UNIVERSITY OF CAPE COAST

POVERTY MEASURES, SOCIAL PROTECTION AND DEPRIVATIONS OF HOUSEHOLDS AND CHILDREN IN GHANA AND KENYA

RAYMOND ELIKPLIM KOFINTI

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BY

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature: …… Date……

Name: Raymond Elikplim Kofinti

Supervisors' Declaration

We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of thesis as laid down by the University of Cape Coast.

Principal Supervisor's Signature…… Date……..

Name: Prof. Samuel Kobina Annim

Co-supervisor's Signature……..... Date……..

Name: Dr. Emmanuel Ekow Asmah

ABSTRACT

This thesis addresses three themes: (1) assess household poverty in Ghana and Kenya; (2) compare poverty methods and examine the poverty-reducing role of social protection in Ghana; and (3) examine rural-urban catch-up in child poverty in Ghana. The last five rounds of the Demographic and Health Surveys of Ghana and Kenya and the sixth round of Ghana Living Standards Survey were used. The First Order Dominance, Multidimensional Poverty Index, Multiple Overlapping Deprivation and Foster Greer and Thorbecke approaches were used to measure poverty. The Endogenous Treatment Effect model of Heckman sample selection, the Propensity Score Matching and Mixed Logistic techniques were used for the econometric analyses. The results indicate a broad-based probability of progress in household welfare in Ghana of 1.00, whereas Kenya recorded muted probability of advance of only 0.01. Consumption expenditure poverty in Ghana is sensitive to disaggregation, income and the Lower-Middle Income Countries poverty line of $3.20. The incidence of multidimensional poverty is higher than consumption expenditure poverty by 6.8 percentage points. Beneficiary households of the National Health Insurance Scheme in Ghana reduce their poverty levels by 0.151 units compared to non-beneficiaries. The risks of child deprivation poverty for urban poor children are at least 196% higher than their rural poor counterparts in Ghana. The National Health Insurance Scheme should prioritise coverage of poor and rural households in Ghana. In Kenya, the Ministry of Environment, Water and Natural Resources should focus on the provision of improved sanitation to the Western and North Eastern regions.

KEY WORDS

Child poverty

First order dominance (FOD)

Money-metric poverty measures

Rural-urban catch-up

Social health insurance

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DEDICATION

To my parents; Mr Theodore Komla Kofinti and Mrs. Justine Ivy Kofinti

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LIST OF ABBREVIATIONS

ATET	Average Treatment Effects on the Treated
CRC	Convention of the Rights of the Child
DHS	Demographic and Health Surveys
ETEM	Endogenous Treatment Effects Model
FGT	Foster, Greer and Thorbecke
FOD	First Order Dominance
GDHS	Ghana Demographic and Health Survey
GLSS	Ghana Living Standards Survey
GPRS	Ghana Poverty Reducing Strategy
GSGDA	Ghana Shared Growth Development Agenda
GSS	Ghana Statistical Service
HDI	Human Development Index
HPI	Human Poverty Index
ILO	International Labour organizations
KDHS	Kenya Demographic and Health Survey
KNBS	Kenya National Bureau of Statistics
LEAP	Livelihood Empowerment Against Poverty
LMICS	Lower Middle-Income Countries
LRT	Likelihood Ratio Test
MCA	Multiple Correspondence Analyses
MDG	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey

MODA	Multiple Overlapping Deprivation Analyses
MPI	Multidimensional Poverty Index
NAS	National Account Statistics
NDPC	National Development and Planning Commission
RUG	Rural-Urban Gap
SSA	Sub-Saharan Africa
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNICEF	United Nations Children Fund

CHAPTER ONE

INTRODUCTION

The significant reduction in global poverty level from 36 per cent to 12 per cent between 1990 and 2015 is marked with disparities in the rate of fall and levels across countries (United Nations [UN], 2015). These disparities and levels are mimicked by Ghana and Kenya, respectively (Ghana Statistical Service [GSS], 2014; Kenya National Bureau of Statistics [KNBS], 2018). The implication of the disparities in the fall of poverty in Ghana is that some of the geographical groupings are left behind and are not benefiting evenly from the impressive poverty reduction. In the case of Kenya, there is a considerable interest to ascertain whether other measures of poverty parallel the high money-metric poverty incidence (36%).

The study makes a useful extension to the narrowly focused money-metric poverty discourse in both countries by incorporating deprivation perspective, thereby contributing to the first Sustainable Development Goal (SDG) of reducing all forms of poverty in the two countries. At a practical level, the study provides vital information for policy decisions on the deprivations of households in Ghana and Kenya. Also, unlike studies that over-emphasise the role of social assistance in poverty reduction (Davis et al., 2016, Handa et al., 2013), the current study makes a case for the poverty-reducing role of social health insurance in Ghana. Finally, it includes information on the rural-urban catch-up in the basic needs of Ghanaian children to survive, develop and be protected from violence.

Background to the Study

Poverty eradication has been without a doubt one of the first international agenda in the past two decades (Fosu, 2017). Within this period, the year 2015 did not only mark the end of the Millennium Development Goals (MDGs) with its position on halving poverty from the 1990 levels (United Nations Economic Commission for Africa [UNECA], 2015). The same year ushered the new global agenda for the SDGs with its first goal focusing on ending poverty in all its manifestations before the year 2030 (UN, 2016).

The global poverty figures indicate significant progress in poverty reduction compared to the 1990 levels. The proportion of people living in extreme poverty of less than $1.25 a day decreased globally by more than halve from 36 per cent in 1990 to 10.9 per cent in 2013. According to the UN (2015), this proportion decrease has lifted more than one billion people out of poverty between 1990 and 2015. The same report indicated that Developing regions also reduced its poverty level significantly by more than halve from 41 per cent in 1990 to 18 per cent in 2015.

Despite the remarkable global poverty reduction, progress has been uneven across sub-regions and at country levels. Figure 1 depicts the regional variations in the fall in poverty levels between 1990 and 2015. The percentage change in poverty reduction levels between the two periods across the regions ranges from as low as 28 per cent in Sub-Saharan Africa (SSA) to as high as 93 per cent in Eastern Asia (UN, 2015). Though Western Asia reduced its poverty levels by less than half, 40 per cent, the incidence of poverty in the region between 1990 and 2015 are five and

three per cent respectively and is far from alarming compared to the other regions. The rest of the sub-regions recorded more than half percentage reduction in their poverty levels between 1990 and 2015, except in SSA.

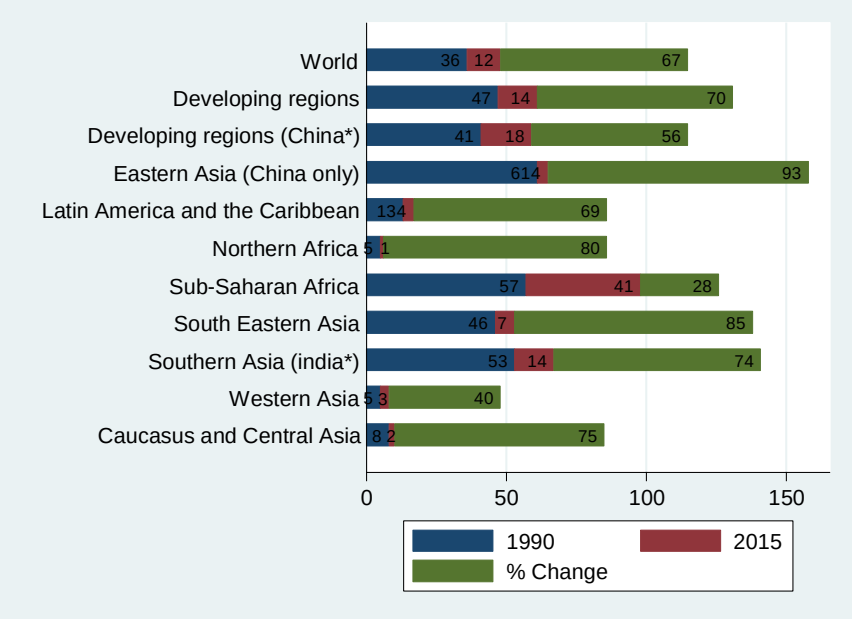

Figure 1: Disparities in poverty reduction across regions

Source: United Nations (2015)

Disparities in poverty levels are not only pronounced at the sub-regional levels but also among SSA countries (UNECA, 2015; Fosu, 2017). The country level disparities in poverty are depicted in Figure 2. From Figure 1, poverty declined in different degrees with a negligible reduction of 0.4 per cent recorded by Cote d'Ivoire to a whopping 32 per cent registered by the Gambia. In contrast, poverty rates increased in six (6) out of 27 countries, ranging from 0.4 per cent in the Central African Republic to 24 per cent in Kenya. The drivers of these disparities are many as they include low labour productivity, growing unemployed youths, increasing informal labour market, labour market inequalities, high

susceptibility to shocks and low coverage of social protection (Federal Ministry for Economic Cooperation and Development, 2008, 2017; Fields, 2011; Filmer & Fox, 2014; Rasaki & Malikane, 2015; UNECA, 2015).

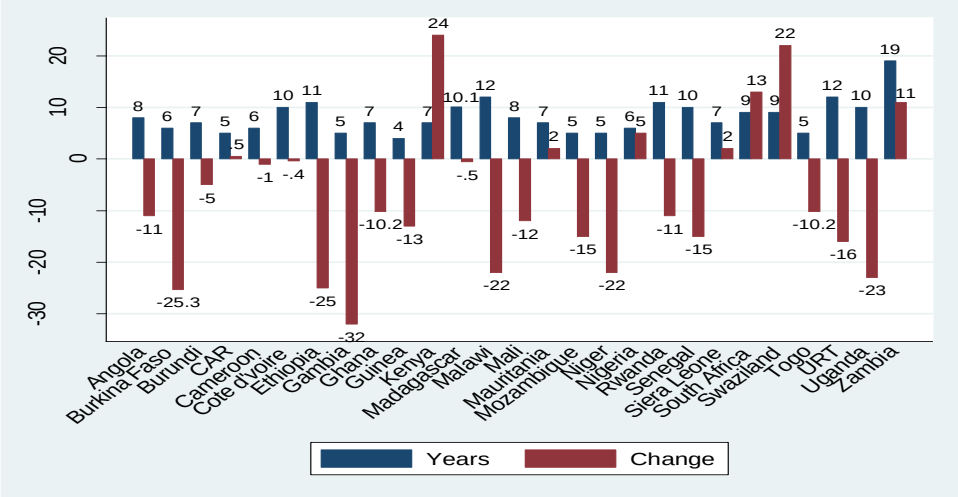

Figure 2: Poverty reduction in 27 SSA countries

Source: United Nation's Statistical Division (2014)

The poverty situation of Ghana and Kenya typify the two global poverty challenges of disparities and levels respectively. In the case of Ghana, the country has experienced a significant reduction regarding absolute and extreme poverty over the last two decades (Cooke, Hague, & McKay, 2016; GSS, 2014). Between 1991/1992 to 2012/2013, the incidence of consumption expenditure poverty has decreased from 51.7 per cent to about 24.2 per cent registering a percentage change of 52.9 per cent reduction (GSS, 2007, 2014).

Concerning Kenya, UNECA (2015) identified the country to have experienced the worst poverty increase among 27 countries in SSA (see Figure 2). More recently, KNBS (2018) estimated the poverty incidence of the country to be

as high as 36 per cent. Kenya managed to reduce its poverty incidence by only nine percentage points compared to the 1992 estimate of 44.8 per cent.

It is worth stating that both countries, Ghana and Kenya, have rolled out a series of poverty-reducing policies and programmes spanning over several decades. The government of Ghana initiatives, plans, and programmes to fight poverty begun with the Programme of Action to Mitigate the Social Costs of Adjustment to cushion the vulnerable in the country against the consequences of structural adjustments in the 1980s (Leite et al., 2000). Subsequent years witnessed initiatives that were more focused on poverty alleviation. The Vision 2020, for instance, was a long-term national development policy framed in 1995 to improve individual and social well-being of Ghanaians by raising living standards and reducing poverty through wealth creation. It was however replaced by the first Ghana Poverty Reduction Strategy (GPRS I) between 2003 and 2005 (Ghana & National Development Planning Commission [NDPC], 2003). The GPRS I entailed detailed policies and actions to enhance growth and poverty reduction. Amidst concerns of poor targeting efficiency of the programme, the GPRS II was launched in 2006 which spanned for 3 years (International Monetary Fund, 2012). A flagship poverty reduction project under the GPRS II was the Livelihood Empowerment Against Poverty [LEAP] (McKay, Pirttilä, & Tarp, 2015). Recent years have also witnessed two phases of the Ghana Shared Growth Development Agenda [GSGDA] (NDPC, 2014).

The commitment of the government of Kenya on the other hand towards poverty reduction dates as far back to her early years of independence. Within this

period, the government of Kenya formulated its first Sessional Paper in 1965 which documented efforts from the government aimed at combatting poverty, disease, and illiteracy as its primary development agenda (Goldsworthy, 1982). Over time, various development plans, strategies, papers, reports and visions have been geared toward fighting poverty. In 1983, the government of Kenya launched the District Focus for Rural Development. This development plan was designed as a decentralised development planning policy paper. The main aim of this development policy was to stimulate rural development and participation in national processes as well as facilitate the equitable allocation of national resources (Oyugi, 1985). Later, in 1994 the government of Kenya launched the Social Dimensions of Development Programme (SDDP) with the intention of protecting the poor from the negative consequences of the 1980 economic reforms (Government of Kenya, 1995). The year 1999 also saw the Kenyan government formulated the National Poverty Eradication Plan (NPEP). The orientation of this development plan was to provide a national policy and institutional framework for effective poverty targeting between 1999 to 2015 (Government of Kenya, 1999). The Government of Kenya was also assisted by donors to formulate Poverty Reduction Strategy Papers (PRSP) between 2000 to 2003 (Ellis & Freeman, 2004; Renard & Molenaers, 2003).

According to Nyamboga, Nyamweya, Sisia and Gongera (2014), the PRSP was the most detailed and focused policy framework by the government of Kenya since independence. Besides the various internal policies towards poverty reduction, the government of Kenya has also been committed to international

development agenda such as the MDGs and the recent post-2015 global SDGs. Recently, the country has launched a long-term development plan known as Vision 2030 aimed at providing a high quality of life to all its citizens by 2030. Also, through a series of consultative meetings with various stakeholders, the government of Kenya has identified the factors that are engendering entrenched poverty across the country (Nyamboga et al., 2014). Despite these positive developments, significant poverty reduction has remained elusive in the country.

The preceding notwithstanding, the central poverty assessment in both Ghana and Kenya overtime has been money-metric poverty measures in consumption expenditure or income. However, the seminal work of Sen (1976) until now, has largely broadened the lens of poverty beyond unidimensional approaches to multidimensional approaches. Further, the capability approach by Sen (1993) has also engendered an increasing consensus that poverty is intrinsically a multidimensional phenomenon. These have generated considerable interest in the use of multidimensional approaches to measure the poverty situation of populations. These approaches invariably measure poverty by aggregating multiple dimensions with corresponding weighting scheme (Alkire & Foster, 2011; Rippin, 2010). The weighting scheme allows for incorporating societal judgement about the importance of each of the multiple dimensions of poverty and facilitates the derivation of a single measure of welfare for a given population (Ravallion, 2010).

The multidimensional approaches with weighting schemes, however, are valid and stable when there is a considerable level of consensus about the appropriate

weighting scheme (Ravallion, 2010). There is, however, the absence of such a consensus on the procedure of weighting scheme application (Arndt et al., 2012).

Within the domain of applied welfare economics, the 'robust' methods have been championed by Atkinson and Bourguignon (1982) using stochastic dominance techniques to show how comparisons of probability distributions can be applied to the comparisons of populations across various classes of their respective social welfare functions. Some of the notable works in these domains are Atkinson and Bourguignon (1987), Bourguignon and Chakravarty (2003), Gravel and Mukhopadhyay (2010). The dominant concept applied by these contributions is based on the specified sign of the second or higher order dominance imposed on the individual utility function. This creates the problem of lower or upper orthant dominance which complicates the ranking of populations (Arndt, Leyaro, & Mahrt, 2014; Nanivazo, 2013). Further, the approaches do not apply to ordinal data observed at the micro-level such as households. According to Shaked and Shanthikumar (2007), an approach for making welfare comparisons where ordinal data is available at the micro-level is that of First Order Dominance (FOD). This approach obviates the need for an arbitrarily weighting scheme; also, it does not dictate dominance based on second or higher order partial derivatives. Instead, it makes a less-restrictive assumption that it is better not to be deprived than to be deprived in any of the welfare indicators (Arndt et al., 2012).

Besides the long-standing measurement issues in poverty measurement, about two decades ago witnessed the emergence of social protection as a policy tool intended to address poverty and vulnerability in developing countries (Fiszbein,

Kanbur, & Yemtsov, 2014). Social protection has been consistently classified under three main components, namely social assistance, social insurance and labour market programmes (Barrientos, 2013; Barrientos & Hulme, 2009; Barrientos & Niño-Zarazúa, 2011; Dungey, Tchatoka, & Yanotti, 2018; Fiszbein, Kanbur, & Yemtsov, 2014; Hidrobo, Hoddinott, Kumar, & Olivier, 2018). Many factors have driven the emergence of social protection. Foremost, the commitment from international development organisations such as the International Labour organisations (ILO), the UN, and the Asian Development Bank. Governments in developing countries are also deploying social protection strategies in their national development processes (Barrientos, 2013). Globalisation and rapid economic transformation have further necessitated the demand for social protection. Moreover, the post-2015 development agenda emphasised social protection in the SDGs; specifically, Goal 1.3 encouraged countries to implement nationally appropriate social protection systems aimed at reducing and preventing poverty, deprivations, social exclusion and vulnerabilities for all (ILO, 2017).

Despite its emergence, social protection has not been a reality for the majority of the world's population (Economic and Social Council, 2018). More than half of the world's population are not covered by any social protection scheme representing about 4 billion people. Also, social protection programmes are biased towards social assistance in developing countries to the neglect of the remaining two components of social protection, namely social insurance, and labour market regulation (Bryant, 2009; Handa et al., 2015; Pearson et al., 2016; Pellerano et al., 2016; Ragno, Hague, & Handa, 2016; van Ufford et al., 2016).

Meanwhile, the coverage of government social health insurance in Ghana has been impressive since its passage. The National Health Insurance Scheme [NHIS] (Act 650) was passed in 2003 with the aim of making health care accessible to all. Based on the Ghana Demographic and Health Survey (GDHS) report (2014), about 62 per cent of women in their reproductive lives and 48 per cent of men are estimated to be benefiting from the NHIS. Ghana thus offers the opportunity to examine the poverty reduction role of government social health insurance instrument of social protection.

Another emerging concern in the poverty discourse concerns the poverty situation of children. In SSA, child poverty is not only widespread but intense and pervasive (Economic & Social Research Council, 2017). The State of the World Children's Report (2016) alluded to the observation that more than half of the children living in extreme poverty are in SSA. Available evidence from the report further suggests that between 2002 and 2012, the proportion of children living in poor income households in SSA increased by 22.7 percentage points from 30.2 per cent in 2002 to 52.9 per cent in 2012.

Similar to SSA, the child poverty situation in Ghana warrants attention. Though the country has made significant efforts in reducing consumption expenditure poverty, the proportion of children living in poor households are higher than the national poverty level by 4.2 percentage points (UNICEF Ghana, 2015). This implies that more children are living in poverty compared to the overall poverty in Ghana. Also, between 2006 and 2013, the proportion of children living in poor households decreased by six percentage points in the rural area compared

to a relatively low reduction in their urban counterparts of 1.2 percentage points. This finding appears to suggest a potential rural-urban catch-up in child well-being in the country.

The implications of potential rural-urban catch-up in child poverty cannot be over-emphasised. Among others, it will indicate a sustainable poverty reduction strategy since poverty is principally a rural phenomenon in the country. In another sense, it will engender rural development with the potential of waning rural-urban migration pressures, and disparities across the country. Moreover, potential rural-urban catch up in child deprivation poverty holds the promise for the country in achieving the tenth SDG of reducing within-country inequalities and disparities.

Statement of the Problem

Empirical works on spatial and temporal analyses of household poverty in Ghana and Kenya have concentrated mainly on money-metric approaches to poverty measurement in either income or consumption expenditure poverty (GSS, 2007, 2014; KNBS, 2007, 2018). In the wake of the first SDG which stipulates ending poverty in all its manifestation (UN, 2015), this observation in both countries is not exhaustive. Even in cases where multidimensional assessment is conducted, most of the studies resort to the usage of composite index approach (Appiah-Kubi, 2004; GSS, 2013; Kabubo-Mariara, Wambugu, & Musau, 2011) with its attendant challenges (Ravallion, 2010; Roelen & Gassmann, 2008; Tsui, 2002).

Evident in the literature is the case for application of stochastic dominance literature to multidimensional poverty assessment (Bossert, Chakravarty & Ambrosio, 2009; Duclos, Sahn & Younger, 2006; Yalonetzky, 2013). At the first level of dominance, the approach makes an unambiguous judgement about the welfare of comparator populations without recourse to any composite indices, cross-partial derivatives or weighting scheme imposed upon the social welfare function (Arndt et al., 2012). However, its empirical illustration is limited to few studies on household poverty.

Concerning methods and policies of deprivation and poverty in Ghana, existing studies on household poverty measures (Appiah-Kubi et al., 2007; Coulombe & Wodon, 2007, GSS, 2007, 2014; McKay, Pirttilä & Tarp, 2015) did not consider the normative evaluations inherent in the poverty assessment of the country. Normative evaluation in poverty assessment is not only philosophical but a practical approach to view poverty estimates from a different lens to motivate policy action (Alkire et al., 2015). Further, the existing studies on the role of social protection in poverty reduction of the country have all focused on the social assistance component of social protection (Cooke et al., 2016; Handa et al., 2013; Ragno, Hague & Handa, 2016). Even in developing countries, a similar trend is observed (Davis et al., 2016). However, there are other two main components of social protection, namely social insurance and labour market regulations (Barrientos & Niño-Zarazúa, 2011; Fiszbein, Kanbur & Yemtsov, 2014; ILO, 2000). An argument for government social insurance is that, whereas social assistance (cash transfers) are reactionary interventions to the circumstances of the

poor, social insurance is proactive in safeguarding the poor from vulnerabilities and deprivations that induce poverty. Further, Cooke et al. (2016) found that economic growth in Ghana benefits the rich more than that of the poor. This finding warrants analyses on the poverty-reducing roles of other social protection instruments, particularly social health insurance in promoting inclusive economic growth in the country.

In terms of child poverty in Ghana, available evidence by United Nations Children Fund (UNICEF)-Ghana (2015) suggests more children are living in poverty compared to the national poverty incidence of 24.2 per cent that. This warrants concern as Nandy and Gordon (2009) noted that children are not only current citizens but also future ones in possession of human rights that are independent of and as important as those of the adults with whom they live.

According to Minujin, Delamonica, Davidziuk and Gonzalez (2006) children do not earn income and by using a money-metric approach to measure their poverty, their specific and different needs, as well as the multifaceted and interrelated nature of their deprivations will be disregarded. Moreover, Roelen and Gassmann (2008) also argued against the monetary approach on the basis that intra-household inequalities confound attempts to compare outcomes hence the need to consider issues directly at the child level.

Objectives of the Study

The general objective of the study is to assess household poverty measures in Ghana and Kenya, poverty reduction role of social health insurance, and child deprivation poverty in Ghana. Specifically, the study seeks to:

1. Determine gains in household welfare overtime in Ghana and Kenya.

2. Compare spatial poverty in Ghana and Kenya from a deprivation perspective

3. Compare outcomes of poverty methods and deprivation measures in Ghana

4.Examine the impact of social health insurance on household poverty in Ghana

5. Compare child poverty from deprivation and income perspective in Ghana

6. Examine evidence of rural-urban catch-up in child poverty from a deprivation perspective in Ghana

Significance of the Study

The essence of this study to poverty discourse is far-reaching. On the international front, the first empirical chapter study presents the opportunity for aligning the findings on the deprivation poverty situation of households in Ghana and Kenya to the global context. This is premised on the first SDG which seeks to end every kind of poverty everywhere before the year 2030. The second empirical chapter assessed different poverty methods and deprivation measures and their sensitivities to the choice of indicator, poverty line, decomposition and methods in the context of Ghana.

The findings will consolidate the efforts of the government in targeting the poorest populace of the country through government social protection programmes

given that the economic growth of the country has not been relative pro-poor. Finally, the third empirical chapter brought to fore social progress on children under five, and those aged from 6 to 17 years in Ghana. The chapter made a case for rural-urban catch-up in child deprivation poverty. The implication is that the findings from the study are intended to motivate policy directives from international organisations such as UNICEF as it concerns Ghanaian children.

Delimitations

The study examines the spatial and temporal analyses of household poverty in Ghana and Kenya in five dimensions of household capabilities, namely water, sanitation, shelter, information, and education. The analyses were conducted across four geographical groupings in Ghana and Kenya between 1992 and 2014. The study further analyses poverty methods and deprivation measures in Ghana. Within the same context, the study examined the impact of the NHIS on deprivation poverty among beneficiary households in Ghana. Finally, the study assessed rural-urban catch-up in child poverty in Ghana from a deprivation perspective. Overall, the analyses employed the last five rounds of the GDHS and the Kenya Demographic and Health Surveys (KDHS) and, the Ghana Living Standards Survey (GLSS).

Contributions of the Study

The first empirical chapter provided a detailed analysis on the wellbeing of households in five basic capabilities, namely in water, sanitation, shelter,

information and education over a period of more than two decades for Ghana and Kenya. Unlike other studies that deploy count approaches in poverty assessment, the chapter employed multidimensional first order dominance approach in both countries based on a series of multidimensional discrete well-being indicators observed at the household level. The approach is stable since it obviates the need to apply any arbitrary weighting scheme across dimensions of deprivation. To ensure reliable ranking across geographical groupings, the chapter used an efficient algorithm in 100 iterations to determine dominance at first order. The temporal analyses indicate dimensions of wellbeing and geographical groupings that are either advancing or regressing over time within and across Ghana and Kenya.

The second empirical chapter contributes to the poverty discourse by taking into cognisance the normative evaluations inherent in the poverty assessment of Ghana over time. Unlike other studies on poverty in Ghana, the chapter assesses how the money-metric poverty measures are sensitive to the choice of poverty indicator (household consumption expenditure and income), decomposition (food and non-food expenditure), and poverty lines and poverty from deprivation perspective. Also, the chapter established household deprivation poverty-reducing effect of social health insurance instrument of social protection with evidence from Ghana.

The final chapter examines the evidence of a rural-urban catch-up in child poverty assessment from the perspective of deprivations in Ghana. Unlike other studies on poverty that are biased towards adults, this chapter exclusively assesses the poverty situation of children over time. The findings suggest a potential rural-

urban catch up in poverty situation of Ghana from the perspective of child deprivation poverty. Thereby positing child deprivation poverty as a potential sustainable strategy to bridging the disparities in the overall (adult) poverty levels in the country.

Limitations

The study has provided the opportunity to investigate issues of deprivation measures, social protection policy, poverty methods and child poverty in Ghana and Kenya. Despite its essence to academic discourse and policy, the methodological choices in the domains of research design and data are not without limitations which could not be addressed during the study. Two main issues were noted.

First, the study mainly employed a repeated cross-sectional survey to assess the inter-temporal deprivation and poverty analyses of households and children using the GDHS and GLSS between the 1992 and 2014 survey periods. However, the repeated cross-sectional data considered different cohorts of households and children for each of the survey periods.. In addition, prior to the commencement of the study, the administrative regions of Ghana were ten. Hence the analyses focused on only the traditional administrative regions without considering the six new regions. Further, the latest round of the living standard survey, GLSS7, was not available during the conduct of the study.

Secondly, some of the variables such as the price of insurance and the probability of a household member falling sick are not provided in the GDHS which

may influence the outcomes of the selection equation of the social protection health insurance policy used to establish deprivation poverty reduction effect on beneficiary households.

It is worth stating that while attention is drawn to these limitations, the coverage and the focus of the study were fashioned by time and resource constraints. Hence, the limitations do not undermine the research but offer means for further considerations and interrogations.

Organisation of the Study

The thesis is organised broadly in three related empirical chapters. The first empirical chapter is the only chapter that was centred on both Ghana and Kenya, the remaining two chapters focused exclusively on Ghana.

Specifically, the thesis is organised into seven broad chapters. The next chapter conducts a critical review of the theoretical and empirical literature related to the tenets of the study. The principal focus in this chapter is to highlight critical theories in poverty methods and deprivation measures as well as empirical works on poverty measures, child poverty and the poverty-reducing effects of social protection programmes. The third chapter delves into methodological issues with specific concentration on Forster and Greer Thorbecke (FGT) Approach, FOD, Multidimensional Poverty Index (MPI), Multiple Corresponding Analyses (MCA), Multiple Deprivation Analyses (MODA), Endogenous treatment effect model of Heckman sample selection, Propensity Score Matching (PSM), Tobit estimation, Mixed logistic regression and binary logistic techniques. In the fourth chapter, the

study presents the first empirical chapter on spatial and temporal analyses of household poverty in Ghana and Kenya. In Chapter five, empirical study on poverty methods, deprivation measures and social protection policy followed. The sixth chapter addressed the rural-urban catch-up in child poverty assessment from the perspective of deprivation to end the empirical chapters. The final chapter presents the summary, conclusions, and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The essence of this chapter is to examine the existing theoretical and empirical literature that relates to the three main areas of the dissertation:(1) spatial and temporal household poverty in Ghana and Kenya; (2) methods and policies of deprivation and poverty in Ghana; and (3) child deprivation poverty in Ghana. This is aimed at putting the current study into perspective. The chapter is broadly divided into two main sections. Whereas the first section examines the theoretical literature that underpins the study, the second focuses on the existing empirical studies.

Theoretical Literature Review

This section situates the argument behind the study within a theoretical context. There are however six main theoretical issues addressed in this section before delving into the empirical literature review. These are in the following areas: (1) theoretical issues in the conceptualization of poverty; (2) theoretical issues in the measurement of poverty; (3) the theory of stochastic dominance; (4) the relationship between social protection and poverty; and (5) theoretical issues in the conceptualization of child poverty.

Theoretical issues in the conceptualisation of poverty

Without theory and a definition, producing valid and reliable measures of a concept becomes impossible including poverty (Gordon, Nandy, Pantazis,

Pemberton, & Townsend, 2003). Unfortunately, differing views about what it means to be poor are very paramount in the literature (McLachlan, 1986; Sen, 2000, 2006; Townsend, 1979). This is because different spaces in which poverty can be defined and measured entail different perspectives on wellbeing and development. From the resource perspective, studies have defined poverty as the inability of an individual to command enough resources to meet his basic needs (Fields, 2002).

Over time, the view of poverty measurement broadened to include social participation, inclusion, relative deprivation and functioning (Barrientos, 2011). However, De Vos and Hagenaars (1988) mentioned that any definition of poverty irrespective of its orientation should consider at least one of the following: (1) having less than an absolute minimum; (2) having relatively less than others in society; and (3) feeling you do not have enough. This definition was also corroborated by Ravallion (1994) view that poverty should be characterised from the resources perspective and non-resource perspective. With these views, three main theoretical frameworks for the conceptualisation of poverty are identifiable in the literature; (1) absolute and relative conceptualisation of poverty; (2) the basic needs approach; and (3) the capability approach.

The absolute and relative conceptualisation of poverty

Income is the crust of the absolute view of poverty. This notion is premised on the assumption that the needs of a person in basic needs such as food, clothing and water are crucial for human survival and this can be quantified in monetary terms to establish an absolute or relative poverty line. Absolute poverty line is independent of any reference group and based entirely on the needs of the poor,

whereas the relative poverty line is defined about a reference group or as a proportion of income or expenditure position of others in society (Barnes, 2009; Ravallion, 1994). Rowmtree (1901) and Booth (1894, 1903) are well acclaimed to have conducted the first scientific study of poverty using these conceptualisations.

They engaged in a somewhat complex application in deriving their absolute poverty line equivalent to minimal food requirements for maintaining adequate nutritional standards (McLachlan, 1986). In this wise, households whose income level fell below the poverty line were considered to be in absolute poverty (Laderchi , 2000). People were considered as poor if they lack the level of income adequate in meeting their basic needs. Further, Lister (2004) considered the idea of absolute poverty as fundamentally that of subsistence means needed to survive, produce and reproduce. Nearly all subsequent studies were influenced profoundly by the application of the concept of subsistence.

However, the absolute view has been criticised on various grounds. The critics argue that a fixed basket of goods comprising the minimum subsistence requirement is woefully inadequate to accommodate the complex nature of poverty (Sen, 1983, 2006). Moreover, the implicit assumption of the absolute approach which assumes that all the goods representing the basic subsistence requirements can be purchased on the market and have monetary values is not always the case (Bourguignon & Chakravarty, 2003; Tsui, 2002).

The idea of absolute poverty encountered its most vigorous opposition from Townsend (1974, 1979). Townsend (1974) argued against the relevance of the subsistence idea inherent in the absolute approach in an affluent society. Townsend

(1979) further contended that the estimates of the costs of necessities other than food in Rowmtree (1901) conceptualisation were not founded upon a scientific approach and also none of the studies that adopted subsistent conceptualisation of poverty considered the issue of criteria of need in isolation of personal judgement. Instead Townsend (1987) proposed that poverty should be conceptualised from a relative perspective which involves identifying material goods and services as objective material deprivation relative to others, while that of social customs, societal participation and relationship as relative to others. This contention, however, contrasts Runciman (1966) definition of deprivation from the perspective of subjective feelings of deprivation relative to others. Townsend (2006) maintains that poverty cannot be measured narrowly regarding survival or subsistence needs but should incorporate broad participation from the perspectives of material possession, health status, conditions at work, and social activities. Implicit in this assertion is that an individual might attain the level of his survival needs, but this may not necessarily translate into healthy participation in his society.

The relative approach to the conceptualisation of poverty holds that the level of poverty is relative to the living standard in a society at a specified period (Ravallion, 2010). For instance, the European Union defines their relative poverty as 60 per cent of the median income of a member country (Gilbert, 2009). The benefit of a relative threshold is that it relates poverty distribution directly to the overall standard of living in a country. This allows for flexibility in adjusting the poverty line unlike the absolute case (Citro & Michael, 1995). However, Sen (1983) cautioned that the use of rigid relative measures of poverty might translate into

perpetual poverty situation which may render the effect of poverty reduction strategies modest.

Basic needs approach

The basic needs approach connotes a multidimensional perspective to poverty measurement which asserts that poverty is not merely the absence of income but entails several aspects such as low levels of educational achievement and poor health conditions. The approach argues that all these other dimensions consequently influence the overall quality of life of an individual. The advocates of the basic needs approach hold the view that human well-being cannot be reduced to a single indicator as income. This approach to poverty conceptualisation is premised on the observation that more than one deprivation are present in the lives of the poor.

The origin of this approach dates to 1970 through the pioneering works of the ILO. They divided the concept of basic needs into two broad aspects, namely the minimum subsistence requirements and other vital services. The former is in the domain of minimum subsistence such as food, shelter and clothing. This aspect of their conceptualisation struck a resemblance with that of Rowntree (1901) approach. The latter, however, shows an improvement on the earlier approach by inculcating other essential services available to the larger society in the domains of sanitation, health care and improved drinking water.

A unique feature of the basic needs approach involves the development of a composite index as the measure of poverty (Ravallion, 2010). Baster (1972) remarked that the first composite index was developed by the United Nations

Institute of Social Development. Later, the Organisation for Economic Co-operation and Development (OECD) created a composite development index from about 100 different indicators. Subsequent years witnessed the emergence of the Human Development Index (HDI), and the Human Poverty Index, Gender Development Index and the Multidimensional Poverty Index. The main advantage of using a composite index is the ease of calculation of the index and implementation (Ravallion, 2010). The approach also allows for flexibility as different sets of basic needs can be created for different geographical groupings. Moreover, the quantifiable nature of the composite index allows for comparing poverty estimates across regions (Roelen & Gassmann, 2008). Further, the composite index can be decomposed into sub-groups and dimensions to enhance better assessment of the poverty situation of a geographical grouping (Alkire & Foster, 2011).

Kanbur and Squire (1999) criticised the composite measure used by the basic needs approach as only useful for ranking countries around the world, but does not differentiate clearly between the poor and the non-poor. Also, they criticised the composite index for its failure to consider the overlaps in the deprivation analyses in the process of aggregating the composite index. Wagle (2002) lamented that the approach failed to include other economic, political and civic perspectives in ensuring holistic life. Furthermore, Ravallion (2010) queries the arbitrariness in the selection of dimensions, the poverty cut-off and the imposition of a weighting scheme inherent in the basic needs approach.

Capability approach

Sen (1983, 1993, 2006) criticised the strict conceptualisation of poverty from the absolute and relative perspectives. Instead, he upholds the middle ground that the concept of poverty has both relative and absolute components. He criticised the absolute view of poverty for idolising income and other standards of living measures. To him, they are only meant to enhance a person's capability to function in society. He also criticised the relative approach for implicitly using a fixed poverty line by arguing that absoluteness of needs is different from fixity of needs over time. This is because though the advocates of the relativist approach assume that the necessities of life are not fixed over time, Sen (1983) argues that these necessities are implicitly fixed since the poverty line is invariably a function of some variables. Sadly, he also kept these variables vague. Again, Sen (1993) lamented about the lack of theoretical bases used by the relative approach in their conceptualisation of poverty.

Sen (1993) used the terms functionings and capabilities to project his conceptualisation of poverty. Functionings are manifested in their 'beings and doings' (Sen, 1985). They can assume two primary forms, elementary and complex state. The elementary functionings are observable in domains such as whether a person is adequately sheltered, and whether a person is educated. In contrasts, the complex functionings are abstract and often difficult to measure. Broadly, the term capabilities as used by Sen (1993) refers to the functioning (doing or being) of an individual contingent on the choices available to them.

A person's quality of life is therefore adjudged by the capability to achieve valuable functionings based on the options available to such an individual. Individuals, however, differ based on the values placed on their functioning. According to Sen (1999), capabilities are not only dependent on individual characteristics but also upon socio-economic and political structures, as well as their civil rights or freedoms. Thus the approach considers income as one of the many factors that influence capability deprivation. However, Kanbur and Squire (1999) cautioned that the effect of income would potentially be different across different socio-economic units. Clark (2005) argued further that while it is good to assess the commodities individuals can command based on their income levels, it is even better to determine the actual functioning of individuals based on the goods and services at their disposal.

The capability approach attracted a fair share of criticisms. A major criticism was the failure of the approach to providing a list of essential dimensions of capabilities in its framework (Martinetti, 1996; Nussbaum, 1987; Williams, 1987). Nussbaum (2000) in an attempt to complete the capability approach brought to fore a list of human capabilities. In order to do this, she drew significantly on the works of Aristotle to develop a definite list containing ten (10) domains of capabilities which he deemed central to human capabilities (Nussbaum, 2000, 2003). However, the list of Nussbaum (2003) appears contradictory, and the fact that the ten capabilities are still opened to revision reverts the approach to the original capability approach. The essence of specifying dimensions especially in poverty measurement cannot be overemphasised.

The capability approach has also been criticised because even if a cemented list of capabilities should exist there is bound to be considerable disagreements on such a listing including the application of a weighting scheme to each of the capabilities (Beitz, 1986; Clark, 2002). Sen (2006) contended that the application of a weighting scheme should take into consideration the extent to which the different abilities are being realised or violated. Further, the weighting scheme should depend on the prevailing circumstances. For instance, in a society with a high incidence of hunger and starvation, ability to be well-nourished should be given a higher weight (importance), whereas the ability to be sheltered in a society with a high incidence of homelessness should assume more significant weight.

Amidst all the criticism, it is undeniable that the capability approach has made an enormous contribution to welfare economics. A fundamental strength of the capability approach is that it has expanded central stream development economics beyond commodities and resources (Gasper, 2002). This contribution has waned the economist obsession with GNP or income to emphasise how the lives of people are more critical than their earnings or expenditure (Alkire, 2002; Gasper, 2002). Another fundamental strength of the capability approach is its flexibility in accommodating multiple capabilities lending its application to different context and disciplines (Alkire, 2002). Given that the approach does not endorse any cemented list of capabilities, this allows for personal value judgement based on contextual consideration and purpose of the assignment. The third strength of the approach is that it can be used to determine the advantage of individuals in a range of different spaces. In this wise, the assessment of poverty might focus on a smaller subset of

capabilities, whereas well-being might require a relatively more extensive and complicated list of capabilities (Alkire, 2002; Clark, 2002; Sen, 1993).

Another concept of poverty that draws on the capability approach is that of social exclusion. Individuals are less capable when they are socially excluded from their ability to function and participate with the larger society on an equal basis. The idea of social exclusion has its root in the latter years of 1970 (Silver & Miller, 2003). However, from the 1990s social exclusion has been treated differently from income poverty especially in the European countries. Specifically, 1997 saw the government of the United Kingdom established a social exclusion unit with a focus on four multiple deprivations of the populace: (1) low quality housing; (2) inadequate access to education; (3) limited access to health care; and (4) low income (Maxwell, 1999). To Atkinson (1998), people facing the mentioned deprivations are deprived of functioning in the society. Consequently, he propounded three aspects of social exclusion: relativity, agency and dynamics. To him, relativity refers to the specific time and place that an individual is excluded from a society. Agency refers to the state of exclusion which can be self-imposed or by the society at large. Finally, dynamics refers to exclusion based on long-term opportunities beyond current circumstances.

Theoretical issues in measuring poverty

Since the Seminal works of Sen (1976) the measurement of poverty has been conceptualised to involve two main steps, namely identification and aggregation of the poor. The first step concentrates on setting the poverty line that

identifies those who are poor. The demands of the identification step vary depending on whether the approach to the measurement of poverty is either unidimensional or multidimensional. In the unidimensional context, the identification step is less demanding (Alkire & Foster, 2011). A threshold of income equivalent to the amount necessary to purchase a basket of goods and services is used to differentiate the poor from the non-poor. In the multidimensional context, the identification process is much more complicated (Alkire & Foster, 2011). This is because each of the set of dimensions has a corresponding deprivation cut-off which allows for identifying the deprivation achievement of each. Further, a decision must be made on the overall poverty, taking into cognisance each of the lists of deprivations. The aggregation step concerns itself with how data can be aggregated over individuals to arrive at an overall measure of poverty.

Sen et al. (1987) also noted two main difficulties in the measurement design of poverty. The first challenge is the relevance of the measure. Relevance entails whether the standard of living measure to be included is significant enough in a poverty measure. This has triggered debates as to whether the relevant measure of poverty should be based on resource availability only or achievement based on the resources available. The second challenge concerns the usability of the poverty measure. This has to do with whether the measure is practical and feasible for the actual assessment of poverty. These two challenges noted by Sen et al. (1987) do not only filter the kinds of information required for poverty assessment but also the techniques that are used to evaluate poverty.

The measurement of poverty has been viewed by some as subjective and arbitrarily, others see the process of poverty measurement as methodological with attention to details. This has heavily projected value judgement into measurement design of poverty. For this reason, Laderchi, Saith, and Stewart (2003) argue that it is paramount to be lucid about the source of the value judgement: whether the source is from the government, policymakers, industry or development partners.

Alkire et al. (2015) however noted that these value judgements are the normative choices in the measurement design of multidimensional poverty. Moreover, these choices associate the measurement design to the lives and values of the poor at the same time connects with policies that facilitate poverty reduction. These normative choices include the space of the measure deployed, the purpose of the measure, the unit of identification and analysis, dimensions considered, indicators to be employed, deprivation cutoffs/thresholds, weights, and the poverty line. Besides the normative issues, Johnson (2009) also stated that geographical and time bases of comparison should be considered in poverty assessment in order to engender a holistic view.

The purpose of the measurement process

The purpose of a measure may include its policy applications, the reference population, dimensions, and time horizon. According to Sen and Foster (1997), the choice of a poverty measure must depend to a greater degree on the nature of the problem at hand. Stiglitz et al. (2009) stated that the purpose of the measurement process is contingent on the objective features to be considered in assessment which in turn depends on value judgement to a large extent. Also, such purpose of measure

can have multiple purposes as noted by Alkire and Seth (2015). In addition, in most cases, the purpose of the assessment measure may also be influenced by external considerations within the spheres of the political economy and institutional issues.

The choice of space of the measurement process

The choice of space considers the indicators to include in the assessment process, whether the assessment process will be influenced by income, consumption expenditure, other resources, access to resources, functionings and capabilities, and subjective utility (Alkire, Foster, et al., 2015). Irrespective of any of the mentioned space chosen, the purpose of the choice should be appropriate (Laderchi et al., 2003). A choice of space has practical implication on the approach to be employed.

Units of identification and analysis

The unit of analysis for a given study may include a person, a household, a geographical area, or an institution. However, the most common units of identification in poverty measure have been either at the household level or that of the individual (Corak, Lietz, & Sutherland, 2005). The unit of analysis also shapes how results are presented and examined. On the one hand, using the person as the unit of identification agrees with the policies of human rights and the analysis can be broken into gender and age-specific characteristics. On the other hand, using the household as the unit of analysis permits intra-household benefits such as caring and sharing (Corak, 2006). Alkire and Santos (2014) stated that the choice of the appropriate unit of analysis depends on the policy focus of the measurement, comparability and data availability.

Choice of dimensions and indicators

Multidimensional poverty measures necessarily require the selection and valuation of deprivations. According to Sen (1992), the process of evaluation must entail two distinct questions, the first being the objects of value and the second is the worth of the objects to the assessment process. According to Grusky and Kanbur (2006), the selection of appropriate dimensions warrants urgent attention because economists are yet to reach a consensus on the indicators that matter or even arriving on what matter. Alkire (2002) enumerated three guiding posts to selecting dimensions for poverty measurement: deliberation and public reasoning, legitimate consensus, and theoretical arguments.

Also, along these lines, Sen and Himanshu (2004) argue that deliberative engagements are needed rather than a pre-ordained list. Legitimate consensus involves selection of dimensions by using official documents. This may include documents on the declaration of human rights, a national development plan, and international consensus on SDG. According to Alkire et al. (2015) multidimensional poverty measures are not in isolation of the linkages to such documents. In addition, these dimensions can also emerge from a theory or a conceptual framework.

However, in most instances, the choice of indicators is premised on empirical considerations focusing on normative and policy issues. Aside from these considerations, the majority of the guidelines factor the indicator selection into policy purposes (King, Renó, & Novo, 2014). According to Atkinson and Marlier (2010), indicators can take several forms: (1) they can either be stock or flow; (2)

subjective or objective; (3) relative or objective; and (4) static or dynamic. Other factors that might influence the choice of indicators are the ease of interpreting the results given the available audience. Alkire et al. (2015) stated that in the case of monetary poverty, it is expected that as the field of multidimensional poverty advances, conventions and standards will define the selection of indicators and the individual calibrations of their parameters.

Deprivation cut-offs and imposition of a weighting scheme

Another component of multidimensional poverty bearing normative judgement is the deprivation cutoffs. Deprivation cutoffs are normative standards which define a minimum level of achievement below which a person is deprived in each indicator (Gordon et al., 2003; Townsend, 1979). According to Bourguignon and Chakravarty (2010), deprivation cutoffs for each indicator is an essential component of multidimensional poverty measure that even allows the researcher to garner information on joint deprivation distributions. This is because being better-off in one indicator does not eliminate deprivation in other indicators. In justifying deprivation cut-offs, reference is often made to either international or national standards (Alkire & Santos, 2014; Townsend, 1979).

In multidimensional poverty assessment, a fundamental normative choice is whether relative weighting scheme will be imposed on the dimensions under consideration. The need for a weighting scheme emerges from the understanding that individuals/societies have different values, hence value can be placed on some dimensions more that of others. Sen (2009) noted that the agreement on an

appropriate weighting scheme is not conclusive and should continue to be an active debate.

The spatial basis of comparisons

Geographic unit of comparison is essential not only for providing information on poverty but also for enabling focus on areas with poverty incidence. According to Laderchi et al. (2003) there are three central importance for comparing poverty estimates across geographical units; (1) to identify relative poverty line of each respective geographical grouping; (2) to aid in defining specific boundaries; and (3) to facilitate effective targeting of poverty with respective to a geographical grouping. These geographical units can range from the town, district, regional and national to even international level comparisons.

Theory of stochastic dominance and poverty

Since Sen (1986) proposed the identification and the aggregation stages in poverty measurement, the literature has been proliferated with studies on multidimensional poverty (Alkire & Foster, 2011; Alkire et al., 2015; Alkire & Santos, 2014; Bourguignon & Chakravarty, 2003; Sen, 1993, 2000; Tsui, 2002). These measures can be broadly dichotomised into two broad approaches in the literature namely, the composite index and the stochastic dominance approaches. The former has a unique characteristic of aggregating the various dimensions of wellbeing into a single composite index. This makes the approach very useful for engendering cross-country comparisons and within region analyses even at the national level (Roelen, 2010). Micklewright and Stewart (2001) noted that the

composite index makes advocacy easy which stimulates public interest in the area of poverty. However, Stiglitz et al. (2009) queried whether the single index of poverty could ever be a sufficient statistic, or whether multiple indices are needed. Ravallion (2010) also argued further that the process of aggregation into a single index might be contentious.

A significant concern yet in the composite approach is that the single index may be sensitive to the evaluative function deployed, the choices of functional forms, the weights attached to each dimension and other considerations which weakens the consistency of the poverty/welfare comparisons (Arndt et al., 2012; Ravallion, 2010). According to Arndt et al. (2012), the application of a weighting scheme is only meaningful when a significant level of consensus exists on the appropriate weighting scheme for each of the dimensions. The absence of such a consensus in the literature renders the results of the index approach less robust as alternative weighting schemes may produce different welfare rankings conclusion.

Unlike the composite index method, the stochastic dominance falls into the category of 'robust comparisons' of poverty and inequality which allows for valid comparisons across several underlying welfare function (Yalonetzky, 2013). The robust comparison methods were popularised by Atkinson and Bourguignon (1982) who showcased how stochastic dominance techniques can be used for comparing probability distribution in order to make comparisons of populations across broad classes of underlying social welfare functions. Some of the empirical applications are in unidimensional applications (Atkinson, 1970; Atkinson & Bourguignon, 1987; Bourguignon & Chakravarty, 2003a; Foster & Shorrocks, 1988; Jenkins &

Lambert, 1998) with extension to multidimensional settings (Batana & Duclos, 2010a; Duclos, Sahn, & Younger, 2006; Gravel & Moyes, 2012; Muller & Trannoy, 2011).

The mentioned contributions, however, apply dominance concepts which rely strictly on assumptions that are typically formulated regarding a specified sign on the second or higher order cross derivatives underlying the social welfare function. This culminates into a more difficult concept of either lower or upper orthant dominance which complicates the welfare ranking of comparator populations. Further, the above contributions do not also apply to ordinal data, which is unfortunate given that welfare achievements are mostly ordinal (Arndt, Siersb\a ek, & Østerdal, 2015; Nanivazo, 2013; Siersb\a ek, Østerdal, & Arndt, 2016).

Shaked and Shanthikumar (2007) pointed out first order dominance (FOD) in the probability theory literature as a natural concept for making comparisons between population distributions with multidimensional ordinal data observed at the micro-level. According to Østerdal (2010), the theory postulates that given two finite population distributions, X and Y, the distributions in population X first order dominates those in Y if population distributions in Y can be obtained in X by shifting probability mass densities within X in such a way that the shifts occur from a preferred source to a worse-off distribution destinations in Y. In the presence of such a dominance where one population distribution X first order dominates the other Y, the dominance in X is deemed as unambiguously better than that of Y.

The FOD does not make any assumption concerning the social welfare function nor on the imposition of any weighting scheme. Instead, it makes only a minimum assumption that it is better not to be deprived than to be deprived in any of the welfare indicators (Arndt et al., 2012). Arndt et al. (2014) asserted that the robustness of the FOD approach lies in the absence of restrictive assumptions inherent in its implementation.

However, this robustness comes at two costs. The first being the likelihood of arriving at an indeterminate outcome when comparing two population distributions. Thus, in some instances, population distribution X and Y may neither dominate each other. This a problem because the essence of the approach is to ensure robust rankings of welfare among comparator populations. The second is that the approach does not depict the degree by which one population parameter dominates the other. However, Siersb\a ek et al. (2016) stated that mitigating these two challenges in multidimensional FOD welfare comparisons requires the application of a bootstrap approach involving repeated bootstrap samples drawn from comparator populations.

Social protection and poverty nexus

International Labour Office (2000) defined social protection in three broad areas: (1) the provision of public measures to protect members of the society against economic and social distress that would be caused by the absence from work or significant reduction of income from work due to various contingencies in the domains of employment, injury, sickness, maternity, invalidity,

unemployment and even death of the breadwinner; (2) the provision of health care for the members of a society; and (3) providing benefits for families with children. This definition is further corroborated by DFID (2005) which broadly defined social protection as a set of public actions and policies that address risk, vulnerability and chronic poverty. Social protection thus shares association with a set of public institutions, standards and programmes to protect workers and their families from contingencies that threaten their basic living standards (Barrientos, 2011). The definition of social protection by ILO (2000) incites a broader and more inclusive notion than social security which includes only legal measures for providing social security (Bonilla- Garcia & Gruat, 2003). Bonilla-Garcia and Gruat (2003) further noted that though the definition of social protection is broad, significant differences exists among societies on their definition and orientation towards social protection due to idiosyncrasies in cultural values, traditions, institutions and political structures. This notwithstanding, ILO's approach to social protection is invariably broader as it adopts a unique structure that endorses equal representation of governments with their corresponding social partners, employers and workers in designing the policies and programmes. Recently, ILO (2017) further incorporated human right perspective into the definition of social protection.

Garcia and Gruat (2003) argue that a broader concept of social protection should satisfy three main objectives. First, it should guarantee access to essential goods and services that ensure protection against various contingencies for all people. Secondly, social protection should include programmes, strategies and policies that are proactive in preventing and protecting against risks. Lastly, social

protection should engender individual and societal potentials and opportunities aimed at poverty reduction and sustainable development. These broad objectives are not only interconnected but also mutually reinforcing in preventing and providing a solution to the consequences of adverse events in the life of an individual and a society. They stated further that achieving these broad objectives necessitates the adoption of social insurance, social assistance and public service/labour market regulation.

DFID (2005) provides a clear definition of social insurance, social assistance and labour market regulation. Social insurance is made up of individuals pooling resources through contributory payments to the state or to private provider against future shocks they may suffer in the future. This guarantees financial support to the beneficiaries such as unemployment insurance, contributory pensions and health insurance. On the other hand, social assistance involves non-contributory transfers to eligible beneficiaries based on their state of vulnerability or poverty. Some of the examples of social assistance include cash transfers to poor households, the provision of free meals to deprived schools and waiving school fees for schools deemed as poor. Labour market regulation involves establishing minimum standards at workplaces that are enforceable to ensure the protection of workers.

Consequently, there is a surge in the implementation of the number and coverage of social protection policies and programmes in developing countries. Recently, the post-2015 development agenda emphasised social protection in the SDGs. Specifically, Goal 1.3 encouraged countries to implement nationally

appropriate social protection systems aimed at reducing and preventing poverty for all. The preceding has nonetheless triggered growing interest in social protection among development and social researchers, research and academic institutions.

Social protection, however, is yet to become a reality for the majority of the populace of the world (Economic and Social Council, 2018). Many challenges are militating against the adoption, implementation and strong impacts of social protection policies. A major challenge to the adoption of a social protection programme in developing countries is financial constraints (Barrientos, 2011; International Labour Office, 2000). These constraints are more severe in low-income countries. International Labour Office (2005) argued that financial challenges transcend affordability to long-term concerns regarding sustainability.

Barrientos (2011) countered the financial constraints challenge in developing countries on the basis that the costs of social assistance programmes for the poor and poorest are small in absolute terms. Even when the proportion of GDP is taken into consideration, the percentage contribution is negligible. He further admitted, however, that financing social insurance in developing countries through payroll taxes may prove insufficient due to the ever presence of significant informal labour market. Another challenge mitigating against social systems in the developing countries is limited institutional capacity. According to DFID (2005) institutions in developing countries have limited experience in managing and delivering social transfer systems. Barrientos (2011) also lamented about the lack of institutional capacity in developing countries to study, measure and analyse

poverty and vulnerability; design and implement the right policies; and deliver and evaluate social protection programmes.

A third major challenge facing successful implementation of social protection policy is the appropriate targeting of beneficiaries. Slater and Farrington (2010) contend that this is crucial in developing countries where limited resources are available for social protection. DFID (2005) earlier emphasised that even well-targeted programmes can sometimes have potential beneficiaries missing out. Even so, some programmes may have a complete failure because of targeting. Farrington, Sharp and Sjoblom (2007) assert that information on the poor is challenging and expensive to collect and analyse with an urgent application. These leave the process with natural inclusion and exclusion errors. Other challenges concern targeted and universal social protection instruments (Mkandawire, 2005). Whereas social assistance instruments are mostly targeted such as cash transfer, that of social insurance instruments such as health insurance schemes operate by self-selection (Slater & Farrington, 2010).

Theory of demand for social health insurance

This section reviews theoretical literature on the demand for social health insurance. The theories on demand for social health insurance can be traced to the 19th century. Every insurance contract aims at reducing risks borne by the client or beneficiary who purchased the insurance (Besley, 1989). Expected utility theory under risk is fundamental to the theory of demand for insurance (Von Neumann & Morgenstern, 2007). According to the expected utility theorem, preference relations

should be characterised by three axioms (Machina & Viscusi, 2013). The first, weak preference, requires that preference relation be complete and transitive. Completeness means that presented with a choice between two alternatives in a given set; the decision maker should be able to indicate his desirable alternative over that of the other. Concerning transitivity, it requires consistency in the choice set. For example, if an alternative X is at least desirable as another alternative Y, and Y is at least as desirable as Z, then alternative Z should not be strictly preferred over Y. The second axiom requires implicitly that, given preferences A and B, neither alternative should be infinitely more, or less, desirable than any other alternative. The third axiom is known as the independence axiom, this allows for a form of separability on the preference relation. By implication, this axiom requires that the choice between any two alternatives should be based on their uniqueness and that commonalities between the choice sets should be disregarded.

However, most of the debates on the theory of demand for health insurance has centred heavily on moral hazards. Pauly (1968) main concern was that health insurance potentially leads to moral hazard with the resultant being an inefficient reallocation of resources. He further added that such inefficiencies have welfare-reducing tendencies when they are institutionalised through government regulation. He contended that moral hazards weaken the case for national health insurance.

De Meza (1983) criticised Pauly (1968) for overstating the inefficiency induced by moral hazard. He argued that the demand curve facing the insured and the uninsured are different. He argued further that, in the case of the insured, the reimbursement of medical expenses emanating from the insurance shifts the

demand curve outward analogous to the case of cash transfer. In this wise, the willingness to pay by an insured person instead increases because of insurance coverage. Though Pauly (1983) acknowledged that insurance coverage might strengthen the income effect of the critically ill clients, he asserted that inefficiency induced by moral hazards among healthier clients are still pronounced. Fuchs (1996) contend that moral hazard does not always make the insured worse-off. This is because the customer who is insured benefits from all the extra medical care by passing the cost to that of others. This engendered subsequent inquiries into an efficient and inefficient moral hazard (Nyman, 1999; Nyman & Maude-Griffin, 2001).

In the midst of all these debates, Nyman (2003) brought on board a new theory for demand for health insurance that overcomes moral hazard tendencies. He postulates that the integral motive for buying insurance depends on the individual's desire to receive an income from the risk pool in the case of an illness. This claim is somewhat debatable given that the expected transfer in the future is minimal compared to the significant premium consumers of insurance pay over time. Nyman (2003) further clarified the basis because consumers seek to maintain a regular consumption or wealth across time by sacrificing a proportion of their consumption when healthy in order to be compensated in the event of injury or illness. By this, the consumer avoids the risk of a potentially massive and sometimes uncertain unfordable medical bill in the future.

The concept of child poverty

Active interest in the conceptualisation of child poverty began with UNICEF report (2000). Gordon et al. (2003) conceptualisation of child poverty was based on the relative deprivation theory of Townsend (1979), and the definition of poverty agreed by the governments of more than 100 countries at the 1990 World Social Summit in Copenhagen. The relative deprivation theory conceptualises deprivation as a continuum that begins from the scale of no deprivation, through mild, then moderate and severe deprivation. Based on this theory, seven deprivations were identified as crucial to the survival and development of children. These basic deprivations are food, safe drinking water, sanitation facilities, health, shelter, education, information, and access to information. Gordon et al. (2003) defines children as living in absolute poverty if they suffer from at least two severe deprivation in any of the seven basic human needs mentioned earlier.

UNICEF (2005) later argued for a right based approach to the definition of child poverty. According to Hunt, Nowak and Osmani (2002), the human rights-based approach to poverty provides a platform for combining human rights concepts, analysis and values into the poverty reduction discourse. Thereby allowing poverty reduction strategies to be guided by human rights laws and values internationally. Hunt et al. (2002) added that the human rights approach provides a standardised normative framework for national and international poverty reduction strategy guidance. Based on the human right approach, UNICEF (2005) defined child poverty using the Child Right Convention as children that are deprived in material, spiritual, and emotional resources needed to survive, develop and

participate fully in their society. Minujin et al. (2006) emphasised UNICEF's definition as suggestive of many components in addressing child poverty: access to basic services, discrimination and exclusion, and psychological development. UNICEF will then use the rights-based approach in conceptualising their global studies on child poverty and disparity.

Minujin et al. (2006) noted that the basic needs conceptualisation of child poverty by Gordon et al., (2003) alongside the emergence of the right based approach had created a significant consensus in the literature about the multidimensionality of child poverty. This has depicted the monetary approach in income (children living in low-income houses) as inappropriate or inadequate in the measurement of child poverty. Many reasons support this claim. First, the monetary approach to child poverty wrongly assumes that the needs of children and adults are homogeneous. Secondly, since the monetary approach is at the household level, the approach fails to take into account the intrahousehold distribution of resources by making a strong assumption of equal distribution of resources which is often not realistic (Waddington, 2004). Minujin et al. (2006) further emphasised that household members may be discriminated against and may not have their share of increases in the levels of income of households. Since children mostly lack any bargaining power and are not active economic members of the household, they may be faced with such discrimination. Thirdly, the monetary approach has an over-ambitious assumption that seems to suggest that all the resources needed for the fulfilment of basic needs are market-based. Not only are such markets imperfect (Bourguignon & Chakravarty, 2003c; Tsui, 2002) but non-existent for children

(Minujin et al., 2006). This is premised on the observation that access to basic services and a safe environment for play is not contingent upon household income, but the level of local provision.

The preceding has necessitated the glamour for a child-focused approach towards poverty. The importance of child-focused poverty is numerous. Child focus poverty measures provide a direct way of assessing the poverty situation of children (White, Leavy, & Masters, 2003). These measures provide crucial information since children are not economic agents, but instead rely on resources from their parents, household and community. Also, focusing directly on children hold the key to breaking the cycle of poverty (UNICEF, 2000). Poverty somehow manifests itself as a vicious circle with the potential of trapping children. Hence reducing child poverty has a long-term consequence of halting adult poverty (Corak, Lietz, & Sutherland, 2005). Furthermore, a child-specific approach highlights the needs that are crucial for the survival and development of children.

Notable child-specific approaches used in the literature are the Bristol Method (Gordon et al., 2003), Multidimensional Poverty Index (Alkire & Roche, 2009) and the Multiple Deprivation Analyses (De Neubourg, Chai, De Milliano, & Plavgo, 2013). Though the Bristol method provides information directly on children, the outcome from the approach is limited to only a headcount analysis. Such analyses fail to incorporate the overlap of deprivations as well as the depth and severity of the poverty situation of children (Alkire & Roche, 2012; Roelen & Gassmann, 2008). The Multidimensional Poverty Index, on the other hand, transcends the headcount ratio to include information on the depth and severity of

poverty that children experience. However, it also fails to account for the overlapping deprivations that children experience.

The MODA is an extension of both the Bristol Method and the Multidimensional Poverty Index to include information on the depth and severity of poverty faced by children as well as the overlapping nature of their deprivations. Another argument for the MODA is that it incorporates life-cycle analyses into its analyses unlike that of the other measures (De Milliano & Plavgo, 2014).

The Life Cycle Approach is based on the acknowledgement that the needs of children are different at different stages of the lives. In the context of MODA, the LCA has divided children into two main age categories, children under five (0-4 years), and children aged from 6 to 17 years reflect their changing needs. Adopting a life cycle approach to child poverty analyses engenders transparency, and this ultimately obviates the analyses from under-estimating the deprivation levels of children (De Neubourg et al., 2013). For instance, while the needs of children under five years are survival-related, those that are 5-years and beyond are predominantly developmental. Also, it facilitates the selection of age-specific indicators. Since the life cycle approach is commendable in the literature, its major limitation is that sample size for age groups are sometimes not large enough for meaningful profiling of deprivations across the various life stages of children.

Empirical Literature Review

This section reviews literature on poverty and deprivation methods with specific focus on three main issues as related to the three main empirical chapters

of this thesis respectively (1) Spatial and temporal household poverty in Ghana and Kenya; (2) Poverty methods, deprivation measures and social protection policy in Ghana; (3) Child deprivation poverty in Ghana.

Spatial and temporal household poverty in Ghana and Kenya

Studies on poverty measurement in developing countries dates as far back as the 1970s. Studies in this domain mainly use the monetary approach to produce their poverty estimates. Ahluwalia, Carter and Chenery (1979) estimated poverty levels in 25 developing countries using Gross National Income as the poverty indicator variable between 1954 to 1975. Though the study provided insufficient information about the methodological framework employed, the study concluded that elimination of absolutes poverty within the next 100 years for developing countries was unlikely. Ravallion, Datt and Van De Walle (1991) under the auspices of the world bank measured the headcount index and poverty gap for about 22 developing countries in 1985 using the current distributions in their income levels as at the year.

Although the essence of this work was the bases for further estimates by the world bank in developing countries, the data on which most of the analyses were based were simulated. Also, the estimates from their study appear to be static given that the analyses were only conducted for 1985. Not surprisingly, Chen, Datt and Ravallion (1994) use somewhat new household income per person data for 44 developing countries to measure their poverty levels. Also, in order to engender robust poverty comparisons across countries, they subjected the poverty outcomes

to restrictive dominance test. In addition, they made their revised study dynamic by using five years (1985-1990) for the analyses. Their study revealed differing poverty experience across regions (South East Asia, East Asia, Latin America & SSA) and among the individual countries.

With data availability becoming common, Chien and Ravallion (2010) attempted a global estimate of poverty by using 297 national surveys from 88 countries between 1987 and 1988. The poverty line used for the global study was a $1.08 at 1993 purchasing power for the respective countries. The outcomes revealed a reduction in all sub-regions except that of SSA and Eastern Europe. However, Sala-i-Martin (2006) noted that using only income distribution from national surveys without combining it with corresponding national accounts of GDP per capita might result in wide dispersions in income distribution. In his estimate of global study from 138 countries between 1970 to 2000. Sala-i-Martin (2006) combined country distributions of income from national surveys with GDP per capita in order to pin down any potential dispersion. Unlike Chien and Ravallion (2010) which used only one absolute poverty line, Sala-i-Martin (2006) advocate for multiple poverty lines in poverty analyses. Consequently, he used four specific absolute poverty lines in his study. Also, relatively recent poverty study by Chen and Ravallion (2010) involving 115 developing countries used five international poverty lines to capture the poverty dynamics from various perspectives.

The studies above are criticised for being narrowly focused on either income or consumption expenditure poverty. The United Nations Development Programme

[UNDP] (1990) laid practical and pragmatic foundations for empirical works on alternative poverty measures through its pioneering publication of the Human Development Report in 1990. UNDP (1990) argued that wellbeing of humanity could not be reduced to a single dimension as economic creatures, instead must entail enlargement of people's choices beyond economic growth, income or wealth. The report used three indicators namely, life expectancy, literacy and standard of living to produce the first estimate of the HDI for 109 developing countries between 1960 to 1988. The findings generally indicate significant progress towards human development in the period considered for the study. The findings further revealed that the average progress in human development shroud the large disparities within developing countries between residence and gender. Anand and Sen (1997) commend the UNDP (1990) for focusing on human development. They, however, criticised the HDI for being too broad an approach for poverty measurement. They argued that the HDI is more suitable for looking at the conditions of people in a society. Anand and Sen (1997) then proposed a new measure that concentrates on the poor in the society called the Human Poverty Index (HPI). Whereas the HDI is people development centred, the HPI is people-deprivation focused. The HPI is made of three indicators: (1) survival deprivation; (2) education deprivation; (3) and economic deprivation. Over time, both indices are estimated for all countries by the annual UNDP report to monitor their level of deprivation and development beyond income.

A significant weakness in using the HDI and HPI is that their empirical works used only macro data to estimate development and deprivation levels across

countries. This obviates either of the indexes from making within country comparative analyses. UN (2010) however, overcame this criticism by incorporating the estimates of MPI by Alkire and Foster (2007) into their annual reports in 2010. Unlike both the HDI and HPI, the MPI uses ten indicators from three dimensions (Education, health and living standards) observed at the household level to measure poverty. The UN (2010) use the MPI to estimate the poverty index across countries in the three dimensions mentioned above. Though the MPI complement the HDI and HPI by providing a poverty measure at the micro-level, its inclusion in the Human Development Report orients towards cross-country comparability instead of within-country analyses.

The HDI, HPI and MPI have faced significant criticism for deploying composite indices as their measure of human development, poverty and deprivation. Kanbur and Squire (1999) criticised the composite indices as only useful for cross-country comparison but does not differentiate clearly between the poor and the non-poor. Micklewright and Stewart (2001) however maintained that the composite index makes advocacy easy for stimulating public interest in the area of poverty. Stiglitz et al. (2009) queried whether a single composite index of poverty could ever be a sufficient statistic for measuring poverty. Ravallion (2010) argued further that even the process of aggregating the dimensions into a single index might be contentious. This is in light of the arbitrariness in the selection of dimensions, the poverty cut-off and the imposition of a weighting scheme.

The challenges of composite indices have motivated the development of 'robust' methods for comparing population welfare, poverty and inequality using

stochastic dominance methods. Recent empirical works in this regard include (Batana & Duclos, 2010a, 2010b; Bossert, Chakravarty & D'Ambrosio, 2009; Duclos et al., 2006; Muller & Trannoy, 2011). However, Arndt et al. (2012) criticised these contributions for relying on the specified signs of the second or higher order cross derivatives that underlie the social welfare functions which often complicates the ranking of populations. Instead, Arndt et al. (2012) proposed the FOD for making welfare comparisons between populations with multidimensional well-being indicators observed at the micro-level. The method argues against two central tendencies in poverty measurement: (1) imposition of an arbitrarily weighting scheme as in the case of the composite indices approach; (2) reliance on higher order cross derivatives to determine the state of the social welfare function of a population. Empirical illustrations of the FOD approach for measuring household poverty has been conducted in Tanzania and Nigeria.

Ajakaiye, Jerome, Olaniyan, Mahrt and Alaba (2014) appraised the non-monetary multidimensional poverty in Nigeria using Arndt et al. (2012) first-order dominance approach. The study considered five dimensions of deprivation in education, water, sanitation, shelter, and energy. For the national, regional, and zonal analysis, the study deployed the Nigeria Demographic and Health Surveys of 1999, 2003, and 2008. However, the Nigeria Living Standard Survey was used for the 2003/04 state analysis.

The FOD comparisons depict that the country registered only fewer gains in the welfare comparisons across time and that poverty reduction indeed has not kept pace with the rapid economic growth attained in Nigeria. The proportion of

households experiencing acute deprivation in all the five welfare indicators decreased marginally by only 0.20 per cent. Their results indicated sanitation as the only welfare indicator that recorded a substantial increase between 199 and 2008 of 18.6 to 40.2 respectively. Notably, as with the other measures of poverty, the worst-ranked states are located in the northern part of the country: Taraba, Adamawa, Gombe, Benne, Plateau, Nassarawa, Kogi, Bauchi and Niger. Though the findings of the study are consistent with the spatial poverty distribution in Nigeria, using mixed datasets in the DHS and the NLSS may not engender useful comparisons across space and time due to the variability in frameworks that the different data sets may assume.

Arndt, Leyaro and Mahrt (2014) used the FOD approach for multidimensional welfare comparisons in Tanzania. Four variants units of analyses were considered for the study in the domains of households, children under five (0 to 4 years old), children (7 to 17 years old), and young women (18 to 30 years old). The principal data source used for the study was the Tanzania Demographic and Health Survey (TDHS) for the survey periods 1991/92, 1996, 2004/05 and 2010. The indicators used for the household analyses were water, sanitation, shelter, Education and Information. The bootstrap results of the temporal FOD comparisons were positive, albeit negligible in some instances. Generally, all the units of analysis reveal that the 2004 and 2010 net dominate both 1992 and 1996, respectively, using the results from the static and bootstrap approaches. For the spatial FOD results, urban area, Eastern and Zanzibar zones were the well-off zones with a higher net probability of dominance in the periods of the study. In contrast,

the Rural and the Western zones were worse off. It is worth stating that though this study is elaborate, FOD comparisons cannot be compared across different units of analyses, and o the multitude unit of analyses deployed in the study undermined the purpose of the study.

In the context of Ghana, studies on the measurement of household poverty are limited to the monetary approach (consumption expenditure) and the composite indices. GSS (2006 & 2013) reports present results on consumption expenditure poverty in Ghana as the country's main poverty assessment. It can be concluded from the series of reports spanning over a period of two decades that absolute poverty had decreased significantly from 52 per cent in 1992 to about 24 per cent in 2013. This registered a more than half reduction in poverty incidence in the country. Over the same period, extreme poverty also declined by about 31 percentage points. However, there are pronounce disparities in the poverty levels across the geographical groupings of the country as about five out of the ten administrative regions have poverty levels higher than the national incidence of 24.2 per cent.

Regarding the multidimensional poverty measures, Appiah-Kubi (2007) use the fuzzy-set theoretical framework to compare levels of deprivation in Ghana using 1992 and 1999 GLSS. The finding indicates stagnation in deprivation levels between 1992 and 1998. The GSS (2010) use the MPI to measure non-monetary poverty in Ghana from the 2010 Population and Housing Census. The study compared the deprivation incidence from the MPI with that of income poverty. The main finding revealed that deprivation incidence for each region was higher than

that of the income poverty, and also indicate the disparities especially between the rural and urban areas. However, the MPI and the Fuzzy set approaches use for the non-monetary poverty appraisal belong to the family of composite indices with their attendant limitations (Arrow, Sen, & Suzumura, 2010; Micklewright & Stewart, 2001; Ravallion, 2011; Squire & Kanbur, 1999; Stiglitz et al., 2009)

In the case of Kenya, the KNBS (2007 & 2018) report has presented consumption expenditure poverty between 1992 and 2016 as the central assessment of poverty in the country. The conclusion from the poverty estimates spanning throughout more than two decades revealed that the incidence of poverty decreased from 44.8 per cent in 1992 to 36 per cent in 2016. Indicating that for more than two decades, Kenya managed to reduce its poverty incidence by only 9 per cent. ECA (2015) compared the incidence of income poverty among 27 countries in Africa based on available information from UNSD. The finding revealed Kenya to have registered the highest poverty increases of 24 per cent among the 27 African countries. It can also be observed from the literature that multidimensional poverty estimates are not household focused in Kenya. The study by Kabubo-Mariara and Musau (2011) though multidimensional, the unit of analyses were women and children. Hence, the conclusion cannot be drawn based on household living conditions.

Poverty methods, deprivation measures and social protection in Ghana

Chen and Ravallion (2010) and Pinkovskiy and Sala-i-Martin (2009) presented significantly different global poverty estimates due to different

methodological approaches employed by both studies. Review of the two studies revealed the following key differences. The first difference concerns the scope of the study: Whereas the scope of the former was on 115 developing countries, that of the latter focused on 191 countries comprising developed and developing countries. The second difference was on the source of data used for both studies: whereas Chen and Ravallion (2010) used household surveys for their study, Pinkovskiy and Sala-i-Martin (2009) employed National Account Statistics (NAS). Thirdly, the two studies employed different welfare metric in consumption expenditure and income. Fourthly the applied different poverty lines for their poverty cut-off. Finally, whereas Chen and Ravallion (2010) used the Lorenzo curves estimation technique, Pinkovskiy and Sala-i-Martin (2009) used the density function approach.

In response to the key differences between the two global estimates of poverty, Dhongde and Minoiu (2013) undertook sensitivity analyses to project the importance of methodological choices in estimating global poverty. Their study used different data sources, estimation methods, and multiple poverty lines to measure global poverty. Their results indicate significant variation in global poverty when they are based on household surveys as against national accounts, but are fairly consistent across the different estimation techniques deployed.

In Ghana, mainstream studies on poverty estimates are conducted consistently by the GSS (2007 & 2014) spanning over two decades. Though these studies are commendable for elucidating the poverty situation of the country and over time, their estimates are based on only consumption expenditure poverty. Even

so, the lower and upper poverty lines representing extreme and absolute poverty that are used to adjudge the consumption expenditure poverty situation of the country are not subjected to further sensitivity analyses. More so, the poverty situation of the two main components of consumption expenditure (food and non-food) are invariably not taken into consideration. It appears the primary purpose or assignment of the GSS is more focused on presenting official estimates on poverty in Ghana, than to concern herself with the nitty-gritty of the assignment process. However, amidst the concern of prevailing gross regional disparities in the incidence of consumption poverty, warrant taking into consideration sensitivity analyses. According to Alkire et al. (2015), sensitivity analyses lend the outcomes of poverty analyses to various considerations.

Furthermore, other studies on multidimensional household poverty measures in Ghana are somewhat heterogeneous regarding the type of data, methods, dimension, the span of study and purpose to engender effective monitoring and comparability. Regarding data, Appiah-Kubi et al. (2007) used the 1992 and 1998 GLSS, and the GSS (2013) used the 2010 Ghana Population and Housing Census (GPHC). Regarding methods, the first study used the Fuzzy Set theorem, whereas the latter employed the MPI. It is worthy of mentioning that, not only were the purposes of the two studies different, their conclusions as well. The purpose of Appiah et al. (2007) was to assess the multidimensional phenomenon of poverty in Ghana between 1992 and 1998. In the case of GSS (2013), the study compared the deprivation poverty ratio with income poverty in Ghana. The first study concluded that non-monetary poverty has stagnated in Ghana between 1992

and 1998. Whereas the second realised that the intensity of deprivation poverty of 42 per cent was higher than income poverty.

From a global perspective, Fiszbein et al. (2014) estimated that 150 million people all over the world are being prevented from falling into poverty because of various social protection programmes. The study further indicated that the major problem facing about half of the low-income countries in their estimated sample has more to do with budgetary adequacy than targeting efficiency. However, Economic and Social Council (2018) estimated that any social protection programme does not cover about four billion people.

Meta-analyses on developing countries by Hidrobo, Hoddinott, Kumar and Olivier (2018) revealed that social protection increases the value of household food consumption and caloric acquisition in developing countries by 13 per cent and 8 per cent respectively. Their study further revealed an increasing effect on the productive asset, livestock and savings. Arnold, Comway and Greenslade (2011) indicated that social transfers improve child nutrition status. However, a broader systematic review by Manley, Gitter and Slavchevska (2013) revealed that though the impact on child nutrition is positive, the effect is not statistically significant.

Country-specific effects of social protection and poverty reduction are also evident across the literature. Samson et al. (2004) revealed that the poverty gap in South Africa is reduced by 47 per cent due to the Child Support Grant. Barrientos (2005) used household data to indicate that the marginal effect of non-contributory pension receipt within a household reduces the probability of poverty by 18 and 12.5 per cent in Brazil and South Africa respectively. Fiszbein and Schady (2009)

estimated the impact of the ‘Oportunidades programme' in Mexico to result in a 20 per cent reduction in the poverty gap. The Cash Transfer Programme for Orphans and Vulnerable children resulted in positive and significant reduction of the incidence and severity of poverty in Kenya by 13 and 10 per cent respectively. Whereas in Malawi, Social Cash Transfer Programme reduce their household poverty incidence by 6 per cent (Barrientos, 2016).

Though all the above social protection programmes have registered poverty-reducing effects, they are biased towards the family of social assistance via cash transfers. Fiszbein et al. (2014) noted that social protection involves three broad components, namely social insurance, labour market regulations and social assistance. Developing regions especially Africa appears to embrace and project social assistance component of social protection compared to social insurance. The difference is that whereas the latter is pre-emptive, the former is merely reactive in weathering the poverty challenge.

In the case of Ghana, two studies have examined the effect of the flagship cash transfer programme of the country, LEAP, on poverty reduction. Handa et al. (2013) used longitudinal propensity score matching to assess the impact of the programme on household outcomes. One of the central findings is that the LEAP programme is reaching the intended poorest households in Ghana, thereby satisfying its targeting efficiency. Concerning quantitative impacts, the programme significantly reduced perceived household and child food insecurities. However, it recorded no impact on adult food consumption. Barrientos (2016) noted that this observation could emanate from the irregular disbursement of funds that

characterised the initial stages of the LEAP programme. The second study, Cooke, Hague, Tiberti, Cockburn and El Lahga (2016) used the ADePT social protection simulation module to assess the mitigating impacts of the LEAP programme on household consumption expenditure poverty. The study revealed that in the absence of fuel subsidy from the government, expansion of LEAP beneficiaries to the minimum of 150000 households could potentially reduce the poverty level in Ghana by 1.6 percentage points. However, as noted by Barrientos (2016), the main problem neutralising the LEAP programme in a significant reduction of household poverty is not in extending coverage, but the irregularities that marked payment of funds to beneficiaries. These two studies in Ghana just as many in developing countries also appear to suggest that the impact of social protection on poverty reduction has mainly emanated from the social assistance component.

Besides social protection and poverty, there are other noteworthy studies on household poverty in Ghana. Duclos, Sahn and Younger (2006) used consumption expenditure and children height for age scores to examine multidimensional poverty in Ghana, Uganda and Madagascar. The findings in the context of Ghana conclude that rural multidimensional poverty ratio was higher than that of urban. However, the scope of dimensions considered for the study was narrow for a multidimensional assessment. Coulombe and Wodon (2007) provide estimates of the trend in consumption expenditure poverty and inequalities estimates between 1990 to 2006. The study also identified age, education of head, education of spouse, marital status, the occupation of head and employment status as significant

correlates of household poverty. Though the scope of the study was broad, the study failed to control for the effect of social protection programme on poverty reduction.

Cooke et al. (2016) conducted a study on the poverty and inequality profile in Ghana. One of their findings suggests that the economic growth of the country is not inclusive. This is premised on the observation that economic growth has increased the welfare of the wealthiest by 1.42 times compared to the poorest. Recently, Annim (2018) use the Ordinary Least Square (OLS) and the Propensity Score Matching (PSM) techniques to examine the poverty reducing effect of microfinance in Ghana. The findings indicate that microfinance has greater poverty-reducing effect in the urban areas compared to that of the rural areas. However, the estimates may suffer from potential bias, given that the study failed to account for self-selection of households into the Microfinance institutions.

Review of main determinants of poverty

This section briefly reviews the determinants of poverty below.

Education of household head

The role of education is based on the human capital theory. This theory is centred on the assumption that formal education translates into an improvement in the production capacity of a population which increases the earnings of the populace to bring them out of poverty (Sakamoto & Powers, 1995). The human capital theory further argues that education does not only increase productivity but also the efficiency of workers through the increased cognitive stock of economically productive human capital (Olaniyan & Okemakinde, 2008). Empirical works on the relationship between education and poverty are available

in Ghana. Coulombe and Wodon (2007) found using the fifth round of the GLSS that the probability of being poor decreases as the education level of the household head increases from primary to a higher level of education. The same trend was observed regarding the education level of the spouse. Annim (2008) also found that household poverty decreases increasingly as the education of the household head increases from basic to post-secondary education.

Religion of head of household

Keister (2011) hold the view that religious affiliations and religious beliefs influence wealth creation by arguing that behaviours in adulthood are an outcome that emanates from behaviours that begun at the early stage of life. As such religion has the potential to influence savings, asset accumulation and wealth creation indirectly through its orientations toward life course processes such as education and educational attainment, marriage, fertility and career behaviours. He further argued that issues such as the timing of marriage, the fertility rate, and career behaviours are influenced by religion which has a potential effect on savings for wealth creation. Further, Anyanwu (2013) corroborated that religion affects a person's general outlook of the real world which affects poverty.

Occupation of head

According to Anyanwu (2013) occupation is related to the amount of earning which potentially affects poverty. It has been observed that occupation types that are labour intensive earn low wages compared to that of capital-intensive occupations which require skills. Concerning empirical works in Ghana, using the GLSS, Coulombe and Wodon (2007) found that household heads who are into

agricultural activity are poorest compared to other occupational types in the country. A study by Annim (2018) found that salary workers decrease their household poverty compared to heads of households that are self-employed.

The ethnicity of head of household

According to Barnard and Turner (2011), ethnicity influences the day to day activities of individuals, the decisions and choices that individuals make as they assume various roles in their society. He further argued that ethnic groups might provide the needed support networks which provide the necessary social capital for poor families. In addition, some ethnic groups have caring practices and responsibilities which prevent them from participating in the labour market or even progressing in their work. This influences the ability of individuals to build savings, skills and social networks which influence their earnings to affect poverty levels. Gilchrist and Kyprianou (2011) argued that ethnicity provides a social network that shapes the experiences and opportunities of people. These experiences and opportunities, in turn, affect the earning potentials of individuals.

Residence and regional effects.

Areas of residence affect poverty due to the disparity of opportunities available in both rural and urban households. Whereas diverse kinds of job opportunities are available in the urban areas, the rural areas can only boast of agriculture as their primary occupation. Assessing job opportunities have effects on the earnings of households across the two areas, and hence their level of poverty. Not surprisingly, several empirical studies have established poverty as principally

a rural phenomenon in Ghana (GSS, 2007, 2014). Regional effects like that of the residence also potentially affect household poverty.

Age of household head

The productive capacity of the household head increases as the head ages. However, when the productive capacity of the head decreases due to old age and the head has limited savings to compensate for the production and income loss, this can translate into poverty. Maloma (2016) found in South Africa using the binary logistic technique that age has a negative relationship with a household becoming poor. Anyanwu (2013b) also found an inverse relationship between the age of household head and household poverty in Nigeria.

Marital status

Waite and Gallagher (2000) argued that marriage produces a range of benefits to the couples which offset poverty tendencies in households. To them, marriage brings an additional earner to the household from the economics perspectives. Coulombe and Wodon (2007) found that household heads who are separated (Divorced or widowed) are poorer compared to those who are single in Ghana. Whereas Anyanwu (2013) in Nigeria found that the odds of a household head becoming poor is larger among single parents compared to those who are married.

Sex of household head

Anyanwu and Erhijakpor (2010) argued that women are more amenable to poverty due to having lower levels of education, limited opportunities to own assets compared to their male counterparts, and are usually victims of labour market

discrimination compared to their male counterparts. According to Horrell and Krishnan (2007) the situations that trigger female-headed households further impoverish such households: For instance, female-headed households result from widowhood, divorced and even in cases when the male head of household is critical.

Ownership of bank account

Chibba (2009) argues that financial inclusion promotes inclusive development which has the poverty-reducing effect on households. Park and Mercado (2015) further argued that financial inclusion provides access for financing which enables households to make longer-term consumption and investment decisions to improve their living conditions. Annim (2018) found that Microfinance has a poverty reducing effect on beneficiary households compared to non-beneficiary households in Ghana.

Household size

Different households have different needs due to size and the composition of the household. The rationale is that households with larger family sizes are likely to have more extensive needs that may not be fully satisfied compared to households with smaller family sizes. In the literature, several studies have shown a positive relationship between household size and poverty (Lanjouw & Ravallion, 1995; Székely, 1998).

Dependency

Sinnathurai (2013) argued that average dependency ratio in developing countries is high due to high population rates. However, labour productivity is also low in these countries due to inadequate nutritional food, health and education. In

this kind of context, when the dependency ratio increases in a family, household poverty also increases. Fry and Mason (1982) also argued that dependents especially children in the household generally increases the consumption necessities of the households. He further added that high rates of youth dependency could deplete household financial assets and make such household vulnerable to worsen poverty levels. Though the preceding strongly suggests a positive relationship between household poverty and dependency, the effect on poverty in this model is taken to be either positive or negative since the actual effect on poverty depends on the labour productivity of the working age population in the household and the consumption necessities of dependants or children. The study by Baiyegunhi and Fraser (2010) in South Africa found the relationship between dependency ratio and poverty to be positive.

Government Social health insurance

According to ILO (2000), social insurance involves individuals pooling resources together through contribution to either the state or private organisations against life contingencies so that in case they suffer a shock or a sudden change in their circumstances; they can still smoothen their consumption by receiving financial benefits. Mathers and Slater (2014) and the ILO (2000) argue that social insurance influences household welfare which has poverty-reducing effects. Hamid, Roberts and Mosley (2011) found in rural India that micro health insurance has a positive effect on household food sufficiency.

Child deprivation poverty: assessment of rural-urban catch up in Ghana

Gordon et al. (2003) used the Bristol Approach to produce the first empirical study on child poverty in developing countries. The indicators used for the analyses are food, water, sanitation, health, education and essential services. They employed the Multiple Indicator Cluster Survey (MICS) and GDHS. Absolute poverty is defined as the proportion of children with at least two severe deprivations in at least two deprivations. The study concluded that South Asia and Sub-Saharan Africa have severe deprivation rates of over 80 per cent.

Nandy and Gordon (2009) later used the Bristol Approach to assess the living situation of children in developing countries using MICS 2005 and 2006. Their findings indicate that East Africa and Middle Africa were worse off in the deprivation in water, and children living on their own are most deprived in shelter. UNICEF (2011) used the Bristol Approach in nutrition, health, child protection and social protection to examine child deprivation poverty in seven countries in East Asia and the Pacific.

Methodology-wise, the Bristol Approach belongs to the counting tradition of poverty measures. The drawback of the headcount is that it does not account for the average intensity of deprivation, much less for depth or severity. In addition, the headcount provides no incentive for policymakers to prioritise the poorest children of all (Alkire & Santos, 2014; Delamonica & Minujin, 2007). This culminated to the adoption of the MPI by Alkire and Foster (2007) into child poverty estimates on the basis that the MPI transcends headcount to address the intensity of poverty.

The first implementation of the Alkire-Foster methodology to child poverty measurement was undertaken by Alkire and Roche (2009) using MICS data from Bangladesh. Another notable study was conducted by Apablaza and Yalonetzky (2011). However, the MPI is criticised for its failure to cater for the overlapping deprivation that children experience (De Neubourg et al., 2013). This is unfortunate because Minujin (2006) noted that the deprivations that children experience are interrelated. According to De Neubourg et al. (2013), the MODA approach provides a middle ground by building on the Bristol Approach and incorporating the overlapping deprivation analyses component into the MPI.

De Milliano and Plavgo (2014) analyse multidimensional child deprivation across thirty countries in sub-Saharan Africa using the Multiple Overlapping Deprivation Analysis (MODA). The study employed the MICS data and the DHS . The general findings indicate that 67% of all the children in the thirty countries used for the analyses are deprived in at least two dimensions of deprivations crucial for their survival and development. Though the study is elaborate, the assignment purpose was arriving at the Sub-Saharan Africa averages, hence country specific averages and standards were not taken into consideration.

In the context of country-specific studies on Ghana, Mba, Kwankye, Badasuu, Ahiadeke and Anarfi (2009) provide a detailed analysis of the degree, distribution and causes of child poverty and disparity in Ghana using the Bristol Approach. However, by using the Bristol method, the study could not provide information on the intensity and the overlapping deprivations experienced by children.

Recently, UNICEF Ghana (2015) used a money-metric approach to estimate the incidence and extreme child poverty from the perspective of consumption expenditure. The region with the highest incidence and extreme child consumption expenditure poverty was the Upper West Region. Using the findings from UNICEF Ghana (2015), 41.8 per cent of poor children are in the rural areas of Ghana while 13.1 per cent is in the urban areas. However, between 2006 and 2013, the proportion of children living in poor households decreased by six (6) percentage points in the rural area compared to a relatively low reduction of 1.2 percentage points in the urban areas. This finding appears to suggest a potential rural urban catch-up in child deprivation poverty which warrants further investigation.

However, given the appreciable acknowledgement in the literature, that poverty transcends monetary measures in income or consumption expenditure (Alkire & Foster, 2007; Minujin et al., 2006; Townsend, 1979), the current results do not suffice in themselves. Also, the monetary approach erroneously wrongly assumes that all the dimensions for meeting the basic needs or the rights of children can be purchased on the markets with their respective prices (Bourguignon & Chakravarty, 2003c; Tsui, 2002).

Kofinti and Annim (2016) used the dominance approach to assess child deprivation and income poverty using the 2006 and 2013 Ghana Living Standards Survey. The results revealed the poorest region to be Volta region. The finding also indicated that children were most deprived in sanitation compared to the remaining deprivation indicators. However, the study neither incorporates a life cycle

approach into its analyses by concentrating only on children of school going age (7 to 17 years) nor proffered any information on the overlapping deprivations experienced by children.

Chapter Summary

The chapter reviewed the theoretical and the empirical strands of literature related to the study. The theoretical literature centred on the following themes; theories that underlie the conceptualisation and the measurement of poverty; the theory of stochastic dominance and poverty; social protection and poverty nexus; the theory of demand health insurance; the theories underlying the conceptualisation of child poverty and its determinants. The empirical literature reviewed empirical works from the global context to the specific setting of Ghana and Kenya for the first empirical chapter. For the subsequent empirical chapters, the specific context was on Ghana.

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter presents the procedures that were employed to meet the objectives of the thesis. The organisation of the chapter follows a series of presentation. The next section presents the research design followed by the description of the data sources. The subsequent three subsections present the objectives, theoretical framework, model specification and estimation techniques for the three empirical chapters of the study. The procedures for post-estimation diagnostics followed.

Research Design

In order to understand how the real world operates warrants the adoption of a specific research paradigm. Research paradigm entails four main components, namely ontology, epistemology, methodology and methods (Bryman, 2016; Guba & Lincoln, 1994; Scotland, 2012). Whereas Ontology concerns itself with the constituents of reality (Crotty, 1998), epistemology focuses mainly on the process of knowledge creation, acquisition and communication (Cohen, 2007). Every paradigm is therefore based on its own ontological and epistemological views with different assumptions of reality and knowledge underlying a research process. These processes and procedures are reflected in their choice of methodology and methods (Scotland, 2012).

Two overarching paradigms generally guide researchers in social science. These are the positivists and the constructivist (Guba & Lincoln, 1994). These two research paradigms have both ontological and epistemological considerations. The ontological position of positivism emanates from realism, whereas its epistemology is objectivism (Cohen, 2007; Crotty, 1998; Frowe, 2001; Pring, 2004). Realism holds the view that objects of research can exist independent of the researcher, and human senses cannot mediate that reality. Objectivism connotes to the impartial discovery of absolute knowledge from objective reality. The positivist's philosophy also attempts to identify cause and effect relationship between phenomena through a deductive approach. This is aimed at theory formulation and generalisation (Creswell, 2009). Consequently, the methodological consideration of the positivist's paradigm favours the use of quantitative approaches to research.

Constructivism, on the other hand, has ontological position rooted in relativism. Relativism views reality from a subjective perspective and argues that reality differs from one person to the other (Guba & Lincoln, 1994). This paradigm further argues that the realities of researchers are mediated by their senses, in the absence of which the world is meaningless (Crotty, 1998). The constructivism epistemology is that of subjectivism which is based on the argument that the existence of the world is not independent of the knowledge of the researcher. Consequently, this paradigm builds human perception and experience into the research processes and favours the qualitative approach to social science research unlike that of the positivist approach.

Besides the two mainstream paradigms, is the middle position which combines the positivists and the constructivists ontological and epistemological beliefs with the claim of providing a holistic investigation encompassing both objective facts and experiential knowledge. This approach is mostly known as the mixed method of research. Consequently, the mixed approach employs both the quantitative and the qualitative approaches to research.

Economist has a long history of analysing economic phenomena primarily from the perspective of the positivist's paradigm (Schumpeter, 1933). This notwithstanding, the choice of research design directly emanates from the problem and purpose of a study. After given careful considerations to the objectives, the study adopts the positivist's philosophy within the framework of welfare economics. This is because the study seeks to contribute to knowledge from an objective perspective by building on existing knowledge on poverty and deprivation measures using quantitative methods and, examining relationships objectively.

Description of Data Sources

Data for the study was sourced from three main national surveys, namely the GDHS, the Kenya Demographic and Health Survey (KDHS), and the Ghana Living Standards Survey (GLSS). Regarding specific deployment, the first empirical chapter used the last five rounds of both the GDHS and the KDHS with the focus group being Ghanaian and Kenyan households. The second empirical chapter used both the last five rounds of GDHS and four rounds of GLSS (2 to 6)

with the focus group being households in Ghana. The third empirical chapter used the last three rounds of the GDHS with the unit of observation being children under-five and those aged from 6 to 17 years. The next sections isolate the mentioned data sources individually to proffer a detailed information on each.

Data for the first empirical chapter

Demographic and Health Surveys (DHS) are nationally representative household surveys that provide data on a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition. In the context of Ghana, the GDHS is a national survey that collects information on health and population trends of women and children in Ghana. Over the years, the data received technical assistance from MEASURE DHS and ICF Macro International and is mainly funded by the United States Agency for International Development. The first round of the GDHS was conducted in 1988. Six rounds of the GDHS are carried out ever since with the second, third, fourth, fifth, and sixth rounds conducted in 1993, 1998, 2003, 2008 and 2014 respectively.

However, the study focuses on the last five rounds of the GDHS to engender comparison from the early 1990s to the current round. The target group for the study is on households. In 1993, data was collected on 5,822 households, whereas the sample increased to 6,003 households in 1998. The subsequent three rounds from 2003, 2008 and 2014 registered data collected from 6,251, 11,778 and 11,835 households from all the ten administrative regions of the country respectively. However, the actual samples used for the analysis in the first empirical chapter are

5,278, 5,952, 6,195, 11,717 and 11,829 in 1993,1998, 2003,2008 and 2014 respectively.

In the case of Kenya, the KDHS collects information on nationally representative samples of household, women aged 15 to 49 and their children. The first round of the KDHS was conducted in 1988, just as in the case of Ghana. Over time, six rounds of the KDHS have been conducted in total, with the second, third, fourth, fifth, and sixth rounds conducted in 1993, 1998, 2003, 2008 and 2014 respectively. However, the current study focuses on the last five rounds of the KDHS with the target being the households. The five surveys are comparable with a slight variation. The 1993 KDHS collected information on 7950 households, whereas the 1998 KDHS collected information from 8,380 households. However, the 1993 and 1998 data covered all regions of Kenya except North Eastern province. The 2003, 2008 and 2014 KDHS collected information from 8,561, 9,057, 36,430 households from the entire regions of Kenya respectively. However, the actual data used for the first empirical chapters of the study after accounting for missing values in the five dimensions of deprivation are 7,500, 8,380, 8,561, 9,057 and 36,430 households respectively.

Data for the second empirical chapter

The second empirical chapter used two main data sets to meet the objectives of the chapter. These are GLSS and the GDHS. These two data sets are used to conduct sensitivity analyses across poverty measures. In addition, the 2014 GDHS

was used to examine the impact of NHIS on household deprivation poverty. The subsequent section presents the needed details on the two data sets.

The study employed the GLSS as one of the data sources for the second empirical chapter. The GLSS is a nationwide survey carried out by the GSS and receives financial support and technical assistance from institutions and organisations such as the Government of Ghana, the United Kingdom Department For International Development, UNICEF, UNDP, ILO and the World Bank. The first round of the GLSS was conducted in 1987-88, and as at 2013, six rounds have been conducted, with the second, third, fourth, fifth and sixth rounds conducted in 1988-99, 1991-92, 1998-99 2005-06 and 2012-2013 respectively. The two central objectives of the GLSS among the many objectives are to monitor the living conditions of Ghanaians and to provide information for updating the country's national accounts. As stated by GSS (2014), the GLSS has emerged as one of the essential tools in the welfare monitoring system along the lines of other surveys like the Core Welfare Indicators Questionnaire and the GDHS to provide a wealth of information for understanding living conditions of Ghanaians. Unlike the GDHS, the GLSS has information on money-metric indicators of welfare in consumption expenditure and household income.

The chapter focuses on the last four rounds of the GLSS (3, 4,5 & 6), and the target groups are households. The analyses employed three main aggregate GLSS files, namely the poverty, household and individual member files in each of the four rounds of the GLSS. From these files, the third, fourth, fifth and sixth GLSS have information on 4523, 5998, 8687 and 16772 households and all the household

samples were used for the sensitivity analyses from the perspective of consumption expenditure poverty. In the case of income poverty sensitivity analyses, the samples were the same as that of the consumption expenditure except for the sixth round where the sample households for the analyses decreased to 16549 because 223 households registered zero income.

The data description and the sampling procedure of the GDHS data have been described earlier in this chapter. Hence, this section focuses on the specific data samples for the analyses of the two deprivation measures, namely the Multidimensional Poverty Index, and the Asset Index. The unit of observation for the Analyses of the MPI is that of households using the last five rounds of the GDHS (1993,1998, 2003, 2008 and 2014). The 1993, 1998, 2003, 2008 and 2014 GDHS collected information on 5822, 6003, 6251, 11,778 and 11,835 households respectively. However, after managing the data and accounting for missing observations in the dimensions of deprivation employed, the MPI analyses used 5794, 5940, 6205, 11733 and 11829 households for the actual analyses. In the case of the asset deprivation, the respective samples used for the analyses are 5822, 6003, 6250, 11778, and 11,835.

This aspect of the second empirical chapter used the GDHS to examine the impact of government social intervention on household deprivation poverty using the 2014 GDHS. The analyses used four files to arrive at the final sample. These are the household and member recode, the women file (individual recode) and the men recode. The household recode, and member file contains information on 11835 households, whereas the individual recode (women's file) has information on 2038

households and that of the men's recode has information on 2923 households. Merging the household file with the women recode (2923 households) and men recode (2038 households) resulted in a total household sample of 4961 for the analyses. However, further data cleaning for the regression analyses reduced the sample size to 4018 households.

Data for the third empirical chapter

The sources of data for the third empirical chapter are the last three rounds of the GDHS and the 2012/2013 GLSS. The GDHS is used for the child deprivation analyses, whereas that of the GLSS is used for child income poverty. For the under-fives, 3,370, 2,670 and 2,717 are in the 2003, 2008 and 2014 GDHS, however after managing the data and accounting for missing observations in each of the six dimensions of deprivation considered, the actual samples used for the deprivation analyses were 2,629, 2018, and 2107 respectively. Concerning the children aged from 6 to 17 years, 9299, 15637, and 14590 are in the 2003, 2008 and 2014 GDHS; however, the actual sample size used for the analyses after accounting for missing observations in each of the six deprivation dimensions are 7,279, 14,462 and 13,332

Regarding the child income poverty, the GLSS was used for the two groups of children. For the under-fives, there were 9,481 in the 2013 GLSS, out of which 9,409 of them living in 6,645 households were used for the analyses. For the children aged from 6 to 17 years, 22,457 of them were in the 2013 GLSS residing in 9,777 households.

Theoretical Frameworks and Data Analyses Procedure

The subsequent sections present the theoretical frameworks and the data analyses procedures for each of the three empirical chapters. For each of the chapters, the section presented the model specification, estimation technique, definition of variables, measurements of variables, and a priori expectations where necessary.

Spatial and temporal analyses of household poverty in Ghana and Kenya

This is the first empirical chapter of the study. As a recap, this empirical chapter seeks to meet two main objectives. The first is to examine the gains in welfare in Ghana and Kenya over time. The second objective, on the other hand, seeks to determine the spatial household deprivation poverty across the geographical groupings of Ghana and Kenya.

Multidimensional FOD analytical framework

The multidimensional FOD is based on the works by (Lehmann, 1955; Strassen, 1965). Suppose that f and g denote multidimensional probability mass functions over a finite subset:

Then, f FODs g if one of the following three equivalent properties hold:

(a) g can be obtained from f by a sequence of probability mass transfers of density from a preferred to a less desirables outcomes

(b) Social welfare is at least as high for f as for g for any nondecreasing additively separable social welfare function such that $\sum_{x\in X} f(x)\, w(x) \geq \sum_{x\in X} g(x)\, w(x)$ for any nondecreasing real function w;

(c) $F(X) \leq G(x)$ for all x in X, where $F(\cdot)$ and $G(\cdot)$ are cumulative distribution functions corresponding to f and g.

To conduct an empirical work, it is critical to determine most efficiently whether one distribution dominates another. Among the properties of the multidimensional FOD specified above, the most efficient and intuitive property according to Arndt et al. (2012) is the condition (a). Arndt et al. explain that whenever, the condition (a) holds between any two population distributions; the dominating population is unambiguously better than the other. Property (c) on the other hand can be used to check dominance by directly comparing all the inequalities in distribution. However, this is generally an inefficient method, since the number of social welfare inequalities to be checked becomes more demanding in a multidimensional setting. For property (b), Fishburn and Lavalle (1995) project that an algorithm can be used to find the maximum flow of probability distributions in a well-defined network in order to determine dominance. However, till now such algorithm is yet to be operational. In contrast, Mosler and Scarcini (1991), and Dyckerhoff and Mosler (1997) show from the property (a) that FOD corresponds to a linear programmes that can be verified using a CONOPT solver in General Algebraic Modelling System.

Empirical linear programme illustration

Define binary indices i, j, k, l, m which can take the value 0 or 1. The value 0 refers to deprived and the value one (1) not deprived for the five (5) welfare indicators.

Define binary indices $i'j'k'l'm'$, which are aliases of i, j, k, l and m respectively.

For two populations A and B, let a_{ijklm} and b_{ijklm} be the share of the respective populations corresponding to the state of deprived and not deprived of the five welfare indicators. For example, a_{11111} is the share of population A not deprived in any dimension. Likewise, b_{00000} is the share of population B deprived in all dimensions.

Define the variable $x_{ijklm,i'j'k'l'm'}$ which represents the transfer of probability mass from the outcome $(ijklm)$ to the outcome $(i'j'k'l'm')$.

Define Z as the set of source-destination pairs $(ijklm, i'j'k'l'm')$ that move probability from preferred to less preferred outcomes. For example, if outcome $(ijklm)$ is the source of the transfer and outcome$(i'j'k'l'm')$ is the destination, a legal transfer is where $(i'j'k'l'm') \leq (ijklm)$ correspondingly. For example, (11111, 01111) is an element of Z since the source (11111) is better than the destination (01111), hence a legal transfer can occur between these two pairs to determine dominance. However, the same cannot be said of the pair (00001, 01111), thereby making it not an element of Z since a legal probability mass transfer is not possible between the source and the destination.

Given all the above conditions, population A FOD population B if and only if the following linear programme is feasible.

$Min\ y = 1$ subject to

$$a_{ijklm} + \sum_{(i'j'k'l'm',ijklm)\in z} x_{i'j'k'l'm',i,j,k,l,m} -$$

$$\sum_{(ijklm,i'j'k'l'm')\in} x_{ijklm} = b_{ijklm} \quad \forall\, i,j,k,l,m \qquad (1)$$

Where $x_{ijklm,i'j'k'l'm'} \geq 0, \quad x_{ijklm,ijklm} = 0$

The conclusion is that if the linear programme has a feasible solution, then population A dominates population B in the static case (since the comparison is made once with the comparator populations). In other words, the static case corresponds to the situation whereby the welfare comparison of population A and B are made over iteration zero (0). However, in order for the approach to mitigate the possibility of indeterminate results of dominance, 100 bootstrap replicates were applied to the comparator populations in order to engender a cardinal measure of dominance. Hence, the final output can be empirically interpreted as the probability that a population dominates the other and vice versa.

The analyses captured the spatial and temporal welfare dominations for geographical groupings in Ghana and Kenya. Temporal analyses entail domination of one-time period over another in the same population. The temporal FOD outcomes will provide three empirical outcomes; (1) Positive probabilities indicating gains over time (2) negative probabilities indicating regression over time; and (3) a blank cell signalling neither gains nor regression over time.

Choice of welfare indicators

As the literature review indicated, various broad dimensions can be used to reflect poverty from the narrow perspective of monetary indicators to broader and complex perspectives of household capabilities. Several reasons can be advanced in the choice of indicators for a multidimensional poverty assessment. However, Sen (2004) cautioned that the underlying factors must consider the specific context of the populations (society) under consideration. Alkire and Foster (2011) also

added that the selection of such indicators should be in line with internationally accepted criteria and other empirical studies on non-monetary poverty.

Further, Ajakaiye et al. (2014) suggested that indicators should be in line with the HDIs as well as relevant measurement indicators that feed into global development goals such as the SDGs. Furthermore, in practice, the choice of appropriate indicators is further influenced by the availability of data and the purpose of the assignment. This chapter used the capability approach alongside the considerations mentioned above to select five indicators of household welfare to access the spatial and temporal analyses of household poverty in Ghana and Kenya.

The five indicators of welfare and their threshold are defined as:

Water: A household is not severely deprived of water if the main household water source for drinking is piped water, borehole, protected well water or rainwater. This indicator of household welfare is reflected in Target 6.1 of the SDG and is under the monitoring of the WHO/UNICEF Joint Monitoring Programme (JMP) of water and sanitation. Several existing studies have used this dimension of welfare in multidimensional poverty assessment (Ajakaiye et al., 2014; Appiah-Kubi, 2004; Arndt, Leyaro, & Mahrt, 2014b; Nanivazo, 2013).

Sanitation: A household is not severely deprived of sanitation if the household has access to a flush toilet, an improved ventilated pit latrine, or a composting toilet. The choice of the sanitation indicator is based on its inclusion in the Target 6.2 of the SDG, and as in the case of drinking water, improved sanitation is under the monitoring of WHO/UNICEF Joint Monitoring Programme (JMP) of water and

sanitation. Some of the existing studies that employed this indicator to assess the welfare of households are (Ajakaiye et al., 2014; Nanivazo, 2013).

***Education*:** A household is not severely deprived of education if the household head has at least a basic level of education. Education has been integral in measuring the HDI advanced by the UN since 1990. The essence of this indicator of welfare is reflected in Target 4.1 of the SDG. Some existing studies that employed this indicator of household welfare are Anand and Sen (1997), and Arndt et al.(2014).

Shelter: A household is not severely deprived of shelter if the floor material of the house is made of a material other than earth/mud. The inclusion of this indicator of household welfare aligns with the UN (1995) definition of absolute poverty which includes shelter as a basic human need of individuals and households. Based on the definition of poverty, the Townsend Centre for International Poverty Research at Bristol University, United Kingdom, provided the list of deprivations known as the Bristol Indicators of which deprivation status in the shelter was defined. Some of the existing studies that used this indicator of welfare are Gordon et al. (2003), Arndt et al. (2012) and Alkire and Foster (2011).

***Information**:* A household is not severely deprived of information if the household belongs to a household that owns either a television or a radio. Deprivation in information is also based on the Bristol Indicators of deprivations. Existing studies that used deprivation in information to measure household welfare are many but not limited to Gordon et al. (2003), Alkire and Foster (2011), and Sahn and Stifel (2003).

Justifying the choice of Ghana and Kenya for the first empirical chapter

Ghana and Kenya are used only for the first empirical chapter. Their choice for the first empirical chapter is not arbitrarily. The first reason as suggested in the background is that the poverty situation of the two countries mimics that of the global pattern of poverty: (1) disparities in the case of Ghana, and; (2) levels as in the case of Kenya. However, the poverty assessment of both countries is primarily that of the money-metric approach. Besides the preceding assignment purpose, the two countries appear to share some common traits.

Historically, both countries are British Colonies and were among the countries in Africa to attain independence before 1970. Their road to independence was marked by struggle and resisting their colonial masters. Politically, both countries have multi-party democracy spanning over two decades, which is supported by their respective constitutions. Indeed, both countries reverted to consistent presidential elections from the year 1992 (Havinden & Meredith, 2002; Miller, Vandome, & McBrewster, 2009).

The economic histories of Ghana and Kenya also have much in common. In the decade of the eighties, both countries launched an ambitious set of reforms that were intended to reverse the deterioration and mismanagement in their economies since 1970 through the support of the IMF, the World Bank, and other donors. During this period, Ghana implemented its Economic Recovery Programme (1983-86) with impressive achievements as growth resumed in the economy. Later, to consolidate growth and overcome structural deficiencies, the

structural adjustment programme was carried out during 1987-88(World Bank, 1989).

In Kenya, the first economic reform also began in 1980 under the programme 'Structural Adjustment Loan with the World Bank' spanning between 1980 to 1984. This adjustment was intended to supplant the country's post-colonial import substitution policies with liberal trade and interest regimes via outward-looking, export-oriented programmes. However, commitment and compliance were limited to the group of only elite civil servants (Swamy, 1994). Consequently, Kenya's trade liberalisation could not translate into sustained growth, modest employment opportunities and reduce the incidence of poverty and inequality (Gertz, 2008). Against this background and with pressure from donors, Kenya implemented its second structural adjustment programme between 1985 to 1991. The second was based on broader consensus and intensification of trade liberalisation. For example, essential restrictions were shifted from quotas to tariffs, and to even decreases in tariff levels. However, the required commitment was again missing in the second implementation. Hence, the desired outcomes were not achieved in Kenya (Swamy, 1994).

Concerning the economic status of both countries, the World Bank has reclassified the two countries as lower Middle-Income countries from low middle-income countries. Further, the structure of both economies and their current account appear to be similar between the period used for the study, 1990 and 2016 as shown by Figure 3. From the figure, the left hand panel shows the economic structure and the right hand panel depicts the current account structure of the two

countries. The service sector contributes the highest to the GDP of both countries: 47 per cent for Kenya and 38 per cent for Ghana. The second highest contributing sector to the economy in both countries is the agricultural sector.

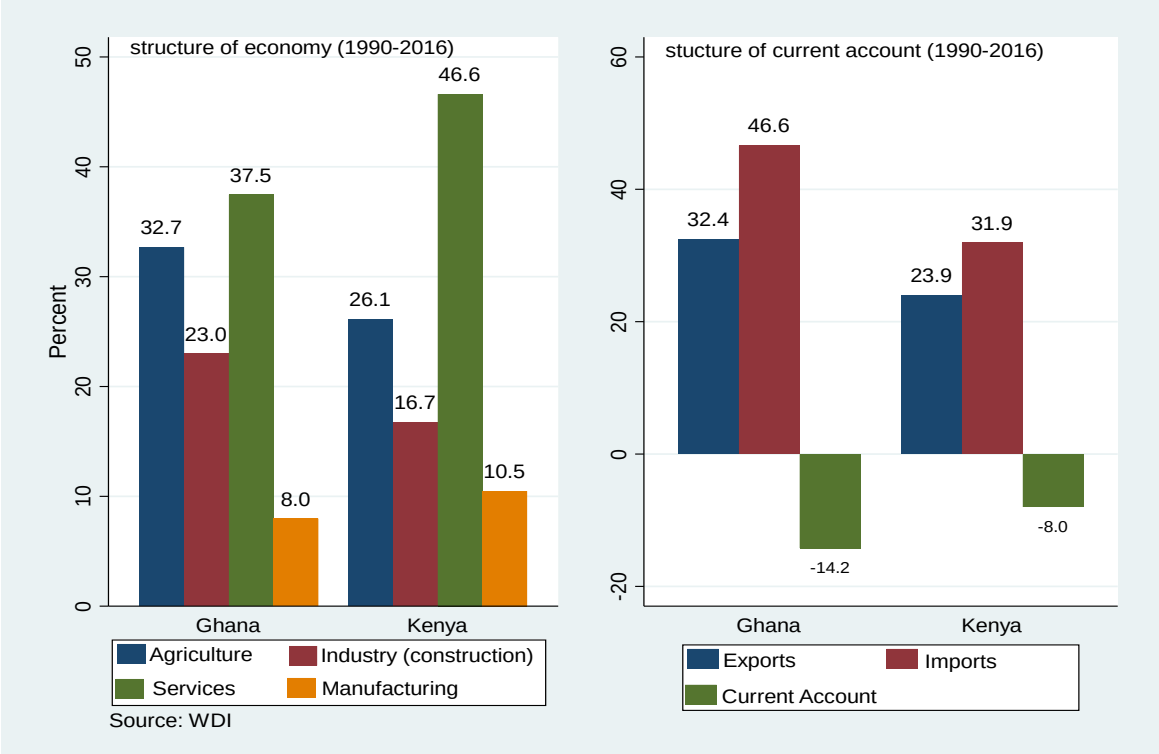

Figure 3: Structure of the economy and current account

Source: Author, 2019

However, the manufacturing sector registered the lowest contribution to the GDP in both countries of eight (8) per cent and 10.5 per cent for Ghana and Kenya respectively. On the other hand, the right-hand panel shows the structure of the current account position of the two countries between 1990 and 2016. The structure inherently evokes similarity with imports of goods and services in both countries absorbing a higher proportion of the GDP, compared to the contribution of export in the two countries. Both countries consequently recorded a current account deficit between the period considered for the current study.

Furthermore, Figure 4 shows the trend of average annual GDP growth rate between the two countries. The figure depicted identical troughs in 1992, 1997, 2000, 2002 and 2008/2009 between the two countries. At the same time, identical spikes are discernible in 1995 and 2010/2011 periods. The fluctuations in the Per Capita annual growth rate are also like the case of the annual GDP growth rate. This situation is also depicted in Figure 5.

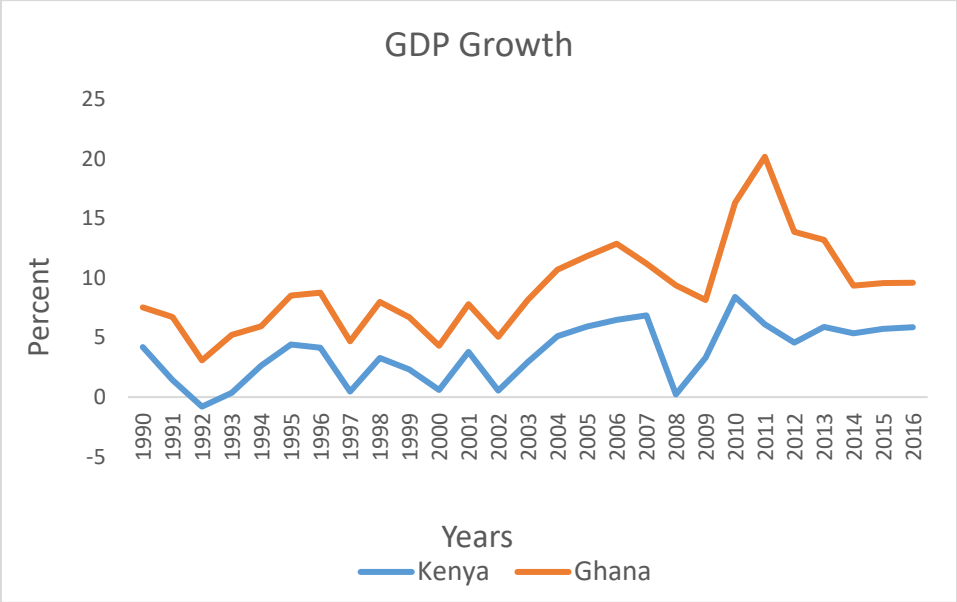

Figure 4: Trend of annual growth rate in GDP between 1990 and 2016

Source: Author, 2019

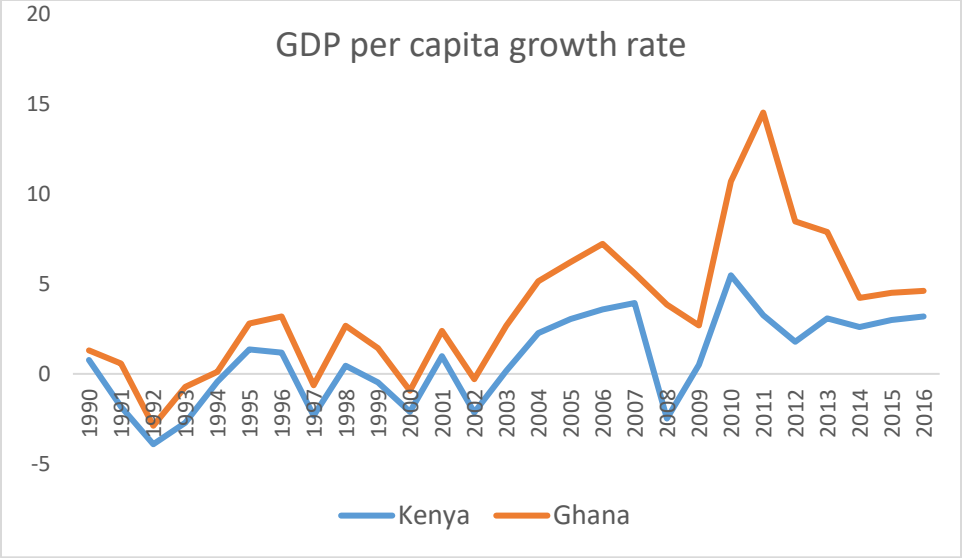

Figure 5: Trend of annual per capita growth rate in GDP between 1990 and 2016

Source: Author, 2019

Poverty methods, deprivation measures and social protection in Ghana

As a recap, the second empirical chapter has two main objectives. The first objective seeks to conduct sensitivity analyses between poverty methods (consumption expenditure and income poverty) and deprivation measures [MPI & Asset index). The second objective examined the impact of NHIS on deprivation poverty in Ghana.

Money-metric poverty measure

The analytical framework for the analyses of the money-metric poverty measures and the corresponding sensitivity analyses follow that of the GSS. The construction of the standard of living measured by the GSS considers differences in the cost of living across the ten administrative regions, and the differences in household size and composition. The household composition reflects the different

calorie requirements. The conventional money-metric indicator commonly used is that of consumption expenditure which is the sum of the food and non-food consumption expenditure.

The total consumption expenditure is divided by the number of adult equivalents in the household to arrive at the standard of living measure. Over the years, adjustments have been made to the consumption aggregates to reflect the variations in the consumption patterns. Such adjustment is necessary to allow for direct comparison between the surveys over time. Further, two nutritionally-based poverty lines are applied to the standard of living measure to reflect the two main poverty analyses of the country, the lower and the upper poverty lines. The former reflects the amount needed by a household to meet the nutritional requirements of household members. Individuals whose total expenditure falls below the lower poverty line are taken to be in extreme poverty. Extreme poverty is characterised by the inability to meet the minimum nutrition requirement even if the entire budget of the household is allocated to food. The latter line focuses on what is needed to meet both essential food and non-food consumption. Individuals consuming below the upper poverty line are meeting their basic food requirement, but not basic non-food needs. This is usually known as the incidence or the poverty headcount.

Over the years, different lower and upper poverty lines have been used by the GSS. Table 1 shows the poverty line from the 1992 GLSS to the 2013 round.

Table 1: *Poverty Lines in Ghana*

Survey Year	Upper Poverty line	Lower Poverty line
1992/1993	90	70
1998/1999	90	70
2005/2006	90	70
2012/2013	1314	792.05

Source: GSS (2007,2014)

As per convention, poverty estimates using the poverty lines in Table 1 have been conducted using the standard Foster, Greer and Thorbecke (FGT) poverty indices. The FGT index is calculated as:

$$P^{\alpha} = \frac{\sum_{i=1}^{n}\left(1-\frac{Y_i}{z}\right)^{\alpha}}{N} I(Y_i \leq z), \alpha = 0,1,2 \quad (2)$$

Where Y_i is the real consumption expenditure or income, z is the poverty line, N is the number of households, and $I(.)$ is an indicator function taking the value one (1) if households are below the poverty line and zero otherwise. Whereas α denotes the poverty aversion parameter. The above details are used to conduct sensitivity analyses of the poverty estimates to decomposition of consumption expenditure into food and non-food expenditure, choice of standard of living measure (consumption expenditure and household income), the World Bank new poverty line for Middle Lower Income Countries (MLIC) of $3.20.

The multidimensional poverty indices

The MPI is an acute multi-dimensional poverty and reflects deprivation in elementary human capabilities (Alkire & Santos, 2014). The MPI identifies each person/household as deprived or not deprived using any available information for household members. The MPI then aggregates across all poor people. The MPI uses

three main dimensions of deprivation in its analyses, namely health, education and standard of living. The mathematical frameworks for analysing the MPI poverty measures are presented as follows:

Notation:

Let $Y = [y_{ij}]$ denote $n \times d$ matrix of achievements where n represents the number of households, d is the number of dimensions, and $y_{ij} \geq 0$ is the achievement of household $i=(1,2,\ldots,n)$ in dimension $j=(1,2\ldots d)$. Each row vector $Y_{i\bullet}=(Y_{i1},Y_{i2},\ldots,Y_{id})$ lists a household's achievements, while each column vector $Y_{\bullet j}=(Y_{1j},Y_{2j},\ldots,Y_{id})$ gives the distribution of dimension j achievements across the set of households. Let $Zj > 0$ denotes the deprivation cutoff below which a household is considered to be deprived in dimension j, and let Z be the row vector of dimension specific cutoff.

Let w_j denote the weight of dimension j where $W_j = 1$.

Deprivation matrix

For a given matrix of achievements y, a matrix of deprivation $g^0 = [g_{ij}^0]$ Whose element is defined by $g_{ij}^0 = w_j$ when $y_{ij} = z_j$ while $g_{ij}^0 = 0$ otherwise. Hence g^0 is a $n \times d$ matrix whose ij^{th} entry is the weight for dimension j when household i is deprived in that dimension, and 0 otherwise according to each deprivation cutoff z. From this matrix, we can construct a column vector c of deprivations counts, whose i^{th} entry $c_i = [g_1^0]$ represent the number of deprivations suffered by household i.

Identification of the Poor Household (The Dual cutoff Approach)

The identification method is defined as $\rho k(y: z) = 1$ whenever $c_i \geq k$, and $p_k(y_i; z) = 0$ whenever $c_i \leq k$. Finally, the set of households who are multidimensional poor is defined as $z_{k=i:}\rho_k(y_i; z)$

The headcount ratio

$$H = q/n. \tag{3}$$

Where H is the percentage of children who are poor

Where $q = q(y; z)$ is the number of households in the set z_k as identified using the ρ_k.

Censored deprivation matrix:

Given the deprivation matrix g^0 and poverty cutoff k, a censored deprivation matrix $g^0(k) = [g_{ij}^0(k)]$ is defined whose typical element $g_{ij}^0(k) = w_j$ if $c_i \geq k$ and g_{ij}^0(k)=0 otherwise. In addition, a censored vector of deprivation counts $c_i(k) = c_i$ and if $c_i < k$, then $c_i(k) = 0$

Intensity of Poverty

$$A = \frac{|C(K)|}{q} \tag{4}$$

Where A is the average deprivations share across the poor.

Adjusted headcount ratio

This is the average of the censored deprivation matrix, so it is given by:

$$M_0 = HA \tag{5}$$

Censored headcount: This represents the proportion of deprived and poor people in dimension *j*

$$C_J = \frac{|g_j^0(k)|}{n} \quad (6)$$

Decomposability

In terms of dimensional decomposability, the contribution of each dimension *j* to M_0.

$$contrj = \frac{|g_j^0(k)|}{M_0} \quad (7)$$

Subgroup decomposability:

Decomposability across comparator populations

$$M_O = \sum_{i=1}^{m} v_e \, M_{0e} \quad (8)$$

Where $M_{o\epsilon}$ denotes the adjusted headcount and v_e is the population share of subgroup ϵ from the total of ϵ subgroups. The frameworks have been used to examine the multidimensional poverty index in Ghana using the last five rounds of the Ghana Demographic surveys.

Choice of dimensions and indicators for the MPI

The MPI has three standard dimensions of welfare in the literature, namely Education, Health and Living standards. These dimensions are based on the basic needs of households in the mentioned dimensions and draw heavily on the HDI proposed by Anand and Sen (1997). In addition, the choice of the indicators under the three broad dimensions is contingent upon the purpose of assignment and the availability of data. This study intends to conduct consistent estimates of MPI

between 1992 to 2014, hence indicators that are consistent across the five surveys are prioritised. Table 2 shows the dimensions and their indicators.

Table 2: *Dimensions and Indicators for MPI Scores*

Dimensions	Indicator	Deprivation status	Relative weight
Education	Years of Schooling	No household member aged ten (10) years or older have completed five years of schooling.	1/6
	Child School Attendance	Any school-aged child is not attending school up to the age at which he/she would complete Primary 6.	1/6
Health	Child Mortality	Any child has died in the household in the five years preceding the survey	1/6
	Child Undernutrition	Any child in the household is stunted	1/6
Living Standards	Electricity	The household has no electricity.	1/18
	Improved Sanitation	The household's sanitation facility is not improved	1/18
	Water	The household does not have access to improved drinking water and safe drinking water is at least 30-minutes walk from home,	1/18
	Information	The household does not own either a television or a radio	1/18
	Overcrowding	At least four household members are using a room for sleeping.	1/18

Source: Adapted from Alkire and Foster (2011)

Multiple correspondence analyses

The mathematical framework of the MCA is derived from the work of Greenacre (2006).

Notations

Let x_i, …, x_q be the categorical variables on N observations. For simplicity and generalizability. Assume H to be a binary indicator matrix. Assume further that x_J is coded with consecutive integers $11, \dots, n_j$ with a corresponding $H^{(j)}$ being the $N \times n_j$ binary indicator matrix associated with x_J as:

$$H_{ig}^{(j)} = 1 \ \ iff \ \ X_{ij} = c \tag{9}$$

Let $H = (H^{(1)}, H^{(2)}, \dots, H^{(q)})$

Equation (9) is the $N \times J$ indicator matrix of the set of categorical variables(x), where

$$J = n_1 + \cdots + n_q.$$

Where i denotes observations $1, \dots, N$, j denotes variables $1, \dots, q$, and g represents categories $1, \dots, n_j$, or $1, \dots, j$.

The $J \times J$, Burt Matrix is defined as

$$B = H'H \tag{10}$$

The diagonal entries of B associated with x_j and x_k emanates from the two-way tabulation of the two variables. $D(v)$ index diagonal matrix having elements of vector v on the diagonal and 0 off-diagonal.

Method and formula

Greenacre and Blasius (1994) stated the definition of the Burt Matrix of indicators as

$$H_{++} = \sum_{k=1}^{J} \sum_{g=1} H_{kh} \quad (11)$$

$$P = H/H_{++} \quad (12)$$

$$c = \sum_{k=1}^{j} P_k = P_+ = P'1, \quad (13)$$

$$S = D(u)^{-\frac{1}{2}}(P - uu')D(u)^{-1/2} \quad (14)$$

Where u is known as column mass, $D(u)$ is the diagonal matrix with diagonal u: $D(u)^{-1/2}$

$H \text{ and } S$ are symmetric.

The decomposition of S in equation (14), using correspondence analyses into eigen values are specified as:

as:

$$S = V\Phi V', \qquad \phi_1 \geq \emptyset_2 > \cdots \quad (15)$$

Thus $V_{kg} > 0$ for the first k for which $V_{kg} \neq 0$.

A standard column coordinate, R, in the Burt Approach takes into consideration the eigen values and the diagonal matrix with diagonal u as specified as:

$$R = D(u)^{-1}V \quad (16)$$

Where $D(u)$ is the diagonal matrix with elements $1/u_i$, with u_i being the elements of u.

Further, the unadjusted principal inertia is defined in the Burt Approach MCA as:

$$\lambda_t^{unadj} = \phi_i^2 \quad (17)$$

Whereas the adjusted principal inertial is defined as:

$$\lambda_i^{adj} = \left(\frac{q}{q-1}\right)^2 \left(\phi_t^2 - \frac{1}{q}\right)^2 \quad (18)$$

If $q\phi_t > 1$, the total adjusted inertia can be specified as:

$$Total = \left(\frac{q}{q-1}\right) \sum \phi_t^2 - \frac{(j-q)}{q^2} \quad (19)$$

Where q index the variables or the asset indicators, ϕ represent the eigen values, and the $j$also emanates from the $N \times n_j$ binary indicator matrix.

However, the standard coordinates defined in equation (19) are independent of the principal inertia from the perspectives of with or without adjustment.

Hence the principal coordinates Z are defined as:

$$Z = RD(\Lambda)^{1/2} \quad (20)$$

Where Λ consists of a vector of adjusted or unadjusted principal inertias and $D(\Lambda)^{1/2}$ is the diagonal matrix with entries $\lambda_t^{1/2}$ on its diagonals.

Choice of household asset indicators

The household asset indicators used to measure the asset deprivation poverty in this study are mainly guided by assets that can discriminate one household from the other in terms of their poverty situation. Other considerations include studies in the literature that employed various asset indicators in their poverty assessment and, finally consistent data availability across all the five rounds of the GDHS also guided the choice of indicators. The analyses were done using eight primary deprivation assets of the households as presented in Table 3.

Similar studies that used the mentioned indicators are Sahn and Stifel (2003), and Booysen et al. (2008).

Table 3: *Indicators of Asset Poverty*

Household Assets	Deprivation status
Television	The household does not own a television
Radio	The household does not own radio
Refrigerator	The household does not have a refrigerator
Electricity	The household is not connected to the national electricity grid
Pipe	The household does not have Pipe Water in dwelling
Car	The household head does not have a Car
Flush Toilet	The household does not have a flush toilet
Floored material	The household has earth or cow dung as floor material

Source: Author, 2019

Conceptual framework for NHIS and household deprivation poverty

This section is based on the works of Hamid et al.(2011), Bonilla-Garcia and Gruat (2003), and Mathers and Slates (2014). Their arguments for the potential impact of government social health insurance in the form of the NHIS on household deprivation poverty are depicted in Figure 6. The figure depicts two channels by which beneficiary households of NHIS will reduce household deprivations. The first channel postulates that beneficiary households may improve their health status through increased utilisation of formal health care and health care awareness. Improved health status potentially translates into higher productivity and labour supply, and workdays loss due to ill health are substantially reduced. Moreover, access to health insurance also reduces household health care expenditure.

Consequently, household income might either be enhanced above that of the subsistence or stabilised. Such households can therefore afford the necessities.

The second argument for the beneficiary households of NHIS is that such households directly impact the welfare of household members by protecting their assets and human capital after a shock. Shocks can manifest in different ways; however, this study assumes shocks in the form of ill-health. Such shocks to any member of a family may have a more significant adverse effect on poor households when the household and its members lack social protection in the form of health insurance. In the absence of such protections, the poor households are often the most vulnerable with their livelihood's conditions disrupted with the increasing cost of health care which weakens their ability to accumulate assets and increase productivity. However, beneficiary households of health insurance are protected from shocks in two ways. First, social protection instruments can prevent households from engaging in distress selling of productive assets after a sudden shock due to ill-health. Secondly, social health insurance instruments usually mitigate negative and harmful coping strategies such as resorting to eating once in a day (or not eating at all) and some cases withdrawing children from school which may result in depleting human capital in the household.

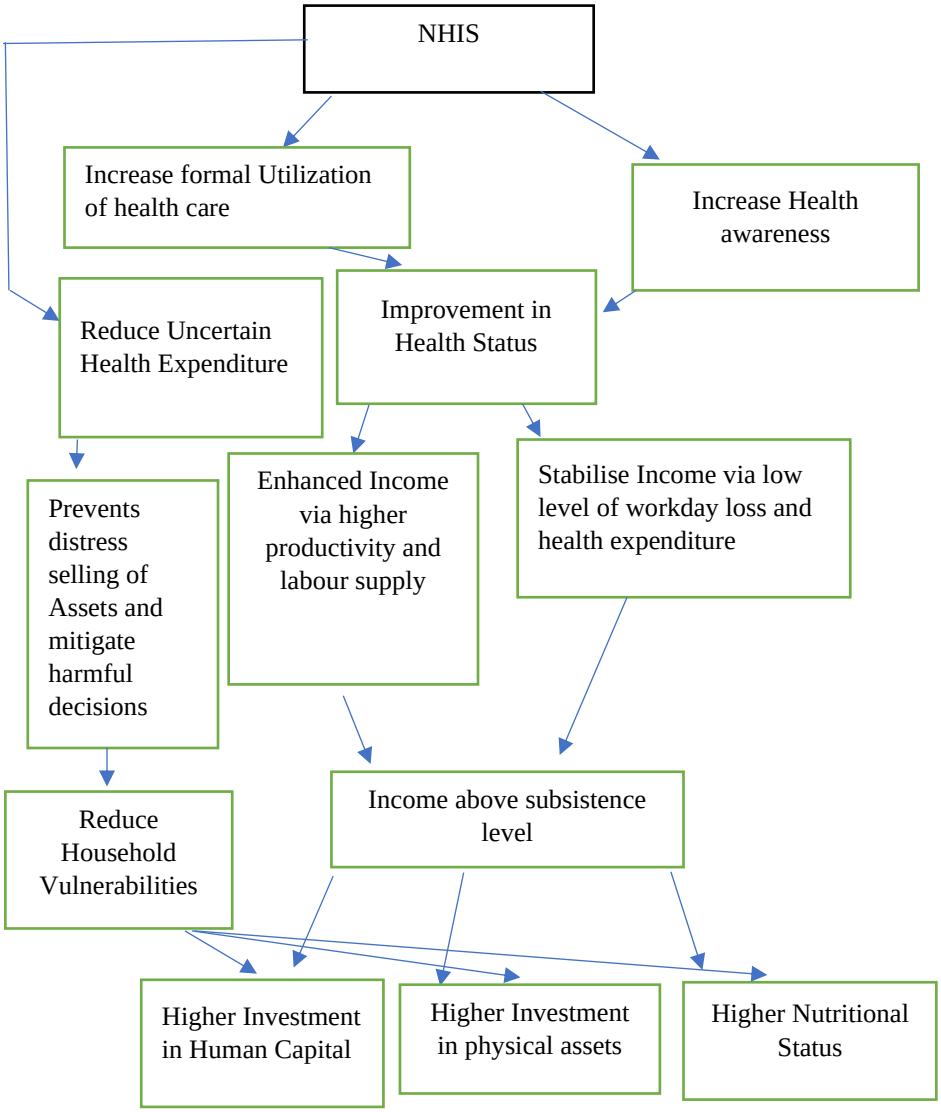

Figure 6 : Conceptual framework for NHIS and poverty

Source: Adapted from the works of Hamid et al. (2001), Bonilla-Garcia and Gruat (2003) and, Mathers and Slates (2014).

Theoretical model for the demand of NHIS

The theory for the demand of health insurance has its bases in expected utility theory. This is because buyers of an insurance scheme have the motive of reducing potential risks they may experience (Hamid et al., 2011). The expected utility theorem adapted for the current study emerged from the earlier works of

Bernoulli (1738) which was formally expounded by von Neumann and Morgenstern (2007).

To model household demand for health insurance, the study makes the following assumptions: Assume the probability that a household member will become ill is denoted by ℓ. Also, the household will spend π on medical care. Assume also that the household has another option to purchase full health insurance coverage index by, λ, for actuarially fair premium, priced at $P_h = \pi\ell$. These are the two choices available to the household. According to the expected utility theorem, the household will only choose full health insurance coverage based on a higher expected utility.

Assume further that before households choose between the two options, they are both faced with the utility of smoothening their level of disposable income:

$$U = U(Y) \tag{21}$$

Where Y denotes the disposable income of households.

The Expected Utility (EU) for households without insurance coverage is:

$$EU_0 = (1 - \ell)U(Y) + \ell U(Y - \pi) \tag{22}$$

The EU for the household with insurance, on the other hand, is specified as:

$$EU_1 = (1- \ell)U(Y - P_h) + \ell U(Y - \pi + \lambda - P_h) \tag{23}$$

According to von Neumann and Morgenstern (2007), utility maximising risk-averse household will purchase insurance if $EU_1 > EU_0$ given that the utility function satisfies the axioms of completeness, transitivity, continuity and independence. They stated that individuals/households that are risk-averse would demand health insurance aimed at protecting themselves from financial losses of

illness. However, Arrow (1963), Newhouse (1978), and Friedman and Savage (1948) argued that the demand for health insurance is not only peculiar to those who are risk-averse, but rather households prefer certain losses to uncertain losses of similar magnitude. Further, Nyman (2003) also contend that consumers of insurance do not necessarily need to be risk-averse because the demand for health insurance is driven by the access it provides to medical care. He added that the access to medical care provides more utility to consumers of health insurance than the premiums they pay.

From the equations (21), (22), (23), Besley (1989) has shown that the demand for health insurance can be modelled as:

$$H_D = H(\ell, \pi, P_h, Y, Z) \quad (24)$$

Where Z represents household characteristics such as the education of the household head and dependency ratio in the household including the degree of risk averseness of the household. To mitigate moral hazard tendencies from the model, equation (24) assumes that the price of health insurance (P_h) are based on actuarially fair premiums charged by the service providers

Empirical model specification

This section presents the empirical model for the impact of NHIS on household deprivation poverty in Ghana by specifying household demand function for NHIS from equation (24) as:

$$SI = H(\ell, \pi, P_h, Y;\ Z) \quad (25)$$

Where SI is the NHIS, ℓ is the probability that a household member will become ill, π is the magnitude of expenditure on medical care when sick, P_h is the price of

insurance, Y is the amount of available disposable income, and Z is the household characteristics.

$$Z = f(Educ, Rel, Occu, Ethn, Res, Reg, Age, Marr, Sex, Ob, Hhsize, Dep) \quad (26)$$

Substituting equation (26) into (25) gives:

$$SI = f(Educ, Rel, Occu, Ethn, Res, Reg, Age, Marr, Sex, Ob, Hhsize, Dep) \quad (27)$$

Equation (27) has an objective of determining the factors that will influence households demand for NHIS in Ghana. After a successful estimation of the equation at the first stage, the study will proceed to estimate the effect of NHIS on household deprivation poverty. Equation (28) is specified to estimate the impact of NHIS on household deprivation poverty in Ghana:

$$Pov = f(Educ, Rel, Occu, Ethn, Res, Reg, Age, Marr, Sex, Ob, Hhsize, SI,) \quad (28)$$

Due to the lack of data on the probability of a household member becoming sick, expenditure on medical care, price of insurance and amount of disposable income in the GDHS, the variables are normalised to one. Whereas it appears some studies substitute the income variable with the wealth index when employing the GDHS data, this is not ideal for the current study given that the dependent variable (MPI) used to measure household deprivation poverty in this study mimics some of the components used in estimating the wealth index variable in the GDHS.

Definition, justification and measurement of variables

Poverty index (Pov)

The main dependent variable of the study is the Multidimensional Poverty Index (MPI) based on the Alkire and Forster Approach to poverty. The dimensions for computing the MPI for this study are shown in Table 2. In 2010, the MPI was introduced in the Human Development Report as a poverty measure that complements conventional money-metric approaches to poverty by measuring the multiple deprivations of households in Education, Health and Living standards.

Beneficiary households of NHIS (SI)

This is the leading independent variable of the study which is essentially the treatment effect variable. Beneficiary households of NHIS is a dichotomous variable with one (1) denoting the case for households with at least a member subscribed unto the scheme, and zero (0) otherwise. NHIS scheme in Ghana is primarily a social health insurance instrument of social protection (Asfaw & Jütting, 2007; Barrientos, 2009, 2011; Barrientos & Hulme, 2009; Hamid et al., 2011; International Labour Office, 2000). The impact of NHIS on the deprivation poverty among beneficiary households is the central crust of this section.

Level of education (*Educ*)

This variable measure the level of education of the household head. The education variable is captured in the analyses as a categorical variable (1=No education; 1=Primary education; and 2=At least secondary education). Mainstream studies on the determinants of poverty have indicated mainly a negative relationship between the level of education and household poverty(Barrientos, Gorman, &

Heslop, 2003; Coulombe & Wodon, 2007a; Jansen, Moses, Mujuta, & Yu, 2015; Majeed & Malik, 2014).

Religious affiliation (Rel)

This variable represents the religious affiliations of the household head. It is recorded into the three main religious groupings in Ghana alongside those who do not belong to any of the three groups. It is represented in the analyses as (0= none; 1= Christian; 2=Islam; and 3=Traditional). According to Keister (2011), religious affiliations and beliefs influence savings, asset accumulation and wealth creation which can potentially affect the vulnerability and deprivations of households. Anyawu (2013) also holds that religion affects a person's general outlook of the real world which may have poverty inducing effects or otherwise. It is therefore paramount to control for the effects of these affiliations in a study of this nature.

Occupation ($Occu$)

This variable captures the type of occupation of the household head. The variable has eight main categories (0= not working; 1=Managerial; 2= Clerical; 3=Sales, 4= Agricultural; 5=Services; 6=Skilled Manual; 7=Unskilled Manual). The current study endorses the eight broad classifications to ascertain the relationship between various livelihood status and household deprivation poverty. Studies in Ghana have largely shown that household heads who are into agricultural activities significantly increase household poverty (Annim, 2018; Coulombe & Wodon, 2007a). Accordingly, the current study controls for the effect of the type of occupation.

Ethnicity or cultural effect (Ethn)

The ethnicity variable is used to control for the cultural effects in the model. The Ghanaian population just like others in Africa is made up of different ethnic groupings. Some of these groups have norms and believes that can affect the demand for NHIS and household poverty levels. It is therefore essential to control for the ethnic effect in a study of this nature. The ethnicity groupings is captured as a categorical variable (0=Akan; 1=Ga; 2=Ewe; 3=Guan; 4=Mole;, 5=Grusi; 6=Gurma; and 8=Mande). The reference category being the Akan's constitute the largest ethnic group in the country.

Residence (Res)

The place of residence of the household is included in the model to index variations in household poverty emanating from rural, urban differences. Poverty in Ghana has mostly and consistently been adjudged as a rural phenomenon(Coulombe & Wodon, 2007a; GSS, 2014b). Consequently, the current study controlled for residential effect by introducing residential dummy to capture such variation. Households in the urban area are captured as one (1), whereas those in the rural area are coded as zero (0).

Region (*Reg*)

To control for the regional variations in household poverty that may arise from regional differences, a set of regional dummy variables for each of the ten administrative regions of the country is used to capture the regional fixed effect. The ten administrative regions have somewhat different climatic conditions, different opportunities and endowments. Each of these factors can influence the

poverty situation of households in a particular region. It is therefore paramount to control for these variations in a national study of this nature.

Age of head

This is the age of the household head captured as a continuous variable. Coulombe and Wodon (2007a) have shown using three different rounds of the GLSS that different categories of ages of household members have a different effect on household poverty(consumption per-equivalent adult) in Ghana. However, the square of the ages resulted in a consistent reduction in household poverty across all the three survey periods. Their study appears to suggest a non-linear relationship between age and household welfare in Ghana. The current study also accounted for household variations that might arise due to the differences in the age of the household head and also accounted for the non-linear relationship by introducing the square of the age of the household head into the model.

Sex of head

The sex of the household head is used to capture the differences in vulnerability to poverty between male-headed and female-headed households. Available literature suggests that female-headed households are more deprived than male-headed households. For instance, Julka and Das (2015) found using household-level data that irrespective of the type of poverty measure used female-headed households are more impoverished than male-headed households. However, Bundervoet (2006) observed that the vulnerability of female-headed households to poverty decreases as their educational achievement increases.

Marital status (Marr)

This is the marital status of the head of the household. This variable is captured as a categorical variable in the model (0=single; 1=married; 2=separated). All these marital statuses of the head of the household have different vulnerabilities to poverty. These different vulnerabilities tend to affect decisions and resources available to the household in influencing poverty reduction. The current study controlled for potential marital vulnerabilities to household poverty.

Ownership of bank account (*Ob*)

The bank account ownership of the head of the household is used to proxy the financial inclusion of household heads. Chibba (2009) argues that financial inclusion promotes inclusive development which has a poverty reduction effect on households. Park and Mercado (2015) further argued that financial inclusion provides access for financing which enables households to make longer-term consumption and investment decisions to improve their living conditions. The current study controlled for this effect by capturing the ownership of a bank account as a dummy variable, with one (1) denoting households head's who owned a bank account, and zero (0) otherwise.

Household size (Hhsize)

Household size is measured as a categorical variable in the model [1=small (1 to 2 members); 2=Average (3 to 5 members); 3=large family size (at least 6 members)]. This variable is included in the model to control for the variations in the needs across households. The basis is that households with larger family sizes are likely to have more extensive needs that may not be fully satisfied compared to

households with smaller family sizes. Hence, households with large family sizes may suffer from deprivation poverty (Lanjouw & Ravallion, 1995; Székely, 1998).

Dependency (Dep)

This is a measure of the dependency ratio of the household. This is measured by the sum of the number of children less than 18 years and the elderly(64 years above) divided by the number of household members who are between 18 years to 64 years. Average dependency ratio in developing countries is high due to high population rates. However, labour productivity is also low in these countries due to inadequate nutritional food, health and education. In this kind of context, when the dependency ratio increases in a family, household poverty also increases. By the previous argument, Sinnathurai (2013) established a positive relationship between dependency ratio and household poverty. Fry and Mason (1982) also argued that children in the household generally increases the consumption necessities of households.

Table 4: *Definition and Measurement of Variables*

Variable	Measurement	A priori sign
$Educ$	Categorical: reference category are household heads with no education	Negative
Rel	Categorical: reference category are heads who do not practice any of the mainstream religions	Indeterminate
$Occu$	Categorical: reference category is those not working	Positive for agricultural and negative for other occupation types.
$Ethn$	Categorical: reference category are household heads who are Akan's	Indeterminate
Res	Dummy variable: =1 if the household head resides in an urban area and 0 otherwise.	Negative
Reg	Categorical: reference category are household heads residing in the Northern region	All other regional dummies will have a negative coefficient
Age	Continuous	Negative
$Agesqr$	Continuous	Indeterminate
$Marr$	Categorical: reference category are heads who are single	Indeterminate
Sex	Dummy variable: =1 if household head is a male and 0 otherwise	Negative
Ob	Dummy variable:=1 if the head of household has a bank account and 0 otherwise	Negative
$Hhsize$	Categorical: reference category is the small household size (1 to 2), members	Positive for 6 or more category
Dep	Continuous: number of children (<=18 yrs) and elderly(>=65 yrs) divided by the number of household members (>18<=64 yrs)	Indeterminate
SI	Treatment variable: = 1 if any household member is a beneficiary of NHIS and 0 otherwise	Negative

Source: Author, 2019

Choice of estimation techniques

The choice of estimation technique for measuring the impact of NHIS on household deprivation poverty in Ghana comes under several considerations. The major concern is the problem of self-selection inherent in household becoming a

beneficiary of the NHIS in Ghana. This problem results in non-randomness of the estimated samples which can potentially bias the coefficients and using the Ordinary Least Square estimation will bias the coefficient of the impact of the NHIS on poverty (Green, 2003). The second consideration is the hint of endogeneity that appears to emanate from endogenous placement of the NHIS.

The third consideration involves quantifying the poverty reduction impact of NHIS on beneficiary households using a counterfactual analysis. The fourth consideration concerns the distribution of the poverty index variable used as the dependent variable. The poverty index used is from the family of the MPI by Alkire and Foster (2011) which is a continuous variable of deprivation scores ranging from zero (0) to 0.834 with a mean of 0.146. However, about 28 per cent of the distribution is censored around zero (0) which gives the data leftward censoring.

Getting an estimation technique that caters for all the four considerations is worth a search, however, the conclusion can only be made on the most suitable. This study employed the Endogenous Treatment Effects Model (ETEM) version of the Heckman sample selection as the main estimation technique. This is because the Heckman sample selection model compensates for the sample selection bias associated with household's self-selection into unto the NHIS. At the second stage, the technique further used an instrument (convenient location of a health facility to the household) to correct for potential endogeneity concerns.

Further, to engender robustness of results and quantify the impact of the insurance scheme on beneficiaries and non-beneficiaries based on a counterfactual analysis, the analyses used three variants of Propensity Score Matching (PSM)

methods, namely, common support, nearest neighbour and kernel estimation techniques. The analyses probe further by using the Tobit estimation technique to examine the poverty-reducing impact of the NHIS amidst the leftward censoring of some of the observations of the dependent variable around zero (0).

Based on the mentioned considerations, this section presents the three estimation techniques for examining the impact of NHIS on household poverty, namely the ETEM, PSM and the Tobit estimation techniques.

Endogenous treatment effect model of heckman sample selection

The dependent variable for the selection equation is the demand for NHIS. It is a dichotomous dependent variable which necessitates the use of a suitable cumulative distribution function (CDF). Hence the probit is used as the selection mechanism, and it is specified below:

$$H_i^* = \gamma X_i + \mu_i \tag{29}$$

Where $H_i^* = 1$, if $H_i^* = \gamma X_i + \mu_i > 0$

$H_i^* = 0$, otherwise

Where

$$\Pr\{H_i = 1|X_i\} = \varphi(\gamma' X_i), \tag{30}$$

$$\frac{\partial p}{X_j} = \varphi(\gamma' X) X_j$$

$$\Pr\{H_i = 0|X_i\} = 1 - \varphi(\gamma' X_i) \tag{31}$$

And

$H_i^* = 1 \qquad \text{if } H_i^* = \gamma X_i + \mu_i > 0$

H_i^* is a latent variable. In this study H_i equals 1 if a household is a beneficiary of NHIS, and 0 otherwise, X_i is a vector of household characteristics including the instrument for the participation equation which is the convenient location of a health facility to a household. φ denotes the standard normal cumulative distribution function.

The probit model can be specified as:

$$\Pr(SI_i = 1|X_i) = \beta_0 + \beta_1 Educ + \beta_2 Rel + \beta_3 Res + \beta_4 Reg + \beta_5 Age + \beta_6 Mar + \beta_6 Sex + \beta_7 Ob + \beta_8 Hhsize + \beta_9 Dep + \beta_{10} cloc + \varepsilon_i \quad (32)$$

The second stage specifies the linear outcome regression model to examine the determinants of poverty proxied by the Multidimensional Poverty Index (MPI) scores. The specifications are presented as follows:

$$W_i = \beta^i Z_i + \theta H_i + \varepsilon_i \quad (33)$$

(μ_i, ε_i), bivariate normal $[0,0,1,\sigma_i,\rho]$

Where θ is the average net wealth benefit of a household being a beneficiary of NHIS. Z_i is the same X_i only that it excludes the instrument for the NHIS participation equation. The expected poverty index for beneficiary households of NHIS can be expressed using the formula for the joint density of bivariate normally distributed variables as:

$$E(W_i|H_i = 1) = \beta' Z_i + \theta + E(\varepsilon_i|H_i = 1) = \beta' Z_i + \theta + \rho\sigma_\varepsilon \frac{\varphi(\gamma' X_i)}{\emptyset(\gamma' X_i)}, \quad (34)$$

Where φ is the standard normal density function. The ratio of φ and $\emptyset$

is called the inverse mills ratio. In the case of the non-poor, the expected MPI for non-beneficiary households is:

$$E(W_i|H_i = 0) = \beta' Z_i + E(\varepsilon_i|H_i = 0) = \beta' Z_i - \rho\sigma_\varepsilon \frac{\varphi(\gamma' X_i)}{1-\emptyset(\gamma' X_i)}, \quad (35)$$

From equations (34) and (35), the expected effect of poverty reduction associated with being a beneficiary of NHIS is computed as shown by Green (2003)

$$E[W_i|H_i = 1] - E[W_i|H_i = 0] = \theta + \rho\sigma_\varepsilon \frac{\varphi(\gamma' X_i)}{\emptyset(\gamma' X_i)[1-\emptyset(\gamma' X_i)]}. \quad (36)$$

If ρ is positive, the coefficient estimate θ of using OLS is biased upward, whereas when the same is negative the coefficient estimate of using OLS is biased downward. However, this biasedness is being corrected by the sample selection term. Given that σ_ε is positive, the direction and the significance of the estimates of $\rho\sigma_\varepsilon$ will determine the presence of any selection bias or otherwise.

In terms of model specification, we specify the outcome equation in the second stage as:

$$Pov = \beta_0 + \beta_1 Educ + \beta_2 Rel + \beta_3 Res + \beta_4 Reg + \beta_5 Age + \beta_6 Mar + \beta_7 Sex + \beta_8 Ob + \beta_9 Hhsize + \beta_{10} Dep + \beta_{11} SI + \varepsilon_i \quad (37)$$

And the selection equation as:

$$\Pr(SI_i = 1|X_i) = \beta_0 + \beta_1 Educ + \beta_2 Rel + \beta_3 Res + \beta_4 Reg + \beta_5 Age + \beta_6 Mar + \beta_7 Sex + \beta_8 Ob + \beta_9 Hhsize + \beta_{10} Dep + \beta_{11} cloc + \varepsilon_i \quad (38)$$

Where SI is the endogenous treatment variable, and $cloc$ is the instrumental variable.

Hence the final equation can be written as:

$$Pov = \beta_0 + \beta_1 Educ + \beta_2 Rel + \beta_3 Res + \beta_4 Reg + \beta_5 Age + \beta_6 Mar + \beta_7 Sex + \beta_8 Ob + \beta_9 Hhsize + \beta_{10} Dep + \beta_{11} SI + \varepsilon_i \quad (39)$$

The disaggregated effects into rural and urban can be specified as:

$$Pov = \beta_0 + \beta_1 Educ + \beta_2 Rel + \beta_4 Reg + \beta_5 Age + \beta_6 Mar + \beta_7 Sex + \beta_8 Ob + \beta_9 Hhsize + \beta_{10} Dep + \beta_{11} SI + \varepsilon_i \text{ if } Res = 1 \quad (40)$$

$$Pov = \beta_0 + \beta_1 Educ + \beta_2 Rel + \beta_4 Reg + \beta_5 Age + \beta_6 Mar + \beta_7 Sex + \beta_8 Ob + \beta_9 Hhsize + \beta_{10} Dep + \beta_{11} SI + \varepsilon_i \text{ if } Res = 0 \quad (41)$$

Where $Res = 1$ provides estimates of the urban sample only, $Res = 0$ gives estimates for rural samples only.

Justification and measurement of the instrument

The endogenous treatment effect model used an instrument to correct for the potential endogeneity between government social health insurance and household poverty. The instrument used is the convenient location of the household to a health facility. The study argues that the convenient location of a household to a health facility determines the demand for NHIS but will not directly affect household poverty level. This is because the convenient location to a health facility engenders direct interaction between health workers and community members which could potentially sensitise household members with information on the NHIS. The study maintains that convenient location of a health facility on its own does not directly lead to poverty reduction since ‘convenient location of a facility' does not connote to the usage of such facilities.

Propensity score matching technique

The propensity score matching technique is a quasi-experimental method that estimates the average effects of an intervention on the outcome of interest. It has a useful application for quantifying the Average Treatment Effects on the Treated (ATET) of which the current study draws from.

$$P(X_i) = prob(H = 1|X_i) = E(H|X_i) \quad (42)$$

Where $P(X_i)$=propensities of observations, X_i is a vector of household characteristics, H is the treatment variable with one (1) denoting the recipients/beneficiaries of treatment and zero (0) otherwise, hence $prob(H = 1|X_i)$ is a logistic regression model.

The propensities of observations from equation (42) are matched using any of the available matching techniques.

After successful matching of the propensity scores, outcomes (Y) are compared between the beneficiary and the non-beneficiaries of the programme.

$$Y = \begin{cases} Y_1 = if & H_i = 1 \\ Y_0 = if & H_i = 0 \end{cases}$$

The counterfactual analyses compare the outcome of the beneficiaries observations with the outcome of the beneficiaries if they were not beneficiaries, and it is specified as:

$$ATET = E(\Delta|H_i = 1) = E(Y_1|X_i, H_i = 1) - E(Y_0|X_i, H_i = 1) \quad (43)$$

Where $ATET$ is Average Treatment Effect on the Treated (beneficiaries), $E(Y_1|X_i, H_i = 1)$ is the outcome on the beneficiaries,

$E(Y_0|X_i, H_i = 1)$ is the counterfactual term which is not observable and can only be estimated. Outcomes of the beneficiaries and the non-beneficiaries can be compared by specifying the PSM as:

$$ATET = E(\Delta|p(X_i), H_i = 1) = E(Y_1|p(X_i),\ H_i = 1) - E(Y_0|P(X_i), H_i = 0) \quad (44)$$

Where:

$$X_i = (Educ, Rel, Reg, Age, Mar, Sex, Ob, Hhsize, Dep) \quad (45)$$

Equation 45 defines the correlates of poverty beside the treatment variable.

and

$$H_i = SI \quad (46)$$

Equation (46) is the NHIS variable with one (1) denoting beneficiary households of NHIS, and zero (0) otherwise.

Y_1= Poverty reducing impact for beneficiary households of NHIS

Y_0=Poverty reducing outcome for non-beneficiaries of NHIS as if they are beneficiaries.

The final empirical estimation can be specified in the way that each beneficiary household of NHIS i is matched with j non-beneficiary households and their outcomes Y_0 are weighed by w in equation (46):

$$ATET = \frac{1}{n_1}\sum_{i\epsilon\{H_i=1)}[Y_{1,i} - \sum_j w(i,j)Y_{0,J}] \quad (47)$$

This study used three variants propensity score matching techniques, namely common support, nearest neighbour, and kernel to ensure robustness of outcomes.

Tobit estimation technique

Censoring of the dependent variable usually occurs in a microeconomic data. Whenever there is censoring, values within a certain range are consigned to a

single value. In this study, the dependent variable, MPI is zero (0) for 28 per cent of the households who are not deprived in any of the deprivation indicators. The remaining households recorded different levels of poverty between 0.1 to 0.84. Green (2003) contended that using the conventional method in the OLS will fail to account for the qualitative difference between the lower boundary consisting of zero observations, and the continuous observations. Another worthy consideration can be to dichotomise the poverty variable into a binary outcome variable to use either logistic or probit model, however, this approach also unduly loses information on the continuous aspect of the data. To benefit from the discrete and the continuous aspect of the data structure, the Tobit model is used which lends itself to such consideration. The formulation is carried as follows:

$$Y_i^* = X_i'\beta + \varepsilon_i, \tag{48}$$

$$Y_i = 0 \quad \text{if } Y_i^* \leq 0$$

$$Y_i = Y_i^* \quad \text{if } Y_i^* > 0$$

Where Y_i^* is the latent variable, Y_i is the dependent variable the poverty scores,

β is the vector of unknown coefficients, ε_i represents the independently distributed error terms. However, for either a censored or non-censored observation drawn from the actual population:

$$E[Y_i|X_i] = \emptyset\left(\frac{X_i'\beta}{\sigma}\right)(X_i'\beta + \sigma\lambda_i) \tag{49}$$

Where $\lambda_i = \frac{\phi[0-X_i'\beta)/\sigma]}{1-\Phi[(0-X_i'\beta)/\sigma]} = \frac{\phi(X_i'\beta/\sigma)}{\Phi(X_i'\beta/\sigma)}$

Green (2003) depicted that for the observed data, the marginal effects can be stated taking into consideration censoring at zero and normally distributed disturbances as :

$$\frac{dE[Y_i|X_i]}{\partial X_i} = \beta\Phi\left(\frac{\beta' X_i}{\sigma}\right) \quad (50)$$

According to McDonald and Mofitt(1980) equation (49), can be decomposed into:

$$\frac{\partial E[Y_i|X_i]}{\partial X_i} = \beta \times \{\Phi_i[1 - \lambda_i(\alpha_i + \lambda_i)\} \quad (51)$$

Where $\alpha_i = X_i'\beta, \Phi_i = \Phi(\alpha_i)$, and $\lambda_i = \frac{\phi}{\Phi}$,

λ_i is called the inverse Mills Ratio, and it captures the change in the population, that is conditioned on $(Y > 0)$

The two parts of the equation (48), can be decomposed separately into:

$$\frac{\partial E[Y_i|X_i]}{\partial X_i} = Prob[Y_i > 0]\frac{\partial E[Y_i|X_i,\ Y_i > 0]}{\partial X_i} + E[Y_i|X_i, Y_i > 0]\frac{\partial Prob[Y_i>0]}{\partial_{X_i}} \quad (52)$$

Equation (51) shows the dual effect of the Tobit model: A change in X (control variables) affects the probability of not censoring, and the expectation of the dependent variable on the bases that it is observed.

Therefore, the empirical analyses of the Tobit Model for the impact of NHIS on household poverty can be specified as:

$$Pov = \beta_0 + \beta_1 Educ + \beta_2 Rel + \beta_3 Res + \beta_4 Reg + \beta_5 Age + \beta_6 Mar + \beta_7 Sex + \beta_8 Ob + \beta_9 Hhsize + \beta_{10} Dep + \beta_{11}(SI) + \varepsilon_i \quad (53)$$

Child deprivation poverty in Ghana: assessment of rural-urban catch-up

The third empirical chapter is premised on two main objectives: (1) Compare child deprivation poverty with child income poverty across the geographical groupings of the country; and (2) Examine the rural-urban catch-up in child deprivation poverty. Hence, the organisation of the methods and procedures of the chapter are divided into the following two sub-sections.

Multiple overlapping deprivation analyses

The MODA approach involves a full twenty-two (22) steps in its empirical illustration and application (De Neubourg et al., 2012). However, it can be surmised into seven (7) steps; (1) Concepts, definitions, data choice; (2) choice of dimensions, indicators, thresholds, and age groups; (3) Analysis by indicator and by dimension; (4) Deprivation count and overlap analysis per age group; (5) Identification of multidimensionally deprived children; (6) Analysis of additional fields of child wellbeing; and (7) overlap analyses between the different fields of child wellbeing. Regarding mathematical orientation, the MODA approach assumes the following notations:

Single deprivation analysis: analysis by indicator and by dimension

The calculation for the deprivation headcount ratio uses the formula as following:

$$h_{j,r} = \frac{q_{j,r}}{n_r} \tag{54}$$

$$q_{j,r=} \sum_{i=1}^{n_r} y_i$$

where

$h_{j,r}$= Headcount ratio of children deprived in dimension j of the reference population r;

$q_{j,r}$ = number of deprived children in dimension j of the reference population r;

n_r = total number of children in the reference population

y_i = Deprivation status of child i in dimension j, with y_i=1, if $x_j < z_j$ (deprivation) and $y_i = 0$ if $x_j \geq z_j$ (no deprivation)

x_j= value of dimension j for child i;

z_j= threshold of the dimension j.

Deprivation Count and Overlap Analysis Per Age Group

The deprivation count uses the following formula:

$$D_i = \sum_{j=1}^{d} y_i \quad (55)$$

Where D_i = Total number of dimensions each child i is deprived in; with $y_i = 1$ if child i is deprived in the dimension; $y_j = 0$ if child i is not deprived in dimension j.

Identification of the multidimensionally deprived children

$y_k = 1$ if $D_i \geq K$

$y_k = 0$ if $D_i < K$

Where K is the deprivation cut-off, whereas D_i is the total number of deprivation per each child.

child deprivation headcount

$$H = \frac{q_k}{n_a} \quad (56)$$

$$q_k = \sum_{i=1}^{n} y_k$$

Where

H = multidimensional child deprivation headcount ratio according to cut-off point K in age group a;

$q_k =$ number of children affected by at least K deprivations in the age group a;

$n_a =$ total number of children in the age group a;

$y_k =$ deprivation status of a child i depending on the cut-off point K;

$D_i =$ number of deprivations each child i experiences;

$K =$cut-off point

The average intensity of deprivation

The average intensity of deprivation uses the following formula:

$$A = \frac{\sum_1^{q_k} c_k}{q_k * d} \quad (57)$$

A= Average intensity of multidimensional deprivation according to the cut-off point k for the age group a;

q_k=number of children affected by at least K deprivations in the age group a;

$d =$total number of dimensions considered per child within the relevant age group a;

c_k =number of deprivations each multidimensionally deprived child i experiences,

with $c_k = D * y_k$

Adjusted child deprivation headcount ratio (M_0)

The multidimensional child deprivation headcount ratio uses the following formula:

$$M_0 = H * A = \frac{\sum_1^{q_k} c_k}{n_a * d} \quad (58)$$

Where,

$M_0 =$ Adjusted multidimensional child deprivation headcount ratio among children affected by at least K deprivations in age group a;

c_k= number of deprivations each multidimensionally deprived child i experiences, with

$$c_k = D_i * y_k$$

Decomposition across sub-groups and dimensions

For instance, the national deprivation level can be calculated for two distinct comparator regions to profile the children living in different geographic areas. The two comparator regions can be denoted by *A* and *B*. Region *A* with population n_1 and deprived children q_1, and region *B* with population $n_2=n-n_1$ and deprived children $q_2 = q-q_1$. It is possible to calculate the multidimensional deprivation headcount ratio for the two regions in the following ways.

$$H_A = \frac{q_{k,1}}{n_1} \quad (59)$$

$$H_B = \frac{q_{k,2}}{n_2} \quad (60)$$

Average Intensity for the two regions can also be calculated:

$$A_A = \frac{\sum_1^{qk,1} c_k}{q_{k,1} * d} \quad (61)$$

$$A_B = \frac{\sum_1^{q_{k,1}} c_k}{q_{k,1} * d} \quad (62)$$

Hence the Adjusted headcount can also be defined as

$$M_{0A} = H_1 * A_1 = \frac{\sum_1^{q_{k,1}} c_k}{n_1 * d} \quad (63)$$

$$M_{02} = H_2 * A_2 = \frac{\sum_1^{q_{k,2}} c_k}{n_2 * d} \quad (64)$$

The contribution of groups (1,2) to the overall adjusted headcount ratio M_0

The contribution is denoted as:

$$\frac{M_{01}\frac{n_1}{n}}{M_0} + \frac{M_{02}(\frac{n_2}{n})}{M_0} = 1 \quad (65)$$

The contribution of dimension j to the overall deprivation level

$$P_j = \frac{\sum_{i=1}^{n}(y_{j*}\, y_k)}{n_a * d * M_0} \quad (66)$$

Where

$P_j =$ Contribution of dimension j to the adjusted headcount ratio M_0

$\sum_{i=1}^{n}(y_{j\ *}\ y_j\ )$ = total number of children i deprived in dimension j while also being deprived multidimensionally according to the cut-off point k.

$y_j = 1$ if child i is deprived in dimension j, and $y_j = 0$ if child i is not deprived in dimension j while also being deprived multidimensionally according to the cut-off point k.

Choice of indicators for children

This study used the Convention of the Rights of the Child (CRC) to select the set of dimensions for the two cohorts of children, children aged under five and children aged from 6 to 17 years. The dimensions and the definitions are provided in Table 5.

Table 5: *Dimensions and their Measurement for Child Deprivations*

Indicators	Cut-off	Source	Age
Nutrition	Children who are more than two (2) standard deviations below the international reference population for stunting (height for age)	CRC Art. 24	<5
Health Care	Children who did not receive immunisation against any diseases	CRC Art. 24	<5
Shelter	Children living in a house with no flooring material (i.e. a mud floor)	CRC Art. 27	<5 & >6-17
Water	Children using surface water such as rivers, ponds, streams and dams, or whom it takes 30 minutes or longer to collect water	CRC Art. 24	<5 & >6-17
Education	Children of schooling age who have never been to school or who are not currently attending school	CRC Art. 28	<5 & >6-17
Information	Children with no access to a radio or television in their households	CRC Art.13, 17	<5 & >6-17
Exposure to Violence	Children who are exposed to violence at home	CRC Art. 28	<5 & >6-17

Source: The 1989 CRC

Examining the correlates of child deprivation poverty

This section examines the correlates of child deprivation poverty and consequently made a case for a rural, urban catch up in child deprivation poverty. The section adapts the child health production function by Behrman and Skoufia (2004) by assuming that households are faced with unified household preference function. This framework has underlined several other studies on child health and nutrition.

Households are assumed to choose child wellbeing (K), Leisure (D), and consumption of goods and services (G), as if they are maximising household welfare function subject to child wellbeing production function constraint and budget constraint. The utility function in equation (67) characterises household preferences,

$$U = U(K, D, G: X_h) \tag{67}$$

The household is faced with the following child wellbeing Production constraints:

$$k_t = k_t(k_{t-1}, \gamma_t, x_{jt}, x_{it}, x_{ct}, \varepsilon_{jict}) \tag{68}$$

$$j = 1,2, \dots m$$

$$c = 1,2, \dots q$$

Time and current period budget constraint:

$$Y_t = P_k K + P_D D + P_G G \tag{69}$$

Where X_h in equation (66) is a vector of household characteristics such as the education of the household head including maternal characteristics within the household in the domains of the mother's educational level and others. Equation (67) on the other hand refers to child wellbeing which is a function of child deprivation achievements in the previous year, γ_t represents wellbeing inputs towards the child, x_{jt} represents child specific characteristic, x_{it} represents household specific characteristic, x_{ct} represents community-specific characteristics. ε_{jict} represents the respective child, household and community characteristics that are unobserved. Y_t in the equation (68) represents full income,

and it is derived from wages and non-wage income, whereas $P_k K, P_D D, P_G G$ in the same equation are the expenditures on child wellbeing, leisure and, goods and services respectively.

The reduced form demand function for child wellbeing that results from the constrained maximisation of equation (67), (68) and (69) as depicted by Behrman and Skoufia (2004) is:

$$k = k(Y, P_k, P_D, P_G, x_{jt}, x_{it}, x_{ct}, \varepsilon_{jict}) \quad (70)$$

However, several different specifications of the reduced-form function are evident in the literature due to the difficulties in getting a data set that incorporates all the determinants of child wellbeing. The GDHS data set to be used any composite data on prices, hence this analysis normalises the effect of prices to be equal to one in equation (70). Further, the analyses used the wealth quintile variable to proxy for the income variable which suits the current analyses.

Empirical model specification

To determine the correlates of child deprivation poverty and to probe for evidence of rural-urban catch-up in Ghana, child wellbeing function can be specified based on equation (69) as:

$$k = k[Z_i, Z_m, Z_h, Z_C] \quad (71)$$

Where Z_i represents child specific characteristics, Z_m represents maternal characteristics, Z_h denotes household characteristics including wealth quintile of the household, and Z_C represents community characteristics.

$$Z_i = f(chsex, chage, chins) \quad (72)$$

Where $chsex$ is the sex of the child, $chage$ is the age of child, $chins$ are the child being health insured.

$$Z_m = f(motduc, motspe, huseduc, husocc, motage, motrel, moteth, mars) \quad (73)$$

Where $motduc$ represents mother education, $motspe$ is mother spending, $huseduc$ husbands educational level, $husocc$ is husbands occupation, $motage$ is mother's age, $motrel$ is mother's religion, $moteth$ is mother's ethnic group, $marst$ is the marital status of the mother.

$$Z_h = f(hsex, hhsize, hsizesq, hhedu, hhccu, hmar\ hriq) \quad (74)$$

Where $hsex$ is the sex of household head, $hhsize$ is the size of household, hsizesq is the household size squared, $hhedu$ is the head's level of education, $hhccu$ is the head's level of education, $hmar$ is the head's marital status, and $hriq$ is the residential household inequality.

$$Z_C = f(ecoz) \quad (75)$$

Where $ecoz$ is the ecological zone location of the household.

Two variants empirical models were used for the analyses, namely determinants of child poverty for children under five ($Chpov_{\varpi}$), and children aged from 6 to 17 years ($chpov_{\pi}$). By incorporating life cycle approach into child wellbeing function, the under-fives are more likely to be influenced by maternal characteristics compared to children aged from 6 to 17 years. This is based on the observation that the primary source of socialisation of the under-fives emanates from their mothers. In contrast, community factors are more likely to influence children aged from 6 to 17 years compared to that of the under-fives. The

specifications of the empirical models for the two cohorts of children incorporated the mentioned considerations.

For the under-fives:

Substituting equations (71), (72), (73) and (74) into equation (70) results in:

$$Chpov_{\varpi} = (chsex, chage, chins, motduc, motspe, husocc,$$

$$motage, motrel, moteth, marst, hsex, hhsize, hriq) \quad (76)$$

For children aged from 6 to 17 years,

Substituting equations (72), (73), (74) and (75) into equation (71) results in:

$$chpov_{\pi} = (chsex, chage, hsex, hhsize, hsizesq, hhedu$$

$$, hhccu, hmar, hriq, \ ecoz) \quad (77)$$

Definition, measurement and justification of variables

This section defines and explains how the predictors of child deprivation poverty were selected and measured as well as their a priori expectations. Table 6 provides a summary of the measurement and the priori expectation.

Sex of child (chsex)

This variable controls for the child-specific characteristics that can have a potential impact on child deprivation poverty. Behrman and Skoufia (2004) have indicated the sex of the child as one of the factors that may affect the health production function of children. The sex of the child is a dummy variable, with female children being the base category.

Age of the child (chage)

This is a continuous variable in the models for the two cohorts of children. For the under-fives, it is measured in months, whereas for children aged from 6 to

17 years it is measured in years. Luzzi et al. (2008) assert that age can be considered as either an increasing or decreasing factor of poverty. The situation of children might indicate a larger burden and increased risk of poverty as they increase in age. This variable is therefore included to account for variations that might result in child deprivation poverty as they age.

Child insured (chins)

According to Ramakrishnan and UNICEF (1995) framework on the correlates of child nutrition, they identified government policies as potential influencers of the well-being of children. This variable captures the effect of such a national policy in the model at the level of the child. This variable is a dummy variable with one (1) denoting children who have a health insurance scheme and 0 otherwise.

Mother's Education (motduc) and Head of Household education(hhedu)

The level of education of the mother is captured as a categorical variable in the model (0=No education; 1=Primary education; 2=At least secondary school education). This variable was used in the under-fives model only because the primary socialisation of children below the age of five (5) is large with their mothers unlike children aged from 6 to 17 years. Studies by (Adetola & Olufemi, 2012; Kabubo-Mariara, Wambugu, & Musau, 2011) have indicated a negative relationship between the level of education of the mother and child deprivation poverty. Specifically, mothers with at least a secondary school education are likely to possess the ability to process health care information to considerably reduce poor health outcomes of their children and consequently their levels of deprivation. In

the same wise, education of the head of the household generally promote child wellbeing because households decide household preferences. The education of the mother was used in the under-five model, whereas that of the head of the household was used in the children aged from 6 to 17 years.

Mother's spending decision (motspe)

This variable captures the control mothers have overspending decisions in the household. It is a categorical variable (1=mother alone spends; 2=both parents spend, and 3=father alone spends). The variable also qualifies to capture the autonomy of the mother in the household. This is based on the assertion of Glick and Sahn (1998) that women are more amenable to spend their resources on improving children's welfare than men. Mba et al. (2009) contend that in the Ghanaian setting the socialisation of the child is chiefly undertaken by mothers. Hence, one can also argue that the basic needs of a child are more profound to the mother than that of the father.

Husbands occupation (husocc)

Existing studies on poverty in Ghana have shown mainly that household heads who are into agricultural activities significantly increase poverty (Annim, 2018; Coulombe & Wodon, 2007a). Accordingly, the current study controls for the effect of the type of occupation. The occupation variable is a categorical variable with the base category being husbands (fathers) who are into skilled labour. Husbands or father's occupation was used for the under-fives, whereas the occupation of the head of the household was used for that of children aged from 6 to 17 years.

Mothers Age(motage)

This variable measures the age of the mother as a continuous variable. This variable captures additional maternal characteristics that can influence the deprivation poverty of the under-fives. Some studies have hypothesised that young maternal age may pose a physiological disadvantage to children compared to older maternal age (Erkan, Rimer, & Stine, 1971; Zlatnik & Burmeister, 1977). However, other studies have maintained that young mothers do not experience any significant disadvantage compared to older mothers (Darabi, Graham, Namerow, Philliber, & Varga, 1984; Oppel & Royston, 1971).

Mothers' Religion (motrel)

The religion of the mother is used to control for the effect of the religious affiliation of the mother. Ghana's population has multiple religious groupings. Some of the religious groups have beliefs that may potentially affect the living conditions of children. In order to account for the religious variations, the variable is captured as a categorical variable (0=Christian; 1=Islam; 2=Traditionalists; 3=None) with the base category being Christian mothers.

Mother's ethnicity (moteth)

The ethnicity variable is used to control for the cultural effects of the mother on the poverty of children. The population of Ghana is heterogeneous concerning ethnicity. Some of the ethnic groups have norms and believes that can affect the deprivation of children or otherwise. It is therefore essential to control for the ethnic effect in a study of this nature. The ethnicity variable is captured as (0=Akan;

1=Ga; 2=Ewe; 3=Guan; 4=Mole, 5=Grusi; 6=Gurma; and 8=Mande) with the Akan ethnic group being the reference group.

Mother's marital status(marst)

This is the marital status of the mother in the household. This variable is captured as a dummy variable with one (1) denoting mothers who are married, and 0 for those who are not married. The marital status of the mother has different implications on the poverty of children by influencing the ability of the mother to meet the needs of children in the household.

Sex of household head (hsex)

This variable captures the characteristics of the household. The sex of the household head is a dummy variable with 1 denoting female-headed household, and 0 for male-headed households. The inclusion of this variable is premised on the different preferences that characterised male and female-headed households. It has been observed that in female-headed households, a higher proportion of the household resources is devoted to the basic needs (food, shelter and health) compared to that of the male-headed households (Blumberg, 1991). They also noted that the fact that women are closer to their children than men, as such female-headed households have a greater awareness of the needs of their children. Hence female-headed households are more likely to promote child wellbeing. Also, female-headed households require special attention because they are generally poor and, consequently the needs of their children may be compromised.

Household size (size) and household size square (hhsizesq).

Household size is measured as a continuous variable in the model. This is included to control for the variations in the needs of children across households. The argument is that households with larger family sizes are likely to have more extensive needs that may not be fully satisfied compared to households with smaller family sizes. Hence, households with large family sizes may suffer from deprivation poverty. The square of household size is also included in indexing any non-linear relationship that might exist between child deprivation poverty and household size.

Household residential inequality (hriq)

This variable shows the rural-urban wealth inequalities of households where children reside. The variable is a categorical variable (0=urban rich; 1=urban poor; 2=rural poor; and 3=rural rich;) with reference group being children living in urban rich neighbourhoods. Urban rich households represent households in at least the rich wealth status and residing in the urban area. The remaining non-rich households in the urban area are denoted as urban poor relatively. Rural Rich households are households with at least the rich wealth quintile and residing in the rural area. The remaining non-rich households in the rural area are denoted as the rural poor in relative terms. Household wealth and neighbourhood effects have implications on the availability of essential services needed for the wellbeing of children. This variable is included to cater for the combined effects of wealth and place of stay on child deprivation in Ghana.

Ecological zone(hreswecoz)

In order to control for the variations in child deprivation poverty that may arise from locational differences, a set of ecological zone dummy variables is incorporated to account for such effects. This study divides the country into three broad ecological zones, namely the Coastal, Forest, and Savannah zones. Hence the variable is a categorical variable (0=Coastal; 1=Forest; and 2=Savannah).

Table 6: *Measurement and A Priori Expectations*

Variables	Measurement	A priori expectation	Cohorts
chsex	Dummy variable: =1 if the child is a male and 0 otherwise	Indeterminate	Both
chage	Continuous variable: in months for under 5, and in years for children age 6 to 17.	Positive	Both
chins	Dummy variable: =1 if a child has health insurance and 0 otherwise	Negative	Under5 only
motduc	Categorical: reference category are mothers with no education	Negative for other categories	Under5 only
motspe	Categorical: reference category are mothers who spend alone	Indeterminate	Under5 only
husocc	Categorical: reference category are fathers who are in skilled labour	Positive for Agriculture and unskilled labour, and negative for the rest	Under5 only
motage	Continuous	Indeterminate	Under5 only
motrel	Categorical: reference category is mothers who are Christians.	Indeterminate	Under5 only
moteth	Category: reference category are mothers who are Akan's	Indeterminate	Under 5 only
marst	Dummy: 1 if the mother is married, and 0 otherwise	Indeterminate	Under 5 only
hsex	Dummy: 1 for female-headed households and 0 otherwise	Positive	Both
hhsize	Continuous	Positive	Both
hsizesq	Continuous	Indeterminate	Both
hriq	Categorical: urban rich, urban poor, rural poor, rural rich. Reference category is urban Rich.	Positive for the remaining residential inequality	Both
hhccu	Categorical: reference category is skilled labour	Positive for Agriculture and unskilled labour, and negative for the rest of the categories	Children 6-17 only
hhedu	Categorical: reference category is heads who have no level of education.	Negative	Children 6-17 only
ecoz,	Categorical: the reference is the coastal zone	Positive for other ecological zones	Children 6-17 only

Source: Author, 2019

Choice of estimation techniques

The study used two estimation techniques to determine the correlates of child deprivation poverty for the two cohorts of children. For the under-fives, consideration was given to the nature of the dependent variable. The dependent variable is binary, where one (1) denotes the situation where a child is deprived in at least two deprivation indicators, and zero (0) otherwise. Additional consideration was also given to the hierarchies in the empirical model for the under-fives specified in equation (75). Two main hierarchies can be observed in the equation, and the first level is the individual units at the child's level with the child information directly tied to other individual members of the household such as mothers, husbands and fathers in the household. The second and higher level concerns household variables such as household size and residential household inequality.

It is worth stating that failure to account for these hierarchies in the data set exposes the analyses to the risk of Type 1 error. This error occurs when a true null hypothesis is rejected due to underestimated standard errors. To estimate correct standard errors, this study argues for the incorporation of the variations among the hierarchies in the analyses. In order to account for such variations at the child and household level, the study employed the mixed logistic estimation technique in the case of the under-fives. However, concerning children aged between 6 to 17 years, the binary logistic regression technique suffices for the analyses of the current study since children within this category are treated solely as household members

according to the design of the GDHS with non-specific exclusive information to enable hierarchical estimation.

Binary logistic regression

Since the dependent variable, child deprivation poverty is a dichotomous dependent variable, the cumulative distribution function (CDF) in the binary logistic model is used as the appropriate model for the analyses. Suppose a continuous latent variable, y_i^*, and a binary outcome variable y_i that satisfies a single index model:

$$y_i^* = x_i'\beta + \varepsilon_i \tag{78}$$

Where x_i' are the explanatory variables.

Although y_i^* is unobserved, it could be realised that

$$y_i = 1 \; iff \; y_1^* > 0$$

$$y_i = 0 \; iff \; y_i^* < 0$$

Hence, if y_i^* is greater than zero, the binary outcome equals one (1), otherwise it is zero (0). Also, the assumption that the threshold equals zero (0) is without loss of generality as long as x_i includes a constant.

Given the latent variable, we get

$$\Pr(y_i^* = 1|x_i) = \Pr\left(x_i'\beta + \varepsilon_i > 0\middle|x_i\right) \tag{79}$$

$$= \Pr\left(-\varepsilon_i < x_i'\beta|x_i\right)$$

$$= \mathrm{F}(x_i'\beta)$$

Where $F(.)$ is the cumulative distribution frequency(CDF) of $-\varepsilon_i$

The CDF for the logit model is stated as:

$$F(X_i'\beta) = \Lambda(x_i'\beta) = \frac{e^{x'_i\beta}}{1+e^{x'_i\beta}} = \frac{\exp(x_{i'}'\beta)}{1+\exp(x_i'\beta)} \quad (80)$$

The odds ratio for individual i are expressed as

$$\frac{\gamma_i}{1-\gamma_i} \quad (81)$$

Where γ_i =Pr$(y_i^* = 1|x_i) = F(X_i'\beta)$

Hence:

$$\frac{\gamma_i}{1-\gamma_i} = \frac{\frac{\exp(x_{i'}'\beta)}{1+\exp(x_i'\beta)}}{1-\left(\frac{\exp(x_{i'}'\beta)}{1+\exp(x_i'\beta)}\right)} \quad (82)$$

$$\frac{\gamma_i}{1-\gamma_i} = \exp(x'\beta)$$

Taking the log of the odds gives:

$$ln\frac{\gamma_i}{1-\gamma_i} = x_i'\beta \quad (83)$$

Hence equation (77) was estimated using equation (82) for the children aged from 6 to 17 years:

Equation (81) is therefore estimated as:

$$ln\left(\frac{chpov_{\pi t}}{1-Chpov_{\varpi t}}\right) = \beta_{0t} + \beta_1 chsex_{it} + \beta_2 chage_{it} + \beta_3 hsex_{ht} +$$

$$\beta_4 hhsize_{ht} + \beta_5 hsizesq_{ht} + \beta_6 hhedu_{ht} + \beta_7 hhccu_{ht} + \beta_8 hmar_{ht} +$$

$$\beta_{10} hriq_{ht} + \beta_{11} ecoz_{ht} + \mu_{it} \quad (84)$$

Where i denotes child-level variables; h denotes household variables; t represents survey periods 2003, 2008 and 2014.

Mixed effect logistic model

Due to the two main hierarchies identified in the model for the correlates of under-five poverty, namely the individual level factors (child-specific correlates which are tied to the mother) and the household level variables, the mixed effect logistic regression is used to account for the variations across the two hierarchies.

Consider a two-level structure model of n individuals in level 1 (n_i) nested within j groups at level 2 with n_j individuals in group j: This is specified as:

$$y_{ij}^{*} = \beta_0 + \beta_1 x_{ij} + u_{j+} e_{ij} \tag{85}$$

$$y_{ij} = \begin{cases} 1 & if \quad y_{ij}^{*} > 0 \\ 0 & if \quad y_{ij}^{*} \leq 0 \end{cases}$$

Where a total y_{ij}^{*} is a continuous unobservable variable.

y_{ij} is the observable response for individual i in group j.

x_{ij} is the individual level explanatory variable.

u_j is the level two residuals: $\mu_j \sim N(0, \sigma_{\mu}^2)$

e_{ij} is the level 1 residual: $e_{ij} \sim N(0, \sigma_{\mu}^2)$

Expressing equation (97), in terms of the expected value of y_{ij}, for an individual in group j and with value x_{ij} on x gives:

$$E(y_{ij} | x_{ij}, u_j) = \Pr(y_{ij} = 1) = \omega_{ij} \tag{86}$$

Where ω_{ij} is the resultant generalised linear random intercept model for the dependency of the response probability ω_{ij}. The model is specified as:

$$\Phi^{-1}(\omega_{ij}) = \beta_0 + \beta_1 X_{ij} + u_j \tag{87}$$

Where Φ^{-1} is the logit link function which is the inverse cumulative distribution function and u_j is the level 2 residual.

The logit link function assumes that the right-hand side of equation (76) is linear in β_0, β_1 and u_j.

Hence the random intercept mixed logit model is specified as:

$$\ln\left(\frac{\omega_{ij}}{1-\omega_{ij}}\right) = \beta_0 + \beta_1 x_{ij} + u_j \quad (88)$$

The estimated mixed logistic model for the correlates of under-five child poverty is:

$$log(\frac{Chpov_{\varpi tih}}{1-Chpov_{\varpi tih}}) = \beta_0 + \beta_1 chsex_{it} + \beta_2 chage_{it} + \beta_3 chins_{it} + \beta_4 motduc_{\omega t} + \beta_5 motspe_{\omega t} + \beta_6 husocc_{\omega t} + \beta_7 motage_{\omega t} + \beta_8 motage_{\omega t} + \beta_{10} motrel_{\varpi t} + \beta_{11} moteth_{\omega t} + \beta_{12} marst_{\omega t} + \beta_{13} hsex_{ht} + \beta_{14} hhsize_{ht} + \beta_{15} hriq_{ht} + \mu_{ht} \quad (89)$$

Where i and ω indicate the individual under-fives (level 1) and their mothers respectively, who are nested within the household h (level two). μ_h is the level 2 (household) residual.

Regression Diagnostics and Post-estimation Tests

In order not to compromise on robust and consistent estimates. The following diagnostic and post-estimation tests were conducted.

Test for heteroscedasticity

A standard probit model assumes the error terms (μ,) to be homoscedastic. However, in the latent variable model, the homoscedasticity of the error terms can be tested. This has been demonstrated by (Cameron & Trivedi, 2005). The current study, therefore, ensured homoscedastic errors by using heteroscedasticity-robust standard errors in the analyses.

Model specification error test

The model specification error test checks whether the estimated regression-like equation is well specified in a sense that any additional independent variable that can significantly affect the model is only by chance. To empirically conduct this test, Pregibon (1981) suggested the model specification error test known as the link test. In the logistic regression, this test makes two assumptions. The first assumption is based on the link function of the outcome variable on the left-hand side of a specified model. The second assumes that all the variables at the right hand of the equation are relevant and that the logit function is a linear combination of the explanatory variables.

Multicollinearity

The study tests for the possibility of multicollinearity in the estimated model. Multicollinearity occurs when the explanatory variables in the regression model are correlated in such a way that an explanatory variable in a multiple regression model can be linearly predicted from the others with a high degree of

accuracy. The analyses used the pairwise correlation coefficient strategy on the explanatory variables to ascertain the presence of multicollinearity or otherwise. For an empirical decision, the study used Anderson (2001) rule of thumb which suggests that correlation coefficient exceeding 0.70 potentially indicates the problem of multicollinearity.

Selection exclusion restriction

The binary selection exclusion variable must satisfy two conditions. Firstly, it must have a non-trivial direct effect on the selection equation, but not on the outcome equation. The second condition is that the exclusion restriction variable should act as an instrumental variable for the endogenous treatment effect variable in the outcome equation.

Covariate imbalance testing

The Rubin test provides the ratio of the variance of the residuals orthogonal to the linear index of the propensity score in the treated group over the non-treated group after matching for each of the covariates. According to Rubin (2001), this allows for the estimation of meaningful counterfactual analyses. When the covariates have the ratio of the variance of their residuals ranging between [0.5,0.8] or [1.25,2]. The variables in this category are flagged for concern. However, covariates or variables that severely affect the balancing between the two sub-samples before and after matching are denoted by double asterisks (**) with a range

[<0.5 or >2]. Implying that such variables cannot be used for the counterfactual analyses because the two groups are not balanced

Variance partitioning coefficient

The variance partition coefficient (VPC) is the measure of the proportion of total variance that can be apportioned to the differences between groups or levels (Rabe-Hesketh & Skrondal, 2008).

$$VPC = \frac{\sigma_u^2}{\sigma_u^2+\sigma_\varepsilon^2} \quad (90)$$

Where σ_u^2 is the level two variance, and σ_ε^2 represents level one variance which is 3.29 in a mixed logistic model. VPC ranges between 0 and 1 representing variation between the two groups.

Testing for group effects

In order to use the mixed logistic technique to account for the hierarchies in the correlates of child deprivation poverty, the study used the likelihood ratio test static to test the null hypothesis that there are no group differences between the under-five children at the child and household levels. A significant p-value for the null hypothesis indicates rejection of the null hypothesis, thereby concluding the presence of group differences (Rabe-Hesketh & Skrondal, 2008).

Chapter Summary

This chapter illustrated the methodological procedures for the thesis. It provided adequate justification for the choice of a quantitative approach and data.

Various approaches to the measurement of household and child poverty, namely the FOD, MPI, MCA, FGT and MODA were adopted and presented in the chapter. Further, the ETEM of the Heckman sample selection, the PSM, Tobit estimation, Mixed logistic and binary logistic techniques were also adopted to establish causal effects and relationships. The chapter concluded with the post-estimation procedures for the respective estimation techniques.

CHAPTER FOUR

SPATIAL AND TEMPORAL ANALYSES OF HOUSEHOLD POVERTY IN GHANA AND KENYA

Introduction

This chapter presents the temporal and spatial distribution of household poverty in Ghana and Kenya using the results of the FOD comparisons. The analysis entails two main parts, the first covering the descriptive statistics involving the distribution of household welfare in the five basic capabilities that the chapter has considered. The second part considers the results of the temporal and the spatial FOD comparisons. The presentations are organised using tables and figures.

Households by Welfare Combinations

Table 7 presents the proportion of Ghanaian and Kenyan households that are not deprived of the five different welfare indicators at national level respectively. In addition, the table reports the percentage change of households not deprived by welfare indicators between the 1993 to 2014 survey periods representing more than two decades for each country. The percentage point changes vary across the welfare indicators between the 1993 and 2014 survey periods.

In Ghana, the percentage point changes range from as low as 3.82 per cent to as high as 38.28 per cent in water and sanitation respectively. The significant percentage change in sanitation of 38.28 per cent suggests that though household welfare in sanitation has been consistently low compared to the other four welfare indicators, considerable efforts have been made over the years. However, the 2014

household sanitation welfare level of 59 per cent shows that a large segment of Ghanaian households is yet deprived of access to improved sanitation. Household welfare in the water, on the other hand, registered only 3.82 per cent improvement over the two decades. This can be partly explained by the patronage of sachet water over the last decade for drinking purposes by households in the country which does not constitute an improved source of drinking water according to the UN's classification. Household daily usage of sachet water for drinking purposes has affordability and sustainability implications on poor households and may even pose a health implication on the general populace given that private entities are actively involved in its supply across the country. Households have highest welfare in shelter compared to the remaining indicators for Ghana. Housing over the year is significantly high as at least 4 out of every 5 households have the floors made with materials other than earth or cow dung.

Regarding household welfare in Kenya, the country recorded at least 17 per cent improvement in all the five dimensions considered. Similar to Ghana, household welfare in sanitation is least in Kenya compared to the other dimensions. In all the five survey periods considered, less than half of the households in Kenya have access to improved sanitation. The implication is that Kenyan population are likely to suffer from diseases associated with sanitation and hygiene compared to Ghana. Also, unlike Ghana, households in Kenya have barely average welfare in their housing conditions indicated by the shelter dimension in the table. The remaining dimensions for Kenya are showcased in Table 7. Overall, households in

Ghana have relatively poor welfare in sanitation and water, whereas that of Kenya has the same in the former and shelter.

Table 7: *Households not Deprived by Welfare Indicators (%)*

Indicators	1993	1998	2003	2008	2014	Change
Ghana						
Water	56.18	62.28	67.35	77.34	60.00	3.82
Sanitation	20.84	32.67	36.64	55.98	59.12	38.28
Shelter	85.11	86.77	87.57	85.83	94.02	8.91
Information	43.80	51.55	72.42	78.21	80.96	37.15
Education	58.15	66.27	65.30	72.61	78.04	19.89
N	5278	5949	6191	11717	11829	
Kenya						
Water	44.99	43.78	47.56	63.67	70.49	25.51
Sanitation	16.27	18.94	19.22	31.44	33.95	17.68
Shelter	30.54	36.21	37.24	44.48	52.58	22.04
Information	69.20	76.56	78.59	82.25	86.32	17.12
Education	52.36	63.67	74.98	75.01	72.34	19.98
N	7489	8026	7923	8941	71296	

Source: Author, 2019

Share of Households in Multidimensional Welfare Combinations

Given that the study employs five main welfare indicators, the number of possible welfare combinations amounts to $2^5=32$, Thus, two binary outcomes (1,0) in all the five welfare indicators. Figure 7 presents the share of households at the national level that falls into each of the 32 welfare combinations and the percentage point change over time in Ghana and Kenya respectively. The left-hand side of the figure shows the share of the households characterised by deprivation in all dimensions (0,0,0,0,0). The households in this welfare combination are either worse off or suffering from acute deprivation. In contrast, the right-hand side of the figure illustrates non-deprivation in any dimension (1,1,1,1,1). The discussion focuses on these two extremes exclusively in Ghana and Kenya.

Considering the worse-off household, in the context of Ghana, left hand side of Figure 7 indicates that this proportion decreased consistently from 4.66, 3.43, 1.53, 1.02 to 0.37 per cent in 1993,1998, 2003, 2008 and 2014 respectively. This is good for the country since the worse of households decreased by more 90 per cent between the 1993 and 2014 survey periods. Whereas in Kenya, worse off households also decreased consistently from 16.47, 8.05, 8.28, 4.88 and 4.16 per cent in 1993, 1998, 2003,2008 and 2014 respectively. Though the proportion of worse-off households in Kenya decreased by more than 70 per cent between the two survey periods, it can be observed that the proportion of worse off households in Kenya of 4.16 per cent in 2014 is almost the same as the worse off households in Ghana in the 1993 survey period (4.66%). This seems to suggest that it might take Kenya about two more decades to be without worse off households.

Considering the better off households, the right hand side of Figure 7, in the case of Ghana, the proportion of better off households (1,1,1,1,1) increased marginally by 0.73 percentage points between 1993 to1998, whereas in the subsequent years, viz., 2003, 2008 and 2014 the percentage point increase assumes more substantial increases to 15.54, 15.09 and 7.35 per cent respectively. In all, the percentage point increase in households that are not deprived in all the five welfare indicators between 1993 and 2014 is as high as 37.98 per cent. This shows that households in Ghana are gaining momentum in meeting all their basic capabilities. In the case of Kenya, the figure shows the percentage of better off households increased by 2.67 percentage points from 1993 to 1998. The subsequent survey periods, 2003,2008 and 2014 recorded a somewhat stable percentage point

increase of 2.78, 4.64, 3.62 respectively. In all, the percentage point increase in better off households between 1993 and 2014 is 13.71 percentage point increase. Comparing this , 13.71, to that of Ghana being 37.98, gives the impression that gains in household welfare in Kenya are somewhat slower over time. The graphical distribution of the worse and better off households is summarised in Figure 7.

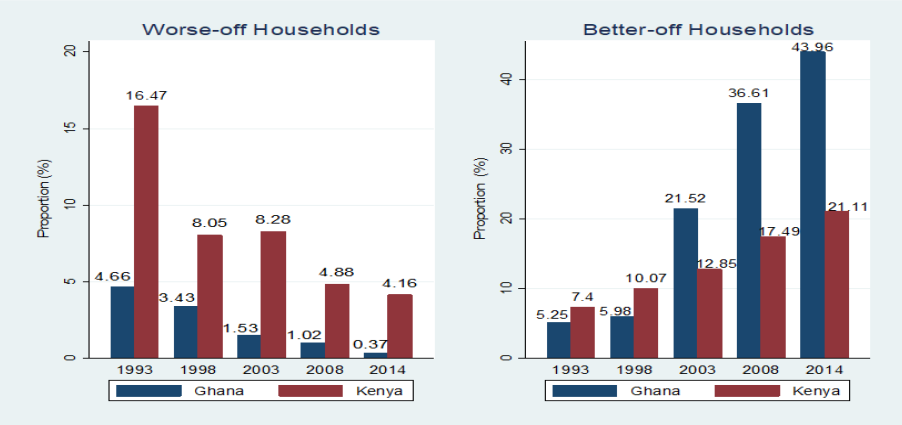

Figure 7 : Worse off and better-off households across Ghana and Kenya

Source: Author, 2019

Households by Number of Deprivations

Tables 8 and 9 show households by the number of deprivations, ranging from 0 to 5 in Ghana and Kenya respectively. Deprivation zero (0) corresponds to households not deprived in any welfare indicator (1,1,1,1,1), hence better off, whereas deprivation 5 corresponds to households deprived in all five welfare indicators (0,0,0,0,0), hence worse off. Considering the better-off households, as indicated by Table 8, the proportion of households in this category in the urban area are more than twice that of their rural counterparts in each of the survey

periods: 13.28, 14.50,38.68,57.87 and 62.69 per cent compared to that of the rural area of 0.71, 1.34, 6.97, 17.24 and 21.12 in 1993,1998,2003,2008 and 2014 survey periods respectively. This shows the gaping rural-urban disparities in household wellbeing in the country as established by other studies (Appiah-Kubi, Amanning-Ampomah, & Ahortor, 2007; Boateng, Ewusi, Kanbur, & McKay, 1992; Coulombe & Wodon, 2007; GSS, 2007; Kofinti & Annim, 2016).

The implication of greater proportions of households in the urban area belonging to deprivation zero is that the urban area is much more likely to dominate other areas than that of the rural area. This is against the backdrop that households in the urban area have a reservoir of better-off households that are transferable to the worse-off households in other geographical groupings, hence their dominance. Similarly, the coastal zone has higher proportions of better-off households compared to that of the forest and the savannah zones. Regarding the ten administrative regions, the Greater Accra region and the Ashanti region boast of a greater proportion of better-off households compared to the remaining eight regions. The implication of the coastal zone, Greater Accra and Ashanti regions having a relatively higher proportion of households in this category is that the mentioned areas are more likely to dominate the remaining areas in terms of household welfare.

In the case of households deprived in all the five welfare comparisons (with deprivation five), households in the rural area have higher proportion of worse off households of 7.17, 5.23, 2.65, 1.90 and 0.81 per cent compared to the urban area of 0.21, 0.12, 0.21 and 0.06 respectively. It is worth noting that the proportion of

households in this category decreased sharply especially in the rural area between the 1993 and 2014 survey periods. The implication of relatively higher level of worse-off households in the rural area is the likelihood of the rural area being dominated much more than other areas. This is because the rural area is more likely than the urban area in becoming the destination of probability mass transfer from better-off areas, hence dominated.

In the case of the ecological zone, the savannah zone followed by the forest zone has a higher proportion of households with deprivation five. This translates to the likelihood of the savannah and the forest zone being dominated much more than that of the coastal zone. Regarding the distribution of worse off households across the ten administrative regions, it is depicted that the Upper East, Northern, Brong Ahafo and Upper West regions have the relatively higher proportion of households with deprivation in all the five welfare indicators in Ghana.

Table 8: *Households by Number Deprivation in Welfare Indicators in Ghana*

Area	0	1	2	3	4	5
National						
1993	5.25	17.64	26.15	27.02	19.29	4.66
1998	5.98	23.85	27.94	25.74	13.06	3.43
2003	21.52	26.03	24.86	17.97	8.10	1.53
2008	36.61	28.76	17.73	11.09	4.79	1.02
2014	43.96	28.25	16.43	8.01	2.98	0.37
change	38.71	10.61	-9.71	-19.01	-16.30	-4.29
Rural						
1993	0.71	8.98	23.59	32.28	27.27	7.17
1998	1.34	14.91	28.50	31.40	18.62	5.23
2003	6.97	20.64	30.13	26.03	13.59	2.65
2008	17.24	28.29	25.05	18.84	8.68	1.90
2014	21.12	30.85	26.57	14.64	6.01	0.81
change	20.41	21.87	2.98	-17.64	-21.26	-6.36
Urban						
1993	13.288	32.983	30.672	17.700	5.147	0.210
1998	14.502	40.273	26.893	15.349	2.861	0.122
2003	38.675	32.391	18.637	8.464	1.620	0.214
2008	57.876	29.266	9.702	2.586	0.515	0.056
2014	62.694	26.121	8.115	2.562	0.504	0.004
change	49.406	-6.862	-22.558	-15.137	-4.643	-0.206
Coastal						
1993	10.57	24.36	26.39	22.69	12.99	3.00
1998	11.54	29.88	29.05	20.94	7.50	1.10
2003	30.71	27.28	23.64	14.18	3.88	0.31
2008	47.74	29.56	14.37	6.10	2.03	0.19
2014	56.03	26.87	11.56	3.86	1.41	0.27
change	45.46	2.51	-14.82	-18.83	-11.58	-2.74
Forest						
1993	2.63	15.93	29.57	29.00	17.99	4.88
1998	3.02	22.63	29.55	28.00	13.19	3.61
2003	20.04	28.68	24.71	16.83	7.84	1.89
2008	36.24	31.40	17.66	9.80	3.85	1.04
2014	41.35	30.40	17.27	7.83	2.85	0.30
change	38.72	14.47	-12.31	-21.17	-15.14	-4.57

Table 8, continued

Area	0	1	2	3	4	5
Savannah						
1993	2.711	9.87	15.944	29.501	34.82	7.158
1998	1.564	10.14	17.173	30.879	30.21	10.03
2003	5.698	13.71	28.179	30.708	18.68	3.019
2008	9.001	17.81	26.687	28.333	15.08	3.093
2014	11.36	24.6	30.449	23.472	9.144	0.979
Change	8.647	14.73	14.505	-6.03	-25.7	-6.18
Central						
1993	1.706	20.31	27.304	29.522	17.92	3.242
1998	2.035	26.48	34.258	29.447	7.411	0.371
2003	13.21	23.73	30.766	24.967	6.808	0.52
2008	32.68	34.94	21.059	9.0099	2.31	0
2014	37.74	34.11	18.116	7.3781	2.285	0.371
Change	36.04	13.8	-9.188	-22.14	-15.6	-2.87
Western						
1993	4.878	10.77	28.049	30.081	20.12	6.098
1998	5.19	19.67	33.278	26.437	13.07	2.35
2003	18.77	28.51	30.977	17.039	4.462	0.249
2008	33.61	32.98	18.436	9.9699	4.504	0.5
2014	46.93	28.54	16.664	5.2079	1.971	0.678
Change	42.06	17.77	-11.39	-24.87	-18.2	-5.42
Greater Accra						
1993	22.78	38.23	24.312	11.009	3.211	0.459
1998	23.74	40.5	21.769	10.162	3.169	0.66
2003	50.56	28.79	13.837	5.0536	1.543	0.219
2008	66.04	24	7.5789	1.8853	0.359	0.136
2014	69.64	22.5	5.7132	1.4534	0.692	0
Change	46.85	-15.72	-18.6	-9.556	-2.52	-0.46
Volta						
1993	0.628	12.13	23.222	28.87	27.41	7.741
1998	0.639	11.32	27.9	33.556	19.89	6.7
2003	16.69	25.95	25.732	17.567	10.68	3.381
2008	24.88	28.84	24.286	14.529	6.485	0.985
2014	28.61	33.1	20.647	11.446	5.402	0.793
Change	27.99	20.96	-2.575	-17.42	-22	-6.95

Table 8, continued

Area	0	1	2	3	4	5
Eastern						
1993	3.56	16.64	30.30	28.73	16.79	3.98
1998	3.56	24.16	30.31	27.85	10.65	3.48
2003	21.96	25.84	22.60	18.97	8.32	2.31
2008	31.41	32.96	21.68	9.66	3.56	0.74
2014	35.59	31.36	21.43	8.58	2.87	0.19
Change	32.03	14.72	-8.87	-20.16	-13.92	-3.80
Ashanti						
1993	3.67	17.48	31.50	29.88	14.13	3.34
1998	5.00	28.14	29.98	25.66	9.23	1.99
2003	22.78	31.46	24.71	13.95	6.42	0.67
2008	47.16	32.40	12.43	5.95	1.57	0.50
2014	54.03	27.83	12.15	4.66	1.27	0.06
Change	50.37	10.35	-19.35	-25.23	-12.86	-3.28
Brong Ahafo						
1993	1.36	15.70	31.01	27.91	17.83	6.20
1998	1.06	22.27	29.37	26.54	17.27	3.49
2003	15.23	28.49	26.17	19.60	7.84	2.67
2008	29.89	29.98	17.83	13.43	6.38	2.49
2014	33.64	32.11	19.88	10.19	3.69	0.49
Change	32.28	16.42	-11.13	-17.72	-14.14	-5.71
Northern						
1993	0.44	8.13	14.07	31.43	40.00	5.93
1998	0.80	8.40	15.13	32.36	34.21	9.10
2003	6.22	12.62	23.78	33.83	21.09	2.46
2008	10.06	18.05	24.13	26.91	16.07	4.77
2014	10.49	23.89	29.52	25.07	10.03	1.00
Change	10.05	15.75	15.45	-6.35	-29.97	-4.93
Upper East						
1993	6.64	11.63	19.93	28.90	28.90	3.99
1998	3.21	12.33	20.01	29.34	23.94	11.17
2003	6.22	14.37	23.74	29.20	22.51	3.97
2008	6.91	14.27	28.93	33.19	15.35	1.36
2014	9.88	27.42	34.00	20.89	7.08	0.72
Change	3.24	15.79	14.07	-8.02	-21.82	-3.26
Upper West						
1993	1.81	11.45	13.86	25.30	31.33	16.27
1998	0.00	9.85	16.22	30.48	33.54	9.91
2003	4.52	15.28	38.20	26.03	12.48	3.50
2008	9.65	25.22	31.75	22.55	10.43	0.39
2014	15.89	22.56	27.99	22.67	9.59	1.29
Change	14.09	11.12	14.14	-2.63	-21.73	-14.98

Source: Author, 2019

In the case of better-off households in Kenya, Table 9, the urban area recorded 36.50, 38.58, 53.60, 42.33, and 43.13 per cent compared to the rural area which registered 1.02, 1.58,3.96, 5.15 and 5.35 per cent respectively in 1993,1998,2003, 2008 and 2014 survey periods. The implication of a higher proportion of better-off households in the urban area is that the urban area, unlike the rural area, is more likely to dominate the rural area in terms of welfare. This pattern is similar to the case of Ghana where the rural-urban welfare disparities was profound. However, the percentage point reduction in this proportion between 1993 and 2014 in Kenya is only 6.63 per cent whereas a substantial percentage point change of 49.41 is recorded in the case of Ghana.

Regarding the regions, Nairobi, the capital city, of Kenya has the highest proportion of better off households in each of the years of the survey compared to any other area in Kenya. This implies that households in Nairobi are more likely to dominate other areas in terms of welfare by becoming a reservoir. It is worth stating that households in the Greater Accra region in Ghana also recorded similar higher welfare as that of Nairobi, though a city and a region cannot be directly compared. Other areas in Kenya that recorded a higher proportion of better-off households, as indicated in the first column of Table 9, are Central and Coast regions of Kenya. Considering worse-off households, the rural area has higher proportion of 20.01,10.37,10.35,6.44 and 6.75 compared to the urban area of 0.26, 0.27, 1.41, 0.32 and 0.53 in 1993, 1998, 2003, 2008 and 2014 respectively. Similar to Ghana, the rural-urban disparity is also evident in Kenya as the worse-off households do not even exceed one (1) per cent in the urban area. The implication is that whereas

the rural area can be easily be dominated by the other areas, the same cannot be said of the urban area. The region with the highest proportion of worse off households is North Eastern. This region is also the poorest region in Kenya from the perspective of consumption expenditure poverty (KIBNS, 2016). In 2003, North Eastern recorded 67.30 per cent of households deprived in all five welfare indicators. This figure decreased sharply from 50.68 to 16.62 in 2008. However, this proportion increased further to 28.88 per cent in 2014.

This high level of worse off households potentially exposes the North Eastern region to be heavily dominated by other areas of the country. It is worth mentioning that for more than two decades as indicated by the last column of Table 9, none of the households in Nairobi is worse off. Though the recent survey period, 2014, has also shown that there are no worse off households in the Greater Accra region, this is not the case in the preceding years. Nairobi and Greater Accra region are viable sources of probability mass transfers of welfare to the other areas of the country.

Table 9: *Households by Number of Deprivations in Welfare Indicators in Kenya*

Area/Dep	0	1	2	3	4	5
National						
1993	7.40	8.71	14.98	25.72	26.72	16.47
1998	10.07	14.81	19.55	27.53	19.99	8.05
2003	12.85	14.42	19.43	29.71	15.31	8.28
2008	17.49	17.91	21.32	24.81	13.59	4.88
2014	21.11	20.90	20.13	21.68	12.04	4.16
change	13.71	12.18	5.15	-4.05	-14.68	-12.31
Rural						
1993	1.02	4.52	13.69	28.81	31.94	20.01
1998	1.58	9.49	20.48	32.89	25.20	10.37
2003	3.96	9.59	20.56	36.53	19.01	10.35
2008	5.15	14.58	24.33	31.72	17.79	6.44
2014	5.35	14.34	23.48	31.41	18.68	6.75
Change	4.32	9.82	9.79	2.59	-13.26	-13.27
Urban						
1993	36.50	27.86	20.87	11.63	2.89	0.26
1998	38.58	32.71	16.43	9.52	2.49	0.27
2003	42.33	30.45	15.66	7.10	3.05	1.41
2008	53.60	27.68	12.51	4.58	1.31	0.32
2014	43.13	30.06	15.44	8.08	2.75	0.53
change	6.63	2.20	-5.42	-3.54	-0.14	0.27
Central						
1993	1.87	10.52	24.73	28.28	23.99	10.60
1998	3.28	18.74	27.25	28.42	16.82	5.49
2003	11.90	15.99	27.61	31.95	9.62	2.94
2008	15.23	24.24	31.39	21.30	6.50	1.33
2014	21.56	30.80	25.22	16.77	4.81	0.83
change	19.69	20.28	0.49	-11.51	-19.19	-9.77
Coast						
1993	6.98	13.94	18.68	21.60	24.33	14.48
1998	9.79	23.71	18.81	19.88	20.17	7.64
2003	14.55	19.85	19.24	19.59	14.33	12.45
2008	27.26	21.09	18.36	14.31	11.80	7.18
2014	25.89	23.90	17.75	16.60	11.51	4.35
change	18.91	9.97	-0.92	-5.00	-12.82	-10.13
Eastern						
1993	2.26	7.53	16.25	25.62	30.46	17.88
1998	4.13	15.62	19.39	28.72	23.95	8.20
2003	8.16	13.56	22.62	31.92	16.32	7.41
2008	8.80	15.83	24.20	29.91	15.60	5.67
2014	13.13	20.17	24.91	24.12	14.03	3.63
change	10.87	12.64	8.66	-1.50	-16.42	-14.25

Table 9, continued

Area/Dep	0	1	2	3	4	5
Nairobi						
1993	47.58	19.17	19.63	12.70	0.92	0.00
1998	49.34	30.04	13.60	5.92	1.10	0.00
2003	60.07	28.76	8.84	2.16	0.17	0.00
2008	76.32	16.93	5.55	1.06	0.14	0.00
2014	65.13	26.05	7.44	1.26	0.12	0.00
change	17.56	6.88	-12.19	-11.44	-0.80	0.00
North Eastern						
1993						
1998						
2003	0.27	1.29	1.63	5.03	24.49	67.30
2008	6.65	5.28	8.48	21.15	41.82	16.62
2014	4.19	9.29	10.22	16.71	30.71	28.88
change	3.93	8.00	8.59	11.69	6.22	-38.42
Nyanza						
1993	2.04	3.63	9.30	25.62	35.19	24.22
1998	3.19	7.28	15.56	36.37	26.08	11.52
2003	3.22	10.35	18.93	39.94	20.90	6.67
2008	5.11	12.92	25.37	35.86	16.38	4.36
2014	8.76	17.47	26.36	30.65	14.06	2.70
change	6.72	13.84	17.07	5.03	-21.13	-21.52
Rift Valley						
1993	6.05	9.35	11.11	24.66	26.63	22.20
1998	8.48	12.03	21.29	26.53	20.66	11.00
2003	9.46	14.11	18.80	27.28	18.92	11.44
2008	15.52	21.25	17.05	24.84	14.97	6.37
2014	16.21	18.71	19.06	24.48	14.63	6.91
change	10.16	9.36	7.95	-0.18	-11.99	-15.29
Western						
1993	6.37	3.60	9.41	34.76	31.80	14.06
1998	7.74	8.36	19.37	34.94	22.92	6.66
2003	3.46	6.92	17.92	47.58	18.35	5.77
2008	2.58	14.06	28.14	32.92	17.68	4.62
2014	6.31	11.31	20.51	36.74	21.02	4.10
change	-0.06	7.71	11.10	1.98	-10.78	-9.95

Source: Author, 2019

Temporal FOD Comparisons

The net temporal domination scores will provide information on three probabilities of temporal household welfare: (1) positive probabilities indicate gains (improvement) in household welfare; (2) negative probabilities indicate regression (worsening) over time; and (3) a blank cell indicating neither gains nor regression (indeterminate result) over time (Arndt et al., 2012). The empirical probabilities lie between 0 and 1, where '1' indicates that all the 100 bootstrap replications resulted in a 100 per cent improvement in household welfare.

Temporal FOD comparisons in Ghana

Table 10 shows the temporal FOD comparisons for Ghana between 1993 and 2014. The main result is on the eighth column of the table where '2014 FOD 1993'. This column indicates whether the welfare level in 2014 based on the five welfare indicators first order dominates the welfare level in 1993. The other columns such as '1998 FOD 1993' and '2008 FOD 2003' follow the same definition. For example, column '2014 FOD 2008' shows whether the welfare level of households in 2014 first-order dominates that of the 2008 level.

Using the results from column '2014 FOD 1993', none of the geographical groupings in Ghana recorded regression in household welfare. The results for the national sample of '1.00' indicates that all the 100 bootstrap iterations resulted in improvement in household welfare by 100 per cent. Meaning there is a 100 per cent probability that the welfare of households, in general, using the national sample has improved in 2014 compared to the welfare levels in 1993. This finding

converges with that of consumption expenditure poverty at the national level in Ghana which recorded more than halve poverty reduction between 1992 and 2013 (GSS, 2007,2014). The rural areas also recorded empirical probability of advance of 100 per cent. This shows that all the 100 bootstrap iterations indicate welfare of households in the rural areas in 2014 is dominant over that of 1993 levels. However, the urban areas recorded positive empirical probability of only 0.36. This means that out of the 100 bootstrap iterations only 36 of them are indicative of an improvement in household welfare. This relatively low advance in urban areas against considerable improvement in the rural areas may suggest several concerns. First, it may suggest that welfare levels are consistently high in urban areas to register appreciable improvement over time. Second, it may be indicative of an emerging urban poverty situation which can significantly neutralise improvement over time in urban areas. Lastly, it may also suggest the general catch-up in household welfare across other geographical groupings in the country which is rendering urban households less dominant. From the table, all the three main ecological zones in the country, namely the Coastal, Forest and the Savannah zone recorded 100 per cent empirical probability of gains in household welfare between 2014 and 1993. The preceding has indicated that the large area aggregates, namely the national, rural, urban, and the three ecological zones have all registered improvement in their welfare levels, albeit lower improvement in the urban areas.

In terms of the ten administrative regions, all the regions recorded positive empirical probabilities indicating advancement in welfare between 1993 and 2014. Almost all the regions recorded robust probabilities of advancement overtime:

Western (1.00), Central (0.97), Volta (0.97), Eastern (0.97), Ashanti (0.98), Brong Ahafo (0.94), Northern (0.93), Upper West (0.91) and Upper East (0.74). However, the Greater Accra region recorded a relatively less robust probability of advance of 0.60. The implications for the relative low welfare improvement in the urban areas can yet be posited for the Greater Region which also happens to register the lowest advancement among the ten administrative regions. The remaining columns in Table 10 indicate the empirical probability of improvement over different periods.

Generally, the results point to the evidence that Ghana has advanced robustly in welfare between 1993 and 2014 not only at the national area but also at the area of residence, ecological zones and the ten administrative regions of the country. All the four sets of geographical groupings of the country recorded a substantial positive empirical probability of advance between 1993 and 2014 indicating gains in welfare. Also, out of the 16 areas used for the study as indicated by Table 10, only one area, the urban area, recorded less than an indeterminate result of 36 per cent. Moreover, '2014 FOD 1993' indicates that no area/region recorded a negative probability of advance in welfare over time.

Table 10: *Temporal FOD Comparison in Ghana*

Area	1998 FOD 1993	2003 FOD 1993	2003 FOD 1998	2008 FOD 1993	2008 FOD 1998	2008 FOD 2003	2014 FOD 1993	2014 FOD 1998	2014 FOD 2003	2014 FOD 2008
NAT	0.51	0.98	0.15	0.80	0.32	0.12	1.00	1.00	1.00	0.66
RA	0.63	0.92	0.04	0.42	0.02	0.05	1.00	1.00	1.00	0.38
UA	0.07					0.32	0.36	0.43	0.95	0.01
CZ	0.44	0.94	0.37	1.00	0.70	0.32	1.00	0.95	0.41	0.13
FZ	0.35	0.19	0.03	0.55	0.43	0.75	1.00	1.00	1.00	0.07
SZ	-0.03	0.25	0.28	0.02	0.18		1.00	1.00	0.54	0.25
WR	0.31	0.98	0.57	1.00	0.49	0.02	1.00	0.83	0.04	0.26
CR	0.43	0.43		1.00	0.42	0.61	0.97	0.33	0.24	
GAR	0.03		0.26	0.03	0.12	0.08	0.60	0.76	0.62	0.09
VR	0.11	0.77	0.45	0.97	0.70	0.23	0.99	0.95	0.63	-0.01
ER	0.10		0.01	0.15	0.24	0.31	0.97	1.00	0.34	0.01
AR	0.38	0.35	0.09	0.51	0.20	0.23	0.98	0.80	0.85	0.15
BAR	0.04	0.17	0.05	0.22	0.17	0.12	0.94	0.86	0.24	0.10
NR	-0.04	0.42	0.41		0.01		0.93	0.89	0.26	0.09
UER	-0.14		0.10			0.02	0.74	0.99	0.53	
UWR	-0.04	0.38	0.04	0.87	0.98	0.04	0.91	0.98	0.07	0.02

Nat=National; RA=Rural Area; UA=Urban Area; CZ=Coastal Zone; FZ=Forest Zone; SZ=Savannah Zone; WR=Western Region; CR=Central Region; GAR=Greater Accra Region; VR=Volta Region; ER=Eastern Region; AR=Ashanti Region; BAR=Brong Ahafo Region=Northern Region; UER=Upper East Region; UWR=Upper West region

Source: Author, 2019

Temporal FOD Comparisons in Kenya

The temporal FOD comparison for Kenya as indicated in Table 11 is divided into two parts: (1) the temporal comparisons of '1998 FOD 1993'; and (2) '2014 FOD 2003'. This is because the 1993 and 1998 surveys did not cover the North Eastern region of Kenya, whereas the surveys from 2003 to 2014 include the entire regions of Kenya including the mentioned. Hence, FOD comparisons are conducted for these two periods independently unlike the case of Ghana where the comparisons run through all the five surveys.

The concentration is on the fourth column '2014 FOD 2003'. The national sample recorded an empirical probability of advance of 0.01. This implies that only 1 out of the 100 bootstrap iterations are indicative of an improvement in welfare at the national level in Kenya between 2014 and 2003. This seems to correspond to the slow decline in consumption expenditure poverty in Kenya between 1992 and 2014 by the KNBS (2007, 2018). The rural area indicated an indeterminate empirical probability of advance between 2014 and 2003. Meaning the approach could not determine whether the welfare levels in 2014 dominated that of 2003 and vice versa. The urban areas also registered negligible empirical probability of advance of 0.03 indicating about only three (3) out of the 100 bootstrap iterations indicated advancement in household welfare between 2014 and 2003.

In terms of the eight regions of Kenya for the study, the region with 100 per cent empirical probability of improvement is the North Eastern region. This implies that North Eastern though the poorest region in Kenya in terms of consumption expenditure poverty, has recorded significant improvement in its deprivation

poverty. The other regions with considerable improvement in household welfare in descending order are Rift Valley (0.43), Nyanza (0.4) and Coastal zone (0.35), albeit lower gains. Overall, household welfare improvement in Kenya is less impressive compared to Ghana, with only the North Eastern region recording an empirical probability of advance of 100 per cent.

Table 11: *Bootstrap Temporal FOD Comparisons in Kenya*

Area	1998 F0D 1993	2008 FOD 2003	2014 FOD 2003	2014 FOD 2008
National	0.87	0.58	0.01	
Rural	0.68	0.33		
Urban	0.01	0.31	0.03	-0.06
Central	0.41	0.3	0.1	0.06
Coast	0.37	0.54	0.35	0.01
Eastern	0.64	0.09	0.02	0.01
Nairobi				
North_Eastern		0.92	1	-0.09
Nyanza	0.55	0.44	0.4	0.05
Rift_Valley	0.49	0.53	0.43	-0.08
Western	0.51			

Source: Author, 2019

Objective 1: examining the gains in welfare in Ghana and Kenya

Concerning the results of the FOD temporal comparisons, the study concludes in the case of Ghana that substantial improvement in household welfare is recorded. All the large area aggregates recorded generally robust empirical probability of advance in their household welfare signifying broad-based advance. Similarly, all the ten administrative regions recorded yet high probabilities of improvement between 2014 and 1993, except the Greater Accra region. In the case of Kenya, empirical probabilities of advance are generally muted over time. However, the Northern Eastern region in Kenya recorded the most substantial

empirical probability of advance among the geographical groupings used for the analyses.

Spatial FOD Comparisons

This section presents the spatial bootstrapped FOD comparisons for 1993, 1998, 2003, 2008 and 2014 DHS for Ghana and Kenya respectively. From the spatial bootstrapped FOD comparisons, the row averages (RAV) indicate the probability that an area dominates (is dominated by) all other constituencies, whereas the column averages (CAV) indicate the probability that all the other areas dominate an area. Therefore, areas with households that are better-off are expected to register high RAV, whereas those with worse off households are expected to have high CAV. Moreover, the clear dominance (ND) which is the row average less the column average (RAV-CAV) is used to rank the geographical groupings of each country according to their relative welfare.

Spatial FOD comparisons in Ghana

Tables 12, 13, 14, 15 and 16 represent the bootstrap spatial FOD comparisons across the national, area of residence, ecological zones and the ten administrative regions of Ghana for 1993,1998,2003,2008 and 2014 survey years respectively. From the tables, the national sample dominated the rural area in all the survey years with a probability of 100 per cent. This implies that households anywhere in Ghana are better off than in the rural area. The national sample also dominated households in the Volta region (1993, 1998), Savannah zone (1998,

2003, 2008 and 2014), and Northern zone (2008) at the indicated survey periods, albeit the dominance was not as consistent as in the case of the rural area. A plausible reason for the utter domination of the national sample over that of the rural area is that in each of the survey years the proportion of better-off households in the national sample were higher than of the rural area, and also that of the worse off households in the rural area are consistently more than the national sample. In terms of the area of residence, the urban area (UA) robustly dominate the rural area (RA) in all the survey periods. As indicated in tables, the urban area dominated the rural area at 100 per cent. In addition, whereas the urban area registered RAV of at least 63 per cent, the rural area could not manage a RAV of not more than five per cent. These rural-urban disparities are reflected in other studies in the country (Appiah-Kubi et al., 2007; Kofinti & Annim, 2016b; McKay et al., 2015)

In contrast, the rural area recorded CAV of more than 40 per cent in all the survey periods whereas the highest CAV of the households in the urban area was only one per cent in 2008. This attests to the gaping rural-urban inequality that characterised a country like Ghana. In terms of the ecological zone, in all the survey periods, the coastal zone of Ghana recorded relatively higher RAV compared to the forest and savannah zones. This is attributable to the findings that there are more better off households in the coastal zone than other zones. At the same time, the coastal zone recorded the least worse off households compared to the savannah and the forest zones. Amongst the three zones, savannah recorded the highest CAV compared to the other two due to the relatively high proportion of worse-off households in each of the survey periods. In terms of the ten administrative regions,

the Greater Accra and the Ashanti regions are the better-off regions. This is because these two regions have the lowest proportion of worse off households than any other region. The tables also show that the Northern, Volta, Upper East, Upper West and the Brong Ahafo regions are the worse off regions in the country. This is because these regions do lack not only a high proportion of better-off households but also have a high proportion of worse off households.

Table 12: *Bootstrap Spatial FOD Comparisons for Ghana, 1993*

Area	NAT	RA	UA	CZ	FZ	SZ	AR	BAR	CR	ER	GAR	NR	UER	UWR	VR	WR	**RAV**
NAT		1				0.28			0.01			0.28		0.16	0.43		**0.14**
RA															0.01		**0.00**
UA	1	1		1	1	1	1	1	1	0.99		1	0.78	0.92	1	1	**0.91**
CZ	0.99	1			0.92	0.8	0.21	0.52	0.29	0.25		0.54	0.06	0.48	1	0.86	**0.53**
FZ		1				0.03						0.17		0.04	0.87		**0.14**
SZ														0.06			**0.00**
AR	0.01	0.99			0.02	0.34			0.09			0.4	0.02	0.14	0.77	0.04	**0.19**
BAR		0.44			0.01	0.04						0.09		0.02	0.34	0.01	**0.06**
CR		0.84			0.02	0.22						0.51	0.02	0.13	0.38		**0.14**
ER		0.57			0.12	0.02		0.14	0.01			0.17		0.04	0.68	0.12	**0.12**
GAR	1	1	0.12	1	1	1	0.99	1	1	1		1	0.97	0.98	1	1	**0.94**
NR														0.01			**0.00**
UER						0.24						0.02		0.36			**0.04**
UWR																	**0.00**
VR		0.01															**0.00**
WR		0.2				0.01						0.04		0.01	0.33		**0.04**
CAV	**0.20**	**0.54**	**0.01**	**0.13**	**0.21**	**0.27**	**0.15**	**0.18**	**0.16**	**0.15**	**0.00**	**0.28**	**0.12**	**0.22**	**0.45**	**0.20**	**0.20**

Nat=National; RA=Rural Area; UA=Urban Area; CZ=Coastal Zone; FZ=Forest Zone; SZ=Savannah Zone; WR=Western Region; CR=Central Region; GAR=Greater Accra Region; VR=Volta Region; ER=Eastern Region; AR=Ashanti Region; BAR=Brong Ahafo Region; NR=Northern Region; UER=Upper East Region; and UWR=Upper West region

Source: Author, 2019

Table 13: *Bootstrap Spatial FOD Comparisons for Ghana, 1998*

Area	NAT	RA	UA	CZ	FZ	SZ	AR	BAR	CR	ER	GAR	NR	UER	UWR	VR	WR	RAV
NAT		1				0.91		0.19				0.7	0.03		0.44		**0.22**
RA						0.04						0.17			0.03		**0.02**
UA	1	1		0.99	1	1	0.98	1	0.67	0.22		1	1	0.94	1	0.95	**0.85**
CZ	1	1			0.67	1	0.18	0.82		0.01		0.98	0.8	0.21	0.93	0.49	**0.54**
FZ		0.98				0.33		0.16				0.49	0.01		0.75	0.01	**0.18**
SZ																	**0.00**
AR	0.22	0.99			0.31	0.83		0.56				0.9	0.12		0.8	0.16	**0.33**
BAR		0.09				0.18						0.23	0.02		0.15		**0.04**
CR		0.24				0.5		0.04				0.64	0.17	0.57	0.23	0.01	**0.16**
ER		0.5			0.05	0.38		0.2				0.4	0.02		0.6	0.01	**0.14**
GAR	1	1	0.02	0.82	1	1	0.92	0.99	0.17	0.79		1	0.99	0.8	1	0.96	**0.83**
NR																	**0.00**
UER						0.05								0.05			**0.01**
UWR																	**0.00**
VR												0.05					**0.00**
WR		0.72			0.13	0.37		0.18				0.71			0.73		**0.19**
CAV	**0.21**	**0.50**	**0.00**	**0.12**	**0.21**	**0.44**	**0.14**	**0.28**	**0.06**	**0.07**	**0.00**	**0.48**	**0.21**	**0.17**	**0.44**	**0.17**	**0.22**

Nat=National; RA=Rural Area; UA=Urban Area; CZ=Coastal Zone; FZ=Forest Zone; SZ=Savannah Zone; WR=Western Region; CR=Central Region; GAR=Greater Accra Region; VR=Volta Region; ER=Eastern Region; AR=Ashanti Region; BAR=Brong Ahafo Region; NR=Northern Region; UER=Upper East Region; and UWR=Upper West region

Source: Author, 2019

Table 14: *Bootstrap Spatial FOD Comparisons for Ghana, 2003*

Area	NAT	RA	UA	CZ	FZ	SZ	AR	BAR	CR	ER	GAR	NR	UER	UWR	VR	WR	RAV
NAT		1				0.52		0.01				0.03	0.23	0.21			**0.13**
RA													0.01				**0.00**
UA	1	1		0.25	0.9	1	0.66	0.62	0.5	0.18		1	0.97	0.98	0.76	0.1	**0.66**
CZ	0.3	1			0.07	0.99	0.04	0.05	0.3	0.01		0.92	0.72	0.65	0.59		**0.38**
FZ		1				0.09		0.03					0.29	0.04	0.16		**0.11**
SZ																	**0.00**
AR	0.23	1			0.12	0.65		0.05		0.01		0.27	0.59	0.37	0.21		**0.23**
BAR		0.19				0.09				0.01			0.31	0.09	0.01		**0.05**
CR						0.04						0.07	0.01				**0.01**
ER		0.09				0.02		0.07					0.14	0.02	0.08		**0.03**
GAR	1	1	0.08	0.53	1	1	0.89	0.97	0.5	0.81		1	1	1	0.97	0.3	**0.80**
NR																	**0.00**
UER																	**0.00**
UWR													0.06				**0.00**
VR		0.07				0.1						0.01	0.01	0.01			**0.01**
WR		0.22				0.37			0.03			0.32	0.25	0.08	0.19		**0.10**
CAV	**0.17**	**0.44**	**0.01**	**0.05**	**0.14**	**0.32**	**0.11**	**0.12**	**0.09**	**0.07**	**0.00**	**0.24**	**0.31**	**0.23**	**0.20**	**0.03**	**0.16**

Nat=National; RA=Rural Area; UA=Urban Area; CZ=Coastal Zone; FZ=Forest Zone; SZ=Savannah Zone; WR=Western Region; CR=Central Region; GAR=Greater Accra Region; VR=Volta Region; ER=Eastern Region; AR=Ashanti Region; BAR=Brong Ahafo Region; NR=Northern Region; UER=Upper East Region; and UWR=Upper West region

Source: Author, 2019

Table 15: *Bootstrap Spatial FOD Comparisons for Ghana, 2008*

Area	NAT	RA	UA	CZ	FZ	SZ	AR	BAR	CR	ER	GAR	NR	UER	UWR	VR	WR	**RAV**
NAT		1				0.85		0.1				1					**0.20**
RA						0.05						0.66					**0.05**
UA	1	1		0.49	1	1	0.16	1	0.01	0.47		1	0.37	0.21	1	0.8	**0.63**
CZ	0.88	1			0.51	0.9	0.01	0.67		0.08		1			0.79	0.51	**0.42**
FZ		1				0.67		0.32				1			0.1		**0.21**
SZ																	**0.00**
AR	0.86	1		0.01	0.86	0.99		0.65		0.37		1	0.28	0.05	0.56	0.18	**0.45**
BAR		0.1				0.11						0.52			0.01		**0.05**
CR		0.71				0.84		0.07				0.95	0.1	0.03	0.04	0.01	**0.18**
ER		0.81				0.58		0.11				0.96			0.05		**0.17**
GAR	1	1	0.05	0.63	1	1	0.59	1		0.98		1	0.51	0.41	1	0.85	**0.73**
NR																	**0.00**
UER																	**0.00**
UW						0.38						0.2	0.12				**0.05**
VR		0.06				0.03						0.34					**0.03**
WR		0.28				0.11		0.09				0.59			0.15		**0.08**
CAV	**0.25**	**0.53**	**0.00**	**0.08**	**0.22**	**0.50**	**0.05**	**0.27**	**0.00**	**0.13**	**0.00**	**0.68**	**0.09**	**0.05**	**0.25**	**0.16**	**0.20**

Nat=National; RA=Rural Area; UA=Urban Area; CZ=Coastal Zone; FZ=Forest Zone; SZ=Savannah Zone; WR=Western Region; CR=Central Region; GAR=Greater Accra Region; VR=Volta Region; ER=Eastern Region; AR=Ashanti Region; BAR=Brong Ahafo Region; NR=Northern Region; UER=Upper East Region; and UWR=Upper West region

Source: Author, 2019

Table 16 : *Bootstrap Spatial FOD Comparisons for Ghana, 2014*

Area	NAT	RA	UA	CZ	FZ	SZ	AR	BAR	CR	ER	GAR	NR	UER	UWR	VR	WR	RAV
NAT		1				0.41		0.16	0.01			0.41	0.16	0.01	0.36		**0.17**
RA						0.01						0.01					**0.00**
UA	1	1		0.6	1	1	0.21	0.97	0.86	0.46		1	0.99	0.69	0.98	0.8	**0.77**
CZ	0.86	1			0.49	0.79		0.6	0.41	0.12		0.68	0.41	0.19	0.86	0.28	**0.45**
FZ	0.02	1				0.25		0.15	0.06			0.26	0.06	0.01	0.61		**0.16**
SZ																	**0.00**
AR	0.57	0.99		0.06	0.73	0.64		0.64	0.3	0.13		0.56	0.44	0.29	0.75	0.17	**0.42**
BAR		0.61				0.27						0.22	0.11	0.04	0.02		**0.08**
CR	0.02	0.76				0.25		0.13				0.31	0.1	0.03	0.31		**0.13**
ER		0.58				0.16		0.06	0.02			0.21	0.01	0.01	0.36		**0.09**
GAR	0.94	1	0.15	0.92	0.91	0.99	0.36	0.95	0.72	0.68		0.96	0.93	0.85	0.97	0.91	**0.82**
NR																	**0.00**
UER						0.02						0.01					**0.00**
UWR																	**0.00**
VR						0.08						0.08	0.02				**0.01**
WR	0.02	0.62			0.02	0.32		0.11	0.04			0.37	0.09	0.03	0.46		**0.14**
CAV	**0.23**	**0.57**	**0.01**	**0.11**	**0.21**	**0.35**	**0.04**	**0.25**	**0.16**	**0.09**	**0.00**	**0.34**	**0.22**	**0.14**	**0.38**	**0.14**	**0.20**

Nat=National; RA=Rural Area; UA=Urban Area; CZ=Coastal Zone; FZ=Forest Zone; SZ=Savannah Zone; WR=Western Region; CR=Central Region; GAR=Greater Accra Region; VR=Volta Region; ER=Eastern Region; AR=Ashanti Region; BAR=Brong Ahafo Region; NR=Northern Region; UER=Upper East Region; and UWR=Upper West region

Source: Author, 2019

Spatial FOD comparisons in Kenya

The bootstrap spatial FOD comparisons in Kenya are depicted using Tables 17, 18, 19, 20 and 21 for the survey years 1993, 1998, 2003, 2008 and 2014 respectively. These comparisons are made for the national and administrative regions of the country. From the tables, the national sample robustly dominates the rural area consistently for all the years of the survey at 100 per cent. Again, the national sample dominated areas such as Nyanza, Rift Valley, and North Eastern, albeit not as robust and consistent as in the case of the rural area. The implication of the finding is that is better to stay anywhere else in Kenya than in the rural area. In the case of the rural-urban differences, the case of Kenya is no different from that of Ghana. The urban area dominated the rural area in all the survey period. The studies by Kabubo-Mariara et al., (2011) and KINBS (2018) corroborated this finding.

Whereas the urban area registered at least RAV of 80 per cent, the highest the rural area could manage was 10 per cent in 2008. The plausible reason for this discrepancy in RAV between the rural area and the urban area is because the urban area has a higher proportion of better off households compared to that of the rural. In contrast, the rural area registered high CAV of at least 55 per cent with the highest being 55 per cent in the 1993 survey year than that of the urban area. This implies that other areas of Kenya heavily dominate households in the rural area. The fundamental reason being that the rural area has a high proportion of worse-off households.

Concerning the regions of Kenya considered for this study: (1) seven regions were used for 1993, and 1998 surveys (excluding North Eastern region of Kenya); (2) eight regions were used for the 2003 to 2014 surveys. Households in Nairobi are better off than any other area of Kenya. The welfare of households in Nairobi is so robust that it registered a RAV of 93 to 100 per cent between 2003 to 2014. The reason is that Nairobi has a high proportion of better-off households than elsewhere in Kenya. Impressively, from the descriptive, Nairobi does not have a single household in the category of worse off households. Followed by Nairobi is the Central region with a relatively higher RAV compared to the other areas in the country. The worse off regions in Kenya are Nyanza, Eastern and North Eastern. This is because these areas have a higher proportion of worse off households.

Table 17: *Bootstrap Spatial FOD Comparisons for Kenya, 1993*

Area	National	Rural	Urban	Central	Coast	Eastern	Nairobi	Nyanza	Rift Valley	Western	**RAV**
National		1				0.37		0.99	0.49		**0.32**
Rural								0.09			**0.01**
Urban	1	1		1	1	1		1	1	1	**0.89**
Central		0.81				0.31		0.39		0.03	**0.17**
Coast	0.01	0.17				0.16		0.39	0.09		**0.09**
Eastern		0.33						0.28			**0.07**
Nairobi	1	1	0.21	1	1	1		1	1	1	**0.91**
Nyanza											**0.00**
Rift Valley		0.1				0.04		0.6			**0.08**
Western		0.15						0.49	0.04		**0.08**
CAV	**0.22**	**0.51**	**0.02**	**0.22**	**0.22**	**0.32**	**0.00**	**0.58**	**0.29**	**0.23**	**0.26**

Source: Author, 2019

Table 18: *Bootstrap Spatial FOD Comparisons for Kenya, 1998*

Area	National	Rural	Urban	Central	Coast	Eastern	Nairobi	Nyanza	Rift_Valley	Western	RAV
National		1				0.36		0.71	0.5		**0.29**
Rural											**0.00**
Urban	1	1		1	1	1		1	1	1	**0.89**
Central		0.89				0.2		0.45	0.01	0.05	**0.18**
Coast		0.02						0.01	0.02		**0.01**
Eastern		0.46						0.06	0.07		**0.07**
Nairobi	1	1	0.65	1	1	1		1	1	1	**0.96**
Nyanza											**0.00**
Rift_Valley		0.28				0.02		0.15			**0.05**
Western		0.26						0.39	0.02		**0.07**
CAV	**0.22**	**0.55**	**0.07**	**0.22**	**0.22**	**0.29**	**0.00**	**0.42**	**0.29**	**0.23**	**0.25**

Source: Author, 2019

Table 19: *Bootstrap Spatial FOD Comparisons for Kenya, 2003*

Area	National	Rural	Urban	Central	Coast	Eastern	Nairobi	North Eastern	Nyanza	Rift Valley	Western	**RAV**
National		1				0.14		1		0.72		**0.29**
Rural								1				**0.10**
Urban	1	1			1	1		1	1	1	0.98	**0.80**
Central	0.2	0.96			0.01	0.52		1	0.77	0.46	0.83	**0.48**
Coast								1		0.06		**0.11**
Eastern		0.47						1		0.08	0.01	**0.16**
Nairobi	1	1	0.98	0.67	1	1		1	1	1	1	**0.97**
North Eastern												**0.00**
Nyanza		0.01						1				**0.10**
Rift Valley		0.08				0.01		1				**0.11**
Western								0.99				**0.10**
CAV	**0.22**	**0.45**	**0.10**	**0.07**	**0.20**	**0.27**	**0.00**	**1.00**	**0.28**	**0.33**	**0.28**	**0.29**

Source: Author, 2019

Table 20: *Bootstrap Spatial FOD Comparisons for Kenya, 2008*

Area	National	Rural	Urban	Central	Coast	Eastern	Nairobi	North Eastern	Nyanza	Rift Valley	Western	RAV
National		1				0.56		0.01		0.28		**0.19**
Rural												**0.00**
Urban	1	1		0.15	1	1		1	1	1	1	**0.82**
Central	0.16	1			0.01	0.76		0.17	0.84	0.31	0.89	**0.41**
Coast		0.02				0.01		0.39		0.03		**0.05**
Eastern		0.14								0.03		**0.02**
Nairobi	1	1	0.98	1	1	1		1	1	1	1	**1.00**
North Eastern												**0.00**
Nyanza											0.03	**0.00**
Rift Valley	0.01	0.41			0.01	0.15		0.02	0.02		0.03	**0.07**
Western												**0.00**
CAV	**0.22**	**0.46**	**0.10**	**0.12**	**0.20**	**0.35**	**0.00**	**0.26**	**0.29**	**0.27**	**0.30**	**0.23**

Source: Author, 2019

Table 21: *Bootstrap Spatial FOD Comparisons for Kenya, 2014*

Area	National	Rural	Urban	Central	Coast	Eastern	Nairobi	North Eastern	Nyanza	Rift Valley	Western	RAV
National		1				0.02		0.98		0.99	0.01	**0.30**
Rural												**0.00**
Urban	1	1			1	1		1	1	1	1	**0.80**
Central	0.19	1				0.96		1	0.85	0.93	1	**0.59**
Coast		0.07						1				**0.11**
Eastern		0.98						0.47		0.02		**0.15**
Nairobi	1	1	1	0.98	1	1		1	1	1	1	**1.00**
North Eastern												**0.00**
Nyanza		0.02									0.49	**0.05**
Rift Valley		0.37						0.6				**0.10**
Western												**0.00**
CAV	**0.22**	**0.54**	**0.10**	**0.10**	**0.20**	**0.30**	**0.00**	**0.61**	**0.29**	**0.39**	**0.35**	**0.28**

Source: Author, 2019

Net Dominance and Rank of Household Poverty in Ghana and Kenya

The average probability of net dominance (ND) is the difference between the average probability of dominating and of being dominated by all other areas, i.e. the RAV less the CAV. Table 22 depicts the average ND and the rank of household poverty over time across the geographical groupings of Ghana and Kenya respectively and the change in ND between 2014 and 1993. Regions with relatively lower ND and higher ranks correspond to poorer regions in terms of poverty, whereas the opposite is exact for better-off regions.

The table depicts the ND and the rank across the administrative regions of the two countries. The rank for each survey is shown beside the ND, and the last column shows the changes between 1993 and 2014 surveys. In the case of Ghana, it can be seen that the Greater Accra and the Ashanti regions recorded the highest ND in all the years and are the better off regions in the country. On the other hand, the Volta region, Upper East and Northern regions are generally the worst-off regions in all the survey periods.

The bottom part of Table 22 indicates the ND and the rank of household poverty across the administrative regions of Kenya. The general picture from the table is that Nairobi, Central and Coast are the best-performing regions in Kenya, whereas the North Eastern, Western and Eastern are the worse off regions. The rank of the regions for each survey are shown beside the ND, and the last column shows the change in rankings across the five surveys.

Table 22: *ND and Rank of Household Poverty in Ghana and Kenya*

	1993		1998		2003		2008		2014			
Ghana	ND	Rank	ND	Rank	ND	Rank	ND	Rank	ND	Rank	change	Rank
Greater Accra	0.94	1	0.83	1	0.8	1	0.73	1	0.82	1	-0.12	9
Ashanti	0.04	2	0.19	2	0.12	2	0.4	2	0.38	2	0.34	1
Western	-0.16	7	0.02	5	0.07	3	-0.08	6	0.00	3	0.16	2
Eastern	-0.03	4	0.07	4	-0.04	4	0.04	4	0.00	4	0.03	4
Central	-0.02	3	0.1	3	-0.08	6	0.18	3	-0.03	5	-0.01	5
Upper West	-0.22	8	-0.17	6	-0.23	8	0	5	-0.14	6	0.08	3
Brong Ahafo	-0.12	6	-0.24	8	-0.07	5	-0.22	8	-0.17	7	-0.05	7
Upper East	-0.08	5	-0.2	7	-0.31	10	-0.09	6	-0.22	8	-0.14	10
Northern	-0.28	9	-0.48	9	-0.24	9	-0.68	10	-0.34	9	-0.06	8
Volta	-0.33	10	-0.73	10	-0.19	7	-0.22	8	-0.37	10	-0.04	8
Kenya												
Nairobi	0.91	1.00	0.96	1.00	0.97	1.00	1.00	1.00	1.00	1	0.09	5
Central	-0.05	2	-0.04	2	0.41	2	0.29	2	0.49	2	0.54	1
Eastern	-0.25	6	-0.22	6	-0.27	7	-0.33	6	0.15	3	0.4	2
Coast	-0.13	3	-0.21	4	-0.09	3	-0.15	3	-0.09	4	0.04	6
Nyanza	-0.58	7	-0.37	7	-0.18	4	-0.29	5	-0.24	5	0.34	4
Rift Valley	-0.21	5	-0.21	5	-0.22	6	0.2	4	-0.29	6	-0.08	7
Western	-0.15	4	-0.16	3	-0.18	5	-0.3	7	-0.35	7	-0.2	8
North Eastern					-1.00	8	-0.26	8	-0.61	8	N/A	

Source: Author, 2019

Objective 2: Assessing the spatial distribution of household deprivation poverty in Ghana and Kenya

Concerning the results in Table 22, the study has presented the spatial distribution of household poverty among the geographical groupings in Ghana and Kenya respectively. It is worth stating that no attempt has been made to either measure or quantify household poverty in each of the regions of Ghana and Kenya, rather FOD is based on relative welfare of each of the regions used to assess their poverty status.

Chapter Summary

This chapter presented the results and discussions of the spatial and temporal poverty from the perspective of deprivations in Ghana and Kenya respectively. The chapter used five dimensions of basic household capabilities in water, sanitation, shelter, information and education to assess the poverty situation of households in both countries between 1993 and 2014 survey periods. The chapter presented detailed results on the various welfare combination of households, and the number of deprivations across geographical groupings. Finally, the chapter provided the empirical results on the temporal and spatial FOD comparisons across the main geographical groupings of Ghana and Kenya respectively.

CHAPTER FIVE

POVERTY METHODS, DEPRIVATION MEASURES AND SOCIAL PROTECTION IN GHANA

Introduction

This chapter provides an empirical analysis of the normative evaluations inherent in poverty assessment in Ghana. These normative evaluations are within the spheres of poverty methods using money-metric approaches in consumption expenditure and income, and deprivation measures using the MPI, and MCA. These approaches are assessed against the background of the first SDG which seeks to end all forms of poverty before 2030. Furthermore, the chapter tests two sequential hypotheses: (1) NHIS has a poverty reduction effect on beneficiary households in Ghana; and (2) NHIS has a greater poverty reduction effect on beneficiary households in the rural areas compared to their urban counterparts.

Normative Evaluations in Money-Metric Poverty Measures

This section verifies the sensitivity of the poverty situation of the country to disaggregation, poverty indicator and poverty line. The essence is rooted in the observation that though poverty levels as measured by the GSS has recorded significant reduction at the national level, disparities persist.

The Trend of Household Food and Non-Food Expenditure

The trend of household consumption expenditure between 1992 to 2013 survey periods is shown in Figure 8. From the figure, total consumption expenditure

is disaggregated into food and non-food expenditure. All the two components of household expenditure increased over the 20 years. However, in 1992, 1999 and the 2006 survey periods, households spent GH¢6.9, GH¢48.4, GH¢30.8 more on food items compared to nonfood items respectively. The reverse was the case in the 2013 survey period were households spent as large as GH¢620.6 more on nonfood items compared to that of food. This swift contrast may emanate from the observation that most of the new consumer goods that entered the consumption basket of Ghanaian households in 2013 are principally nonfood in nature. Some of these are user values for a vacuum cleaner, rice cooker, toaster, electric kettle, water heater etc. which were non-existent for the previous surveys (1992-2006).

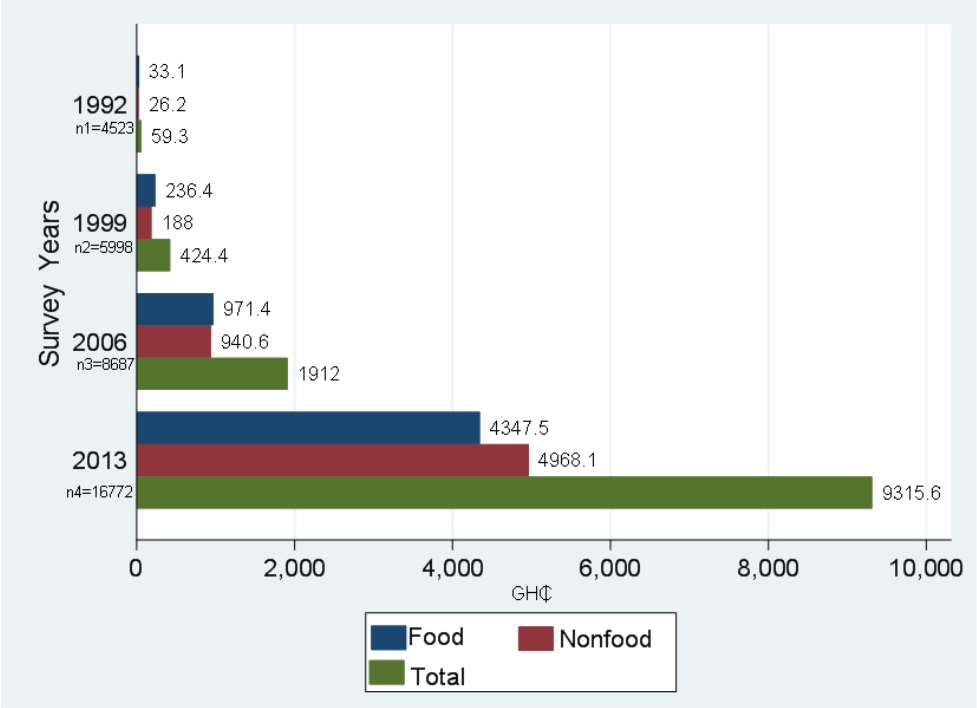

Figure 8: Trends in food and non-food consumption expenditure between 1992 and 2013

Source: Author, 2019

Food and Non-Food Consumption Expenditure Poverty

Tables 23 and 24 show the incidence (P_0) and extreme (P_1) food and non-food poverty between 1992 and 2013 survey periods. The last two columns indicated percentage changes in the incidence and extreme poverty estimates between 1992 and 2013 survey periods. From Table 23, the greatest reduction in the incidence of food consumption expenditure poverty was recorded in the urban area (33.2%), Greater Accra (50.8%), coastal zone (37.7%) between 1992 and 2013. In contrast, the lowest reduction was recorded in the savannah zone (6.6 %), Northern (7.1%) and, even Upper West recording an increase of 7.9 per cent. Besides the Greater Accra region (50.8%), none of the geographical groupings reduced their incidence of food expenditure poverty by more than half. The national incidence recorded about a quarter percentage decrease of only 26.3 per cent between 1992 and 2013 surveys. This is not the case compared to the incidence of overall consumption expenditure poverty by GSS (2014) where poverty reduced by more than half (53.2%) between the same period. Concerning the extreme food consumption expenditure poverty, the distribution is generally similar to the case of the overall consumption expenditure poverty. The rural, Savannah, the Upper West, Upper East and the Northern regions have recorded the highest incidence across the survey periods compared to the urban, coastal, Greater Accra and the Ashanti regions which recorded relatively lower incidence. In terms of the percentage change of extreme poverty over the two decades, about 10 out of the 15 geographical groupings recorded percentage decrease of at least half. These areas are the Greater Accra (73.4%), Ashanti (66%), Coastal (65.1%), Western

(63.9%),Urban(61.3%), Eastern (60.3%), Forest(57.9%), Brong Ahafo (56.3%), and the Upper East(52.1%). The resultant being extreme food expenditure poverty at the national level also reduced by more than halve by 55.3 per cent. This corresponds with the findings of extreme consumption expenditure poverty by GSS (2014) which also recorded a percentage decrease of more than halve.

In terms of non-food consumption expenditure poverty using Table 24, the highest percentage reduction in the incidence of non-food expenditure poverty was recorded in the Greater Accra region (67%), Coastal (48.7%) and urban (46.4%) compared to the relatively lower percentage point decreases in the Northern (8.4%), Upper West (8.7%) and the Savannah zone (10.4%). Apart from the Greater Accra region, none of the geographical groupings recorded a percentage decrease of more than half. The national incidence of non-food consumption expenditure recorded percentage decrease of 32.1 per cent. This finding contrasts the case of the overall consumption expenditure poverty where the national poverty incidence decreased by more than half (53.2%) between the same period (GSS, 2014). Considering the case of the extreme non-food poverty revealed a steeper general decline compared to its incidence between the 2013 and the 1992 survey periods. Eight out of the 15 geographical groupings used for the analyses recorded percentage decrease in the extreme nonfood poverty by more than half. Greater Accra (85.6%), Urban (72.8%), Coastal (70.5%), Western (63.8%), Ashanti (58.2%), Eastern (56.3%), Central (54.7%) and Forest (53.1%) fall into this category. This culminated into the national sample recording a percentage decrease of 53.3 per cent.

Tables 23 and 24 have shown that it was only the cases of extreme food and non-food expenditure poverty that mimic the overall poverty situation of Ghana. However, this was not the case for the incidence of poverty (headcount index) of food and non-food expenditure poverty. These findings suggest that the reduction in the incidence of consumption expenditure poverty by more than halve between 1992 to 2013 is sensitive to disaggregation into food and non-food expenditures. Whereas, this is not the case for extreme food and non-food expenditure poverty.

Table 23: *Food Consumption Expenditure Poverty (%)*

	1992		1998		2006		2013		% Change	
Area	Po	P1	Po	P1	Po	P1	Po	P1	Po	P1
Rural	85.4	75.6	77.1	65	70	55.7	70.0	40.0	-18.0	-47.1
Urban	73.4	56.9	55.9	41.5	48.4	34.4	49.0	22.0	-33.2	-61.3
Coastal	77.1	63.1	61.3	45.6	55.3	40.2	48.0	22.0	-37.7	-65.1
Forest	83.0	71.3	68.4	55.0	58.7	42.6	61.0	30.0	-26.5	-57.9
Savannah	84.6	75.6	90.4	84.2	80.0	71.7	79.0	53.0	-6.6	-29.9
Western	85.6	74.7	68	50.2	57.1	39.8	60.0	27.0	-29.9	-63.9
Central	73.4	59.2	75.9	66.0	56.7	40.8	59.0	28.0	-19.6	-52.7
Greater Accra	73.1	56.3	43.8	25.6	53.2	40.1	36.0	15.0	-50.8	-73.4
Volta	81.4	68.2	76.2	58.1	66.7	50.5	65.0	40.0	-20.1	-41.3
Eastern	80.6	70.5	76.8	63.5	47.0	31.4	61.0	28.0	-24.3	-60.3
Ashanti	81.0	67.7	58.6	46.4	60.7	44.6	54.0	23.0	-33.3	-66.0
Brong Ahafo	89.3	80.1	65.2	56.1	65.8	48.8	69.0	35.0	-22.7	-56.3
Northern	84.0	75.0	85.7	78.5	73.2	63.0	78.0	52.0	-7.1	-30.7
Upper East	94.7	87.6	97.8	94.8	85.4	77.5	73.0	42.0	-22.9	-52.1
Upper West	80.1	69.9	95.3	87.6	95.5	93.4	88.0	72.0	9.9	3.0
National	81.4	69.4	70.1	57.2	61.9	47.7	60.0	31.0	-26.3	-55.3
N	4523	4523	5998	5998	8687	8687	16772	16772	N/A	N/A

Source: Author, 2019

Table 24: *Nonfood Consumption Expenditure Poverty (%)*

	1992		1998		2006		2013		% Change	
Area	Po	P1	Po	P1	P0	P1	Po	P1	P0	P1
Rural	95.7	92.2	90.4	83.3	86.6	77.8	81.1	59.9	-15.3	-35.03
Urban	73.7	62.5	60.4	48.2	42.9	29.8	39.5	17	-46.4	-72.80
Coastal	83.9	75.8	69.6	58.1	58	45.4	43.0	22.4	-48.7	-70.45
Forest	88.5	82.3	81.2	71.6	69.1	57.5	63.4	38.6	-28.4	-53.10
Savannah	96.3	94	97.9	96.1	92.7	88.6	86.3	70.3	-10.4	-25.21
Western	94.4	90.2	79	68.2	69	55.4	56.4	32.7	-40.3	-63.75
Central	91.3	84.6	91.7	83.8	68.8	58.4	66.6	38.3	-27.1	-54.73
Greater Accra	68.2	55.5	43.7	28.8	43.2	29.9	22.5	8.00	-67.0	-85.59
Volta	93.3	87.3	87.4	80.1	79.6	70.7	76.0	51.8	-18.5	-40.66
Eastern	94.2	89.0	88.9	79.2	71.8	57.1	64.5	38.9	-31.5	-56.29
Ashanti	80.3	72	66.7	55.6	59.1	46.9	54.9	30.1	-31.6	-58.19
Brong Ahafo	89.8	85.4	90.3	80.1	74.8	66.6	67.9	43.5	-24.4	-49.06
Northern	94.7	90.4	97.3	95.1	90.6	85.1	86.7	69.9	-8.4	-22.68
Upper East	98.3	98.3	97.3	96.3	95	92.3	83.2	64.9	-15.4	-33.98
Upper West	97.8	97.7	100	99.1	96.7	95.5	89.3	79.0	-8.7	-19.14
National	88.4	82.3	80.4	71.6	70.3	59.9	60.0	38.4	-32.1	-53.34
N	4523	4523	5998	5998	8687	8687	16772	16772	N/A	N/A

Source: Author, 2019

The Sensitivity of Monetary-Metric Poverty to the Choice of Indicators

There are two main indicators for measuring monetary poverty, namely household consumption expenditure and income. Though considerable arguments support the choice of the former over the latter, this section intends to assess whether using income as the indicator of monetary poverty in Ghana will also indicate the considerable poverty reduction as that of the consumption expenditure poverty. In addition, the section also ascertains whether the two approaches are sensitive to rankings across the sets of geographical groupings of the country. In order to estimate the income poverty for the country and over time, the study used the methodology inherent in the consumption expenditure estimation by applying the same upper and lower poverty lines to the gross household income in each survey periods of the GLSS. In addition, the gross household income was corrected to engender comparisons across the survey years by dividing it by the adult equivalence scale and the prevailing price index in each survey.

The Incidence and Extreme Income Poverty in Ghana

The incidence and extreme income poverty are presented between the 1992 and the 2013 survey periods in Table 25. As a recap, the poverty lines for the consumption expenditure poverty are applied to the case of the income poverty. Specifically, upper and lower poverty lines of GH¢ 70 and GH¢ 90 for the 1992 to 2006 survey periods respectively, whereas a revised upper and lower poverty lines of GH¢1314 and GH¢792.05 apply to the 2013 survey. From the table, the national incidence of income poverty indicated that poverty reduced marginally by one (1)

percentage points between the 1992 to 1998 survey periods, whereas that of the extreme income poverty slightly increased by 0.4 per cent.

Further, between 1992 and 2006 surveys, the incidence of income poverty increased from 67 to 74 percentage points; likewise, extreme poverty also increased from 59.6 to 68.2 per cent between the same period. This contrast the findings from the consumption expenditure poverty where poverty levels at the national level generally decline between 1992 to 2006 surveys (GSS, 2014). Comparing the national income poverty between the two decades (1992 to 2013) period, the findings revealed a general decline. The incidence recorded a percentage decrease of 29.7 per cent which is less than half as recorded by the consumption expenditure poverty of 53.2 per cent. The implication is that assuming the country adopts household income as the standard of living measure, the general poverty levels of the country would not have been halved by the year 2013 as in the case of the consumption expenditure poverty.

Further, against the backdrop of the first SDG advocating for ending all forms of poverty by the year 2030, income poverty incidence of about half of the population of Ghana (47.1%) based on the most recent survey taunts the impressive poverty reduction story recorded by the consumption expenditure poverty. The extreme income poverty recorded a percentage decrease of 48.3 per cent between 1992 to the 2013 survey period. This decline is impressive given it is almost halved between the two decades (1992-2013), however comparing 48.3 per cent decline to 77.4 per cent decline in extreme consumption expenditure poverty between the same period leaves much to be desired. In addition, extreme income poverty of

more than a quarter of the population of Ghana (30.8 % in 2013) is undesirable. The preceding suggests that the significant poverty reduction by halving in Ghana is sensitive to the choice of the monetary indicator used.

Table 25: *The Incidence and Extreme Income Poverty over time in Ghana*

Areas	1992		1998		2006		2013		% change	
Area	Po	P1	Po	P1	Po	P1	Po	P1	Po	P1
Rural	75.7	69.2	73.	67	79.8	74.1	53.7	35.9	-29.1	-48.1
Urban	49.5	40.4	52	46	65.1	58.3	40.5	25.6	-18.2	-36.6
Coastal	58.2	49.3	53	46	65.8	59.3	40.1	26.0	-31.1	-47.3
Forest	65.3	57.8	67	60	75.4	68.4	43.5	26.8	-33.4	-53.6
Savannah	87.3	83.0	87	85	85.3	82.3	70.4	51.8	-19.4	-37.6
Western	65.7	57.3	61	53	67.4	59.6	38.0	24.0	-42.2	-58.1
Central	66.6	57.8	59	52	69.8	63.9	55.5	39.4	-16.7	-31.8
Greater Accra	44.3	35.0	40	35	62.3	56.1	34.1	19.9	-23.0	-43.1
Volta	60.3	52.7	68	64	79.8	74.0	48.7	32.0	-19.2	-39.3
Eastern	76.5	71.3	74	65	74.7	65.4	41.7	23.2	-45.5	-67.5
Ashanti	60.8	53.4	57	51	73.5	67.0	41.1	25.3	-32.4	-52.6
Brong Ahafo	68.1	59.0	76	67	75.9	70.8	45.8	28.9	-32.7	-51.0
Northern	85.2	79.6	87	84	79.6	76.2	67.9	47.5	-20.3	-40.3
Upper East	89.8	86.1	82	79	93.4	89.7	74.6	57.0	-16.9	-33.8
Upper West	89.4	87.0	96	95	93.8	92.6	73.5	59.5	-17.8	-31.6
National	67.0	59.6	66	60	74.0	68.2	47.1	30.8	-29.7	-48.3
n	4523	4523	5998	5998	8687	8687	16549	16549	N/A	N/A

Source: Author, 2019

Comparison of Income and Consumption Expenditure Poverty

Table 26 compares the rankings of the incidence of poverty using income and consumption expenditure across three sets of geographical groupings in the country, namely the area of residence (rural and urban), ecological zones (coastal, forest and savannah) and the ten administrative regions. In doing the rankings, the five (5) large area aggregates (residence and ecological zones) are ranked differently from the ten (10) administrative regions. From the table, higher ranking corresponds to poorer regions, and the reverse also holds. The rankings of the consumption expenditure poverty are in the bracket attached to that of the income poverty. The entries in the 'Diff' column are binary where '1' denotes the situation where the ranking of the incidence of income and consumption expenditure poverty is different, and '0' when they are the same. In the 1992 survey, the rankings for the large area aggregates for the incidence of income and consumption expenditure poverty are all the same, as indicated by '0' under the Diff column. In terms of the rankings for the ten administrative regions, significant variations persist: only Greater Accra and the Upper East regions recorded the same ranking across the two measures.

This implies about 80 per cent variation in ranking at the regional level between the two poverty measures. In the 1998 comparisons, the rankings across the large area aggregates are not sensitive to the poverty indicator with the differences in rankings being zero (0). However, the rankings recorded considerable differences across the ten administrative regions. Seven (7) out of the ten regions recorded differences in rank across the two measures registering a variation of 70

per cent. In the 2006 survey period, the rankings remain the same for the large area aggregates whereas the regional variations indicated six (6) out of 10 regions recording differences in rankings. In terms of the 2013 survey, the large area aggregate recorded two differences in rankings out of the five areas, namely the coastal zone and the urban area. The regional variations in rankings are much more pronounced with nine (9) out of the ten administrative regions recording differences in rankings. This reflects a variation of about 90 per cent at the regional level when the two approaches are used to rank regions in terms of their poverty levels in order to influence policy. The only region with a consistent ranking across the four survey periods is the Greater Accra region. This is not surprising as the Greater Accra is the capital city of the country, boast of considerable opportunities and welfare. The results from this section have shown that the ranking of larger areas using their incidence of poverty is not sensitive to the monetary indicator deployed. However, the regional rankings are sensitive to the monetary indicator deployed in income or consumption expenditure.

Table 26: Comparisons of the Rankings of Income and Consumption Expenditure Poverty

Large Areas	1992		1998		2006		2013	
	Ranks	Diff	Ranks	Diff	Ranks	Diff	Ranks	Diff
Rural	4(4)	0	4(4)	0	4(4)	0	4(4)	0
Urban	1(1)	0	1(1)	0	1(1)	0	2(1)	1
Coastal	2(2)	0	2(2)	0	2(2)	0	1(2)	1
Forest	3(3)	0	3(3)	0	3(3)	0	3(3)	0
Savannah	**5(5)**	0	5(5)	0	5(5)	0	5(5)	0
Regions								
Western	4(6)	1	4(2)	1	2(3)	1	2(4)	1
Central	5(3)	1	3(7)	1	3(4)	1	7(3)	1
Greater Accra	1(1)	0	1(1)	0	1(1)	0	1(1)	0
Volta	2(4)	1	5(5)	0	8(7)	1	6(7)	1
Eastern	7(5)	1	6(6)	0	5(2)	1	4(5)	1
Ashanti	3(2)	1	2(3)	1	4(5)	1	3(2)	1
Brong Ahafo	6(8)	1	7(4)	1	6(6)	0	5(6)	1
Northern	8(7)	1	9(8)	1	7(8)	1	8(9)	1
Upper East	10(10)	0	8(10)	1	9(9)	0	10(8)	1
Upper West	9(8)	1	10(9)	1	10(10)	0	9(10)	1

Source: Author, 2019

Sensitivity to New Poverty Line for Lower Middle-Income Countries

The new poverty line for LMICS released by the World Bank in 2011 is $3.20. The sensitivity of this poverty line to the current poverty line of $1.83 used in Ghana is ascertained in this section. The mentioned poverty lines are converted to the local currency (cedis) using the 2013 average monthly exchange rate of 1.941. Consequently, the corresponding poverty lines of $3.2 and $1.83 are GHS2263 and GHS1314 respectively. The latter is the current poverty line used by the GSS, whereas the former is World Bank's proposed poverty line for LMICS .

Two main sensitivity analyses are carried out in this section: Sensitivity across levels in 2013, and the degree of the fall compared to that of the 1992 estimates. Table 27 shows the estimates.

From the table, the national incidence of poverty using the LMIC new poverty line of GH¢2263 in 2013 is 52.3 per cent. This implies that as a LMIC, using consumption expenditure, more than half of Ghanaians are poor and cannot afford their minimum food and non-food needs. Comparing this figure to the prevailing poverty incidence in the country in the same period of 24.2 per cent signifies that the proportion of the poor has more than doubled from about a quarter of the population to more than half as a middle-income country. This suggests that the level of poverty in Ghana is dependent on the poverty line deployed and therefore likely to be sensitive to other poverty lines. Further, comparing the incidence of the new poverty line (52.3%) in 2013 to the 1992 poverty incidence of 51.72 per cent signifies that between the two periods, the incidence of poverty somewhat increased by 1.12 per cent.

This starkly contrasts the GSS poverty estimates which indicate that poverty reduced by more than half (52.96%) between 1992 and 2013 survey periods. This implies that the poverty situation of the country using the World Bank's poverty line for LMICS makes Ghana worse-off. The preceding suggests that the incidence of poverty in Ghana is sensitivity to the poverty line used.

Table 27: Sensitivity of Poverty Estimates to the World Bank's New Poverty Line

New Poverty Line for LMIC				Bench Mark (GSS)		
Areas	1992	2013	%Change	1992	2013	% Change
	Po	*Po*		*Po*	*P0*	
Rural	63.62	69.73	9.60	63.62	37.91	-40.41
Urban	27.72	34.96	26.12	27.72	10.62	-61.69
Coastal	42.38	37.42	-11.70	42.38	13.11	-69.07
Forest	51.51	53.54	3.94	51.51	22.29	-56.73
Savannah	68.82	78.96	14.73	68.82	52.39	-23.87
Western	59.55	48.80	-18.05	59.55	20.88	-64.94
Central	44.27	55.28	24.87	44.27	18.82	-57.49
Greater Accra	25.78	21.29	-17.42	25.78	5.61	-78.24
Volta	47.96	63.94	33.32	47.96	33.84	-29.44
Eastern	57.01	54.92	-3.67	57.01	21.65	-62.02
Ashanti	41.23	45.15	9.51	41.23	14.75	-64.23
Brong Ahafo	65.00	59.68	-8.18	65.00	27.86	-57.14
Northern	63.43	78.73	24.12	63.43	50.35	-20.62
Upper East	88.40	74.01	-16.28	88.40	44.40	-49.77
Upper West	66.90	86.73	29.64	66.90	70.68	5.65
National	51.72	52.30	1.12	51.72	24.33	-52.96

Source: Authors, 2019

Deprivation Poverty Measures

This section presents the estimates of the two measures of deprivation poverty, namely the MPI and the MCA. The first sub-section presents the indicators and the estimates of the MPI measure between the 1993 and 2014 survey periods. The MPI estimates represent household deprivation poverty over time. The estimates emanating from the MCA represent asset poverty is presented in Appendix A.

Indicators of Household Deprivation

The MPI index broadly entails three dimensions of household deprivation, namely education, health and standards of living. Out of these three dimensions, ten (10) indicators are used to measure household deprivation poverty in Table 28. From the table, all the ten household deprivation indicators have shown improvement between 1993 and 2014. The largest improvements as measured by percentage point differences between the 1993 and 2014 survey periods in the order of magnitude were achieved in years of schooling (40.6%), electricity (40.3%), information (35.6%) and sanitation (32.15%). In terms of halving the deprivation levels between 1993 and 2014, five out of the ten indicators have realised this feat, namely years of schooling, child mortality, child stunting, information and electricity.

Table 28: *Proportion of Households Deprived in the Ten Indicators of MPI*

Indicators	1993	1998	2003	2008	2014
Education					
<5 years of schooling	61.41	32.74	30.45	24.98	20.86
Child school attendance	10.86	12.17	17.37	6.67	7.91
Health					
Child Mortality	6.30	5.20	5.69	1.86	2.68
Child stunting	10.08	13.15	17.23	5.68	4.52
Living standards					
Sanitation	79.25	69.9	67.3	49.29	47.1
Water	51.71	49.68	42.55	35.69	47.2
Shelter	14.52	16.77	15.63	18.24	8.34
Information	57.73	49.55	28.09	23.00	22.12
Overcrowding	10.94	9.76	N/A	9.55	8.19
Electricity	69.35	60.96	56.76	44.76	29.01
N	5794	5940	6205	11829	11829

Source: Author, 2019

MPI Index across Geographical Groupings

The multidimensional poverty assessment of the country based on the ten indicators is presented in Table 29 for the survey periods 1993 and 2014 deprivation ratios. The central crust of this section, however, is to ascertain whether the incidence of multidimensional poverty ratios have declined by more than halve between the two survey periods. From the table, the headcount index (Ho) known as the incidence of multidimensional poverty measures the percentage of multidimensionally poor households in the country. The intensity index (Ao) measures the average number of deprivations poor households experience at the same time. This can also be described as the burden of deprivation on poor households. Mo is the composite index derived from the product of the headcount and the intensity of multidimensional deprivation (Ho × Ao).

From the table, the incidence of poverty (Ho) in the 1993 survey period indicates that 73 per cent of the households were multidimensionally deprived at the national level. The incidence of poverty by 2014 reduced steeply to 31 per cent. This registered more than halve reduction in the incidence of multidimensional deprivation poverty. This mimics the reduction in the incidence of poverty from the perspective of consumption expenditure poverty where the incidence of poverty decreased by more than half (GSS 2007, 2014). All the geographical groupings recorded more than half per cent decrease in the incidence of poverty between the two survey periods.

The intensity of poverty (Ao) indicates that poor households are experiencing average deprivation levels of 40 per cent in the 1993 survey period at

the national level. This signifies the burden of deprivation on poor households in the country. In 2014 survey period, the intensity of multidimensional poverty on poor households decreased by eight percentage points to 32 per cent. The study by GSS (2013) using the 2010 GPHC has also registered a high intensity of poverty of 46 per cent. This shows that though the incidence of multidimensional poverty has decreased significantly in the country, the same cannot be said concerning the burden of deprivation poor households are experiencing.

The adjusted headcount is the incidence of poverty that adjusts for the intensity of the multiple deprivations that poor households are experiencing. The 1993 survey recorded adjusted headcount of 29 per cent at the national level, which reduced substantially to 10 per cent in the 2014 survey period. All the geographical groupings recorded a significant reduction in the adjusted headcount akin to the incidence of multidimensional poverty. The preceding discussion concerning Table 31 suggests that though the headcount and the adjusted headcount have registered significant poverty reduction by more than half, the intensity of the multidimensional household poverty indicates that the burden of deprivation on poor households remained high over the periods considered for the study.

Table 29: *MPI Scores for 1993 and 2014 Surveys*

	1993			2014			Change		
Areas	H0	A0	M0	H0	A0	Mo	H0	A0	M0
RA	0.85	0.42	0.36	0.44	0.34	0.15	-0.41	-0.08	-0.21
UA	0.47	0.32	0.15	0.18	0.28	0.05	-0.29	-0.04	-0.10
CZ	0.62	0.37	0.23	0.24	0.30	0.07	-0.38	-0.07	-0.16
FZ	0.74	0.38	0.28	0.28	0.32	0.09	-0.46	-0.06	-0.19
SZ	0.87	0.48	0.42	0.56	0.38	0.21	-0.31	-0.11	-0.21
WR	0.76	0.39	0.30	0.22	0.27	0.06	-0.54	-0.12	-0.24
CR	0.75	0.37	0.28	0.42	0.31	0.13	-0.33	-0.06	-0.15
GAR	0.39	0.33	0.13	0.17	0.29	0.05	-0.22	-0.04	-0.08
VR	0.74	0.41	0.30	0.33	0.33	0.11	-0.41	-0.07	-0.19
ER	0.69	0.38	0.26	0.30	0.33	0.10	-0.39	-0.04	-0.16
AR	0.76	0.37	0.28	0.22	0.32	0.07	-0.54	-0.05	-0.21
BAR	0.76	0.38	0.29	0.34	0.32	0.11	-0.42	-0.06	-0.18
NR	0.89	0.51	0.45	0.59	0.39	0.23	-0.30	-0.12	-0.22
UER	0.87	0.47	0.41	0.50	0.34	0.17	-0.37	-0.13	-0.24
UWR	0.83	0.46	0.38	0.53	0.36	0.19	-0.30	-0.10	-0.19
NAT	0.73	0.40	0.29	0.31	0.32	0.10	-0.42	-0.08	-0.19
n		5974			11829				

Source: Author, 2019

The Sensitivity of Deprivation and Poverty Measures to Regional Rankings

This section depicts the sensitivity of the rankings of deprivation measures (MPI, FOD and Asset Poverty) and poverty methods (consumption expenditure and income poverty) across the ten administrative regions. The differences in ranking are presented using Table 30. From the table, the Greater Accra and the Ashanti regions are the least poor areas of the country across all the deprivation and poverty measures by registering the least rankings.

This suggests that poverty levels irrespective of the approach mainly adopted depicted the two regions as the least poor regions in the country, though the Ashanti region was the third better-off region in the case of household income poverty. The second pattern depicted in the table is that the three regions in the savannah zone of the country, namely the Upper East, Upper West and the Northern regions have been ranked mainly as the worst regions in the country, albeit the FOD approach has indicated the Volta region as the worst region. Though rankings are somewhat different between these two extremes, the pattern of poverty across the deprivation and poverty methods are mostly similar in the country. This finding is corroborated by Dhongde and Minoiu (2013) who found that though variations exist in the estimates of global poverty using multiple techniques, the patterns are relatively consistent across methods.

Table 30*: Rankings of Deprivation Measures and Poverty Methods*

REGIONS	MPI Rankings	Asset P Rankings	FOD Rankings	CEP Rankings	IP Rankings
Greater Accra	1	1	1	1	1
Ashanti	2	2	2	2	3
Western	2	3	3	4	2
Central	7	4	5	3	7
Eastern	4	5	4	5	4
Volta	4	6	10	7	6
Brong Ahafo	4	7	7	6	5
Northern	10	8	9	9	8
Upper West	9	9	6	10	9
Upper East	8	10	8	8	10

Source: Author, 2019

Objective 3: Compare outcomes of poverty methods and deprivation measures

In order to satisfy the third objective of the study, four comparisons of poverty outcomes were conducted. First, the chapter ascertained whether the significant consumption expenditure poverty in Ghana is sensitive to decomposition into food and non-food consumption expenditure poverty, and income poverty. Second, the chapter compared the outcomes of the consumption expenditure poverty in the country with the World Bank's new poverty line for the LMICS. Finally, a comparison was done across the outcomes of the poverty methods and the deprivation measures using the sixth round of the GLSS. The results generally suggest that poverty levels are sensitive to decomposition (food and non-food), poverty indicator (consumption expenditure and income), and the poverty line adopted. However, the pattern of the regional rankings of the poverty methods and deprivation measures are not sensitive to the approach deployed.

The Impact of Health Insurance on Household Deprivation Poverty

Table 31 presents the summary statistics of the variables used in estimating the impact of NHIS on household poverty. The first three variables are continuous variables used in the model. Though the table presented their means only, their respective standard deviation and range are stated as follows. For the poverty index emanating from the MPI, the standard deviation is 0.139, and it ranges between 0 and 0.834. In the case of the age of the household head, the standard deviation is 9.769 and the variable ranges between 15 to 59 years. Finally, for household dependency ratio, the standard deviation is 1.128, and the range of the variable is between 0 and 7. Overall, Table 31 shows the frequency and the percentage distribution of all the other variables used in the estimation.

Table 31: *Summary Statistics of Variables*

Variables	Observations	Mean
Poverty Index	4814	0.146
Age of household head	4814	36.714
Dependency	4814	1.084
Educational Attainment of household head	Frequency	Per cent
None	925	19
Primary	744	16
At least Secondary	3145	65
	4814	100
The religion of the household head	Frequency	Per cent
Christian	3568	74
Islam	762	16
Traditional	234	5
None	250	5
	4814	100
Occupation of head of household	Frequency	Per cent
Not working	276	6
Managerial	532	11
Clerical	77	2
Sales	1096	23
Agricultural	1542	32
Services	116	2
Skilled Manual	766	16
Unskilled Manual	409	9
	4814	100
The ethnicity of head of household	Frequency	Per cent
Akan	2283	47
Ga	347	7
Ewe	639	13
Guan	128	3
Mole	943	20
Grusi	202	4
Gurma	232	5
Mande	40	1
	4814	100
Residence of the head of household	Frequency	Per cent
Rural	2272	47
Urban	2542	53

Table 31, continued

Variables	Observations	Distribution
Region of dwelling	Frequency	Per cent
Western	597	12
Central	521	11
Greater Accra	564	12
Volta	434	9
Eastern	549	11
Ashanti	562	12
Brong Ahafo	556	12
Northern	385	8
Upper East	375	8
Upper West	271	6
	4814	100
Marital Status of the head of household	Frequency	Per cent
Single	1058	22
Married	2920	61
Separated	836	17
	4814	100
Sex of head of household	Frequency	Per cent
Female	1992	41
Male	2822	59
	4814	100
Bank account ownership	Frequency	Per cent
No	2392	50
Yes	2422	50
	4814	100
Household size	Frequency	Per cent
Small (1 to 2 members)	1919	40
Average (3 to 5 members)	1984	41
Large (At least 6 members)	911	19
	4814	100
Convenient location of health facility	Frequency	Per cent
Convenient location	1640	66
Inconvenient location	3174	34
	4814	100
National Health Insurance Scheme	Frequency	Per cent
NHIS beneficiary households	3669	76
Non-beneficiary households of NHIS	1145	24
	4814	100

Source: Author, 2019

Mean Poverty Index for Beneficiary and Non-Beneficiary Households of NHIS

This section presents early descriptive of the distribution of the mean deprivation poverty index for the beneficiary and non-beneficiary households of NHIS in Ghana. This is presented using Figure 9. The mean poverty scores for the beneficiary and non-beneficiaries are presented across the entire sample using the large area aggregates, namely area of residence, ecological zone and the national sample. From the graph, beneficiary households of NHIS in the rural areas have lower deprivation poverty of 0.196 compared to their non-beneficiary counterparts of 0.212. The same trend is observed across the urban area and the three ecological zones.

Moreover, the national sample corroborated the trend by indicating that the mean deprivation poverty index for beneficiary households is lower than non-beneficiary households by 0.016 units. The findings from Figure 9 show that beneficiary households of NHIS have a lower poverty index than their counterparts (non-beneficiary households). This evidence proffered early support for the claim that beneficiary households of NHIS have a poverty-reducing effect.

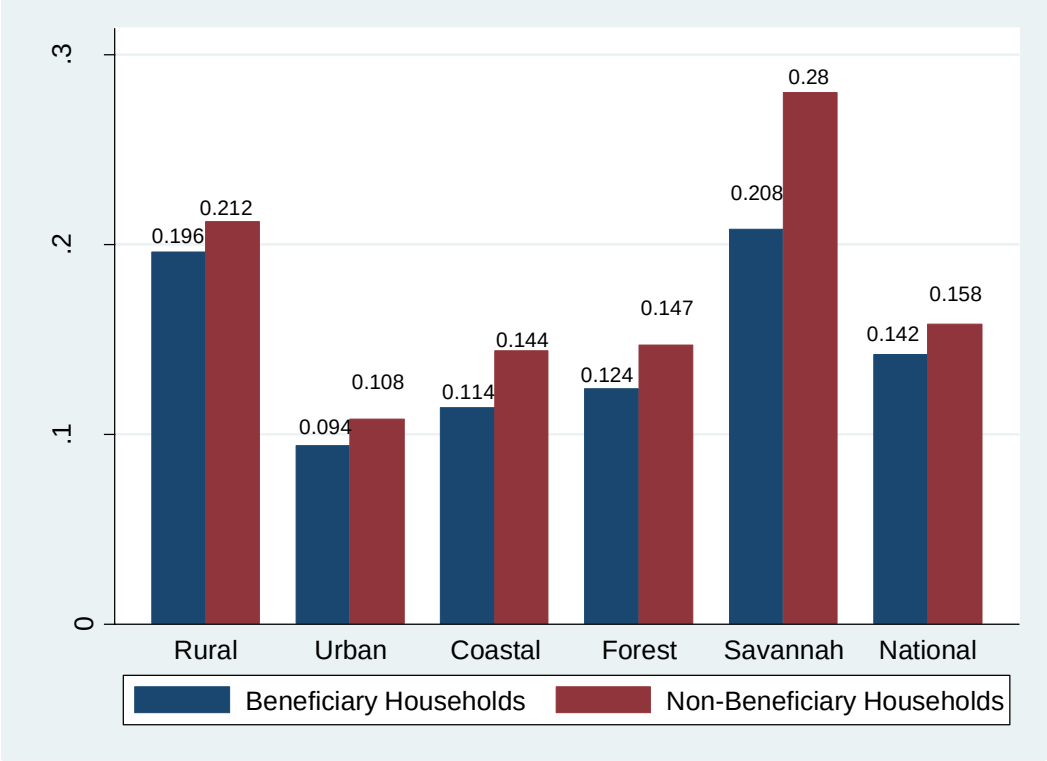

Figure 9 : Mean poverty index by household type across area aggregates

Source: Author, 2019

Econometrics Results of the Impact of NHIS on Poverty

The ETEM of Heckman sample selection technique is used to test two sequential hypotheses in this section: (1) being a beneficiary household of NHIS has a negative impact on household deprivation poverty; (2) beneficiary households of NHIS has a greater negative impact on household deprivation poverty in the rural areas compared to their urban counterparts. Also, the significance of the coefficients emanating from the ETEM has been verified using three variant PSM (common support, nearest neighbour and kernel), and Tobit techniques. The PSM technique also makes a valuable contribution by quantifying the impact of NHIS

from a counterfactual perspective, whereas the Tobit technique further validates the findings amidst leftward censoring concerns in the dependent variable.

The estimation results of the ETEM in Table 32 test the two hypotheses using models 3, 4 and 5 for the national, rural and urban samples respectively. Concerning the first hypothesis of testing whether NHIS has a negative impact on deprivation poverty of beneficiary households, the results from the national sample (model 3) indicate that beneficiary households of NHIS have 0.151 units of deprivation poverty index lower than non-beneficiary households of NHIS. This finding suggests that beneficiary households are relatively better-off. In terms of the second hypothesis, the impact of NHIS was tested on deprivation household poverty using rural and urban sub-samples respectively. Using the rural sub-sample (model 4), the results indicate that beneficiary households in the rural areas have 0.18 units of poverty index lower than non-beneficiary households in the rural area. The results from the urban sub-sample (model 5) on the other hand indicate that beneficiary households of NHIS have 0.131 units of poverty index lower than their counterparts in the urban area who are non-beneficiaries.

These consistent significant results across the three sub-samples at one (1) per cent significance level provide evidence of deprivation poverty reduction effect of NHIS among beneficiary households across the country. The results further indicate that the poverty reduction effect among beneficiary households in the rural areas (0.18) is higher than their urban counterparts (0.13). Imposing the chow test on the coefficient for the beneficiary rural and urban households from the respective samples of the ETEM indicate that their differences are significantly different from

zero at 5 per cent significance level. Hence, the poverty-reducing impact is higher among rural beneficiaries compared to their urban counterparts. The results of the Chow test are displayed below Table 32.

The other two estimation techniques using the PSM and the Tobit further firmed up the findings that beneficiary households of NHIS have a poverty reduction effect on household deprivation poverty, and that effects are higher among beneficiaries in the rural areas compared to their counterparts in the urban areas. Table 33 shows the results of the PSM. From the table, all the three variant PSM techniques (common support, nearest neighbour and kernel) have indicated that NHIS reduces deprivation poverty of beneficiary households at the national level by at least 0.03 units compared to the non-beneficiaries assuming that they are beneficiaries. The rural sample also indicates that beneficiaries in the rural areas reduce their deprivation poverty levels by at least 0.03 units using the kernel matching technique. The effects were significant across all the matching techniques for the rural and the national samples. The results of the urban sample have shown that beneficiary households of NHIS in the urban area reduced their poverty index by 0.019 units compared to their non-beneficiary urban counterparts assuming that they are beneficiaries. However, unlike the rural and national samples, it was only the kernel matching technique that was statistically significant in the case of the urban sample. In all, the PSM has corroborated the finding from the ETEM that NHIS has a poverty reduction effect on beneficiary households compared to non-beneficiary households. Also, the PSM further validates the finding that the effects are greater among beneficiaries in the rural areas (0.031) compared to their urban

counterparts (0.019) using the kernel matching technique. The Tobit model p in Appendix B further preserves the findings.

This finding suggesting the poverty reduction role of NHIS as a government social protection health insurance instrument is corroborated by a study on the flagship social protection programme of the country using government social assistance component of social protection. Handa et al. (2013) found that the cash transfer social protection programme in Ghana, popularly known as the LEAP Programme decreased child and household food insecurity, the likelihood of children falling sick and also increased secondary school enrolment among children between 13 to 17 years. Similar trends of poverty reduction impacts of social protection are also observed across developing countries. (Barrientos, 2005; Davis et al., 2016; Fiszbein & Schady, 2009; Samson et al., 2004). Whereas the mentioned studies are all oriented towards social assistance in cash transfers, the current study is making a case for the poverty reduction role of social protection via social health insurance component with evidence from Ghana.

Drawing on the conceptualisation of the role of health insurance in poverty reduction from the works of Hamid et al.(2011), Bonilla-Garcia and Gruat (2003) and Mathers and Slates (2014), this section argues that beneficiary households of NHIS reduce their household deprivation poverty through two channels. The first argues that beneficiary households improve their health status via increase utilisation of formal health care which boosts their labour supply and productivity and reduces health expenditures of households. The potential result is the enhancement and stabilisation of household income above subsistence level to

offset vulnerabilities, nutritional, human capital and physical assets deprivations that might beset the household. The second channel maintains that beneficiary households of NHIS have the potential of reducing the uncertainty of health expenditure emanating from shocks in the form of ill-health to a member of the household which could plunge households into vulnerabilities. Further, the reduction in uncertainty in health expenditure prevents households from engaging in distress selling of productive assets and harmful coping strategies as resorting to eating once in a day (or not eating at all) and some cases withdrawing children from school which may result in poor nutritional outcomes and depleting human capital among household members respectively. However, when social protection is in place, the vulnerable households then improve their plights and instead increase their investment to enhance their living conditions thereby reducing household deprivations significantly.

Table 32: *ETEM Results of the Effect of NHIS on Deprivation Poverty*

	(1)	(2)	(3)	(4)	(5)
Correlates	NHIS Coverage dydx(*)	Poverty OLS	Poverty ETEM	Poverty ETEM	Poverty ETEM
	National	*National*	*National*	*Rural*	*Urban*
Education of head (base=none)					
primary	0.004	-0.044***	-0.042***	-0.045***	-0.036***
	(0.022)	(0.007)	(0.007)	(0.008)	(0.007)
At least secondary	0.069**	-0.126***	-0.120***	-0.118***	-0.119***
	(0.019)	(0.006)	(0.006)	(0.008)	(0.006)
Religion of head (base=none)					
Christian	0.087**	-0.018**	-0.018**	-0.013	-0.024***
	(0.026)	(0.008)	(0.008)	(0.01)	(0.009)
Islam	0.088***	-0.029***	-0.029***	-0.029**	-0.023**
	(0.031)	(0.01)	(0.01)	(0.012)	(0.01)
Traditional	-0.053	0.003	0.004	-0.008	0.028**
	(0.04)	(0.012)	(0.012)	(0.013)	(0.016)
Occupation of head (base=not working)					
managerial	0.082**	0.001	0.003	-0.002	0.011
	(0.021)	(0.006)	(0.006)	(0.016)	(0.008)
clerical	0.037	-0.003	0.00	-0.013	0.005
	(0.047)	(0.008)	(0.008)	(0.03)	(0.012)
sales	-0.033	0.003	0.001	-0.005	0.004

Table 32, continued

	(1)	(2)	(3)	(4)	(5)
Agriculture	-0.018	0.041***	0.039***	0.032**	0.026***
	(0.028)	(0.007)	(0.007)	(0.013)	(0.009)
services	-0.036	0.008	0.007	-0.016	0.020*
	(0.044)	(0.009)	(0.009)	(0.028)	(0.01)
skilled manual	-0.034	(0.001)	(-0.001)	(-0.016)	(0.011)
	(0.028)	(0.007)	(0.007)	(0.014)	(0.007)
unskilled manual	-0.028	0.001	-0.001	-0.012	0.007
	(0.031)	(0.007)	(0.007)	(0.016)	(0.008)
The ethnicity of the head (base=Akan)					
Ga	0.027	0.006	0.008	0.034***	-0.005
	(0.024)	(0.006)	(0.006)	(0.013)	(0.006)
Ewe	0.011	0.009	0.011***	0.022**	0.004
	(0.024)	(0.006)	(0.006)	(0.011)	(0.006)
Guan	0.037	-0.002	0	-0.019	0.018***
	(0.037)	(0.01)	(0.01)	(0.016)	(0.011)
Mole	0.021	0.009	0.011	0.013	0.007
	(0.023)	(0.007)	(0.006)	(0.011)	(0.007)
Grusi	0.047	-0.007	-0.005	-0.013	0.004
	(0.035)	(0.01)	(0.009)	(0.015)	(0.01)
Gurma	0.075***	0.042***	0.039***	0.042***	-0.009
	(0.028)	(0.011)	(0.01)	(0.013)	(0.012)
Mande	0.048	0.044**	0.052**	0.031	0.061***
	(0.062)	(0.023)	(0.024)	(0.036)	(0.017)

Table 32, continued

Variables	(1)	(2)	(3)	(4)	(5)
Residence (base=rural)					
urban	0.027**	-0.035***	-0.033***		
	(0.013)	(0.004)	(0.003)		
Region (base=Northern)					
Western	-0.143***	-0.027***	-0.030***	-0.055***	-0.002
	(0.028)	(0.009)	(0.009)	(0.014)	(0.009)
Central	-0.177***	-0.005	-0.009	-0.035**	0.023**
	(0.03)	(0.01)	(0.01)	(0.014)	(0.009)
Greater Accra	-0.242***	-0.012	-0.018**	-0.081***	0.011
	(0.031)	(0.009)	(0.009)	(0.02)	(0.009)
Volta	0.021	-0.035***	-0.035***	-0.061***	-0.002
	(0.028)	(0.01)	(0.01)	(0.016)	(0.011)
Eastern	-0.093***	-0.011	-0.011	-0.035**	0.01
	(0.028)	(0.009)	(0.009)	(0.014)	(0.009)
Ashanti	-0.206***	-0.034***	-0.039***	-0.048***	-0.022**
	(0.029)	(0.009)	(0.009)	(0.015)	(0.009)
Brong ahafo	-0.015	-0.022**	-0.023**	-0.042***	0.003
	(0.024)	(0.009)	(0.009)	(0.013)	(0.009)
upper east	0.073***	-0.024**	-0.020**	-0.029**	-0.006
	(0.023)	(0.01)	(0.01)	(0.014)	(0.01)
Upper west	0.036	-0.023**	-0.022**	-0.032**	-0.017
	(0.025)	(0.011)	(0.01)	(0.014)	(0.011)

Table 32, continued

	(1)	(2)	(3)	(4)	(5)
Age of head	0.003	-0.002*	-0.002*	-0.002	-0.003**
	(0.004)	(0.001)	(0.001)	(0.002)	(0.001)
Age square	-0.0000382	0.0000	0.0000	0.0000	0.0000
	(0.0002293)	(0.0000)	(0.0000)	(0.0000)	(0.00000)
Marital status of head (base= single)					
married	0.074***	0.013***	0.019***	0.024***	0.016***
	(0.019)	(0.004)	(0.004)	(0.009)	(0.005)
separated	0.023	0.006	0.007	0.011	0.006
	(0.023)	(0.005)	(0.005)	(0.011)	(0.006)
Sex of Head of household (base=female)					
Male	-0.070***	0.012***	0.004	0.019**	-0.009**
	(0.015)	(0.004)	(0.004)	(0.008)	(0.004)
Account ownership of head (base=No)					
Yes	0.106***	-0.030***	-0.026***	-0.033***	-0.019***
	(0.013)	(0.003)	(0.003)	(0.008)	(0.004)
Household size (base=1 to 2)					
3 to 5	0.127***	-0.012***	-0.005	-0.004	-0.004
	(0.018)	(0.004)	(0.004)	(0.008)	(0.005)
At least 6	0.127***	0.004	0.012*	0.013	0.004
	(0.025)	(0.007)	(0.007)	(0.01)	(0.007)

Table 32, continued

Variables	(1) NHIS Coverage dydx(*) National	(2) Poverty OLS National	(3) Poverty ETEM National	(4) Poverty ETEM Rural	(5) Poverty ETEM Urban
Dependency	0.003	0.020***	0.019***	0.024***	0.015***
	(0.008)	(0.002)	(0.002)	(0.003)	(0.002)
Convenient location of health facility (base=inconvenient location)	0.133***	-0.004			
	(0.013)	(0.004)			
NHIS (base=non-beneficiary household)			-0.151***	-0.180***	-0.131***
			(0.012)	(0.018)	(0.008)
Constant		0.313	0.417	0.446	0.368
rho			0.673	0.669	0.736
sigma			0.116	0.134	0.095
lambda			0.078***	0.089***	0.07***
			(0.008)	(0.01)	(0.004)
R-squared		0.447			
N	4818	4814	4814	2272	2542

* p<0.10, ** p<0.05, *** p<0.01, (1) *dydx (*) =marginal effects of the probit model(first stage) standard errors in bracket; (2)OLS=Ordinary least Square, (3) ETEM=Endogenous Treatment Effect Model (national); (4) ETEM=Endogenous Treatment Effect Model (rural); (5) ETEM=Endogenous Treatment Effect Model (urban); test [rural mean]NHIS=[urban mean]NHIS*

chi2(1) = 4.29

Prob > chi2 = 0.0383

Source: Author, 2019

Table 33: *PSM Results of the Effect of NHIS on Poverty*

Areas and Matchings techniques	Treated (Beneficiary households)	Control (Non-Beneficiary Households)	Difference
Common support			
National	0.142	0.17	-0.028(-2.85)
Urban	0.094	0.101	-0.007(-0.74)
Rural	0.195	0.246	-0.051(-2.92)
Nearest Neighbor			
National	0.141	0.17	-0.028(-2.87)
Urban	0.094	0.102	-0.008(-0.78)
Rural	0.195	0.246	-0.051(-2.92)
Kernel			
National	0.141	0.168	-0.027(-5.36)
Urban	0.094	0.113	-0.019(-3.73)
Rural	0.195	0.226	-0.031(-3.93)

t statistics in the bracket

Source: Author, 2019

The results of the control variables from the perspective of the national sample are generally intuitive and consistent with the a priori expectations. The coefficients of the education variable have indicated a significant poverty reduction effect. The results show that household heads with a higher level of education reduce their household deprivation poverty level at an increasing rate compared to their counterparts without any level of education. For example, heads with primary school education and at least a secondary school education reduced household poverty by 0.044 and 0.126 units respectively. This pattern is also consistent across all the rural and urban sub-samples. This finding is consistent with the theory of human capital which postulates that formal education translates into an improvement in the productive capacity of household members which increases their earnings above subsistence levels (Sakamoto & Powers, 1995).

The religion variable has indicated that household heads who are Christians and Moslems decrease household deprivation poverty by 0.018 and 0.029 respectively compared to heads who are not into any type of religion in the country. Though the results are inconsistent across the rural and urban samples, the finding alludes to potential networking within the two dominant religious affiliations in the country to provide opportunities to mitigate household deprivations and vulnerabilities. This finding supports the claim by Keister (2011) that religious affiliations and beliefs influence behaviours at early stages of life which potentially influences wealth creation in adulthood. The occupation variable has consistently indicated that household heads who are into agriculture are increasing household deprivation poverty. This result is consistent across the rural and urban samples. Anyanwu (2013) noted that occupation is directly related to the amount of earnings by household members which potentially affects their poverty levels. In Ghana, agricultural activities are mainly labour intensive and usually susceptible to risk compared to other types of occupation. Hence, deprivations and vulnerabilities persist among household heads in agriculture compared to their counterparts in other types of occupation. The finding from this study is corroborated by Coulombe and Wodon (2007).

The dummy variable for the area of residence indicates that households in the urban area reduce household poverty by 0.033 units compared to those in the rural areas. This supports the poverty phenomenon in Ghana as principally a rural phenomenon (GSS,2007, 2014; Cooke et al., 2016). The regional dummy variable has mainly indicated that all the other nine administrative regions recorded a

reduction in poverty levels compared to the Northern region. This pattern is however not consistent across the rural and urban sub-samples. It can also be observed that the significant negative coefficients are lower in the Upper East and the Upper West regions compared to the other regions. The age of the head of the household reduces household poverty by 0.002 units; however, this is only weakly significant, and the effect is significant and consistent for urban households only. The coefficient of the variable on marital status has showcased that deprivation household poverty increase for household heads who are married by 0.019 units compared to those who are single. This effect is consistent across the two sub-samples used for the analyses.

This finding contradicts Waite and Gallagher (2000) argument that marriage produces a range of benefits to the couples which lessens household poverty tendencies. In the same wise, studies by Coulombe and Wodon (2007) and Anyanwu (2013) contradict the finding by showcasing that single household heads are poorer than married household heads. It can however be argued that household heads who are married have different and demanding welfare baskets to satisfy compared to household heads who are single. As a result, such households may be prone to deprivations. The sex of the head of household has mainly indicated a mixed result. Whereas the urban sample indicated that male-headed households reduce household poverty, that of the rural sample was on the contrary. The coefficient of bank account ownership has indicated that heads who own a bank account reduce household poverty by 0.026 compared to heads who do have a bank account. The effect is consistent across the rural and the urban samples. This is

corroborated by the assertion of Park and Mercado (2015) that financial inclusion provides access for financing which enables households to make longer-term consumption and investment decisions to improve their living conditions. The household size variable has indicated that households with a family size of at least six (6) members increase household poverty by 0.012 compared to smaller size families of at most two members. The basis is that households with larger family sizes are likely to have larger needs that may not be fully satisfied compared to households with smaller family sizes. Available studies support the positive relationship between household size and poverty (Lanjouw & Ravallion, 1995; Székely, 1998). Household dependency variable mostly indicates an intuitive result. The coefficient signifies that an additional dependant in the household increases household poverty by 0.019 units. This effect is consistent across the rural and the urban samples, the findings by Baiyegunhi and Fraser (2010) in South Africa corroborated the current finding.

The results of the marginal effects of the Probit model for the demand for NHIS is the selection equation for the first stage of the Heckman sample selection model. The results are generally intuitive using model (1) from Table 34. The exclusion restriction variable (convenient location of a household to a health facility) has shown that households which are conveniently located to a health facility have a higher probability of demanding NHIS by 13.33 percentage points compared to households that are not conveniently located to a health facility.

The OLS estimates using model (2) has also shown that the exclusion restriction variable does not have a direct relationship with the outcome variable by

being insignificant. This further shows the exclusion restriction variable (convenient location of a household to a health facility) is valid as an instrument for the endogenous treatment variable, beneficiary households of the NHIS in the outcome equation.

Objective 4: Examine the impact of NHIS on household deprivation poverty

The objective is based on the following two hypotheses.

(1) Ho: NHIS does not have a poverty reduction effect on beneficiary households.

From the test conducted using the national sample in Table 32, we fail to accept the null hypothesis at one per cent significance level. Therefore, the coefficient of NHIS is statistically different from zero in the ETEM. This finding was also consistent using the PSM and the Tobit estimation techniques. Therefore, the study concludes that NHIS has a significant poverty reduction influence on beneficiary households in Ghana.

(2) Ho: NHIS insurance has the same effect on beneficiary households in the rural areas as their counterparts in urban areas

From the results using the urban and the rural sub-samples from Table 32, the ETEM indicated that beneficiary households in the rural areas have a greater poverty reduction effect compared to their urban counterparts. The chow test indicated that the difference in the mean effects between the rural and the urban beneficiary households is statistically different from zero at five(5) per cent. This trend was also confirmed by the PSM and the Tobit estimation techniques. The study, therefore, concludes that the poverty reduction effect of NHIS is greater

among beneficiary households in the rural areas compared to their counterparts in the urban areas.

Regression Diagnostic and Post-Estimation Test

In this section, the study presents the results of the diagnostic and post-estimation test used in the ETEM to establish the impact of NHIS on the poverty of beneficiary households.

Statistical justification of the instrument used

In order to ascertain the soundness of the instrumental variable used in the ETEM, convenient location of a household to a health facility. The study at the initial stages argued that the convenient location of a household to a health facility influence the demand for social health insurance but will not directly affect household poverty level. This argument is now tested statistically. The first condition demands a non-trivial relationship between the convenient location of a household to a health facility and demand for NHIS.

This can be verified from Table 32 and Appendix C. This is significant at one per cent statistical significance and consistent across rural and urban samples. The other condition which obviates the direct relationship between household poverty and convenient location of a health facility is also shown using Appendix C. From the correlation matrix, all the significant correlations less than 10 per cent significance level are starred. It can, therefore, be observed that convenient location

of a health facility to a household does not indicate a statistically significant relationship with the poverty index.

Test of multicollinearity

The correlation matrix in Appendix C is used to test for the potential presence of multicollinearity using the Anderson (2001) suggested rule of thumb which asserts that any correlation coefficient exceeding 0.70 shows a potential multicollinearity problem that needs to be dealt with. Based on the correlation matrix, none of the explanatory variables exhibited any serious multicollinearity problem with another using the rule of thumb. This suggests that the econometric results are not affected by the problem of multicollinearity.

Covariate imbalance testing

The Rubin test provides the ratio of the variance of the residuals orthogonal to the linear index of the propensity score in the treated group over the non-treated group after matching for each of the covariates. Appendix D is used to showcased the Rubin test for this chapter. The variables with one asterisks (*) denote concern or caution in terms of the balancing in the matching between the treatment and the control group to allow for meaningful comparisons between the two groups. The covariates in this category have the ratio of the variance of their residuals ranging between [0.5,0.8] or [1.25,2]. However, covariates or variables that severely affect the balancing between the two sub-samples before and after matching are denoted by double asterisks (**) with a range [<0.5 or >2]. Implying that such variables

cannot be used for the counterfactual analyses because the two groups are not balanced. From the post-estimation results, none of the covariates wrongly influence the balancing between the treated and the control group after matching by registering double asterisks (**). This implies that the counterfactual analyses of the PSM are valid.

Chapter Summary

The chapter addressed two main issues relating to poverty methods, deprivation measures and social protection policy with evidence from Ghana. The first section delved into the sensitivity of money-metric poverty methods to decomposition (food and non-food expenditures), poverty line, choice of indicator, deprivation measures and ranking. The second examined the poverty-reducing role of NHIS on household poverty. The impact was further examined across the rural and urban beneficiary households. The closure of the chapter was on regression diagnostic and post-estimation tests.

CHAPTER SIX

CHILD DEPRIVATION POVERTY IN GHANA: ASSESSMENT OF RURAL-URBAN CATCH-UP

Introduction

This chapter provides an empirical analysis of child deprivation poverty in Ghana, and the assessment of rural-urban catch-up. The chapter is founded on two main objectives. The first objective compares child deprivation and income poverty, whereas the second examined rural-urban catch-up in child deprivation poverty in Ghana. The chapter commences with the descriptive analyses of the various deprivations that children in Ghana are experiencing over time. The subsequent sections delve into the two objectives of the chapter.

Single Deprivation Analyses

Analysing each of the six dimensions considered in this study separately provides the basis for understanding the situation of the two cohorts of children in the country and overtime. Table 34 shows the deprivation levels across the two cohorts of children. For the under-fives, the proportion of children aged less than five years who are deprived in water decreased by 21.5 percentage points between the 2003 and the 2014 survey periods. Within the same period, deprivation levels in sanitation also decreased by about 40 percentage points for children aged less than five years. The deprivation levels in child nutrition decreased by 16.5 percentage points between 2003 and 2014. Health deprivation decreased by 5.4

percentage points between 2003 and 2014. The proportion of children that are exposed to violence also decreased by 23.2 percentage points.

The proportion of children aged from 6 to 17 years recorded percentage decreases in all the deprivation indicators as in the case of children under-five. The most substantial percentage decrease was registered in sanitation whereas the lowest was recorded in information deprivation. Though the proportion of children deprived in education decreased between 2003 and 2014, deprivation levels in education marginally increased between 2008 and 2014 by 0.4 percentage points.

Table 34: *Deprivation Levels and Dimensions*

Dimensions	2003	2008	2014	change
Under5 (0 to 5)				
Water	42.8	22.8	21.3	-21.5
Sanitation	73.2	22.8	33.5	-39.7
Housing	16.7	19.1	6.6	-10.1
Nutrition	35.2	27.8	18.7	-16.5
Health	16.7	11.8	11.3	-5.4
Violence	60.2	44.7	37.04	-23.16
N	2,629	2,018	2,107	
6 to 17				
Water	40.68	25.97	24.83	-15.85
Sanitation	73.44	41.98	40.07	-33.37
Housing	17.63	22.56	10.85	-6.78
Education	34.72	20.1	20.55	-14.17
Information	24.48	22.3	23.42	-1.06
Violence	62.62	19.6	34.67	-27.95
N	7,279	14,462	13,332	

Source: Author, 2019

Multidimensional Deprivation Ratios

This section presents the deprivation ratios of child deprivation poverty in Ghana using the MODA. The findings in this section suffice for meeting the first objective of the study. Results are provided on three deprivation measures, namely the headcount (Ho), intensity (Ao) and the adjusted headcount (Mo). The headcount is the incidence of child deprivation poverty in the country at a specified period.

The intensity of poverty measures the average number of deprivations that each poor child experiences. The adjusted headcount (M_0) is the final measure used as the measure of child poverty in this study. The adjusted headcount (M_0) incorporates the average number of deprivations that each poor child experiences into the headcount index. Mathematically, the adjusted deprivation headcount (M_0) is a product of the headcount and the intensity of deprivations experienced by children. Hence, the adjusted headcount is used for the ranking of the geographical groupings of the country based on their deprivation poverty levels.

Since the life-cycle approach was incorporated into the analyses, the multidimensional deprivation ratios were estimated for two cohorts of children; children under-five and those aged from 6 to 17 years. These estimates are showcased in Tables 35 and 36 respectively. As can be deduced from the tables, the national deprivation ratio for the 2003 survey period is 40 per cent for the Under-fives whereas that for the children aged from 6 to 17 years recorded 35 per cent. However, both samples recorded a sharp decline in their deprivation ratio (M_0) to 20 per cent for the under-fives and 17 per cent for children aged from 6 to 17 years from 2003 to 2014. From the tables, the areas of higher ranks are areas of high child deprivation poverty, whereas the lower ranks are the relatively less poor areas of child poverty. In each of the two tables, the intensity of poverty (Ao) and the headcount of child poverty (Ho) is positively correlated with the deprivation ratio (M_0) as shown by the correlation coefficient in the bottom row. From Table 35, rural under-five children have a higher deprivation ratio compared to their urban counterparts in each of the surveys: in the 2003 survey period, 50 per cent of

the rural under-five children are poor compared to 20 per cent of their urban counterparts; in the 2008 survey, 30 per cent of the rural under-five children are poor compared to their urban counterparts of 10 per cent; in 2014, 30 per cent of the rural under five are poor compared to their urban counterparts of only 10 per cent. Similarly, Table 36 indicates that older children (aged from 6 to 17 years) in rural areas are poorer than those in urban areas: in the 2003 survey, 44 per cent of the rural older children are poor compared to 21 per cent of their counterparts in the urban areas; in the 2008 survey 25 per cent of the rural older children are poor compared to their urban counterparts of only 6 per cent; in the 2014 survey, 26 per cent of the rural older children are poor compared to their urban counterparts of 7 per cent. In terms of the ecological zones, the savannah has at least two out of every five children multidimensional deprived and is the worse zone in the country.

Concerning the ten administrative regions of the country, the Northern region mainly registered the highest incidence of deprivation poverty across the survey periods except for the children aged from 6 to 17 years. A study that corroborates Northern region being the worst region in terms of child deprivation poverty is that of Mba et al. (2009), however, their study used the Bristol method to child deprivation poverty which is merely a headcount approach. The findings of Kofinti and Annim (2016) on the other hand contrast the two studies by recording the Volta region as the poorest in terms of child deprivation poverty, albeit the analyses were done with children aged 7 to 17 years only using the FOD approach.

The regions with the least child poverty are the Greater Accra and the Ashanti regions. An observation that can be made from the tables is that though the incidence and the headcount of child deprivation poverty decreased significantly between 2003 and 2014, this is not the case for the intensity of deprivation poor children are experiencing. This suggests that the incidence of deprivation among children is reducing significantly across the country as a whole, but this is not the case for the burden of deprivation that poor children are experiencing. This is because, for the under-fives, the burden of poverty decreased by only 10 percentage points between 2003 and 2014 whereas the case for children aged between 6 to 17 years only decreased by three percentage points between the same periods.

Table 35 *Child Deprivation Poverty for the Under-fives:*

	2003				2008				2014			
Large Areas	H0b	A0b	M0b	Rnk1	H0b	A0b	M0b	Rnk2	H0b	A0b	Mob	Rnk2
Rural	0.87	0.50	0.50	4th	0.64	0.50	0.30	4th	0.55	0.50	0.30	4th
Urban	0.46	0.40	0.20	1st	0.24	0.40	0.10	1st	0.17	0.40	0.10	1st
Coastal	0.66	0.50	0.30	2nd	0.33	0.40	0.10	2nd	0.26	0.40	0.10	2nd
Forest	0.68	0.50	0.30	3rd	0.42	0.40	0.20	3rd	0.31	0.40	0.10	3rd
Savannah	0.94	0.60	0.50	5th	0.83	0.50	0.40	5th	0.75	0.50	0.40	5th
Western	0.76	0.50	0.40	5th	0.49	0.40	0.20	6th	0.38	0.40	0.20	4th
Central	0.86	0.50	0.40	7th	0.41	0.40	0.20	3rd	0.33	0.40	0.10	3rd
Greater Accra	0.4	0.40	0.20	1st	0.14	0.00	0.0	1st	0.12	0.00	0.00	1st
Volta	0.76	0.50	0.40	4th	0.57	0.50	0.30	7th	0.45	0.50	0.20	7th
Eastern	0.74	0.50	0.40	6th	0.42	0.40	0.20	3rd	0.36	0.50	0.20	5th
Ashanti	0.63	0.50	0.30	2nd	0.36	0.40	0.10	2nd	0.18	0.40	0.10	2nd
Brong Ahafo	0.67	0.50	0.30	3rd	0.41	0.50	0.20	5th	0.39	0.40	0.20	5th
Northern	0.94	0.60	0.50	10th	0.86	0.50	0.40	10th	0.84	0.50	0.40	10th
Upper East	0.95	0.60	0.50	9th	0.78	0.50	0.40	9th	0.56	0.40	0.20	8th
Upper West	0.94	0.50	0.50	8th	0.78	0.50	0.40	8th	0.58	0.40	0.30	9th
National	0.74	0.50	0.40		0.49	0.50	0.20		0.38	0.40	0.20	
Correlation		0.85			0.69				0.58			

Source: Author, 2019

Table 36: *Child Deprivation Poverty for Children 6 to 17 years*

	2003				2008				2014			
Large Areas	H0b	Aob	Mob	Rnks	H0b	Aob	Mob	Rnks	H0b	Aob	Mob	Rnks
Rural	0.86	0.52	0.44	4th	0.52	0.47	0.25	4th	0.55	0.47	0.26	4th
Urban	0.48	0.43	0.21	1st	0.15	0.38	0.06	1st	0.18	0.40	0.07	1st
Coastal	0.58	0.46	0.27	2nd	0.24	0.42	0.10	2nd	0.24	0.41	0.10	2nd
Forest	0.69	0.48	0.33	3rd	0.29	0.41	0.12	3rd	0.35	0.43	0.15	3rd
Savannah	0.91	0.55	0.50	5th	0.76	0.51	0.39	5th	0.71	0.50	0.36	5th
Western	0.70	0.47	0.33	3rd	0.37	0.43	0.16	6th	0.29	0.42	0.12	3rd
Central	0.75	0.48	0.36	6th	0.26	0.39	0.10	3rd	0.36	0.44	0.16	5th
Greater Accra	0.36	0.44	0.16	1st	0.11	0.35	0.04	1st	0.14	0.43	0.06	1st
Volta	0.72	0.51	0.37	7th	0.40	0.45	0.18	7th	0.50	0.46	0.23	7th
Eastern	0.70	0.50	0.35	4th	0.32	0.40	0.13	4th	0.35	0.43	0.15	4th
Ashanti	0.63	0.46	0.29	2nd	0.20	0.41	0.08	2nd	0.24	0.45	0.11	2nd
Brong Ahafo	0.74	0.47	0.35	4th	0.33	0.45	0.15	5th	0.45	0.43	0.19	6th
Northern	0.91	0.56	0.51	9th	0.77	0.52	0.40	10th	0.78	0.51	0.40	10th
Upper East	0.93	0.52	0.48	8th	0.79	0.48	0.38	9th	0.62	0.45	0.28	8th
Upper West	0.92	0.58	0.53	10th	0.66	0.48	0.32	8th	0.64	0.47	0.30	9th
National	0.70	0.49	0.35		0.37	0.46	0.17		0.38	0.46	0.17	
Correlation		0.88				0.92				0.85		

Source: Author, 2019

Child Income Poverty in Ghana

The estimates of child income poverty across the geographical groupings in Ghana are provided in Table 37. These estimates represent the proportion of children living in low-income households in the country. Thus, children living in households with income below the upper poverty line of GH₵ 1314 with poverty aversion parameter of one. The estimates are conducted across all the geographical groupings for the two cohorts of children as shown in Table 37. The two cohorts recorded similar estimates and patterns of the incidence of child income poverty.

Regarding the large area aggregates for the under-fives, the highest incidence was recorded in the savannah zone (41%), followed by the rural area of about 29.4 per cent. In contrast, the forest zone recorded the least incidence of child income poverty among the under-fives. It can be argued that income-generating activities and employment opportunities are mostly vibrant regions in the forest zone such as the Greater Accra and Ashanti Regions. Hence households in such areas are more likely to have higher income levels compared to their counterparts in the rural and urban areas.

For children aged from 6 to 17 years, the three regions in the savannah zone, namely the Upper West, Upper East and the Northern regions recorded the highest incidence across the two cohorts of children, with the least incidence recorded in the Greater Accra, Eastern and the Ashanti regions. The national incidence for the two samples was about 26 per cent which corroborates the UNICEF Ghana (2015) estimates of child consumption expenditure poverty being higher than general household poverty level in the country using the sixth round of

the GLSS. The regional rankings are provided beside the respective cohort of children.

Table 37: *Incidence of Child Income Poverty in 2013*

Areas	< 5 Yrs		6-17 Yrs	
	2013(Po)	Ranking	2013(Po)	Ranking
Large areas				
Rural	29.4	4	30	4
Urban	22.6	2	23.3	1
Coastal	23.7	3	23.4	3
Forest	21.9	1	23.3	1
Savannah	41	5	42.6	5
Region				
Western	23.5	5	20.4	2
Central	33.1	7	34.8	7
Greater Accra	18.3	1	18.5	1
Volta	25.3	6	26.4	6
Eastern	18.5	2	21.6	3
Ashanti	20.8	3	22.2	4
Brong Ahafo	23.4	4	24.1	5
Northern	38.1	8	39	8
Upper East	47.2	10	48.2	10
Upper West	45.2	9	47.2	9
National	26.4		26.8	

Source: Author, 2019

Comparison between Child Deprivation and Income Poverty in Ghana

The section compares the regional rankings of child deprivation and income poverty in Ghana. Comparing the rankings across the ten administrative regions will enable identification of the appropriate poverty challenge facing children in the respective regions, whether the challenge emanates from the availability of the basic needs of children from a deprivation perspective or whether it has to do with the household ability to afford the needs of children from income perspective. From the Table 38, the ranking for the Child Income Poverty (CIP) is in the bracket to engender a direct comparison with the deprivation rankings from the MODA

approach. The column on Diff entails two entries, where one (1) denotes when the ranking between the two approaches are different and zero (0) when the rankings are the same. Also, higher rankings correspond to geographical groupings with a relatively higher incidence of poverty, whereas the reverse is also true. From Table 40, the comparison of the rankings between the MODA and child income poverty revealed that about eight (8) out of the ten regions recorded differences in rankings. This signifies variation of about 80 per cent. Thus, it was only the Greater Accra region and the Upper West region that recorded the same ranking. The same pattern was observed for children aged from 6 to 17 years.

The implication of the significant differences in rankings across the two approaches suggests different approaches in dealing with the poverty situation of children. From the table, whereas the situation in Upper East region mostly hovers on the difficulty of households in affording the needs of children, the difficulty in the Northern region concerns the availability of basic needs for children. Thus, lack of affordability is not equivalent to availability. Given that children are not economic agents in the household with seemingly weak bargaining power at home, the two approaches provide different lenses to assess their poverty situation from the household perspective and, directly as it relates to the child.

Table 38: *Comparison between Child Deprivation and Income Poverty*

	<5 Yrs		6 -17 Yrs	
Region	MODA(CIP)	Diff	MODA(CIP)	Diff
Western	4(5)	1	3(2)	1
Central	3(7)	1	5(7)	1
Greater Accra	1(1)	0	1(1)	0
Volta	7(6)	1	7(6)	1
Eastern	5(2)	1	4(3)	1
Ashanti	2(3)	1	2(4)	1
Brong Ahafo	5(4)	1	6(5)	1
Northern	10(8)	1	10(8)	1
Upper East	8(10)	1	8(10)	1
Upper West	9(9)	0	9(9)	0

CIP= *Child Income Poverty*

Source: Author, 2019

Objective 5: Comparing child deprivation and income poverty in Ghana.

Table 38 compares the incidence of child deprivation and income poverty across the ten administrative regions of the country using the two cohorts of children, children aged under five and those aged from 6 to 17 years. The regional rankings differ considerably between the MODA and the child income poverty suggesting the essence of viewing the poverty situation of children from the two perspectives. The finding from this objective is that the regional rankings of the poverty situation of children are sensitive to the method deployed in deprivation and the money-metric measure in income.

Assessing Rural-Urban Catch-Up in Child Deprivation Poverty

This section addresses the third objective of the chapter. The objective seeks to examine rural-urban catch-up in child deprivation poverty. To investigate this, two approaches are used, first descriptive analyses in graphs were used to examine rural-urban catch up in deprivation ratios. Secondly, inferential statistics in mixed and binary logistic techniques were used to ascertain the effect of residential inequality on child deprivation poverty among the two cohorts of children over time. It is worth stating that the issue of rural urban catch up in poverty deprivation is very important to measure the lop-sidedness of development and could prompt policy makers to prioritise resource allocation to needed spaces.

Rural-urban catch-up across the deprivation ratios

This section presents the Rural Urban Gaps (RUG) for the three main deprivation ratios used in the study; headcount, intensity and the adjusted headcount for the two cohorts of children. As in the earlier section, the focus is centred on whether the RUG in these deprivation ratios has narrowed between the 2003 and 2014 survey periods. Figure 10 indicates the RUG for the deprivation ratios for children under-five. From the figure, the headcount ratio narrowed from 41.5 per cent in 2003 to 37.9 per cent in 2014. Similarly, the intensity also narrowed from 9.8 to 6.4 per cent between the two survey periods. Further, the adjusted deprivation also indicate that the gaps are narrowed from 26. 6 per cent to 18. 1 per cent.

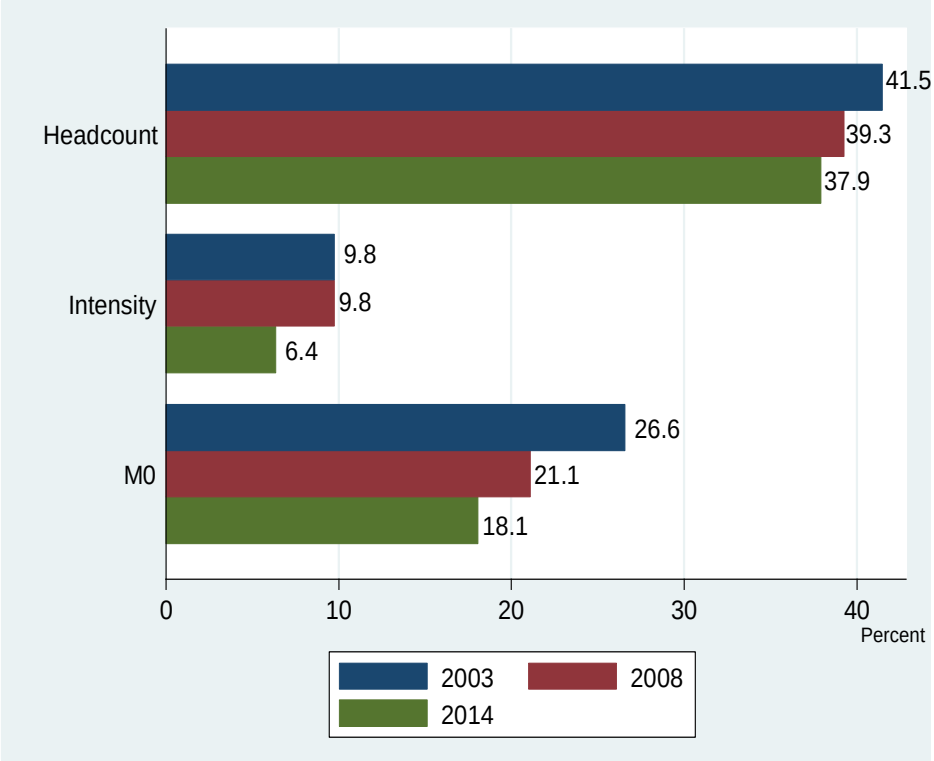

Figure 10 : RUG in deprivation ratios (under 5's)

Source: Author,2019

A similar trend is observed for children aged from 6 to 17 years as indicated in Figure 11. The narrowing gaps in all the three deprivation ratios appear to suggest that the rural-urban gaps in deprivation levels between the rural and urban areas are gradually narrowing over time. This signifies a potential catch-up between the rural and the urban areas. However, it also raises concerns for an emerging urban poverty.

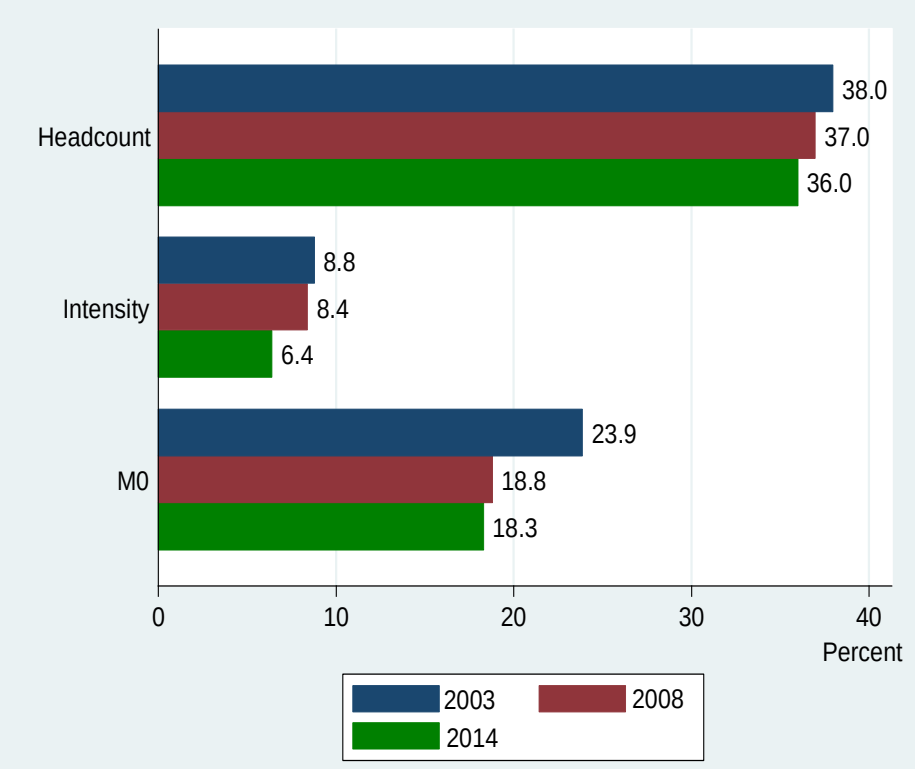

Figure 11: RUG in deprivation ratios (6 to 17)

Source: Author, 2019

Rural-urban catch-up across residential inequalities

This section further examines the rural-urban catch up using the coefficients of residential inequalities on child deprivation poverty for the two cohorts of children overtime: under-fives and children aged from 6 to 17 years. For the under-fives, three mixed logistic models are used for the 2003, 2008 and 2014 survey periods respectively. For the children aged from 6 to 17 years, the binary logistic model is used to examine the correlates of child deprivation poverty across the three survey periods in the country.

Econometric Results for the Correlates of Child Poverty

The dependent variable, child poverty, is a binary outcome variable with "1" denoting poor children defined as those who are multidimensionally deprived in at least two of the six deprivation dimensions used in the study, whereas zero (0) represents non-poor children identified as those deprived in only one or none of the six deprivation dimensions. The distribution of child deprivation poverty for all the three survey periods, namely 2003,2008 and 2014 are depicted in Figure 12 for the two categories of children used in the study. From the figure, the proportion of poor children decreased over time. For the under-fives, about three (3) out of four (4) children were poor in the 2003 survey period. However, this number decreased to about two (2) out of five (5) in the 2014 survey period. In the case of the children aged from 6 to 17 years, three (3) out of five (5) children were poor in the 2003 survey period, whereas that of 2014 recorded about two (2) out five (5) children being poor. The descriptive statistics for the correlates of deprivation poverty for the under-fives and those aged from 6 to 17 years are presented in Appendices E and F respectively.

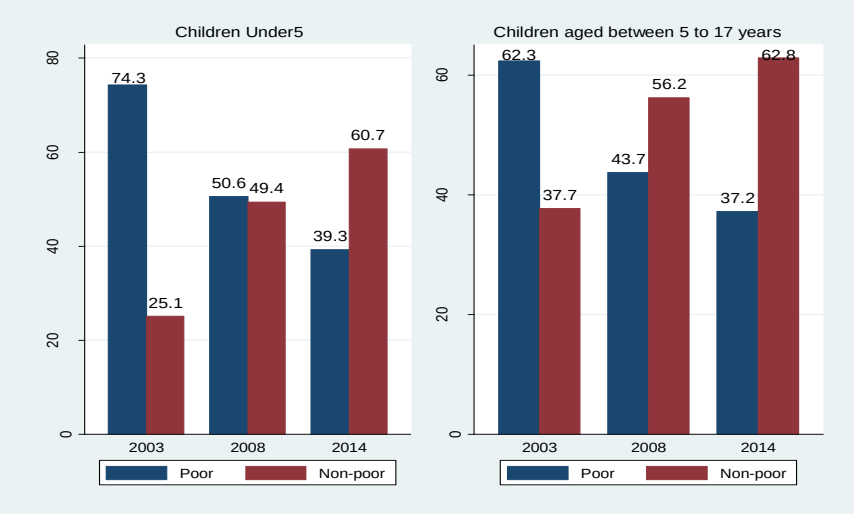

Figure 12: Distribution of poor children over time

Source: Author, 2019

Effects of Residential Inequality on Child Poverty (under-fives)

The effects of residential inequality on child deprivation poverty in the case of children under-five is Figure 13 respectively. The full results for all the correlates is provided in Appendices G. For the 2003 survey period, children living in urban poor households are 22.12 times more likely to experience deprivation poverty compared to their urban rich counterparts. In 2008, however, the odds of children in this category falling into deprivation poverty decreased to 17.79 times. The decrease in the risk of child poverty emanates from child welfare in sanitation, water, housing, information, and protection. This records a percentage decrease of 19.6% in the odds that children in urban poor households will experience deprivation poverty between 2003 and 2008 as shown in Figure 13. In the case of rural-poor households in 2003, the odds that a child will fall into deprivation poverty is 201 times compared to an urban rich child. However, the odds decreased

to 158 times in the 2008 survey period recording a percentage decrease of 21.11% as shown in Figure 13. It can be observed from the preceding that though the odds of a child being poor is higher in absolute terms among rural- poor households (201 & 158 times) compared to urban poor households (22.12 & 17.79 times) between 2003 and 2008 surveys respectively, the percentage change has shown the risk of child deprivation poverty to have decreased fairly steeper among children in rural-poor households (21.11%) compared to those in urban poor households (19.6%) between the two periods.

Furthermore, in the 2014 survey, children living in urban poor households are 56.46 times more likely to experience deprivation poverty compared to children living in urban rich households. Comparing this to the 2008 odds ratio (17.79) indicates that the risk of children in urban poor households falling in deprivation poverty increased by 217 per cent between 2008 and 2014. In the case of the rural-poor households, the odds of a child experiencing deprivation poverty in the 2014 survey is 191.4 times compared to children in the urban rich households. Comparing the odds ratio to that of 2008 (158.8) indicates that the risk of children living in rural-poor households falling into deprivation poverty increased by 20.67 per cent between 2008 and 2014. Hence, comparing the risk of child deprivation poverty among children in rural poor households of 20.67 per cent with their counterparts in urban poor households of 217 per cent between the 2008 and 2014 survey periods, reveals that under-five children in urban poor households are facing greater risk of child deprivation poverty over time compared to children living in

rural-poor households. This appears to suggest potential rural-urban catch-up over time for the under-fives in the country as shown in Figure 13.

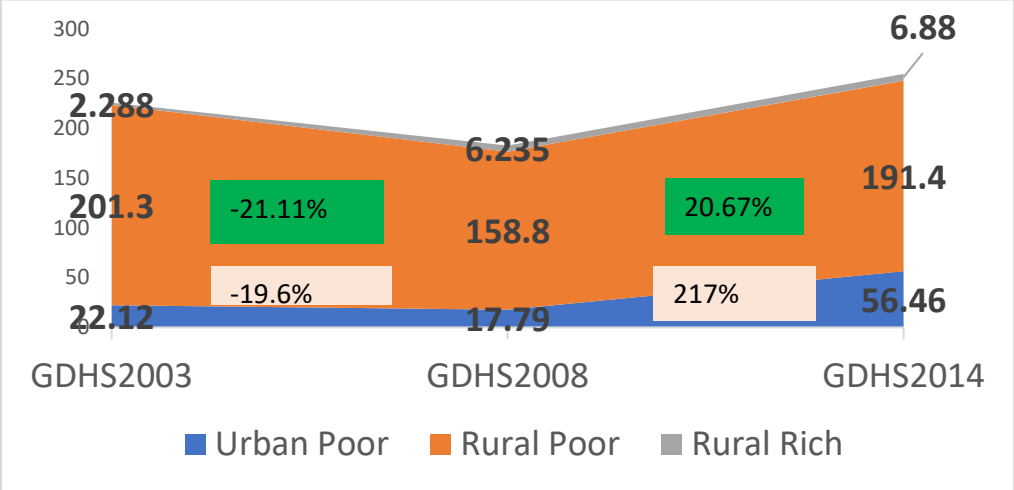

Figure 13 : Risk of child poverty across residential inequality overtime

Source: Author, 2019

Effects of Residential Inequality on Child Poverty (6 to 17 years)

In the case of children aged between 6 to 17 years, the effects of residential inequality on child deprivation poverty are presented using Figure 14. The full results are provided in Appendix H. Similarly. In the 2003 model, the odds of a child in the urban-poor household experiencing deprivation poverty is 4.77 times compared to children living in urban rich households. The odds decreased to 4.33 times in the 2008 model recording a percentage decrease of 9.22 per cent. However, the 2014 model realised an increase in the odds of children living in urban poor households to 11.84 times. Comparing the odds between 2008 and 2014 indicates that the risk of child deprivation poverty among children living in urban poor households increased by 173.3 per cent. For children living in rural-poor households, however, the odds of a child becoming poor is about nine (9) times

compared to those living in the urban rich households in the 2003 model. However, the odds increased to 14 times in the 2008 model recording a percentage increase in the risk of child deprivation poverty of 57.16%.

This contrasts the case of children living in urban poor households where the risk of child deprivation poverty instead decreased between 2008 and 2014. In the 2014 model, the odds of children living in rural-poor households falling into deprivation poverty decreased to 10 times recording a percentage decrease of 26.18 per cent in the risk of child deprivation poverty among children living in rural- poor households between 2008 and 2014. Comparing this percentage with children living in urban poor households (173.4%) indicates that the risk of child deprivation poverty is higher overtime for children living in urban poor households compared to their rural-poor counterparts. Figure 14 is also suggestive of potential rural-urban catch-up overtime.

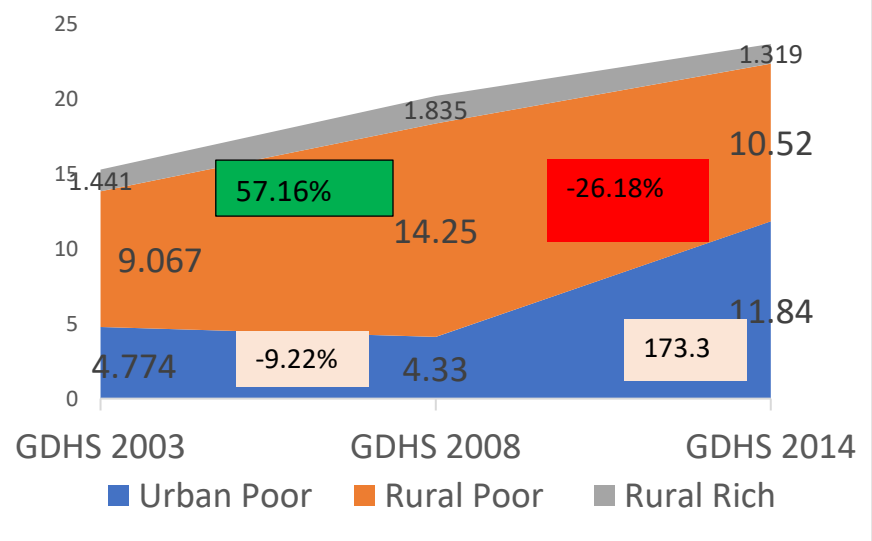

Figure 14: Risk of child poverty (6 to 17) across residential inequality overtime

Source: Author, 2019

The outcomes of Figures 15 and 16 appear to suggest a potential rural-urban catch up in child deprivation poverty in Ghana. This is because the child deprivation poverty risk facing children living in urban poor households are higher than children living in rural-poor households over time.

The essence of a potential rural-urban catch-up in child deprivation cannot be over-emphasised to a country like Ghana, marked with disparities in her poverty levels across the geographical groupings of the country. A potential catch-up will open-up the rural areas for investment opportunities, engender the competitiveness of rural areas as a place of dwelling across the country, and signal a holistic approach geared towards inclusive development. However, the higher risk of child deprivation poverty among children living in urban poor households for the two cohorts of children overtime potentially indicates the emergence of urban poverty concerns in the urban areas of the country.

Objective 6: Assessing the rural-urban catch-up in child deprivation poverty

This section assessed the rural-urban catch-up in child deprivation poverty overtime in Ghana. The study assessed the potential rural-urban catch-up from three perspectives: (1) the deprivation dimensions; (2) deprivation ratios; and (3) the effects of residential inequalities on child deprivation poverty. The results appear to suggest a potential rural-urban catch in the dimensions of deprivation, deprivation ratios and the risk of rural poor children becoming poor compared to that of the urban poor children over-time.

Post-estimation Tests and Diagnostics

Mixed logistic technique

The post-estimation test for the mixed logistic models is shown at the bottom of Appendix G. From the table, the LRT is significant across the three models, justifying the need to use the mixed logistic technique over the binary logistic technique for the under-fives. Also, the VPC has indicated the amount of variation in the coefficient in each of the three models that can be ascribed to the household variance. Their respective variations in the 2003, 2008 and 2014 models that can be ascribed to the household are 77, 81 and 82 per cent respectively. These variations would have been lost had the analyses not employed the mixed logistic estimation technique.

Binary logistic model

The post-estimation tests are shown at the bottom of Appendix H. The $\_hat^2$ is shown to be consistently insignificant across all the three models suggesting that the coefficients in each of the models are not suffering from potential omitted variable bias. The insignificant p-value recorded within the row of the goodness of fit indicates that the models fit the data.

Chapter Summary

This chapter examined child deprivation poverty in Ghana using three survey periods, namely 2003, 2008 and the 2014 GDHS. Also, the chapter compares the outcomes of child deprivation poverty to that of child income poverty.

Further, the chapter examined rural-urban catch up in child deprivation poverty from the perspective of deprivation dimensions, deprivation ratios and household residential inequality. Furthermore, the chapter presented the effects of other correlates of child deprivation poverty besides that of the residential inequality. A commentary was made on the post-estimation test and diagnosis to conclude the chapter.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Amidst the significant reduction in global poverty levels are underlying concerns, some of these challenges are; the inherent disparities that masked the acclaimed reduction in poverty levels at sub-regional and country levels; the long-lasting challenge of the appropriate measurement of poverty; the need for countries to develop social protection programmes to absorb potential and increasing poverty rates of their populace; and the emerging focus on child poverty as a sustainable strategy for poverty reduction. Against this background, the study used country-specific evidence mainly from Ghana (all the empirical chapters), and Kenya (only the first empirical chapter) to investigate the mentioned issues.

This chapter provides a summary of the findings, conclusions and recommendations alongside suggestions for future research. The next section presents a summary of the entire thesis. This is followed by conclusions that can be drawn from the study. The recommendations emanating from the main findings and conclusions conclude the chapter.

Summary

This study assesses household deprivation measures, poverty methods, social protection policy and child poverty in Ghana and Kenya. The study is aimed at contributing to the existing literature and proffer suggestions for addressing the main findings of the study. It is designed to provide information on the progress of

households and children in various dimensions of deprivations. This is premised on the first SDG which seeks to end all forms and manifestations of poverty, and the tenth SDG which upholds the mandate to reduce inequality within and among countries. The thesis considered six broad objectives which are subsumed into three empirical chapters. The study adopted a quantitative approach using repeated cross-sectional data.

The first empirical chapter assesses the temporal and spatial household poverty in Ghana and Kenya. It assessed two broad objectives: (1) determine the gains in household welfare over time in Ghana and Kenya; (2) compare spatial deprivation poverty in Ghana and Kenya overtime. The study used the last five rounds of the Ghana and Kenya DHS (1993,1998, 2003,2008 and 2014) in five dimensions of household deprivation namely, water, sanitation, shelter, information and education to assess the distribution of poverty, and progress in household wellbeing over time in both countries. The study employed the multidimensional FOD approach to assess the spatial and temporal poverty across the geographical groupings of Ghana and Kenya.

Three key findings emerged from the first empirical chapter. The first finding suggests that households in Ghana are generally deficient in sanitation and water, whereas those in Kenya are poor in sanitation and shelter among the five indicators of deprivation considered for both countries. Second, the study identified the Northern and Volta regions as the poorest regions in Ghana, whereas the North Eastern and the Western regions were identified as the poorest regions in Kenya. These areas are the regions of worse-off households in Ghana and Kenya. Thirdly,

the findings on temporal FOD comparisons identified the urban area and the Greater Accra region of Ghana as the geographical grouping with the least improvement in household welfare between 1993 and 2014, whereas the Eastern region, urban area and Nairobi city were identified in Kenya as the geographical grouping with the least improvement in household welfare between 2003 and 2014.

The second empirical chapter examined household deprivation measures, poverty methods and social protection in Ghana. This chapter addresses two objectives. First, the chapter carried out the sensitivity of poverty methods to disaggregation, poverty line, choice of indicators and the ranking of the outcomes across deprivation measures of poverty. The second objective is to determine the poverty-reducing impact of the NHIS on beneficiary households. For this chapter, the study used the last four rounds of the GLSS (1992,1998, 2006 and 2013), and the last five rounds of the GDHS (1993,1998,2003,2008 and 2014). For the poverty methods, the study used the FGT approach for the consumption expenditure and income poverty. For the deprivation measures, the study used the MPI and the MCA to estimate deprivation and asset poverty respectively. In order to examine the impact of NHIS on household poverty, the chapter employed the ETEM of heckman sample selection, the PSM and the Tobit estimation techniques.

The key findings emanating from the second empirical chapter are:

(1) The significant reduction in the incidence of consumption expenditure poverty in Ghana is sensitive to disaggregation (food and non-food consumption expenditure), choice of poverty indicator and the poverty line used. However, the pattern is largely the same across the money-metric and deprivation measures; (2)

Beneficiary households of NHIS reduce household deprivation poverty in Ghana; (3) NHIS has a larger poverty-reducing effect on beneficiary households in rural areas compared to their urban counterparts.

The third empirical chapter addressed two main objectives; (1) compare child deprivation and income poverty in Ghana; and (2) assess the rural-urban catch up in child deprivation poverty in Ghana. The study employed the last three rounds of the GDHS with the focus group being children under-fives and those aged from 6 to 17 yrs. In order to measure child deprivation poverty, the study used the MODA and considered six deprivation indicators based on the CRC (1989) apiece for the two cohorts of children. In the case of child income poverty, the study used the FGT approach. The assessment of rural-urban catch-up in child deprivation was carried out across deprivation ratios. In addition, the effects of residential inequality on child deprivation poverty using the mixed logistic and binary logistic estimation techniques were also examined.

Three main findings emerged from the chapter. First, regional rankings of child deprivation and income poverty are different given that eight out of the ten regions for both cohorts of children recorded differences in ranking for the measures of child poverty. Second, the findings appear to suggest a potential rural-urban catch up in child deprivation poverty across deprivation ratios and residential inequality over time.

Conclusions

The main purpose of the study was to examine household deprivation measures, poverty methods, child deprivation poverty and social protection poverty reducing effect with evidence largely from Ghana, and Kenya. Based on the main findings, the following specific conclusions were arrived at after the study.

The conclusion based on the findings from the first empirical chapter is that there is a broad-based advance in the welfare of households in Ghana; however, advance in Kenya is much more muted in the five indicators of welfare over time. Regarding the second empirical chapter, two main conclusions can be drawn. The first is that the pattern of regional poverty outcomes is reasonably stable across money-metric and deprivation poverty methods in Ghana. However, the levels and rate of fall are sensitive to poverty indicator variable and the poverty line. The second conclusion is that the NHIS is largely pro-poor in Ghana. Concerning the third empirical chapter, two conclusions are drawn. The first is that affordability does not suffice in meeting the needs of children, but also the availability of the needs of children are essential for fulfilling children's basic needs. Secondly, the risk of child deprivation poverty is higher among children living in urban-poor households compared to rural-poor households over time in Ghana.

Recommendations

Based on the results of the study and conclusions drawn, the following policy recommendations are proposed:

1. In order to reduce the proportion of worse-off households in the five dimensions of welfare used in Ghana and Kenya, the study recommends two policy options: First, Ministry of Sanitation and Water Resources in Ghana should prioritise the provision of pipe borne water, boreholes and improved sanitation in the Volta and Northern regions. In the case of Kenya, the Ministry of Environment, Water and Natural Resources should focus on the provision of improved sanitation to the Western and North Eastern regions.

2. Based on the sensitivity of the consumption expenditure poverty estimate to various poverty parameters, the study recommends that the GSS should consider adding any of the following options to the assessment of the poverty profile in Ghana: (1) estimates of food and non-food expenditure poverty; (2) estimates of poverty across a range of poverty lines; and (3) estimates using household income as poverty indicator.

3. The National Health Insurance Scheme should prioritise health insurance coverage of poor households and rural beneficiaries in the country. In order to do this, the Ministry of Health should provide free/subsidised NHIS for rural poor households.

4. The differences in the rankings of child deprivation and income poverty rates demonstrate that affordability does not suffice in meeting the needs of children, but also the needs of children entail availability of basic needs. The study, therefore, recommends that the Ministry of Gender, Children and Social Protection should enforce children's right to basic necessities (

education, shelter, improved sanitation and drinking water) and freedom from exposure to domestic violence are safeguarded with priority giving to children residing in the Northern Region of Ghana.

5. Based on the finding on potential rural-urban catch-up in child deprivation poverty, the study recommends the adoption of a national policy on child poverty by the NDPC of Ghana. In order to do this, the study recommends two sets of policies for the rural and urban areas: In the urban areas, the Ministry of Gender, Children and Social Protection through the departments of Children, and Social Welfare should enforce the Child and Family Welfare Policy in improved water, sanitation and violence free homes. In the rural areas, the government through the Local Assemblies should intensify rural infrastructure development particularly in the areas of basic social amenities such as sanitation and water.

Suggestions for Further Research

Further studies should consider using the latest version of the GLSS, specifically the seventh round, which was not available during the commencement of the current study to extend the scope of the analyses. Also, future studies should broaden the impact of social insurance on household poverty to other countries in SSA.

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APPENDICES

A: Asset Poverty Index in Ghana

Areas	1993 Asset Index	1998 Asset Index	2003 Asset Index	2008 Asset Index	2014 Asset Index
Rural	3.93	4.62	3.4	3.5	2.29
Urban	2.74	3.44	4.48	2.34	1.25
Coastal	3.15	3.81	3.61	2.56	1.4
Forest	3.63	4.3	4.09	3.02	1.78
Savannah	3.82	4.68	4.53	3.51	2.25
Western	3.62	4.33	4.02	3	1.62
Central	3.63	4.31	4.16	3.02	1.66
Greater Accra	2.31	3.06	3	1.99	0.96
Volta	3.9	4.61	4.29	3.24	1.97
Eastern	3.59	4.21	4.09	3.15	1.84
Ashanti	3.48	4.08	3.93	2.67	1.29
Brong Ahafo	3.72	4.52	4.19	3.26	2.03
Northern	3.84	4.6	4.48	3.51	2.2
Upper East	3.94	4.85	4.61	3.52	2.32
Upper West	3.7	4.62	4.52	3.5	2.24
n	5822	6003	6250	11788	11835

Constants: 1993=3.5; 1998=4.232; 2003=4.043; 2008=2.987; 2014=1.77
Source: Author, 2019

B: Tobit Estimation Results

Variables	National	Rural	urban
Education(base=none)			
primary	-0.045***	-0.047***	-0.039***
	(0.007)	(0.01)	(0.011)
At least secondary	-0.133***	-0.128***	-0.135***
	(0.006)	(0.009)	(0.009)
Religion(base=none)			
Christian	-0.020**	-0.014	-0.026*
	(0.009)	(0.011)	(0.013)
Islam	-0.030***	-0.030**	-0.021
	(0.01)	(0.013)	(0.017)
Traditional	-0.001	-0.01	0.023
	(0.013)	(0.014)	(0.024)
Occupation (base=not working)			
managerial	0.002	-0.004	0.011
	(0.008)	(0.015)	(0.01)
clerical	-0.003	-0.027	0.006
	(0.012)	(0.027)	(0.013)
sales	0.005	-0.005	0.009
	(0.008)	(0.014)	(0.009)
Agric	0.048***	0.036***	0.038***
	(0.009)	(0.013)	(0.012)
services	0.012	-0.017	0.028**
	(0.012)	(0.024)	(0.013)
Skilled labour	0.002	-0.015	0.014
	(0.008)	(0.014)	(0.01)
unskilled manual	0.002	-0.013	0.012
	(0.009)	(0.016)	(0.011)
Ethnicity(base=Akan)			
Ga	0.001	0.032**	-0.013
	(0.008)	(0.015)	(0.008)
Ewe	0.011	0.025**	0.001
	(0.007)	(0.011)	(0.008)
Guan	0.004	-0.023	0.025*
	(0.011)	(0.018)	(0.013)
Mole	0.011	0.013	0.004
	(0.008)	(0.012)	(0.009)
Grusi	-0.005	-0.014	0.003
	(0.011)	(0.017)	(0.013)
Gurma	0.045***	0.051***	-0.011
	(0.011)	(0.016)	(0.017)
Mande	0.044*	0.027	0.047
	(0.026)	(0.038)	(0.034)

Appendix B, continued

	National	Rural	Urban
Region(base=Northern)			
western	-0.027***	-0.052***	0.003
	(0.01)	(0.016)	(0.013)
central	-0.007	-0.035**	0.027*
	(0.011)	(0.017)	(0.014)
Greater Accra	-0.003	-0.075***	0.026**
	(0.01)	(0.02)	(0.012)
Volta	-0.036***	-0.068***	-0.001
	(0.012)	(0.017)	(0.016)
eastern	-0.007	-0.034**	0.016
	(0.01)	(0.016)	(0.013)
ashanti	-0.048***	-0.051***	-0.032**
	(0.011)	(0.017)	(0.013)
brong ahafo	-0.020**	-0.040***	0.006
	(0.01)	(0.016)	(0.013)
upper east	-0.022**	-0.031*	-0.008
	(0.011)	(0.017)	(0.014)
upper west	-0.028**	-0.034**	-0.029*
	(0.012)	(0.017)	(0.018)
Age_head	-0.003*	-0.002	-0.004**
	(0.001)	(0.002)	(0.002)
Age Square	0.00	0.001	0.00
	(0.00)	(0.00)	(0.00)
Marital status(base=single)			
married	0.018***	0.021**	0.015**
	(0.005)	(0.009)	(0.006)
widow and divorce	0.008	0.013	0.008
	(0.006)	(0.01)	(0.008)
Sex of head (base=male)	0.009**	0.027***	-0.005
	(0.005)	(0.008)	(0.005)
Account ownership(base=none)	-0.033***	-0.038***	-0.025***
	(0.004)	(0.006)	(0.005)
Family size(base=small)			
Average	-0.011**	-0.012	-0.009
	(0.005)	(0.008)	(0.006)
large	0.006	0.007	0.0003
	(0.008)	(0.011)	(0.011)
Dependency	0.022***	0.025***	0.020***
	(0.002)	(0.004)	(0.003)
NHIS (base=Non-beneficiary)	-0.025***	-0.031***	-0.019***
	(0.004)	(0.007)	(0.005)
Constant	0.333***	0.335***	0.289***
	-0.027	-0.041	-0.035
sigma			
	0.117***	0.126***	0.102***
	(0.002)	(0.002)	(0.002)
N	4814	2272	2542

** p<0.10, ** p<0.05, *** p<0.01, standard error in bracket .*

Source: Author,2019

C: Correlation Matrix

	A	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
a	1.00															
b	-0.05*	1.00														
c	-0.56*	-0.01	1.00													
d	0.25*	-0.03	-0.30*	1.00												
e	0.08*	-0.07*	-0.10*	0.10*	1.00											
f	0.29*	0.14*	-0.43	0.31*	0.03	1.00										
g	-0.37*	0.00	0.26*	-0.13*	-0.05*	-0.11*	1.00									
h	0.18*	0.19*	-0.30*	0.19*	-0.01*	0.55*	-0.07*	1.00								
i	0.08*	0.12*	-0.17*	0.10*	0.09*	0.02	-0.08*	0.05*	1.00							
j	0.07*	0.11*	-0.15*	0.10*	0.08*	0.02	-0.08	0.05*	0.99*	1.00						
k	0.12*	0.11*	-0.18*	0.04	0.05*	0.02	-0.10*	0.02*	0.42*	0.38*	1.00					
l	0.06*	-0.03	0.01*	0.20*	0.26*	0.19*	-0.11*	0.13*	0.18*	0.20*	-0.15*	1.00				
m	-0.37*	0.11*	0.35*	-0.18*	-0.08*	-0.13*	0.29*	-0.08*	-0.02	-0.03	-0.11*	0.06*	1.00			
n	0.29*	0.21*	-0.26*	0.17*	0.10*	0.20*	-0.19*	0.15*	0.37*	0.34*	0.27*	0.15*	-0.11*	1.00		
o	0.31*	0.15*	-0.23*	0.08*	0.01	0.06*	-0.15*	0.07*	0.14*	0.11*	0.30*	-0.24*	-0.19*	0.63	1.00	
p	-0.01	0.23*	0.00	-0.01	-0.05*	0.05*	0.03	0.10*	0.02	0.08	0.09*	-0.10*	0.04	0.21*	0.13*	1.00

* denotes significance ≤ 10 %. a= poverty index; b=NHIS; c=education of head; d=religion of head; e=occupation of head; f=ethnicity of head; g=residence of head; h=region of head; i= age of head; j=age of head square; k=marital status; l=sex of head; m=bank account ownership; n=household size; o= dependency; p=convenient location to a health facility.

Source; Author,2019

D: Covariate Imbalance Testing

Variable	U	Mean		%reduct				V_e(T)/
	M	Treated	Control	%bias	|bias|	t	p>|t|	V_e(C)
headeduc	U	1.46	1.48	-2.5		-0.7	0.5	1.11
	M	1.45	1.47	-2.5	25.2	-0.8	0.4	1.06
occupation	U	3.7	4.02	-17.1		-5.1	0	1.05
	M	3.71	3.6	5.9	65.5	2.54	0	1.05
ethnicity	U	2.91	2.26	33.3		9.56	0	1.06
	M	2.89	2.64	13.3	60.2	5.39	0	0.97
residence	U	0.53	0.52	0.8		0.24	0.8	1
	M	0.53	0.52	2.3	-178.8	0.99	0.3	0.96
region	U	5.33	4.1	47.1		13.5	0	1.03
	M	5.3	4.98	12.1	74.3	5.16	0	1.1
Age_head	U	37.36	34.67	27.5		8.2	0	0.96
	M	37.31	37.51	-2	92.6	-0.9	0.4	1.04
agesqr	U	1488.2	1301.6	25.2		7.44	0	1.04
	M	1484.5	1497.9	-1.8	92.8	-0.8	0.4	1.05
sexhead	U	0.58	0.61	-6.7		-2	0.1	1.09
	M	0.58	0.53	10.5	-55.6	4.41	0	1.05
bankacount	U	0.53	0.41	25.7		7.56	0	1.05
	M	0.53	0.5	5.6	78.2	2.37	0	0.95
dependency1	U	1.18	0.78	35.1		10.5	0	1.00
	M	1.18	1.26	-7.8	77.7	-2.9	0	0.66*
	U	1.88	1.51	51.3		15	0	1.11
Size	M	1.87	1.95	-10.8	79	-4.3	0	0.98

* if 'of concern', i.e. variance ratio in [0.5, 0.8) or (1.25, 2] ; ** if 'bad' variance ratio <0.5 or >2

Source: Author, 2019

E: Descriptive of the Correlates of Child Poverty (<5 years)

Variables	2003			2008			2014		
	Non-Poor	Poor	Total	Non-Poor	Poor	Total	Non-Poor	Poor	Total
sex of child									
female	26.8	73.2	100	48.7	51.3	100	61	39	100
male	24.6	75.4	100	50.4	49.6	100	60.6	39.4	100
Child insured									
No				40.9	59.1	100	53.5	46.5	100
Yes				61.1	38.9	100	63.9	36.1	100
mother's education									
No education	11.9	88.1	100	29.4	70.6	100	33.3	66.7	100
Primary	24.1	75.9	100	43.5	56.5	100	58.6	41.4	100
SHS and beyond	44.8	55.2	100	72.4	27.6	100	82.1	17.9	100
mothers spending decision									
Mother alone	27.2	72.8	100	50.2	49.8	100	56.4	43.6	100
Mother and Husband	25.6	74.4	100	55.7	44.3	100	68.7	31.3	100
Husband alone	16.3	83.7	100	23.3	76.7	100	60.5	39.5	100
Mother's marital status									
not married	26.1	73.9	100	53.9	46.1	100	57.6	42.4	100
married	25.6	74.4	100	48.5	51.5	100	61.7	38.3	100
Father's occupation									
Professional	49.4	50.6	100	78	22	100	91	9	100
Clerical	66.7	33.3	100	74.1	25.9	100	87.5	12.5	100
Sales	46.9	53.1	100	77.1	22.9	100	82.1	17.9	100
Agric	12.8	87.2	100	30	70	100	36.4	63.6	100
Services	54.2	45.8	100	72.9	27.1	100	78.9	21.1	100
Skilled manual	44	56	100	66.6	33.4	100	77	23	100
unskilled manual	47.1	52.9	100				75.5	24.5	100

E, continued

Variables	2003 Non-Poor	Poor	Total	2008 Non-Poor	Poor	Total	2014 Non-Poor	Poor	Total
sex of head									
female	35.8	64.2	100	60.4	39.6	100	63.1	36.9	100
male	22.6	77.4	100	46.5	53.5	100	60.3	39.7	100
Residential inequality									
Urban poor	29.9	70.1	100	60.3	39.7	100	61.4	38.6	100
Rural poor	9.9	90.1	100	29.9	70.1	100	40.1	59.9	100
Urban rich	64.9	35.1	100	87.6	12.4	100	95.4	4.6	100
Rural rich	54	46	100	74.8	25.2	100	92	8	100
continuous variables									
Child age	29.08	29.27		27.03	28.92		27.7	30.82	
Mother's age	31.4	31.2		31	30.5		32.18	32.03	
Household size	5.65	6.31		5.3	6.41		5.32	6.92	
n	635	1839	2474	875	891	1766	908	586	1494

Source: Author, 2019

F: Descriptive of the Correlates of Child Poverty (6 to 17 years)

Variables	2003 Non-Poor	Poor	Total	2008 Non-	Poor	Poor	Total	2014 Non-Poor	Poor	Total
sex of child										
male	40.1	59.9	100		57.3	42.7	100	67.9	32.1	100
female	38.2	61.8	100		58.4	41.6	100	65.8	34.2	100
sex of head										
female	47.1	52.9	100		69.3	30.7	100	71.1	28.9	100
male	35.8	64.2	100		52.6	47.4	100	63	37	100
Occupation of head										
not working	62	38	100		82.6	17.4	100	71.3	28.7	100
managerial	63	37	100		81.1	18.9	100	92.1	7.9	100
clerical	93.5	6.5	100		90.5	9.5	100	91.4	8.6	100
sales	58.2	41.8	100		83.1	16.9	100	82.3	17.7	100
agricultural	26	74	100		40.5	59.5	100	48.3	51.7	100
services	66.9	33.1	100		79.9	20.1	100	73.4	26.6	100
skilled	57	43	100		79.6	20.4	100	83.4	16.6	100
unskilled	50	50	100		62.5	37.5	100	82	18	100
Education of head										
no education	27.2	72.8	100		46.1	53.9	100	56	44	100
primary	42.8	57.2	100		56.8	43.2	100	65.8	34.2	100
Sec+	56.6	43.4	100		80.2	19.8	100	84.3	15.7	100
Marital status										
never married					56.6	43.4	100	64.8	35.2	100
married					57.1	42.9	100	66.7	33.3	100
widowed					56	44	100	63.4	36.6	100
divorced					68.8	31.2	100	73.8	26.2	100

Source: Author, 2019

G: Correlates of Child Poverty for Under-fives

Correlates	2003 OR	2008 OR	2014 OR
Fixed effects			
Individual-level variables			
Sex of child (base=female)	1.479*	0.96	1.068
	-1.79	(-0.16)	(-0.22)
Age of child	1.016***	1.015**	1.032***
	(-2.69)	(-2.12)	(-3.73)
Child insured(base=no)	-	0.431**	0.421**
	-	(-2.45)	(-2.09)
Mothers education(base=no education)			
Primary	0.366***	0.759	0.313**
	(-2.95)	(-0.63)	(-2.24)
At least Secondary	0.153***	0.193***	0.092***
	(-5.89)	(-3.59)	(-4.37)
Mothers spending (base=mother alone)			
Mother and husband	0.633	0.926	0.635
	(-1.46)	(-0.22)	(-1.08)
Husband alone	1.302	6.747***	0.62
	(-0.6)	(-2.92)	(-0.58)

G, continued

	2003 (OR)	2008 (OR)	2014 (OR)
Husbands occupation			
Professional	0.736	0.713	0.565
	(-0.63)	(-0.50)	(-0.66)
Clerical	0.159*	0.431	0.156
	(-1.68)	(-1.32)	(-0.83)
Sales	0.921	0.849	0.45
	(-0.16)	(-0.21)	(-0.93)
Agricultural	1.899*	2.193	3.102**
	(-1.82)	(-1.58)	(-1.98)
Services	0.366	1.482	0.644
	(-1.37)	(-0.45)	(-0.35)
Unskilled labour	0.899	-	0.86
	(-0.09)	-	(-0.23)
Mother's age	0.964*	0.922***	0.918***
	(-1.93)	(-2.97)	(-2.81)
Religion(base=Christian)			
Islam	-	1.975	0.533
	-	(-1.34)	(-1.13)
Traditional	-	6.433**	1.412
	-	(-2.54)	(-0.38)
None	-	3.73	0.325
Ethnicity(base=Akan)			
Ga			6.261*
			(-1.88)
Ewe			1.719
			(-0.91)
Guan			13.47**
			(-2.37)
Mole Dagbani			3.857**
			(-2.27)
Grusi			1.803
			(-0.69)
Gurma			66.64***
			(-4.75)
Mande			8.753
			(-1.23)
Marital status(base=not married)		1.509	1.437
		(-0.98)	(-0.81)

Appendix G, continued

Post estimation	2003	2008	2014
Random Effects			
Household Random variance(SE)	11(0.815)	15(2.567)	14(3.16)
Household VPC (%)	77	82	81
LRT	156***	188.07***	118***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; *Z in bracket, OR= Odds Ratio; VIF=Variance Inflation Factor, LRT=Likelihood Ratio Test*

Source: Author, 2019

H: Binary Logistic for Correlates of Child Poverty (6 to 17 years)

Correlates	2003 0R	2008 OR	2014 OR
Sex of child (base=female)	0.927	0.837**	1.00
	(-1.07)	(-2.16)	(0.00)
Age of child	1.025**	1.079***	1.066***
	(-2.34)	(-6.08)	(-5.7)
Sex of head(base=male)	1.164*	1.223*	2.115***
	(-1.67)	(-1.74)	(-6.95)
Household size	1.274***	1.071***	1.029*
	(-4.73)	(-4.03)	(-1.91)
Household size square	0.984***	-	-
	(-5.15)	-	-
Occupation of the head (base=skilled labour)			
Not working	1.217	0.666	1.826**
	-0.8	(-1.04)	-2.49
Managerial	0.989	0.963	0.875
	(-0.07)	(-0.15)	(-0.52)
Clerical	0.221**	0.794	1.179
	(-2.35)	(-0.51)	(-0.31)
Sales	1.304*	0.961	1.363*
	(-1.87)	(-0.20)	(-1.9)
Agriculture	1.319**	1.680***	2.275***
	(-2.29)	(-3.28)	(-5.49)
Services	0.955	1.333	2.450***
	(-0.23)	(-1.00)	(-2.65)
Unskilled labor	0.67	18.54***	1.356
	(-0.60)	(-3.55)	(-1.18)
Marital status (base=Single)			
Married	-	0.794**	0.766***
	-	(-2.03)	(-2.83)
Widowed	-	1.13	0.9
	-	(-0.54)	(-0.57)
Divorced	-	1.156	0.932
	-	(-0.75)	(-0.45)

Appendix H, continued

Education of head (base=no education)	2003 (OR)	2008 (OR)	2014 (OR)
Primary	0.631***	0.914	0.699***
	(-5.74)	(-0.98)	(-4.33)
At least secondary	0.419***	0.513***	0.365***
	(-8.62)	(-5.09)	(-8.78)
Residential inequality (base=urban Rich)			
Urban Poor	4.774***	4.123***	11.84***
	(-10.87)	(-6.75)	(-16.23)
Rural Poor	9.067***	14.25***	10.52***
	(-20.08)	(-14.39)	(-18.96)
Rural Rich	1.441**	1.835**	1.319**
	(-2.31)	(-2.14)	(-1.71)
Ecological zone (base=Coastal)			
Forest	0.941	0.843	1.029
	(-0.70)	(-1.54)	(-0.28)
Savannah	1.469***	4.345***	1.696***
	(-3.61)	(-12.55)	(-4.95)
Pseudo R2	0.211	0.322	0.269
Wald chi2	1032***	990***	1105***
_hat	1.002***	1.00***	0.992***
	(-31.48)	(-28)	(-18.26)
_hat2	-0.014	0.003	-0.004
	(-0.45)	-0.17	(-0.16)
gof	P=0.214	P=0.167	P=0.614
Mean VIF	1.13	1.15	1.17
N	4722	3937	4770

* p < 0.1, ** p < 0.05, *** p < 0.01; Z in bracket, OR= Odds Ratio;

Source: Author, 2019