement has generally been theorized at identification and aggregation levels. In the uni-dimensional measure of poverty, more emphasis was given to the properties that should be satisfied by the poverty index in the course of aggregation. Contrary, in the multidimensional context, complexity arises at the identification stage. Given a set of dimensions, each of which has an associated deprivation cut-off or poverty line, it is possible to identify whether each person is deprived in each dimension. However, the difficult task is deciding who is considered multi-dimensionally poor (Santos & Karma, 2008).

Two extreme approaches, intersection and union approaches, have been used in multidimensional poverty literature to identify multi-dimensionally poor people. First, this method aggregated achievements in each of the respective indicators into a single welfare index. Then it imposed a deprivation cut-off for the overall index rather than for each indicator. On the one hand, the Union approach considers individuals or households to be multi -dimensionally poor if they are deprived in at least one dimension. Nevertheless, a limitation of this approach is that when a large number of dimensions are included, most of the population will be identified as poor (Alkire & Foster, Counting and Multidimensional Poverty Measurement, 2011).

On the other hand, the intersection approach identifies people as being multi-dimensionally poor only if they are deprived in all dimensions. Just like the union approach, this approach's weakness is that it misses out on people who are deprived in

several important dimensions and experience extensive deprivation even if they are not universally deprived. Despite all this, the union approach gained more support and appeal in practice and theory (Sumarto & De Silva, 2014).

In support of the union approach, several authors have used the technique to develop different frameworks and indices. For example, Tsui (2002) builds a self-evident framework for multidimensional poverty measurement and develops two relative multidimensional poverty measures. One of these is a generalization of Chakravarty's (1983) one-dimensional class of poverty indices, and the other is a generalization of Watts's (1969) poverty index. Likewise, Bourguignon and Chakravarty (2003) suggested a family of multidimensional poverty measures, which were also a generalization of the Foster-Greer-Thorbecke (FGT) family of measures but aggregated relative deprivations using a constant elasticity of substitution (CES) function, implying a degree of substitution between dimensions.

In consideration of the limitations of the extreme union and intersection approaches, Alkire & Foster (2011) proposed and developed a novel identification methodology referred to as the Multidimensional Poverty Index (MPI) as an alternative. While allowing for the two extremes approaches, the novel method also permits intermediate alternatives, such as identifying the multi-dimensionally poor as those deprived in  $k$  number of dimensions out of the total  $d$  number of dimensions. A person is considered poor if the number of deprived dimensions falls above the cut-off  $k$ . This identification method is referred to as the “dual cut-off” method since it depends on determining whether a person is deprived within that dimension and across dimension cut-offs. It identifies the poor by “counting” the number of dimensions in which an individual is deprived Alkire and Foster (Alkire & Foster, 2011).

The MPI is designed to reveal the combination of deprivations that affect the population simultaneously (World Bank Group, 2016). As such, an aggregate measure is generated, which ordinarily takes the individual or household as the starting point and counts the different types of deprivations experienced, capturing both the percentage of poor people

(headcount ratio or incidence of poverty) and the percentage of deprivations that poor people face (intensity of poverty) (Alkire & Foster, 2011). The author of this study uses the Alkire and Foster methodology as it has proven to consider and address the limitations of the extreme approaches (Union and interaction approaches).

#### **2.4 Contribution to literature**

Considering the theories reviewed in this study, the paper argues that poverty is an equity issue and belongs to political philosophy, especially ethics and ultimately to moral philosophy. Among the available theories, the paper opted for Sen's capability approach to differentiate approaches to equity, involving a distinction between resources, freedom, and achievement spaces, combined with the basic recognition of human diversity. The capabilities approach in this study integrates the fundamental variables taken into consideration through the basic needs approach. Still, it adds to it other variables access to social services, including water and sanitation, energy, education, health, food, health, employment and housing, among others.

The empirical evidence reviewed in this study assessed and analysed poverty in all dimensions, both unidimensional and multidimensional assessments. On the one hand, studies that evaluated the determinants of poverty and its dynamics in Malawi based their estimates on metric money measures, which then ignores and leaves out the importance of long-term well-being as proposed by Sen's Capability approach. On the other hand, the studies that aimed at providing a Multidimensional Poverty analysis did not emphasize examining and analyzing the factors influencing the shifts or changes in multidimensional poverty status between the time periods; instead, only current deprivation and multidimensional poverty rates were reported. In addition, aside from the results by NSO (2021), the multidimensional poverty indices used in all other studies were not Malawi-specific but borrowed from the global perspective.

The summarized literature review brings forth the contribution that this study will add to the multidimensional poverty literature. First, this study employs the Malawi-specific multidimensional poverty index to identify and quantify the factors influencing MPI

changes over time. Furthermore, the study utilizes the Oaxaca Blinder decomposition method, which the previous authors have not used to assess multidimensional poverty in Malawi.

## **2.5 Summary**

The chapter has presented and discussed different theories regarding multidimensional poverty. However, this study adopts Sen`s capability approach theory, which defines living a good life in terms of the set of valuable ‘beings and doings’. The chapter also identifies gaps in the assessment of multidimensional poverty changes in Malawi by reviewing different empirical studies by various authors. Finally, the chapter discusses how the study intends to contribute to the literature on the identified research gaps.

## **CHAPTER THREE**

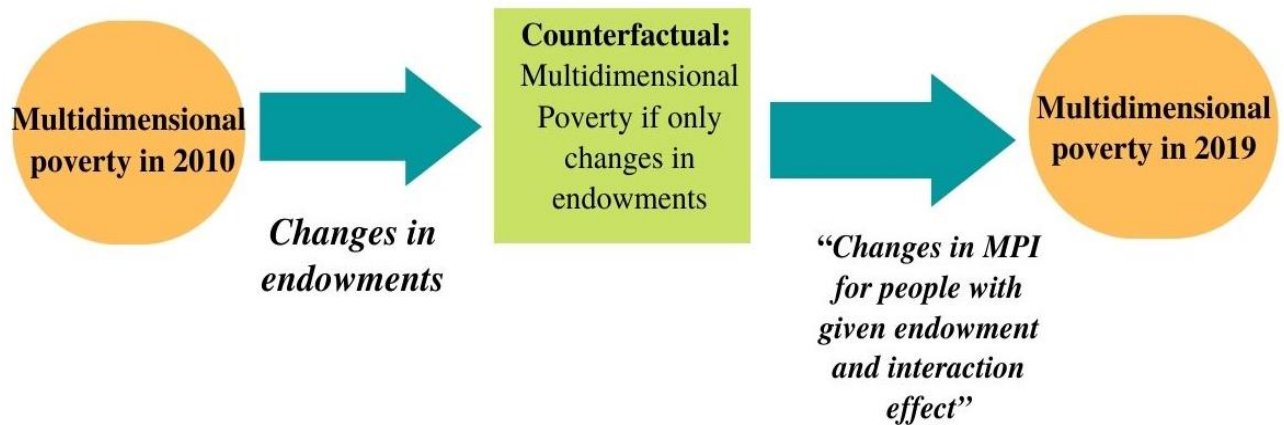
### **METHODOLOGY**

#### **3.1 Introduction**

This chapter aims to describe the approaches used in the study to achieve the objectives of the study. In addition, the chapter gives a detailed description of the data sources and the econometric and empirical models used. Section 3.2 provides the conceptual framework showing the underlining concept of the study and multidimensional poverty changes between 2010 and 2019. Section 3.3 presents the Malawi multidimensional poverty Index, background, and detailed dimensions and indicators. Section 3.4 is the analytical framework, giving the analytical technics and methods used in the study, the variables used, and the econometrics and statistical approach. Finally, the data sources of the study are presented in section 3.5.

#### **3.2 Conceptual Framework**

The study adopts the World Bank's (2015) concept of MPI change. The framework below explains the idea aligning with the multidimensional poverty changes in Malawi from the year 2010 to 2019. The concept emphasized the importance of counterfactuals scenario and endowments, as illustrated in figure 2 below.



*Adopted from World bank, 2015*

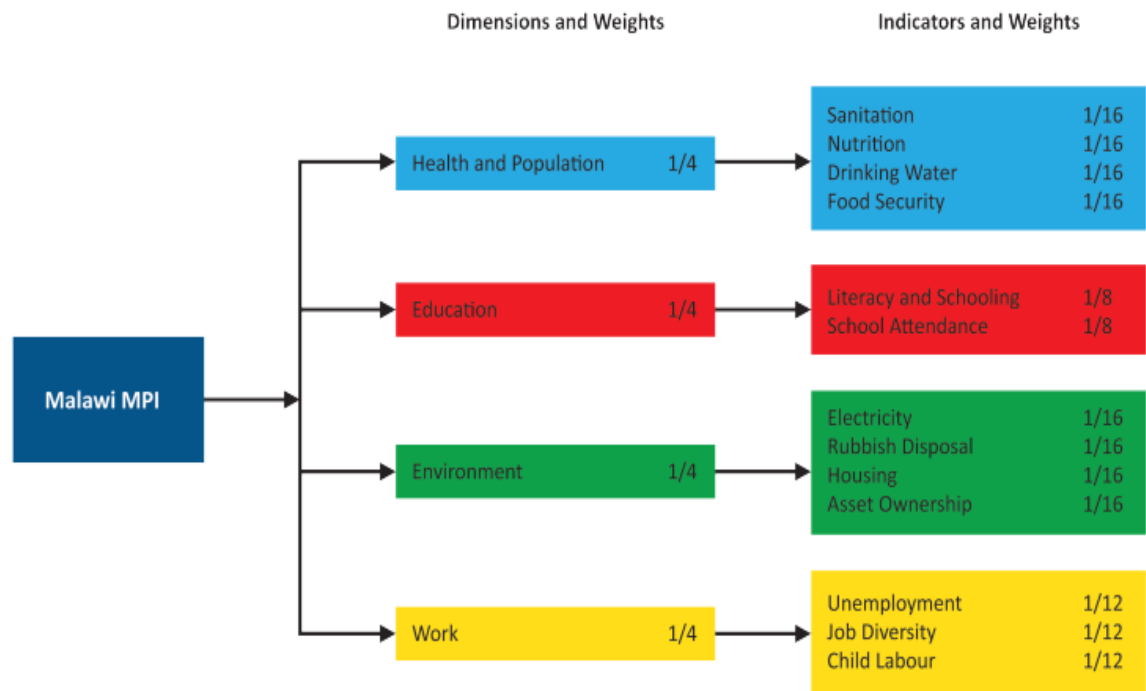
**Figure 2:** *Multidimensional Poverty Change concept*

The study's concept of MPI changes relies on defining a counterfactual scenario, which is then used to help identify the quantitatively important changes that have occurred during this period. This technique relies on defining a counterfactual scenario and estimating what would have happened to poverty had the counterfactual scenario occurred. Determining a counterfactual scenario can quantify the changes that have been important to overall poverty reduction. Figure 2 above depicts how this can work for the given counterfactual scenarios. The focus is on a counterfactual of a constant relationship between endowments and poverty in Malawi from 2010 to 2019. This counterfactual is used to determine which changes in endowments could have contributed to poverty reduction and how much poverty reduction could have changed as a result of a changing relationship between poverty and endowments. The concluding is sometimes referred to as changes in the returns to endowments. However, it represents how the conditional correlation between a given endowment and consumption has changed World Bank (2015). This underlying concept guides the choice of appropriate analytical methods for the study.

### **3.3 Malawi Multidimensional Poverty Index**

The index reflects deprivations in basic needs and core human functionings for households. This shows various patterns for poverty rather than income poverty, as the index reflects different deprivations. In the computation of MPI for this study, the study adopts the M-MPI index developed by the OPHI, UNDP and the National Statistical Office (NSO) of Malawi- consisting of four dimensions: Health and Population, Education, Environment and Work (measured using 16 main indicators).

The choice of the dimensions and indicators was backed up by Sen's (1976) argument that the choice of relevant functionings and capabilities for any poverty measure is a value judgement rather than a technical exercise. Therefore, upon choosing the dimensions and indicators, weights (which must add up to one or 100 percent) were applied to each of the deprivations, which were then summed so that each person has a deprivation score that gives the weighted percentage of deprivations they experience. In this regard, people are identified as multi-dimensionally poor if the weighted sum of their deprivations is greater than or equal to the poverty cut-off (UNDP, OPHI, & University of Oxford, 2019).



Source: National Statistical Office, M-MPI 2016/17

**Figure 3:** Malawi MPI dimensions and indicators weights

As illustrated in Figure 3 above, the Malawi MPI identifies deprivations across health and population, education, environment and work. It counts an individual as multi-dimensionally poor if they suffer deprivations in a fourth of the weighted indicators. The index construction is based on binary and categorical indicators. In constructing our index, equal weight was given to each indicator at each period as all indicators were considered equally important for an individual's wellbeing. All the weights of the indicators add up to 1 so do the weights of the dimensions. The indicators are weighted to determine the effect of each indicator in determining poverty. Table 2 has details of the indicators of poverty dimensions and deprivation used in this study.

**Table 2:** Indicators of poverty dimensions and deprivation cut-offs<sup>2</sup>.

| Domain      | Indicator                | Description                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Education   | • Literacy and schooling | A household is deprived if all members aged 15+ have less than 8 years of schooling OR cannot read or write English or Chichewa                                                                                                                                                                                                                                                            |
|             | • School Attendance      | A household is deprived if at least one child aged 6-14 is not attending school                                                                                                                                                                                                                                                                                                            |
| Health      | • Sanitation             | A household is deprived if the sanitation facility is not flush or a VIP latrine or a latrine with a roof OR if it is shared with other households                                                                                                                                                                                                                                         |
|             | • Nutrition              | A household is deprived if there is at least one child under 5 who is either underweight, stunted or wasted                                                                                                                                                                                                                                                                                |
|             | • Food Security          | A household is deprived if, in the past 12 months, they were hungry but did not eat AND went without eating for a whole day because there was not enough money or other resources for food                                                                                                                                                                                                 |
| Environment | • Electricity            | A household is deprived if they do not have access to electricity                                                                                                                                                                                                                                                                                                                          |
|             | • Rubbish Disposal       | A household is deprived if rubbish is disposed of on a public heap, is burnt, disposed of by other means or there is no disposal                                                                                                                                                                                                                                                           |
|             | • Housing                | A household is deprived if at least two of the following dwelling structural components are of poor quality: <ul style="list-style-type: none"> <li>▪ Walls (grass, mud, compacted earth, unfired mud bricks, wood, iron sheets or other materials)</li> <li>▪ Roof (grass, plastic sheeting or other materials)</li> <li>▪ Floor (sand, smoothed mud, wood or other materials)</li> </ul> |
|             | • Drinking Water         | A household is deprived if their main source of water is unimproved OR it takes 30 minutes or more (round trip) to collect it                                                                                                                                                                                                                                                              |
|             | • Asset Ownership        | A household is deprived if they do not own more than two of the following basic livelihood items: radio, television, telephone, computer, animal cart, bicycle, motorbike or refrigerator AND do not own a car or truck                                                                                                                                                                    |
| Employment  | • Unemployment           | A household is deprived if at least one member aged 18-64 has not been working but has been looking for a job during the past four weeks                                                                                                                                                                                                                                                   |
|             | • Job diversity          | A household is deprived if all working members are only engaged in farm activities, household livestock activities or casual part-time work ( <i>ganyu</i> )                                                                                                                                                                                                                               |
|             | • Child Labor            | A household is deprived if any child aged 5-17 is engaged in any economic activities in or outside of the household                                                                                                                                                                                                                                                                        |

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<sup>2</sup> Adopted from *National Statistical Office, MPI 2016-2017 and Kostenko et al. (2014)*

### 3.4 Analytical Framework

#### 3.4.1 Changes in Multidimensional Poverty in Malawi over time (2010-2019)

The study used the Alkire and Foster Method that identifies the poor using two forms of cut-offs, one within a dimension and one across dimensions.

##### 3.4.1.1 Alkire and Foster Method

Assume we observe, for  $N$  individuals in a population of interest,  $J$  different dimensions of deprivation and  $T$  equally-spaced periods of time. We say that an individual  $n$  is deprived in dimension  $j$  at time  $t$  when  $x_{njt}$ , where  $n \in \{1, 2, \dots, N\}$ ,  $j \in \{1, 2, \dots, J\}$ ,  $t \in \{1, 2, \dots, T\}$ ,  $x_{njt}$  is individual  $n$ 's achievement in dimension  $j$  at time  $t$ , and  $Z_j$  is a cut-off point that determines whether or not an individual is considered deprived in a particular dimension at a specific time. For instance, in the health dimension,  $x$  may be the individual's Body Mass Index, in which case  $Z_{Health}$  would be some threshold below which the individual would be considered underweight and therefore deprived in the health dimension (Nicholas & Sinha, 2013).

Each individual can be said to have an individual deprivation profile, which is a matrix

$$D_n = \begin{pmatrix} d_{n11}^\alpha & \dots & d_{n1T}^\alpha \\ \vdots & \dots & \vdots \\ d_{nJ1}^\alpha & \dots & d_{nJT}^\alpha \end{pmatrix}$$

3. 1

$$\text{where, } d_{n_{jt}}^\alpha = \begin{cases} \left(1 - \frac{x_{njt}}{Z_j}\right)^\alpha & \text{if } x_{njt} < Z_j \quad \forall j \in \{1, 2, \dots, J\} \text{ \& } \forall t \in \{1, 2, \dots, T\} \\ 0 & \text{Other wise} \end{cases}$$

$\alpha \geq 0$  is a sensitivity (to the depth of poverty) parameter along the lines of the poverty measure due to FGT (Ballon & Apablaza, 2012). Call  $d_{n_{jt}}^\alpha$  deprivation inputs. When observed achievement levels are discrete or ordinal, it is common to restrict  $\alpha = 0$  such that  $d_{n_{jt}}^\alpha \in \{0, 1\}$ . The population deprivation profile is a vector  $\rho = (D_1, \dots, D_N)$ .

Define the identification vector  $v = (C_1, \dots, C_N)$  . where  $C_n$  takes the value 1 if the individual is considered **poor** and 0 otherwise. An individual is considered poor if he has at least  $k$  different deprivations; this can be based on a minimum number of periods, dimensions, or a combination of both. A union identification method would set  $k = 1$ , while the intersection method would use  $k = (J \times T)$ . The poverty index is a function  $g: (\rho, v) \rightarrow \mathcal{R}_+$ .

The dimensional cut-off (denoted by  $z$ ) is a traditional dimension-specific deprivation cut-off that identifies a person as deprived if she falls below a (dimension-indicator) poverty line. The cross-dimensional cut-off (denoted by  $k$ ) states how widely deprived a person must be to be identified as multi-dimensionally poor by counting the dimensions in which she is deprived.

#### 3.4.1.2 Technical Analysis

##### a) MPI Computation

The AF methods propose a family of measures that can reflect multidimensional poverty's incidence, depth and severity. The analysis here focuses on multidimensional poverty incidence ( $H$ ), adjusted headcount ratio ( $M_0$ ) and intensity ( $A$ ). The calculation of MPI and its measures were replicated for all the rounds (2010 to 2019) to establish the changes in multidimensional poverty over the years. The calculation of MPI is done as follows.

$$M_0 = H \times A$$

3. 2

Where:

**H** is the multidimensional headcount ratio. This is the percentage of people identified as poor using the dual cut-off approach. It shows the incidence of multidimensional poverty

**A** is the average proportion of weighted deprivations people suffer simultaneously. It shows the intensity of people's poverty – the joint distribution of their deprivations.

**M<sub>0</sub>** The Adjusted Headcount ratio is the MPI value for a given individual.

In complement to the AF family Poverty measures, the study went further to investigate the amount of contribution from each given indicator and overall dimension to the MPI each year. Calculating the contribution of each indicator or dimension to multidimensional poverty provides information that can be useful for revealing a country's deprivation structure hence, helping with policymaking.

The MPI is calculated as an aggregate of the weighted dimensions, and it is given as follows:

$$MPI = \text{Adjusted Headcount ratio } (M_0) = Y_{it}^j = \frac{\sum_{c=1}^{n_j} y_{it}^c}{n_j} \quad 3.3$$

In this case, using our defined dimensions, we have:

$$MPI = Y_{it}^{pov} = \sum_{j=1}^4 Y_{it}^j = Y_{it}^{edu} + Y_{it}^{hea} + Y_{it}^{Env} + Y_{it}^{Wor} \quad 3.4$$

AF poverty measures are given by:

**Headcount Poverty rate (H):**

$$P_H = \frac{1}{N} \sum_{i=1}^N I(Y_{it}^{pov} < z). \quad 3.5$$

**The severity of Poverty (A):**

$$P_A = \frac{1}{N} \sum_{i=1}^N I \left( \frac{z - Y_{it}^{Pov}}{z} \right)^2$$

3. 6

**Contribution of each dimension to MPI ( $M_0$ ):**

$$\phi_j^0(z) = w_j \frac{P_H}{M_o}$$

3. 7

Contribution depends on  $w_j$  and  $P_H$ . Whenever the  $\phi_j^0(z)$  is much larger than  $w_j$ , the poor are more likely to be deprived of that indicator. Where:  $w_j$  is the indicator weight;  $\phi_j^0(z)$  is the dimension contribution percentage;  $N$  is the Sample Population;  $z$  is the dimension-specific deprivation cut-off; and  $Y_{it}^j$  Is a given dimension at time  $t$ .

#### *b)MPI Changes Over Time Estimation*

After the computation of the MPI, it is vital to compare the MPI and its associated partial indices over time along the different waves, in this case, 2010 to 2019. According to (Alkire S. , Roche, Santos, & Seth, 2011), poverty changes over two time periods can be due to the effect of changes in the incidence of poverty, the intensity of poverty or the MPI itself. As such, the study used the absolute rate of change to quantify the absolute pace of change across periods and the relative rate of change to evaluate changes in poverty across two time periods. A T-test was then used to determine the significance of the changes.

The **absolute rate of change** ( $\Delta$ ) is the difference in MPIs (similarly for H and A, replace where there is MPI) between two periods. Computed as follows:

$$\Delta \mathbf{MPI} = \mathbf{MPI}(X_{t_2}) - \mathbf{MPI}(X_{t_1})$$

3. 8

The **relative rate of change** is the difference in poverty as a percentage of the initial poverty level. Interpreting the analysis of absolute and relative changes together provides a clear insight into the overall progress. The **relative rate of change** ( $\delta$ ) is computed for the MPI (and similarly for  $H$  and  $A$ ) as:

$$\delta \mathbf{MPI} = \frac{\mathbf{MPI}(X_{t_2}) - \mathbf{MPI}(X_{t_1})}{\mathbf{MPI}(X_{t_1})} \times 100$$

3. 9

The initial period is denoted by  $t_1$  and the final period by  $t_2$ , and the corresponding achievement matrices for the two periods are denoted by  $X_{t_1}$  and  $X_{t_2}$ , respectively. The same set of parameters, deprivation cut-off vector  $z$ , weight vector  $w$ , and poverty cut-off  $k$  are used in each period (Alkire, Kovesdi, Mitchell, Pinilla-Roncancio, & Scharlin-Pettee, 2020).

### 3.4.2 *Decomposing Multidimensional Poverty Changes in Malawi*

The study used the Unconditional quantile regression-based decomposition method that is based on the Recentred Influence Function (RIF) to examine factors (endowments) and characteristics that influence Multidimensional Poverty changes in Malawi. This methodology was used because of its ability to represent the rescaled effect that a change in distribution from one factor to another has on the MPI score of a given individual (Rios-Avila, 2019). In addition, this method is used to analyse unconditional partial effects on distributional statistics based on regression and decomposition analysis (Firpo, Fortin, & Lemieux, 2018).

The approach was extended to the Oaxaca-Blinder decomposition for quantile regression to non-linear models. The RIF method was used to provide aggregate and detailed Oaxaca Blinder decomposition estimates at each quantile of the Multidimensional Poverty distribution. The RIF method uses joint distribution statistics to estimate

covariates' marginal effects on an outcome variable's unconditional quantiles (Firpo, Fortin, & Lemieux, 2009). As such, the method helped highlight heterogeneity in the overall and specific endowment and structural constraints that contribute to the Multidimensional gap (changes) at each quantile.

On the one hand, the Oaxaca-Blinder decomposition was used to analyse outcomes differences between two well-defined groups. On the other hand, the method is used to explain the differences in the means of a dependent variable between two groups by decomposing the gap into that part that is due to differences in the mean values of the independent variable within the groups, on the other hand, and group differences in the effects of the independent variable, on the other hand.

This methodology was used to permit an assessment of poverty changes as a result of changes in the characteristics of households and individuals ("endowments") compared to the changing nature of the Malawian economy and poverty. The RIF decomposition relies on defining a counterfactual scenario and estimating what would have happened to poverty had the counterfactual scenario occurred. By defining a counterfactual scenario, the changes that have been important to overall poverty changes can be quantified.

The RIF analysis focuses on a counterfactual of a constant relationship between covariates and poverty in Malawi over the years 2010 to 2019. This counterfactual is used to determine which changes in endowments could have contributed to poverty changes and how much poverty could have changed as a result of a changing relationship between poverty and endowments. The latter is sometimes referred to as changes in the returns to endowments, but it represents how the conditional correlation between a given endowment and consumption has changed. In the RIF decomposition approach, there is an interaction effect which can be interpreted as a measure of the correlation between population shifts and changes in endowments and returns in the RIF analysis.

As an advantage of this methodology, the proposed method can be easily generalized to other distributional statistics such as the Gini, the log variance or the Theil coefficient.

However, the methodology also faces a limitation of assuming that the covariates,  $X$ , are independent of unobservable,  $\varepsilon$ , in the general model  $Y = h(X, \varepsilon)$  for the outcome variable,  $Y$ , tend to be highly restrictive in many problems of economic interest (Firpo, Fortin, & Lemieux, 2007).

#### *3.4.2.1 Variables*

The study uses the household as the unit of analysis to explain the factors influencing multidimensional poverty changes in Malawi over time. The dependent variable of interest is the Multidimensional poverty score of each household, which is calculated as an aggregate of the weighted household deprivations. The choice of the independent variables for the study is guided by Sen's capability approach theory, which suggests that a person's capability to live a good life is defined in terms of the set of valuable 'beings and doings' (Sen, 1985). As such, the choice of the variables was solemnly based on a) special importance to the society or people in Malawi and b) social influence, which means they are an appropriate focus for public policy rather than a private good or a capability (World Bank Group, 2016).

Furthermore, the study also takes advantage of previous studies (Adepoju, 2018; Alkire, Roche, & Vaz, 2017; Bokosi, 2007; Seff & Joliffe, 2016; Martinez Jr. & Perales, 2014; Mukherjee & Benson, 2003) that suggest and mention some of the factors that affect determinants of poverty and its dynamics (Rios-Avilla, 2019). Table 3 below highlights the variables used in the regression model of the study.

**Table 3:** Variables used in the RIF regression

| Variable                     | Variable definition                                                                                                                      | The expected direction of the effect |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Dependent Variable</b>    |                                                                                                                                          |                                      |
| MPI score                    | The aggregate of the weighted household deprivations                                                                                     |                                      |
| <b>Explanatory variables</b> |                                                                                                                                          |                                      |
| Shock experience             | 1 if experienced shocks or disaster, 0 otherwise                                                                                         | Positive (+ve)                       |
| Household size               | Number of members in a household                                                                                                         | Positive (+ve)                       |
| Income                       | Income generated from all available sources per year                                                                                     | Negative (-ve)                       |
| Access to credit             | 1 if had access to credit, 0 otherwise                                                                                                   | Negative (-ve)                       |
| Social protection            | 1 if was involved in any social protection program, 0 otherwise                                                                          | Positive (+ve)                       |
| Marital Status               | 1 if married, 0 otherwise                                                                                                                | Positive (+ve)                       |
| literacy                     | 1 if the household head knows how to read or write, 0 otherwise                                                                          | Negative (-ve)                       |
| Place of residence           | 1 if the household stays in a rural area, 0 otherwise                                                                                    | Positive (+ve)                       |
| Education level              | Categorical for the household head (1 if has no education, 2 if primary education, 3 if secondary education and 4 if tertiary education) | Negative (-ve)                       |

**a) Econometrics and statistical Approach of the Unconditional quantile regression-based decomposition method**

***Steps to RIF decomposition:***

1. Obtain the sample quantile

$$q_\theta$$

2. Obtain RIF

$$RIF(y; q_\theta) = q_\theta + \frac{\theta - 1[y \leq q_\theta]}{f(q_\theta)}$$

3. 10

3. Assuming zero mean and Linearity, we get:

$$E[RIF(y; q_\theta)|X] = X\beta^\theta$$

3. 11

4. Estimate Coefficients for each quantile using OLS:

$$q_\theta = E_X[E[RIF(y; q_\theta)|X]] = E[X]\beta^\theta$$

3. 12

5. Apply the Oaxaca-Blinder decomposition:

$$\Delta_y^\theta = q_{A|A}^\theta - q_{B|B}^\theta = [RIF(y_A; q_{A,\theta})|X] - [RIF(y_B; q_{B,\theta})|X]$$

3. 13

6. Obtain Decomposition components:

$$\Delta_y^\theta = \underbrace{(\hat{\beta}_{A,\theta} - \hat{\beta}_{B,\theta}) \bar{X}_B}_E + \underbrace{(\bar{X}_A - \bar{X}_B) \hat{\beta}_{B,\theta}}_C + \underbrace{(\bar{X}_A - \bar{X}_B) (\hat{\beta}_{A,\theta} - \hat{\beta}_{B,\theta})}_I \quad 3.14$$

**Endowment effect**      **Coefficients differences contribution**      **Interaction**

**Where:**  $q_\theta$  Is the  $\theta$ th quantile of endowments (sample quantile),  $f(q_\theta)$  is the unconditional density of endowments at the  $\theta$ th quantile,  $y$  is the MPI score,  $1[y \leq q_\theta]$  It is an indicator function that shows whether the outcome of interest is equal to or small than the  $\theta$ th quantile, and  $[X]\beta^\theta$  Coefficient Parameter for a given vector of X (factors)

As shown in the last equation, 3.16 above, the decomposition is split into three components, (E) the **Endowments effect**, which presents the amounts to the part of the differential due to group differences in the predictors. The second component, (C), represents the **contribution of differences in the coefficients** (including differences in the Intercept) and the last component, (I), is the **interaction term**, accounting for the fact that differences in endowments and coefficients exist simultaneously between the two groups. However, according to (Jann (2008); O'Donnell, van Doorslaer, Wagstaff, & Lidelow (2008)), the last component (I) is difficult to interpret as it accounts for the indirect effect of the variables.

### 3.5 Data Sources

The study used the Integrated Household Panel Survey (IHPS) data <sup>3</sup> for the period 2010 – 2019, a nationally representative data collected across all regions of Malawi consisting

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<sup>3</sup> Accessed at <https://microdata.worldbank.org/index.php/catalog/3819>

of information on consumption patterns of households both in terms of food and non-food, collected by the National Statistical Office. A balanced panel comprising a total of 4,388 households (1,097 households spread across four waves) with 23,697 individuals was used. The panel was balanced to allow observations of the same unit in every wave hence reducing the heterogeneity of the unit.

### **3.6 Summary**

The chapter has presented the Alkire-Foster method of MPI computation, the indicators and dimensions used for this method, and why this methodology was adopted. The chapters also present different poverty measures that necessitate quantifying MPI changes overtime. The chapter also explains the Oaxaca Blinder decomposition, a RIF-based regression analysis method used to identify and quantify various determinants of MPI changes over time from 2010 to 2019, which is the time period of the study. The concept of the study, data sources, and the variables for the regression are also explained in the chapter.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.1 Introduction**

This chapter presents the study results obtained by employing the methodology suggested in chapter three. The section presents both the univariate and multivariate analyses. Section 4.2 present and discusses the descriptive statistics. Section 4.3 presents and discusses the results of changes in multidimensional poverty in Malawi to address the study's first objective. Section 4.4 presents and discusses the RIF regression results. The chapter ends with section 4.5, which summarizes the entire chapter.

#### **4.2 Descriptive Statistics**

Table 4 below presents the detailed descriptive statistics of the data and variables used in this study. The years of study cover 2010 to 2019. The study findings highlight that from the sample, there has been an increase in average income from MK 17, 242.46 per person per year in 2010 to MK 141,307.20 per person per year in 2019. The year 2010 had an average household size of 5.97 members per household, slightly increasing to an average of 6.45 members per household in 2019. Nevertheless, between 2013 and 2019, the household size did not show any significant movements, as it averaged around 6.5 members per household.

The year 2010 had the highest proportion of married individuals compared to all the years. The proportion of married individuals moved from 53.6% in 2010 to 45.1% in 2019. In all the years, the 0-14 age group had the highest proportion of people compared to all the other age groups, specifically 47.9%, 46.9%, 43.3% and 41.5 % in 2010, 2013, 2016 and 2019, respectively.

In terms of population concentration, the northern region had the smallest proportion of people in all the years compared to the central and southern regions. However, the central region had the highest proportion of people in 2010 at 45.1%, which then decreased to 43% in 2019, making the southern region the region with the highest proportion of people among all three regions in Malawi in 2019 at 44.1%. In all the regions, the rural area had the highest number of people in all the years than the urban area.

**Table 4: Descriptive statistics and Demographic information**

|                       | 2010  |          | 2013     |          | 2016     |          | 2019     |         |
|-----------------------|-------|----------|----------|----------|----------|----------|----------|---------|
| Attribute             | Mean  | SD       | Mean     | SD       | Mean     | SD       | Mean     | SD      |
| <b>Income (MK)</b>    | 17,24 | 176,400. | 31,691.5 | 250,622. | 72,037.8 | 587,784. | 141,307. | 243,735 |
|                       | 2.455 | 278      | 78       | 344      | 5        | 525      | 2        | 9.321   |
| <b>Household size</b> | 5.972 | 2.370    | 6.448    | 2.423    | 6.568    | 2.325    | 6.468    | 2.529   |
| <b>Sex</b>            |       |          |          |          |          |          |          |         |
| Female                | 0.508 | 0.500    | 0.502    | 0.500    | 0.503    | 0.500    | 0.504    | 0.500   |
| Male                  | 0.492 | 0.500    | 0.498    | 0.500    | 0.497    | 0.500    | 0.496    | 0.500   |
| <b>Marital Status</b> |       |          |          |          |          |          |          |         |
| Not married           | 0.464 | 0.499    | 0.499    | 0.500    | 0.527    | 0.499    | 0.549    | 0.498   |
| Married               | 0.536 | 0.499    | 0.501    | 0.500    | 0.473    | 0.499    | 0.451    | 0.498   |
| <b>Age groups</b>     |       |          |          |          |          |          |          |         |
| Agegroup:0-14         | 0.479 | 0.500    | 0.469    | 0.499    | 0.433    | 0.496    | 0.415    | 0.493   |
| Agegroup:15-24        | 0.189 | 0.391    | 0.183    | 0.387    | 0.182    | 0.386    | 0.21     | 0.408   |
| Agegroup:25-34        | 0.144 | 0.351    | 0.136    | 0.342    | 0.111    | 0.314    | 0.094    | 0.291   |
| Agegroup:35-44        | 0.084 | 0.277    | 0.098    | 0.297    | 0.102    | 0.302    | 0.119    | 0.324   |
| Agegroup:45-54        | 0.05  | 0.218    | 0.054    | 0.226    | 0.062    | 0.240    | 0.07     | 0.256   |

|                          |       |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Agegroup:55+             | 0.054 | 0.227 | 0.061 | 0.239 | 0.111 | 0.314 | 0.091 | 0.288 |
| <b>Region</b>            |       |       |       |       |       |       |       |       |
| Northern                 | 0.124 | 0.330 | 0.123 | 0.328 | 0.126 | 0.332 | 0.129 | 0.335 |
| Central                  | 0.451 | 0.498 | 0.443 | 0.497 | 0.43  | 0.495 | 0.43  | 0.495 |
| Southern                 | 0.425 | 0.494 | 0.435 | 0.496 | 0.444 | 0.497 | 0.441 | 0.497 |
| <b>Residence</b>         |       |       |       |       |       |       |       |       |
| Urban                    | 0.274 | 0.446 | 0.264 | 0.441 | 0.253 | 0.435 | 0.259 | 0.438 |
| Rural                    | 0.726 | 0.446 | 0.736 | 0.441 | 0.747 | 0.435 | 0.741 | 0.438 |
| <b>Shock experience</b>  |       |       |       |       |       |       |       |       |
| No shock experience      | 0.698 | 0.459 | 0.276 | 0.447 | 0.415 | 0.493 | 0.356 | 0.479 |
| Experienced shock        | 0.302 | 0.459 | 0.724 | 0.447 | 0.585 | 0.493 | 0.644 | 0.479 |
| <b>Social protection</b> |       |       |       |       |       |       |       |       |
| Did not receive          | 0.982 | 0.131 | 0.892 | 0.310 | 0.881 | 0.324 | 0.82  | 0.385 |
| Received                 | 0.018 | 0.131 | 0.108 | 0.310 | 0.119 | 0.324 | 0.18  | 0.385 |
| <b>Access to credit</b>  |       |       |       |       |       |       |       |       |
| Did not have access      | 0.84  | 0.366 | 0.738 | 0.440 | 0.715 | 0.452 | 0.716 | 0.451 |
| Had access               | 0.16  | 0.366 | 0.262 | 0.440 | 0.285 | 0.452 | 0.284 | 0.451 |
| <b>Literacy</b>          |       |       |       |       |       |       |       |       |

|                        |             |       |             |       |             |       |             |       |
|------------------------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|
| Not literate           | 0.433       | 0.496 | 0.399       | 0.490 | 0.373       | 0.484 | 0.305       | 0.461 |
| Literate               | 0.567       | 0.496 | 0.601       | 0.490 | 0.627       | 0.484 | 0.695       | 0.461 |
| <b>Education level</b> |             |       |             |       |             |       |             |       |
| No education           | 0.836       | 0.370 | 0.826       | 0.379 | 0.724       | 0.447 | 0.732       | 0.443 |
| Primary education      | 0.066       | 0.248 | 0.064       | 0.244 | 0.081       | 0.273 | 0.084       | 0.278 |
| Secondary education    | 0.09        | 0.286 | 0.106       | 0.307 | 0.182       | 0.386 | 0.157       | 0.364 |
| Tertiary education     | 0.008       | 0.089 | 0.004       | 0.067 | 0.012       | 0.111 | 0.027       | 0.163 |
| <b>N</b>               | <b>5465</b> |       | <b>6055</b> |       | <b>6188</b> |       | <b>5989</b> |       |

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The proportion of those experiencing different shocks like floods, drought, famine and other weather-related shocks has increased over the years, from 30.2 % in 2010 to 64.4% in 201, with the highest reported proportion being in the year 2013 that had 72.4 % of people experiencing different related shocks. Similar to the experience of shocks, there has also been an increase in the proportion of people receiving social protection services over the years, from 1.8% in 2010 to 18% in 2019. The increase also applies to the proportion of people accessing credit, from 16 % in 2010 to 28.4% in 2019.

Regarding literacy in Malawi, the results show that there has been an increase in the proportion of people who can read and write from 56.7% in 2010 to 69.5% in 2019. However, in all the years, education levels appeared to have been poor, as the proportion of people with no education remained the highest in all the years compared to all other education levels. Nevertheless, noticeable improvements have been shown as the proportion of people without education decreased from 83.6% in 2010 to 73.2% in 2019.

### **4.3 Changes in Multidimensional Poverty in Malawi over time (2010-2019)**

#### ***4.3.1 Multidimensional Poverty Measures (2010-2019).***

The MPI value is the product of two measures; the incidence of multidimensional poverty (H) and the intensity of poverty (A). In table 5 below, the incidence of multidimensional poverty (H) measure indicates there has been an overall decline in the number of multi-dimensionally poor people; for instance, 70.4 percent, 73.5 percent, 62.6 percent, and 62.1 percent of individuals were multi-dimensionally poor in the years 2010, 2013, 2016, and 2019 respectively. Similarly, the MPI portrayed an overall declining trend, having the MPI moving from 0.402 in 2010 to 0.347 in 2019. Regarding the intensity of poverty (A), the figures were almost constant for all the years, depicting that an average multi-dimensionally poor person was deprived in more than half (57 percent) of the weighted indicators. Of all the poverty measures, 2013 had the highest poverty rates contrary to all years, and 2019 had the least.

**Table 5:** Malawi`s Multidimensional Poverty Changes over time (2010-2019)

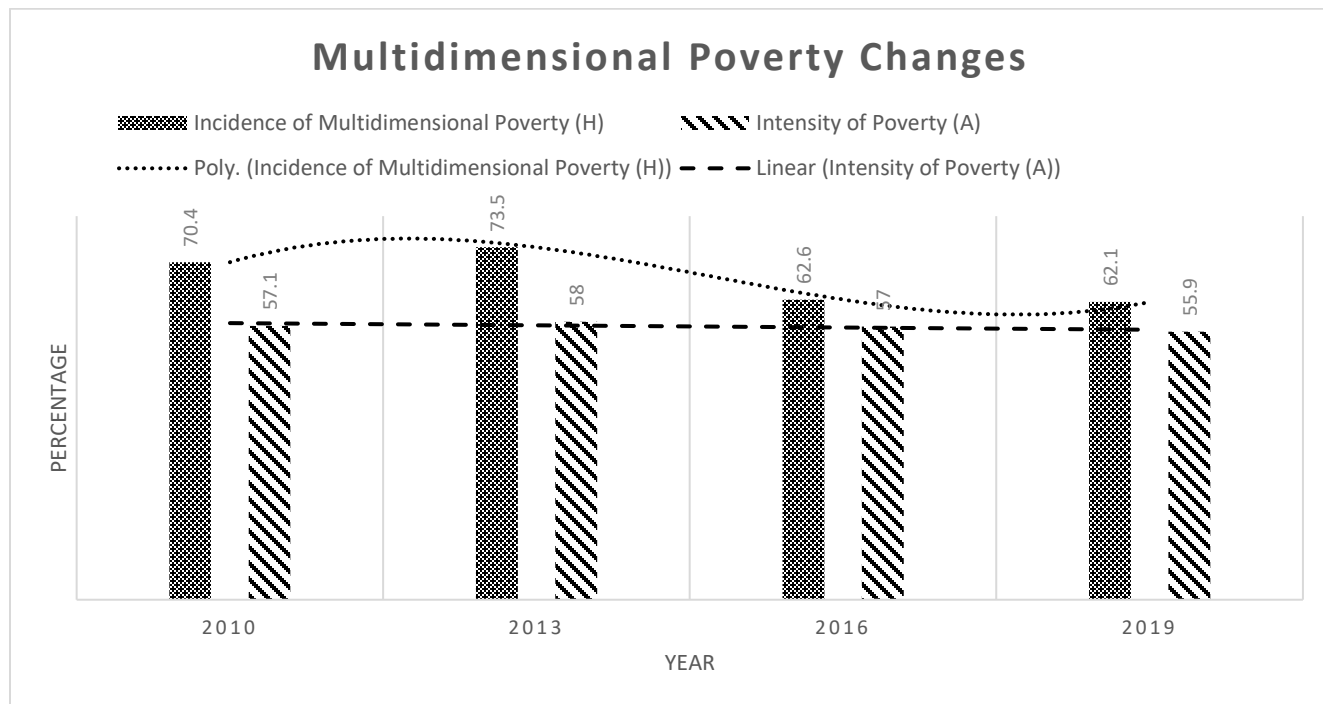
| Poverty Measure                                  | Years | Level | Absolute change      | Relative rate of change (%) |
|--------------------------------------------------|-------|-------|----------------------|-----------------------------|
| <b>Multidimensional Poverty Index (Mo)</b>       | 2010  | 0.402 | -                    | -                           |
|                                                  | 2013  | 0.426 | 0.024                | 5.97                        |
|                                                  | 2016  | 0.357 | -0.069<br>***        | -16.20<br>***               |
|                                                  | 2019  | 0.347 | -0.01                | -2.80                       |
| <b>Overall Change</b>                            |       |       | <b>-0.055</b><br>*** | <b>-13.68</b><br>***        |
| <b>Incidence of Multidimensional Poverty (H)</b> | 2010  | 70.4  | -                    | -                           |
|                                                  | 2013  | 73.5  | 3.1<br>**            | 4.40                        |
|                                                  | 2016  | 62.6  | -10.9<br>***         | -14.83<br>***               |
|                                                  | 2019  | 62.1  | -0.5                 | 0.80                        |
| <b>Overall Change</b>                            |       |       | <b>-8.3</b><br>***   | <b>-11.79</b><br>***        |
| <b>The intensity of Poverty (A)</b>              | 2010  | 57.1  | -                    | -                           |
|                                                  | 2013  | 58.0  | 0.9                  | 1.58                        |
|                                                  | 2016  | 57.0  | -1                   | -1.72                       |
|                                                  | 2019  | 55.9  | -1.1                 | -1.93                       |
| <b>Overall Change</b>                            |       |       | <b>-1.2</b>          | <b>-2.10</b>                |

Statistical significance levels: \*\*\*  $p \leq 0.01$ , \*\*  $p \leq 0.05$ , \*  $p \leq 0.1$

Despite having an almost constant intensity of poverty value throughout the years, the movements in the MPI and incidence of multidimensional poverty values depict an overall improvement in the poverty levels. However, the insignificant difference in the intensity of poverty stipulates that there is a lot to be done for an average multidimensionally poor person to move from their current deprivation status. The absolute and relative rates of change have shown that there were overall significant

changes in the MPI and the incidence of multidimensional poverty from 2010 to 2019. This explicates that throughout the years (2010 to 2019), there have been differences in poverty levels following different directions. Figure 4 below illustrates the movements of multidimensional poverty over the years of study (2010 to 2019).

As explained earlier, it is also important to note that even though an overall change in MPI and incidence of multidimensional poverty was observed, the transitions between subsequent years were only observed to be significant in 2016 for the MPI and 2013 and 2016 for the incidence of multidimensional poverty. This suggests that no statistically significant changes in the MPI happened between 2010 and 2013 and between 2016 and 2019. Nevertheless, the results show a seemingly declining trend in both the MPI value and incidence of poverty over time.



**Figure 4:** *Multidimensional Poverty over the Years*

Nevertheless, there are several possible reasons why the MPI began to change in 2016 and not in 2013. Firstly, several studies have established the effect of the introduction of SDGs on poverty reduction (United Nations (2019); Chirwa (2016)), particularly in countries that experienced a decrease in poverty levels after the introduction of the SDGs. Similar reasoning could also apply to Malawi since the MPI change was observed in 2016, a year after the Government of Malawi had put in place mechanisms to ensure that national development plans are being implemented to realise the 2030 agenda as specified Sustainable Development Goals (National Planning Commission, 2019). Table 4, under descriptive statistics above, complement this reasoning as it shows a big jump in income between 2010 to 2016.

The study findings on MPI changes are consistent with the results by IFPRI (2019) which reported a decreasing trend in the MPI from 2004 to 2016 using the global MPI. The results are also comparable to NSO (2021), which reported 61.7 percent of individuals as multi-dimensionally people in 2016. On the same, the findings show that 62.6 percent of individuals were multi-dimensionally poor. Even though the numbers seem different, the findings lie within the 95% confidence interval of the results reported by NSO (2021). However, the results contradict the World Bank Group (2016) results, which reported a substantial decrease in the MPI from 2010 to 2013. Contrary to these findings, the study findings do not establish any statistical difference in MPI between these two waves. The difference could arise due to the different methodologies used in pursuit of establishing the MPI by the authors and could also be explained by the study limitations.

Despite the differences in the reported values of MPI by the previous authors (the world bank Group (2016); IFPRI (2019); and NSO (2021)), the study agrees with the overall findings of the existing literature on MPI that over half of Malawi's population has been multidimensionally people over time. The results also agree with the literature on the Alkire-Foster decompositions by location. In addition, all the previous authors found that the incidence of multidimensional poverty in Malawi was higher in rural areas compared to the urban area, which is consistent with the current study findings.

#### 4.3.1.1 Alkire-Foster Decompositions

Decomposing the MPI by subgroups, in this case by region and place of residence, gender, and education level, provides more information by revealing the multidimensional poverty from different parts of the country. The decompositions were done for all the time periods of the study (2010 to 2019) to appreciate the changes that have been happening each year regarding a specific poverty measure. The decompositions have been outlined and explained below.

##### a) Region decomposition

Table 6 below shows the decomposition by region. The decomposition seeks to unveil how multidimensional poverty levels were across all three regions of Malawi in all the time periods of the study. From the results, the northern region had the lowest proportion of multidimensionally poor people across all the years (62.1 % in 2010, 65.4% in 2013, 39.1% in 2016, and 41.7% in 2019) as compared to the central and southern regions. On the other extreme, the southern region had the highest proportion of people living in multidimensional poverty in the years 2010 (76.5%), 2013 (77.8%), and 2016 (69.9%).

**Table 6:** Alkire-Foster decomposition by region

| Poverty Measure                                  | 2010  |        |       | 2013  |        |       | 2016  |        |       | 2019  |        |       |
|--------------------------------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|
|                                                  | North | Center | South | North | Center | South | North | Center | South | North | Center | South |
| <b>Incidence of Multidimensional Poverty (H)</b> | 62.1  | 66.9   | 76.5  | 65.4  | 71.6   | 77.8  | 39.1  | 62.0   | 69.9  | 41.7  | 64.4   | 62.1  |
| <b>Intensity of Poverty (A)</b>                  | 53.30 | 56.80  | 58.30 | 53.52 | 58.10  | 58.87 | 55.24 | 56.45  | 57.80 | 53.0  | 55.75  | 59.90 |
| <b>Multidimensional Poverty Index (Mo)</b>       | 0.331 | 0.380  | 0.446 | 0.350 | 0.416  | 0.458 | 0.216 | 0.350  | 0.404 | 0.221 | 0.359  | 0.372 |

The results also show that the southern region had made improvements in the levels of multidimensional poverty in 2019 (62.1%), making the central region topping the list being the region with the highest proportion of individuals who were multidimensionally poor (64.4%) as compared to the other two regions. Across all the regions and in all the years, the intensity of poverty remained above 50% and below 60%, stipulating that no noticeable improvements were seen as regards the number of deprivations an average poor individual faces. In all the years and regions, an average multidimensional poor individual was deprived of at least half of the weighted indicators. The trend in 2016 is consistent with that of NSO (2021).

b) Place of residence decomposition

Overall, the rural area had a higher percentage of multi-dimensionally poor people (77 percent) than the urban area (39.1 percent). The tables below summarize the results. The results have been consistent over the years in trend. The same applies to the MPI and intensity of Poverty. Although a higher proportion of multidimensional poor individuals in all the years was in a rural area, the urban area seemed to have been better off. Table 7 below highlights the results.

**Table 7:** Alkire-Foster decomposition by place of residence

| Poverty Measure                                  | 2010  |       | 2013  |       | 2016  |       | 2019  |       | Overall |       |
|--------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|
|                                                  | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban   | Rural |
| <b>Incidence of Multidimensional Poverty (H)</b> | 44    | 80.4  | 44.7  | 83.8  | 32.7  | 72.8  | 35    | 71.6  | 39.1    | 77    |
| <b>The intensity of Poverty (A)</b>              | 51.14 | 58.21 | 51.45 | 59.18 | 51.98 | 57.83 | 50.57 | 56.7  | 51.41   | 58.05 |
| <b>Multidimensional Poverty Index (Mo)</b>       | 0.225 | 0.468 | 0.23  | 0.496 | 0.17  | 0.421 | 0.177 | 0.406 | 0.201   | 0.447 |

Nevertheless, it is important to note that slight improvements were observed in the rural area between 2016 and 2019. This could result from different interventions and initiatives implemented in the country to improve livelihood in rural areas. For example, among

other interventions, the president of Malawi launched the *Mudzi* Transformation Trust (MTT) initiative in 2013, a five-year project that seeks to provide good shelter, access to potable water, and accessible transport as well as ensure food security and nutrition to low-income households in the rural area. These rural-based initiatives could explain the slight improvements as most of the focus areas of the interventions were directly related to the MPI indicators.

#### c) Gender of household head decomposition

Decomposition of the multidimensional poverty by gender of household head

Decomposing the multidimensional poverty results by gender is essential for policy implications as it provides direction regarding gender balances and decision-making processes and may indicate a need for interventions to address gender-based discrimination and inequalities. Table 8 below presents the Alkire-Foster decomposition by gender of the household head. From the results of all the years, the incidence of multidimensional poverty is higher for individuals living in female-headed households (71.7% in 2010, 74.2% in 2013, 63.8% in 2016, and 66.3% in 2019) as compared to those living in male-headed households (69.1% in 2010, 72.4% in 2013, 61.4% in 2016, and 62.2 % in 2019). Furthermore, looking at the M-MPI (Mo) and the intensity of poverty values (A), the results also clearly show that female-headed households are overall multidimensionally poorer than male-headed households in all the years.

**Table 8:** Alkire-Foster decomposition by gender of household head

| Poverty Measure                                          | 2010  |        | 2013  |        | 2016  |        | 2019  |        | Overall |        |
|----------------------------------------------------------|-------|--------|-------|--------|-------|--------|-------|--------|---------|--------|
|                                                          | Male  | Female | Male  | Female | Male  | Female | Male  | Female | Male    | Female |
| <b>Incidence of<br/>Multidimensional<br/>Poverty (H)</b> | 69.1  | 71.7   | 72.9  | 74.2   | 61.4  | 63.8   | 62.2  | 62.0   | 66.3    | 67.8   |
| <b>The intensity of<br/>Poverty (A)</b>                  | 56.87 | 57.18  | 57.48 | 58.36  | 56.84 | 57.37  | 55.63 | 56.13  | 56.71   | 57.37  |
| <b>Multidimensional<br/>Poverty Index<br/>(Mo)</b>       | 0.393 | 0.410  | 0.419 | 0.433  | 0.349 | 0.366  | 0.346 | 0.348  | 0.376   | 0.389  |

These results are consistent with those reported by NSO (2021) for the year 2016. The justification for these results may be due to the social and cultural norms and expectations, which limit women's ability to participate in the labour force and control their economic resources. In addition, women in Malawi also face barriers and discrimination in accessing education and employment opportunities. This limits their ability to generate income, acquire household assets and improve their economic status, making it more difficult for them to escape poverty (Montfaucon, 2020).

#### d) Education level of household head decomposition

Disaggregating poverty levels by the household head's education level can help shed light on the specific challenges and barriers faced by different groups within a population and inform targeted policies and interventions to address poverty. The results in table 9 below show the various multidimensional poverty measures across different education levels of a household head within the time period of the study (2010 to 2019).

The study found that in all the years of study, the incidence of multidimensional poverty is significantly higher among households headed by individuals with no education (76% in 2010, 80.3% in 2013, 72.9% in 2016, and 72.3% in 2019), and by with

those who completed primary education (59.6% in 2010, 52.5% in 2013, 49.6% in 2016, and 42.7% in 2019), as compared to those headed by individuals with at least secondary and tertiary education. The trend also follows for the M-MPI and intensity of poverty. This justification of these results could be as per evidence by Brown & James (2020) that established in their study that education has the potential of improving an individual's job prospects and earning potential, which can help to lift them and their household out of poverty.

**Table 9: Alkire-Foster decomposition by the education level of household head**

| Attribute                  | 2010 |       |       | 2013 |       |       | 2016 |       |       | 2019 |       |       |
|----------------------------|------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|
|                            | H    | A     | Mo    | H    | A     | Mo    | H    | A     | Mo    | H    | A     | Mo    |
| <b>No education</b>        | 76.0 | 57.89 | 0.440 | 80.8 | 58.91 | 0.476 | 72.9 | 58.02 | 0.423 | 72.3 | 56.85 | 0.411 |
| <b>Primary education</b>   | 59.6 | 50.17 | 0.299 | 52.5 | 49.90 | 0.262 | 49.6 | 54.64 | 0.271 | 42.7 | 52.22 | 0.223 |
| <b>Secondary education</b> | 31.8 | 49.69 | 0.158 | 31.9 | 48.28 | 0.154 | 31.6 | 50.63 | 0.160 | 34.1 | 49.27 | 0.168 |
| <b>Tertiary education</b>  | 6.8  | 41.18 | 0.028 | 3.7  | 48.65 | 0.018 | 1.2  | 0.33  | 0.004 | 9.2  | 46.74 | 0.043 |

e) MPI Indicator Deprivations (K=38 percent)

This section presents results on the proportion of the multi-dimensionally poor population that is deprived in that indicator at the same time, also known as the censored headcount ratio (NSO, 2021). The results below represent indicators' deprivation by year at a cut-off point of 38 percent, a cut-off point used for computing M-MPI.

The results show that, overall, Electricity had the highest deprivation rate of 86.04 percent among all the indicators; this was followed by those who were deprived of Child labour (81.82 percent) and 73.40 percent of individuals deprived of employment. On the other hand, the least deprivation came from literacy and school (20.72 percent) and job diversity (24.35 percent). On the one hand, findings from the study have shown that

deprivations in sanitation, housing, drinking water, and rubbish disposal have followed a decreasing trend from 2010 to 2019. While on the other hand, deprivation proportions in Nutrition, food security, and asset ownership have not been consistent, which makes it hard to establish the direction of their movement. Nevertheless, the rest of the indicators have been constantly stable in their movement over the years. Table 10 below summarizes the results.

**Table 10: Indicator Deprivations per Year**

| Indicator            | Deprivation Percentage by Year (%) |       |       |       | Overall (%) |
|----------------------|------------------------------------|-------|-------|-------|-------------|
|                      | 2010                               | 2013  | 2016  | 2019  |             |
| Health & Population  |                                    |       |       |       |             |
| Sanitation           | 40.92                              | 35.72 | 33.74 | 21.01 | 32.68       |
| Nutrition            | 49.95                              | 51.02 | 51.44 | 52.60 | 51.28       |
| Drinking-Water       | 29.59                              | 76.81 | 23.64 | 17.58 | 37.07       |
| Food Security        | 35.68                              | 41.92 | 55.27 | 48.06 | 45.52       |
| Education            |                                    |       |       |       |             |
| Literacy & Schooling | 20.20                              | 20.74 | 21.11 | 20.77 | 20.72       |
| School Attendance    | 35.96                              | 36.60 | 36.75 | 36.52 | 36.47       |
| Environment          |                                    |       |       |       |             |
| Electricity          | 88.34                              | 86.56 | 82.85 | 78.88 | 84.06       |
| Rubbish Disposal     | 38.83                              | 41.87 | 37.49 | 33.33 | 37.87       |
| Housing              | 60.04                              | 54.22 | 44.36 | 38.22 | 48.94       |
| Asset Ownership      | 72.46                              | 49.84 | 44.76 | 69.85 | 58.79       |
| Work                 |                                    |       |       |       |             |
| Unemployment         | 73.65                              | 74.01 | 73.26 | 72.72 | 73.40       |
| Job Diversity        | 25.14                              | 25.09 | 24.56 | 24.63 | 24.85       |
| Child Labor          | 81.26                              | 81.83 | 82.18 | 81.93 | 81.82       |

The results show that nutrition and food security are worsening and unstable. According to Aberman, Meerman, & Benson (2018), the results are not surprising in the country's context. For the past decade, food security and nutrition have been an issue in the country and covering the whole globe, especially Africa. In addition, the problems of rainfall and climate change have affected a large proportion of the Malawian population regarding

their farm productivity and food availability. This, therefore, calls for specific interventions to improve food security and nutrition among children under five and pregnant women in the country.

We also observe that child labour is consistently high in all the years, with an overall of 81.82% of children aged 5-17 years being engaged in any form of economic activities in or outside of the household. The results would tally with the definition of child labour as per MPI computation; for example, if a child aged 16 years was recorded to have contributed to selling a household's business or helping draw water for a household, that in this case was recorded as child labour. With that in mind, the dataset had a significant number of children engaged in child labour in one way or another.

#### f) Indicator and Dimension contribution to the MPI

As highlighted in the methodology section above, the MPI is a measure of poverty that takes into account multiple indicators and dimensions of poverty, including health & population, education, environment and work. Calculating the contribution of each indicator and dimension to the MPI is important because it helps to understand which dimensions or indicators of poverty are most prevalent in a given population and which dimensions are most important in determining poverty status. Therefore, this information can be used to target interventions and resources in the areas where they are most needed and to evaluate the effectiveness of those interventions in reducing poverty.

#### g) Indicator contribution to MPI

The study findings establish that overall, child labour, school attendance, electricity, unemployment, asset ownership, housing, school and literacy, nutrition and food security were the major contributing indicators to the MPI, with contributions of 13.3 percent, 11.6 percent, 10.7 percent, 10.5 percent, 8.2 percent, 7.3 percent, 6.7 percent, 6.6 percent and 6.3 percent respectively. Zooming in on the major indicator contribution to MPI by year, the year 2010 had the indicator; child labour (13.3%), school attendance (11.1%), electricity (10.8%), unemployment (10.5%), asset ownership (9.4%), housing (8.5%), nutrition (6.4%), literacy and schooling (6.2%), rubbish disposal (5.3%), and food

security (5.1%). The year 2013 had child labour (12.9%), school attendance (10.6%), electricity (10.5%), unemployment (10.4%), drinking water (9.3%), asset ownership (6.9%), housing (7.1%), nutrition (6.4%), literacy and schooling (6.1%), rubbish disposal (5.7%), and food security (5.5%).

For the year 2016, the major indicator contributions to MPI were as follows; child labour (13.4%), school attendance (12.4%), electricity (10.7%), unemployment (10.4%), food security (7.7%), literacy and schooling (7.2%), housing (7.1%), asset ownership (6.8%), nutrition (6.7%), rubbish disposal (5.4%), and job diversity (5.3%). Finally, the year 2019 had child labour (13.5%), school attendance (12.8%), electricity (10.7%), unemployment (10.7%), asset ownership (9.8%), literacy and schooling (7.3%), nutrition (7.2%), food security (7.0%), housing (6.3%), job diversity (5.3 %), and rubbish disposal (5.1%).

From the analysis, only sanitation and drinking water indicators have decreased in their contribution to the MPI over the years. The rest of the indicators have shown to have had an almost constant or increasing contribution trend over the years. The detailed indicator contributions over the years are explained and shown in table 11 below.

**Table 11:** Indicator contributions to the MPI

| Indicator            | Contribution to MPI by Year (%) |      |      |      | Overall (%) |
|----------------------|---------------------------------|------|------|------|-------------|
|                      | 2010                            | 2013 | 2016 | 2019 |             |
| Health & Population  |                                 |      |      |      |             |
| Sanitation           | 4.5                             | 3.6  | 3.3  | 1.6  | 3.3         |
| Nutrition            | 6.4                             | 6.4  | 6.7  | 7.2  | 6.6         |
| Drinking-Water       | 3.9                             | 9.3  | 3.5  | 2.7  | 5.1         |
| Food Security        | 5.1                             | 5.5  | 7.7  | 7.0  | 6.3         |
| Education            |                                 |      |      |      |             |
| Literacy & Schooling | 6.2                             | 6.1  | 7.2  | 7.3  | 6.7         |
| School Attendance    | 11.1                            | 10.6 | 12.4 | 12.8 | 11.6        |
| Environment          |                                 |      |      |      |             |
| Electricity          | 10.8                            | 10.5 | 10.7 | 10.7 | 10.7        |
| Rubbish Disposal     | 5.3                             | 5.7  | 5.4  | 5.1  | 5.4         |
| Housing              | 8.5                             | 7.5  | 7.1  | 6.3  | 7.3         |
| Asset Ownership      | 9.4                             | 6.9  | 6.8  | 9.8  | 8.2         |
| Work                 |                                 |      |      |      |             |
| Unemployment         | 10.5                            | 10.4 | 10.4 | 10.7 | 10.5        |
| Job Diversity        | 4.8                             | 4.7  | 5.3  | 5.3  | 5.0         |
| Child Labor          | 13.3                            | 12.9 | 13.4 | 13.5 | 13.3        |

The presented results on the major contributors of MPI make sense as they portray the basic needs for one's livelihood. Child labour, school attendance, electricity, unemployment, asset ownership, housing, school and literacy, nutrition and food security are major contributors to the MPI because they are important indicators of poverty and well-being. For example, children engaged in child labor are often denied the opportunity to attend school, which can negatively affect their education and future prospects. On the other hand, children who are able to attend school and receive an education are more likely to have better life outcomes and to be able to escape poverty. Electricity, unemployment, and asset ownership are also important contributors to the MPI because they are closely related to living standards and economic well-being. Access to electricity

is essential for many aspects of daily life, including lighting, heating, and powering appliances. On the other hand, unemployment and asset ownership are important indicators of economic security and the ability to meet basic needs.

Housing, nutrition, and food security are also major contributors to the MPI because they are essential for physical and mental health and well-being. Adequate housing protects people and provides a safe and healthy living environment. On the other hand, nutrition and food security are essential for physical and mental health and the ability to lead a productive and fulfilling life. Overall, these indicators can be considered major contributors to the MPI because they are all important determinants of poverty and well-being and are closely interrelated (Shaikh, Ahmed, Yousaf, & Ahmed, 2020). Therefore, improving any of these indicators can positively impact multiple dimensions of poverty and well-being.

#### h) Contribution of Each Dimension to the MPI

Environment dimension contribution to the MPI was consistently the highest in all the years, with an overall percentage contribution of 31.6 percent. Work was seconded consistently in all the years, with an overall dimension contribution of 28.8 percent to the MPI. Education had the least dimension contribution to the MPI, with an overall dimension contribution of 18.3 percent. Table 12 below shows the results.

**Table 12: Contribution of each Dimension to the MPI**

| Dimension                      | Year |      |      |      | Overall (%) |
|--------------------------------|------|------|------|------|-------------|
|                                | 2010 | 2013 | 2016 | 2019 |             |
| <b>Health &amp; Population</b> | 20.0 | 24.8 | 21.3 | 18.6 | 21.3        |
| <b>Education</b>               | 17.3 | 16.6 | 19.6 | 20.1 | 18.3        |
| <b>Environment</b>             | 34.1 | 30.6 | 30.0 | 31.8 | 31.6        |
| <b>Work</b>                    | 28.7 | 28.0 | 29.1 | 29.5 | 28.8        |

Analysis by year revealed that health and population dimension contribution to the MPI was highest in 2013 at 24.8 percent compared to its contribution in 2010, 2016 and 2019. Likewise, the education dimension contributed more to the MPI in 2019 at 20.1 percent compared to its contribution in 2010, 2013 and 2016. The analysis further indicates that the contribution of the environment to the MPI was highest in 2010 at 34.1 percent compared to its contribution in the rest of the years. Last of all, the work dimension contributed more to the MPI at 29.5 percent in the year 2019 as compared to its contribution in 2010, 2013 and 2016.

These results portray an important message and area for intervention. The highest major contributor environment, including electricity, rubbish Disposal, housing and asset ownership, is a very important dimension because it allows people to enjoy their full standards of living as it signifies productivity, a clean environment, safety and comfortability, and financial stability and security. The second major contributor, work, is an important factor because having a job can provide people with a source of income and a sense of purpose. It can also give people the opportunity to improve their skills and prospects for the future. The third one on the list, health & population, is also an important factor because good health is essential for people to lead productive and fulfilling lives. Poor health can limit a person's ability to work, learn, and participate in their community and negatively impact their overall well-being. Finally, the least contribution dimension is education; the last is also important because it can give people the knowledge and skills they need to improve their lives and opportunities. It can also

help people better understand their rights and responsibilities and participate more fully in their communities.

#### **4.4. Determinants of MPI changes in Malawi over time**

Intending to establish and explain the factors influencing the changes in multidimensional poverty in Malawi, the study used Oaxaca Blinder RIF decomposition, an unconditional quantile regression model. The Oaxaca-Blinder decomposition is a statistical method used to decompose the differences between two groups into various components, such as the effect of observed characteristics and the effect of unobserved characteristics. In this method, the Oaxaca-Blinder decomposition was used to decompose the difference in the predicted values of the dependent variable between two time periods (2010 to 2013 and 2016 to 2019) as guided by the results in table 5, into the portion that is explained by the observed characteristics included in the model and also the unexplained portion.

The observed characteristics included in the model are the variables that have been included in the model to explain the differences in household MPI changes between the two time periods. The coefficients for these variables represent the magnitude of the effect of each characteristic on the difference in MPI changes between the two time periods. A positive coefficient means that the characteristic is associated with a higher change in the household's MPI score in one time period compared to the other. If it is negative, it means that the characteristic is associated with a lower change in the household's MPI score in one time period compared to the other. The unexplained portion of the difference in MPI changes between the two time periods can be useful for identifying characteristics that may be driving the differences between the time periods but are not captured in the model.

Overall, this analysis aimed to identify the specific factors contributing to households' MPI score changes over time (between 2010 and 2019) in Malawi and to understand the relative importance of each factor in explaining these differences. The results in table 13 below present estimates from the RIF regression for different MPI score quantiles, the sample mean MPI score (Standard RIF), the interquartile range, and the Gini.

**Table 13: MPI changes Determinants in Malawi: Oaxaca Blinder Decomposition Approach**

| Variable                              | MPI Score<br>Mean      | MPI Score<br>Gini      | MPI Score<br>IQR (10 90) | MPI Score<br>Q 25      | MPI Score<br>Q 50      | MPI Score<br>Q 75      |
|---------------------------------------|------------------------|------------------------|--------------------------|------------------------|------------------------|------------------------|
| <b>Overall :</b>                      |                        |                        |                          |                        |                        |                        |
| Second time period<br>(2016 and 2019) | 0.4369<br>(0.0021)***  | 0.2403<br>(0.0019)***  | 0.4801<br>(0.0045)***    | 0.3185<br>(0.0026)***  | 0.4446<br>(0.0028)***  | 0.5714<br>(0.0033)***  |
| First time period<br>(2010 and 2013)  | 0.4704<br>(0.0022)***  | 0.2242<br>(0.0021)***  | 0.4930<br>(0.0053)***    | 0.3621<br>(0.0029)***  | 0.4873<br>(0.0030)***  | 0.6192<br>(0.0032)***  |
| Difference                            | -0.0335<br>(0.0030)*** | 0.0161<br>(0.0028)***  | -0.0129<br>(0.0070)**    | -0.0436<br>(0.0039)*** | -0.0427<br>(0.0041)*** | -0.0478<br>(0.0046)*** |
| Explained                             | 0.0032<br>(0.0018)*    | -0.0044<br>(0.0014)*** | -0.0086<br>(0.0022)***   | 0.0068<br>(0.0021)***  | 0.0038<br>(0.0021)*    | 0.0041<br>(0.0023)*    |
| Unexplained                           | -0.0367<br>(0.0026)*** | 0.0205<br>(0.0026)***  | -0.0043<br>(0.0070)      | -0.0504<br>(0.0035)*** | -0.0465<br>(0.0037)*** | -0.0518<br>(0.0044)*** |
| <b>Explained</b>                      |                        |                        |                          |                        |                        |                        |
| Shock experience                      | 0.0017<br>(0.0004)***  | -0.0019<br>(0.0004)*** | -0.0030<br>(0.0009)***   | 0.0028<br>(0.0005)***  | 0.0016<br>(0.0005)***  | 0.0018<br>(0.0006)***  |
| Household size                        | 0.0024<br>(0.0004)***  | -0.0012<br>(0.0003)*** | -0.0012<br>(0.0006)**    | 0.0021<br>(0.0004)***  | 0.0018<br>(0.0004)***  | 0.0040<br>(0.0007)***  |
| Income                                | -0.0003<br>(0.0001)*** | 0.0006<br>(0.0002)***  | 0.0011<br>(0.0003)***    | -0.0005<br>(0.0002)*** | -0.0003<br>(0.0001)*   | 0.0000<br>(0.0002)     |
| Access to credit                      | -0.0005<br>(0.0003)*   | -0.0007<br>(0.0003)**  | -0.0032<br>(0.0008)***   | 0.0006<br>(0.0004)*    | 0.0001<br>(0.0004)     | -0.0024<br>(0.0005)*** |
| Social protection                     | 0.0019<br>(0.0004)***  | -0.0009<br>(0.0004)**  | 0.0001<br>(0.0011)       | 0.0023<br>(0.0006)***  | 0.0014<br>(0.0006)**   | 0.0034<br>(0.0008)***  |
| Marital Status                        | 0.0007<br>(0.0002)***  | -0.0000<br>(0.0002)    | 0.0010<br>(0.0005)*      | 0.0007<br>(0.0003)*    | 0.0004<br>(0.0003)     | 0.0012<br>(0.0004)**   |
| literacy                              | -0.0049<br>(0.0008)*** | 0.0001<br>(0.0002)     | -0.0062<br>(0.0011)***   | -0.0030<br>(0.0005)*** | -0.0047<br>(0.0008)*** | -0.0072<br>(0.0012)*** |
| Place of residence                    | 0.0020<br>(0.0007)**   | -0.0017<br>(0.0006)**  | -0.0011<br>(0.0004)**    | 0.0026<br>(0.0009)**   | 0.0025<br>(0.0009)***  | 0.0019<br>(0.0007)**   |
| Primary education                     | -0.0011<br>(0.0003)*** | 0.0004<br>(0.0002)**   | -0.0006<br>(0.0004)*     | -0.0009<br>(0.0003)*** | -0.0018<br>(0.0005)*** | -0.0011<br>(0.0004)**  |
| Secondary education                   | 0.0010                 | -0.0009                | -0.0006                  | 0.0013                 | 0.0011                 | 0.0009                 |

|                     |             |             |             |             |             |             |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                     | (0.0006)    | (0.0005)    | (0.0004)    | (0.0008)    | (0.0007)    | (0.0006)    |
| Tertiary education  | -0.0020     | 0.0027      | 0.0038      | -0.0032     | -0.0020     | -0.0016     |
|                     | (0.0004)*** | (0.0005)*** | (0.0008)*** | (0.0006)*** | (0.0004)*** | (0.0003)*** |
| <b>Unexplained</b>  |             |             |             |             |             |             |
| Shock experience    | -0.0030     | -0.0045     | -0.0228     | 0.0048      | -0.0055     | 0.0037      |
|                     | (0.0028)    | (0.0028)    | (0.0076)**  | (0.0037)    | (0.0040)    | (0.0048)    |
| Household size      | 0.0394      | -0.0243     | -0.0276     | 0.0373      | 0.0356      | 0.0512      |
|                     | (0.0063)*** | (0.0062)*** | (0.0170)    | (0.0083)*** | (0.0091)*** | (0.0107)*** |
| Income              | 0.0012      | -0.0023     | -0.0053     | 0.0019      | 0.0005      | -0.0001     |
|                     | (0.0003)*** | (0.0003)*** | (0.0009)*** | (0.0004)*** | (0.0004)    | (0.0005)    |
| Access to credit    | -0.0026     | 0.0015      | -0.0010     | -0.0010     | -0.0051     | -0.0054     |
|                     | (0.0012)**  | (0.0012)    | (0.0034)    | (0.0017)    | (0.0018)*** | (0.0021)**  |
| Social protection   | -0.0000     | -0.0003     | 0.0002      | -0.0008     | 0.0009      | 0.0011      |
|                     | (0.0006)    | (0.0006)    | (0.0016)    | (0.0008)    | (0.0008)    | (0.0010)    |
| Marital Status      | -0.0099     | 0.0112      | 0.0204      | -0.0128     | -0.0032     | -0.0107     |
|                     | (0.0027)*** | (0.0026)*** | (0.0072)**  | (0.0035)*** | (0.0039)    | (0.0045)**  |
| literacy            | -0.0153     | 0.0041      | 0.0040      | -0.0148     | -0.0086     | -0.0270     |
|                     | (0.0043)*** | (0.0043)    | (0.0116)    | (0.0057)**  | (0.0062)    | (0.0073)*** |
| Place of residence  | -0.0098     | 0.0169      | 0.0333      | -0.0157     | -0.0089     | 0.0069      |
|                     | (0.0046)**  | (0.0046)*** | (0.0125)**  | (0.0061)**  | (0.0067)    | (0.0078)    |
| Primary education   | 0.0013      | 0.0003      | 0.0029      | 0.0018      | -0.0008     | 0.0011      |
|                     | (0.0009)    | (0.0009)    | (0.0024)    | (0.0012)    | (0.0013)    | (0.0015)    |
| Secondary education | 0.0041      | -0.0048     | -0.0088     | 0.0067      | 0.0015      | 0.0002      |
|                     | (0.0012)*** | (0.0012)*** | (0.0032)**  | (0.0016)*** | (0.0017)    | (0.0020)    |
| Tertiary education  | 0.0001      | -0.0001     | -0.0013     | -0.0005     | -0.0004     | -0.0000     |
|                     | (0.0002)    | (0.0002)    | (0.0006)**  | (0.0003)*   | (0.0003)    | (0.0004)    |
| Constant            | -0.0388     | 0.0229      | 0.0019      | -0.0573     | -0.0524     | -0.0729     |
|                     | (0.0106)*** | (0.0104)**  | (0.0283)    | (0.0139)*** | (0.0152)*** | (0.0179)*** |

Robust standard errors in parentheses, statistical significance levels: \*\*\*  $p \leq 0.01$ , \*\*  $p \leq 0.05$ , \*  $p \leq 0.1$

In general, the study findings depict that all the estimated models suggest a difference in the household's MPI score between the time periods, as shown by the significance of the explained part of the overall model. Specifically, the overall decomposition at various quantiles (Q25, Q50, and Q75) means that there is a time difference in MPI score among

households at those various quantiles. The results also indicate that for the standard RIF (mean), Gini inequality, and the interquartile range of values falling between the 10<sup>th</sup> and 90<sup>th</sup> percentiles (IQR (10 90)), the difference in a household's MPI score in these time periods is due to the differences in covariates that are in the explained part rather than the unexplained part. As such, this means that the different household characteristics included in the models directly affect the changes and differences in the household's MPI score over time.

#### ***4.4.1 Observed Coefficients***

The study only interprets and discusses the significant coefficients under-explained part of the models of the analysis. Therefore, the variables for the observed coefficients are interpreted and discussed below.

#### ***4.4.2 Shock experience***

The contribution of shock experience is positive in the standard RIF, 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> quantiles of the model, which aligns with the expected signs indicated in table 3 above. This, however, implies that holding all other factors constant, a household that had an experience of any type of shock was associated with an increase in the difference of its MPI score by the given coefficient value over time as compared to those who did not experience any type of shock in a given time period. It is also important to note that even though the shock experience's contribution is positive in the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> quantiles, its magnitude decreases with increasing quantile levels. The results are consistent with the Gini inequality coefficient, which explains that the experience of shock is related to a reduction in inequality measured, consequently leading to an increase in the MPI score. Similarly, the results also agree with the interquartile range results, which follow the sign of the Gini coefficient because of the inclusion of all the values falling between the 10<sup>th</sup> and 90<sup>th</sup> percentiles.

Braced by the expected sign of the variable in table 3 and the descriptive statistics in table 4 above, the positive effect of shock experience on one's household MPI score over time

is justifiable, with the reasoning that a household that has an experience in different any type of shocks tend to be more vulnerable as compared to a household that has not experienced any shock. For instance, if a household experiences a shock like a flood, it tends to lose household assets, housing, food items, etc. This means an increase in deprivations of prospect indicators used in MPI score computation; hence, the household is more likely to have a higher MPI score over time compared to a household that did not experience any shock.

#### ***4.4.2.1 Household size***

Similar to the shock experience, household size also portrayed a positive effect on the household's MPI score difference over time, as shown by the positive signs of its coefficients in the mean (standard RIF) and all quantiles and a negative sign in the Gini and Interquartile range coefficients. The results from all the models explain that holding all other factors constant, an increase in household size by one member is associated with an increase in a household's MPI score difference by the given coefficient value. The results are consistent with the expected sign in table 3 and are justifiable given that the average household size has increased from 2010 to 2019, as shown in table 4 above. Given that the results are the same in all the quantiles, this suggests that the relationship between household size and MPI score is relatively symmetrical around the median.

The positive effect of Household size on the household's MPI score changes is not surprising. A household with more members will require more resources to provide for the needs of its members. As such, there is a likelihood of scrambling to limited resources to maintain basic needs, which automatically translates to ignoring some important aspects of life like electricity, child labour and rubbish disposal. Consequently, this increases the household's deprivations, hence increasing the MPI score. These results concur with the findings by Rios-Avilla (2019), who found that having an additional child is associated with an increase in the household's poverty level.

#### *4.4.2.2 Income*

Income has a negative contribution to the household's MPI score differences. The results are consistent with the negative expected sign-in table 3 above. The regression results on income imply that holding all other factors constant, an increase in income by 1 Kwacha is associated with a decrease in the household's MPI score by the value of the respective coefficient in table 11 above over time. However, the income's contribution magnitude decreases at each subsequent quantile. As such, the contribution is high at the lower quantile (Q25), lower at the middle quantile (Q50), and insignificant at a higher quantile (Q75).

Exploring potential explaining to these results, an increase in income is associated with an increase in purchasing power (Bergh & Nilsson, 2014), as such a household is empowered with the ability to purchase household assets, access good health services and acquire food items, among other things. This could stipulate a reduction of household deprivations, hence a reduction in the household's MPI score over time.

#### *4.4.2.3 Access to credit*

Access to credit has both negative and positive effects on a household's MPI score changes over time. However, the results are ambiguous depending on the model and quantile. For instance, the standard RIF and higher quantile (Q75) results show that credit access has a negative effect on the household's MPI score changes. This implies that holding all other factors constant, a household with access to credit is associated with a decrease in MPI score over time compared to a household that does not have access to credit.

Contrary to this, the results for the Gini, interquartile range (IQR (10 90)) and the lower quantile (Q25) depicts a positive effect, implying that with all other factors being equal, a household that has access to credit is associated with an increase in MPI score over time, compared to a household that does not have access to credit. These results depict an inequality-enhancing effect that increases over time. Nevertheless, the results are insignificant for the middle quantile (Q50), even though the direction is still positive.

The difference in the results suggests that the relationship between access to credit and a household's MPI score is skewed in some way. Although looking at the results, the estimate for Q75 is much larger than the estimates of Q25; it suggests that there is a higher probability of the household MPI score variable being large when the access to credit is at a certain level. This could be due to the presence of outliers in the data that are driving the estimates higher. However, Further research is necessary to assess the validity of this explanation, thus providing additional insights into the effect of access to credit on the changes in the household's MPI over time.

#### *4.2.2.4 Social protection*

Social protection has positive significant coefficient values in the mean, Q25, Q50 and Q75 models and a negative significant coefficient value in the Gini model. This implies a positive effect on the household's MPI score differences over time. Specifically, the results show that holding all other factors constant, a household under social protection programs is associated with an increase in MPI score over time compared to a household not on social protection program. This, therefore, suggests that social protection positively contributes to the MPI score changes over time. The results are consistent with the expected sign in table 3 above.

It is important to note that social protection programs are designed to assist vulnerable individuals and households at risk of poverty, social exclusion and other forms of disadvantage (UN DESA, 2018). The results, however, contradict Barrrientos (2010), who claims that social protection programs play an important role in reducing poverty and improving the well-being of those who are most vulnerable. On the contrary, the study findings suggest that these programs encourage the continuation of poverty. The argument could result from the fact that those most involved in Malawi's social protection programs are those households in need of assistance. As such, the program does not focus on poverty reduction but acts as a relief and assistance mechanic. Furthermore, these programs often have no graduation criteria set, which in the long run could promote dependence syndrome, yielding to the vicious cycle of poverty. The findings of the study

are also backed up by the results of Dabalen et al. (2017), who reported social protection programs to be a failure in alleviating poverty in Malawi, despite its potential due to poor targeting performance, low overall budgets relative to international standards and limited coverage of the poor.

#### *4.2.2.5 Marital status*

Marital status` contribution to household`s MPI score differences was found to be positive. This stipulates that all other factors being equal, a married household head is associated with an increase in the household`s MPI score over time compared to one who is unmarried. This is in line with the expected sign of the result outlined in table 3 above. Furthermore, the results harmonize with the rational thinking that a married household head is more likely to have extended responsibilities and costs than one who is not married. In addition, it is expected that married people are more likely to have children. As such, the MPI score calculation will have a wide scope to consider compared to a household with an unmarried head. However, there is a need for further research to solidify this claim.

#### *4.2.2.6 Literacy*

The literacy coefficient has a negative value in all quantiles, implying that holding all other factors constant, being a literate household head reduces inequality in the household`s MPI score compared to being an illiterate household. This means that a household with a literate household head is associated with a lower MPI score compared to one with an illiterate household head over time. The results also show that literacy decreases inequality or difference in the MPI score at the lower end of the distribution and decreases inequality even more at the higher end of the distribution.

The negative effect of literacy could be due to the fact that literacy is often associated with several positive outcomes, including increased access to education and employment opportunities, which can lead to higher incomes and reduced poverty. In addition, literacy may facilitate access to information and resources that can help individuals make rational decisions about their households and livelihoods, which can also contribute to reduced

poverty. Furthermore, literacy may also be correlated with other factors that are associated with reduced poverty, such as increased civic participation and improved health outcomes. These results concur with Oranga, Obuba, & Nyakundi (2020), who found that reduction in illiteracy levels is one of the key factors in reducing poverty and promoting economic growth and that investing in literacy programs can lead to significant economic returns.

#### *4.2.2.7 Place of residence*

The Place of residence has a positive contribution to the differences in the household's MPI score, as shown by the positive sign on its significant coefficients, which is in line with the expected sign of effect direction in table 3 above. Particularly, the regression results on the variables mean that holding all other factors constant, a household in a rural area is associated with an increase in the MPI score over time compared to a household in an urban area. The results, therefore, stipulate that a rural-based household increases its chance of being multidimensionally poor compared to living in an urban area over time. The findings are consistent with the results shown under the Alkire-Foster decomposition in table 7 and may be due to a variety of factors, including limited access to education and employment opportunities, poor infrastructure, and a lack of access to healthcare and other basic services that could improve their livelihoods (Yassine & Bakass, 2022).

#### *4.2.2.6 Education*

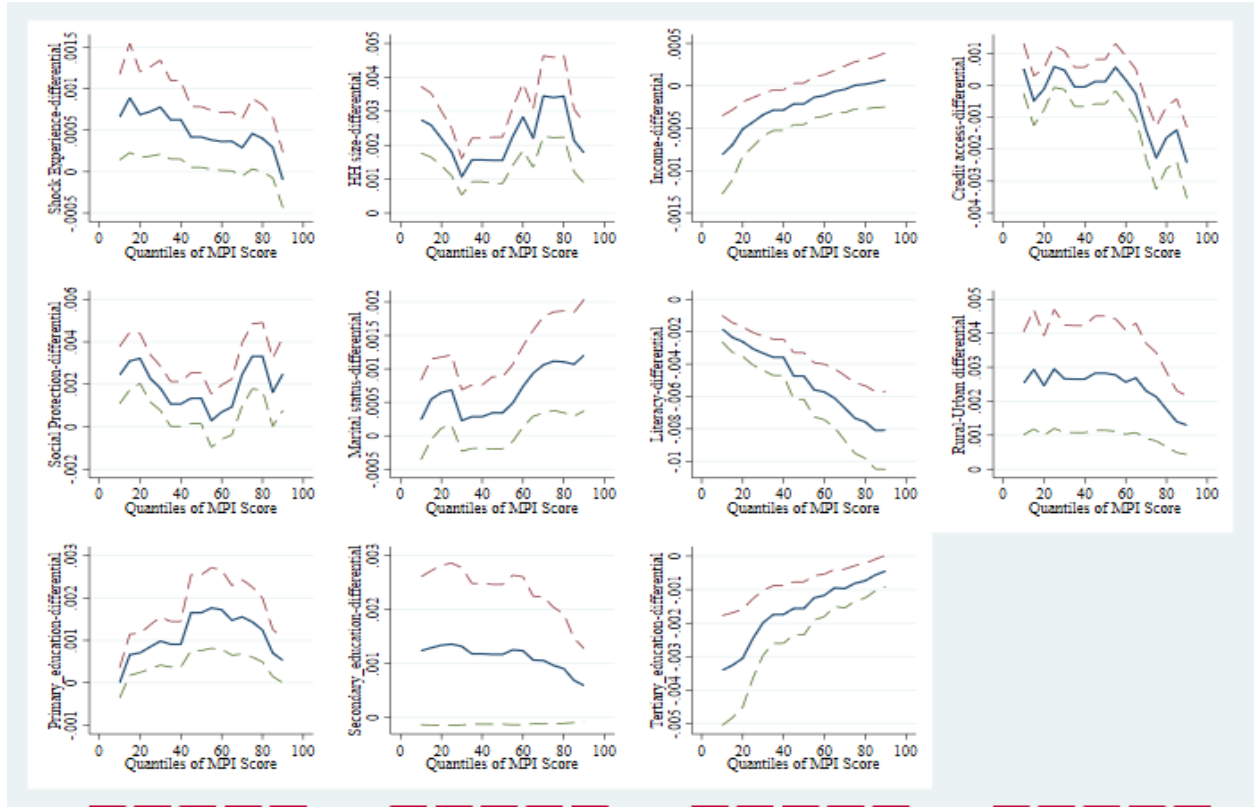
A categorical variable containing no education, primary education, secondary education and tertiary education was used to quantify the effect of household head education on the household's MPI score changes over time. The categories were put into dummy variables, with no education being the reference group. The results showed that secondary education was insignificant in all the models. Both primary education and secondary had a negative effect on the household's MPI differences over time, demonstrated by the positive sign of its significant coefficients (except Gini coefficients). This is consistent with the expected sign-on direction of effect for the variable. For primary education, the negative coefficients mean that holding all other factors constant, a household with a head who attained primary education is associated with a decline in

MPI score difference over time compared to a household whose head acquired no education. For tertiary education, the negative coefficients mean that holding all other factors constant, a household with a head who attained tertiary education is associated with a decrease in MPI score difference over time compared to a household head with no education.

In both cases, a household where the head completed at least a level of education tends to have lower poverty levels than a household whose head has not attained any education. However, as shown in the results, the magnitude of the effect is much higher in a household where the head attained tertiary education than in a household where the head attained primary education. This may be so because tertiary education can provide an individual with specialized skills and knowledge in high demand in the job market, which can lead to higher-paying jobs and increased economic opportunities. While primary education acts as a foundation for further education and training, limited economic opportunities are present. Nevertheless, just like literacy, primary and tertiary education can also facilitate access to information and resources that can help individuals make better decisions about their lives and livelihoods, hence reducing poverty. The results tally with those found by Valero (2021), who argue that education through human capital directly affects economic growth.

#### ***4.2.3 The marginal effect of Change in the distribution of Covariates***

The study also used visual inspections to support the Oaxaca Blinder decomposition analysis results of each covariate to inspect the distribution of effect on linear predictions on different quantiles. Figure 6 below illustrates the covariates differentials of each covariate used in the regression results.



**Figure 5:** Marginal effect of change in the distribution of covariates

Figure 6 above is a graphical representation of the results presented in table 13 above involving quantile RIF regression. The explanations of the results are the same. However, one may wish to know that the graphs on each plot have an upper (upper dotted line) and lower limit (lower dotted line) of the marginal effect of each covariate at a 95% confidence interval. This helps to illustrate the distribution of effect at each quantile of the MPI score.

#### 4.3 Summary

This chapter has presented the findings in line with the study's objectives. First, the chapter presented the descriptive statistics, the results on MPI changes over time and findings from the Oaxaca Blinder decomposition. It is observed from the results that there have been MPI changes over the years, from 2010 to 2019. Further, the results were

decomposed in terms of location, gender and education level to get a clear picture of different social aspects. Upon establishing the changes, the study findings also presented the contributions of each indicator and dimension used in calculating the MPI to shade lighter on areas of policy interventions towards multidimensional poverty. Regarding the first objective, the study establishes that the MPI changes are following a decreasing trend in the country.

The results from the Oaxaca Blinder decomposition show that, on the one hand, increase in household income, literacy of household heads, and higher education levels play a greater role in alleviating multidimensional poverty. On the other hand, an experience of a household to any type of shock, an increase in household size, being in social protection programs, being married, and residing in rural areas, are associated with an increase in MPI over time. Nevertheless, the relationship between access to credit and a household's MPI score was found to be ambiguous, as it is negative in some higher quantiles and positive in lower quantiles. These findings were presented to address the second objective of the study.

## **CHAPTER FIVE**

### **CONCLUSION AND POLICY IMPLICATIONS**

#### **5.1 Summary of the study**

The study aimed at closing the research gap regarding the current understanding of social exclusion and disadvantage in the Malawian context by knowing how multidimensional poverty has changed by using a new Malawi-specific Multidimensional Poverty Index (M-MPI) and how various factors have contributed to the changes in the poverty rates in recent times. Based on available literature and empirical studies, the study leans on Sen's capability approach theory and uses different technics to achieve its specific objectives. The Alkire-Foster method was employed using the Malawi specific multidimensional poverty index measure to assess if there have been changes in the country's multidimensional poverty over time. Upon establishing the changes, the study uses the Oaxaca Blinder decomposition method to examine the specific factors influencing multidimensional poverty changes in Malawi. The uses Integrated Household Panel Survey (IHPS) data for the period 2010 – 2019, a nationally representative panel data collected across all regions of Malawi.

The study finds that there have been significant changes in the MPI value and incidence of multidimensional poverty in Malawi over time (2010 to 2019). The study also finds that child labour, school attendance, electricity, unemployment, asset ownership, housing, school and literacy, nutrition and food security are major contributors to the MPI values across all the years of study because they are important indicators of poverty and well-being. To answer the first objective, the study establishes that there has been an overall decline in the MPI from 2010 to 2019; hence, the MPI has been changing over time.

Regarding examining determinants associated with MPI changes, the study establishes that on one hand, increase in household income, literacy of household head, and higher education levels play a greater role in alleviating multidimensional poverty. On the other hand, an experience of a household to any type of shock, an increase in household size, being in social protection programs, being married, and residing in rural areas, are associated with an increase in MPI over time. Nevertheless, the relationship between access to credit and a household's MPI score was found to be ambiguous, as it is negative in some higher quantiles and positive in lower quantiles. These findings were presented to address the second objective of the study.

## **5.2 Conclusion**

In conclusion, the study concludes that there have been changes in MPI over time in Malawi (2010 to 2019), and the changes are favourable, meaning that Malawi's MPI has overall declined over time. The study also concludes that the MPI changes are influenced by several factors which negatively and positively influence the changes. On the one hand, An increase in household income, literacy of household head, and higher education levels of the household head result in declining the household's MPI scores over time. On the other hand, an experience of a household to any type of shock, an increase in household size, being in social protection programs, being married, and residing in rural areas, are associated with a rise in MPI over time. Access to credit, however, has an ambiguous effect on MPI changes, as it can influence the changes positively and negatively depending on the distribution and percentile.

## **5.3 Study limitations**

The author recognizes the need to acknowledge study limitations. Some of the study limitations include: a limited time frame; the dataset used in the study was collected at certain intervals. As such, the study could not capture MPI changes over a long period. In addition, given that the data used was captured at different time periods, the study observed some inconsistencies that might have affected the data quality and the accuracy of the MPI.

#### **5.4 Recommendations and policy implications**

Several potential recommendations and policy implications may be derived based on the study results. First, policymakers should emphasize implementing interventions that will help reduce multidimensional poverty over time. Second, regarding deprivation in indicators with the highest contributions to the MPI, the government should work with law enforcers to implement initiatives to eradicate child labour. Third, the government, together with the ministry of education and other organisations working in the education sector, should deliberate efforts to make investments that will promote school enrolment and increase school attendance. Fourth, given that electricity is the major energy source that also affects productivity in Malawi, the Government, through the ministry of energy, should invest more resources to increase coverage and conduct more research to identify alternative sustainable energy sources for the country.

To deal with unemployment, both the Government and the youth should identify and venture into social problem-solving investments that will create more room for other people's employment. The author also recommends that economically active household members try as much as possible to invest their income and be used it to acquire household or personal assets as they bring a sense of financial stability and security. Regarding nutrition and food security, the Government, through the ministry of agriculture and other agriculture-related organizations, should put in place interventions that will increase access to affordable agricultural inputs, encourage sustainable farming practices, enhance the availability and quality of extension services to farmers, increasing investment in agriculture and rural development, increasing access to clean water and sanitation, and promoting dietary diversity to ensure that people have access to a range of nutrients and reduce the risk of malnutrition. These specific interventions on the MPI's major contributors could help eradicate poverty in all dimensions as the quality of life would also improve.

The author also recommends that the Government should strengthen shock or disaster-related responses to support affected individuals as this can greatly affect the environment dimension of the MPI, which carries a higher contribution to the MPI

among all the dimensions. Furthermore, the health sector should strengthen its engagement with the communities and promote family planning methods that put in check the household size over time. In addition, the Government invest in rural development to improve the quality-of-service delivery and productivity of community members. Furthermore, there is a need for strategies by the government, development partners, NGOs and its citizens to ensure households are involved in at least one income-generating activity. Finally, the government and different stakeholders should implement interventions to promote adult literacy and education.

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